



Leveraging PlantwisePlus to Support Bangladesh's Climate and Development Goals: A Scoping Study

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Summary

This study brief presents the findings of a scoping study conducted in Bangladesh between October 2023 and March 2024. The main purpose was to explore how, through the PlantwisePlus programme, CABI can support Bangladesh in achieving some of its climate and development priorities, as outlined in the key national policies and frameworks on climate change, particularly within the agriculture sector. The study identified areas of alignment, existing gaps, and opportunities to integrate and enhance PlantwisePlus priority actions in the country. Additionally, this study can also be used to identify potentially new opportunities for project development and partnerships in Bangladesh, strategically aligning with the national and local stakeholders' priorities for an inclusive, sustainable and low-emission trajectory towards a climate resilient agriculture sector.

Highlights

- Programmes such as PlantwisePlus can act as catalysts for embedding plant health systems into Bangladesh's climate and development policies, particularly supporting the country to translate its crop health related priorities into actions on ground.
- PlantwisePlus goals align closely with Bangladesh's National Adaptation Plan, especially in climate-smart agricultural practices through integrated pest management strategies.
- The Department of Agriculture Extension (DAE) recognizes the importance of developing advanced early pest detection mechanisms through practical tools and technologies, and embedding environment and climate into phytosanitary regulations, an area that PlantwisePlus can explore more in depth. The stakeholders have alluded to the need to move away from crisis response to systems preparedness for effective response planning.
- Significant gaps persist in understanding of the key climate policies, such as the Nationally Determined Contribution and the National Adaptation Plan, across the different levels of the government, with limited vertical and horizontal institutional collaborations. There is also limited awareness at the local levels regarding what these key policy frameworks mean in practice.
- There is a clear scope for deeper collaboration with government and research organizations under the DAE, leveraging their field presence and scientific expertise in deploying climate-resilient crop varieties and other climate smart technologies relevant to local context.
- Integrating climate change adaptation activities into PlantwisePlus project interventions can enhance the sustainability of programme outcomes and strengthen a case for a follow-up phase of the programme in the country.

Background

Bangladesh is at the forefront of the climate crisis. According to the Global Climate Risk Index 2021, Bangladesh was the seventh most affected country due to climate change impacts between 2000 and 2019. Owing to its geographic location, fast growing population, environmental and land degradation, high dependency on the agriculture sector, and increasing frequencies and intensities of climate induced shocks and extreme weather events, the country remains highly exposed to climatic and non-climatic stressors. This undermines livelihoods, ecosystems and socio-economic growth.

Agriculture is the backbone of this growing economy, employing at least 45% of the labour force and contributing about 12% towards GDP. Women account for almost half of the agriculture workforce (BBS, 2022). Currently, 70 percent of the land mass is dedicated to agricultural activities, a sector largely characterized by subsistence production practices and dominated by smallholder male and female farmers (CIAT & World Bank, 2019). The current food system has supported the country to deliver strongly on key outcomes such as tackling hunger, malnutrition and poverty challenges, but it remains quite fragmented and highly volatile, unlikely to withstand future direct and indirect impacts of climate change. Between 2015 and 2020, natural disasters inflicted crop losses in Bangladesh valued at BDT 517,961 million (approx. USD 4.7 billion) (BBS, 2022). If current trends continue, climate change is projected to cause annual agricultural losses of up to USD 7.7 billion, with rice production alone potentially declining by 33% over the next 20 years (Chowdhury et al., 2022).

Similarly, by 2030, arable land efficiency is projected to decline cumulatively by 5% for rice, 13% for wheat, and 17% for overall cereal grain output (Bandara & Cai, 2014). Other significant impacts include an increase in the number of hot days, high humidity and solar irradiance, that is likely to intensify pest infestations and diseases, driving the use of pesticides and subsequently, raising environmental and public health concerns (Khatun et.al. 2023). In Bangladesh, between 10-25% of crops are lost to pest problems (Rajendran & Islam, 2017).

Bangladesh recognizes the escalating risks posed by climate change and has outlined ambitious adaptation and mitigation goals through its [Nationally Determined Contribution \(NDC\)](#), [National Adaptation Plan \(NAP\)](#) and several other key policy frameworks. Agriculture is a priority sector, featuring strongly in these policies. However, despite these strategic commitments, considerable fragmentation remains, with limited coherence between climate objectives and sectoral development plans. Additionally, the linkages between national-level strategies and grassroot implementation are often weak or inconsistent, hindering the effective translation of policies into locally relevant and actionable outcomes. There is, therefore, a strong need to align developmental priorities with national adaptation and mitigation efforts through gender inclusive, climate smart and evidence-based agricultural solutions across governance levels.

Led by CABI, PlantwisePlus is a global programme with an ambition to reach 75 million smallholder farmers in 27 low and lower-middle income countries, including Bangladesh, providing them with access to the knowledge and skills they need to improve their crop production practices. PlantwisePlus works closely with the national and local governments in the country to address some of the emerging plant health related challenges. However, the extent to which the programme's current and future capabilities and objectives can be strengthened to support Bangladesh in achieving its agriculture related climate change priorities needed better understanding. Under this context, this scoping study was undertaken to determine how PlantwisePlus can best support the Government of Bangladesh in strengthening climate-resilient plant health systems, enhancing food security, and delivering on its climate change adaptation and mitigation commitments, particularly ones highlighted in the NAP and the NDC. By identifying synergies, gaps, and opportunities for collaboration, the study aims to inform future programming and partnerships between CABI, national institutions, and other key stakeholders in Bangladesh.

What we did

The scoping study employed a mixed methodological qualitative approach. Information was collected primarily through desk reviews and key informant interviews. The desk study included analyses of the NDC and NAP, and rapid reviews of the Mujib Climate Prosperity Plan, Bangladesh Delta Plan 2100, 8th Five-Year Plan and the National Food and Nutrition Security Policy and Action Plan (2021-2023). Furthermore, research reports and journal papers were also reviewed mainly for background and context. Additionally, during this scoping study, CABI also co-organized two regional workshops with the Food and Agriculture Organization of the United Nations (FAO) and partners in Asia and Pacific countries on advancing their climate ambitions in the agriculture and land use sectors. These were organized in October 2024 and March 2025. During these two workshops, CABI co-led sessions on:

- Identifying the common priorities for agriculture and land use for a joint Asia-Pacific regional submission to the United Nations Framework Convention on Climate Change; and
- Taking stock of NDC 2.0 implementation and needs assessment for NDC 3.0 formulation in the participating countries.

Discussions during these workshops have guided this scoping study through valuable insights from the participants into current gaps and priority areas, enabling the study to focus on actionable recommendations. The author also had the opportunity to engage with plant health during a CABI organized *Pest Management Decision Guideline* workshop, that also provided insights into this study. Lastly, key informant interviews were conducted with stakeholders (online and in person) representing the Ministry of Finance, Ministry of Environment, Forest and Climate Change (MoEFCC), Ministry of Agriculture, Bangladesh Rice Research Institute (BRRI) and PlantwisePlus Country Coordinator for Bangladesh.

Findings

At policy and national levels of governance

A lack of integration and understanding of the implementation processes of the key policies, including NDC and NAP

Bangladesh had taken a very strategic direction in developing its NDC and NAPs, building on its previous policy frameworks on climate change. MoEFCC is responsible for overseeing the NDC and NAP implementation processes, while the Ministry of Agriculture leads the agriculture components. The NAP has been widely praised for its inclusivity, ambition, targeted actions and notably, for incorporating a comprehensive financial framework to support implementation. Despite this, it remains unclear how the finance will be mobilized, especially at the local levels, who are crucial in translating this plan into action. At the same time, the usual challenges remain in institutional coordination, engagement of research and extension networks in the process and limited technical capacity at the local level to implement the adaptation priorities.

Discussions with BRRI focused on the challenges that national research organizations face in engaging in these processes. Despite their critical contributions through research on agricultural productivity for key crops, integrating their work into broader strategies remains challenging. They are often only consulted to provide background studies, rather than being meaningfully involved in policy development and implementation phases. These institutions also face persistent funding crisis. While they recognize the importance of climate policies, they often lack the understanding of modalities to align these policies with their organizational priorities.

At the same time, representatives from the ministries of finance and environment have reiterated that thorough, participatory and inclusive consultation processes were conducted during the NAP formulation. Upon deeper conversations, it was evident that there is still a need for further understanding on how the vertical and horizontal integration of national climate policies across the different government organizations can be streamlined for a lasting impact.

The need for designing integrated and cross-sectoral projects and programmes generating both adaptation and mitigation benefits

The Bangladesh NAP currently budgets 52% of the total allocation to the water sector, indicating that adaptation interventions will prioritize integrated water management approaches across different sectors, including agriculture. For effective implementation of the NAP, any future projects considering holistic approaches that address multiple challenges through cross-sectoral programming, will receive high priority from the government. Similarly, environmental and climate compliant interventions that can help in both adaptation and mitigation efforts will also be prioritized, as was discussed with Ministry of Environment stakeholders.

Robust monitoring and evaluation framework is still work in progress

A key requirement of the Paris Agreement is effective monitoring and reporting of the NDC and NAP processes. Bangladesh has been reporting NDC-NAP progress, based on the guidance from the United Nations. For the agriculture sector, development of a national framework for real-time monitoring of agricultural emissions and land use by 2030, focusing mainly on the agriculture-related emissions and adaptation progress, using remote sensing, satellite data, and field-level measurements, is still at the planning stages. Based on the discussions with the different key informants, no clear response could be identified on how field-level interventions on climate change adaptation and climate change mitigation are being prioritized or identified for inclusion into the reporting processes. Generating quality agriculture data and management of infrastructures for effective monitoring, reporting and verification is still a major challenge.

At programme and local levels of governance

The scoping study identified the following key issues, some of which are also increasingly evidenced in recent literature.

- Adoption of IPM practices such as pest traps, biopesticides, pheromone traps are gaining traction, but the rate of adoption is also largely dependent on the availability of these products, which is still fairly limited in many parts of the country.
- Plant pest problems are becoming more widespread within the key crops, leading to increased losses that are often not quantified because of lack of monitoring and resources. Predicting pest emergence and designing meaningful bundled advisories on crop management, particularly under climate change scenarios, is now needed to limit the problem of pest related crop losses.
- Pest management practices are evolving autonomously, mostly at the farmer levels. Some of these practices could be climate-smart but they are currently not well-documented, which makes it challenging to determine their efficacy with changing climate. The most natural reactive practice still is to use pesticides to address pest problems.
- DAE mostly delivers advisories through agricultural officers at the district, union and upazila levels. The frequency, quality and timeliness of the advisories can be limiting, due to several reasons, the main ones being lack of technical and human resources.
- There is an ever-growing interest from private sector actors to scale sustainable plant health inputs, targeting both men and female needs. The market system in many parts of the country remains underdeveloped but opportunities need to be explored to support the ecosystems for developing inclusive agribusinesses.

- Women farmers are majorly responsible for monitoring crop pests – more gender responsive and climate smart trainings are needed for women in IPM to increase the uptake.

Stronger plant health systems and climate resilience through development programmes such as PlantwisePlus

During the scoping work, it was evident that there is a lack of knowledge and understanding among those working with the DAE on the NAP and other climate processes. Among several other priorities, the NAP recognizes the importance of,

- Promoting stress tolerant, pest and disease resistant rice and non-rice crops.
- Training on good agricultural practices, modern agricultural technology and sloping agricultural land technology.
- Conducting action research and field demonstrations on climate-smart agriculture.

Furthermore, under Goal 2 of the NAP which is to “Develop climate-resilient agriculture for food, nutrition, and livelihood security”, the critical role of climate-smart agriculture (CSA) in addressing crop health challenges is clearly recognized. Among the key indicators identified is the occurrence of pest and disease outbreaks, which are increasingly driven by climate variability. In this context, PlantwisePlus activities in Bangladesh are strategically aligned with NAP priorities, directly supporting the government’s efforts to tackle the key issue of plant health and pest problems and build resilience of the agriculture sector. Programmes such as PlantwisePlus remain crucial enablers to empower the critical mass of plant health specialists with scientific knowledge and information to drive agricultural transformations, considering emerging climate risks. However, systems are still constrained by challenges around capacity and knowledge gaps, and lack of funds. Under future scenarios of climate change, there is a need for stronger support on the early detection of pests in the country through various routes and strengthening the phytosanitary regulations by embedding environmental and climate risks and information, where possible.

Recommendations and way forward

This scoping work identified how interventions through PlantwisePlus can lead to concrete actions in support of the national climate and agriculture priorities in Bangladesh. The study highlights that the impacts generated by programmes like PlantwisePlus can serve as key levers for deeply integrating plant health systems into climate and development policies. However, sustainability of interventions, changing priorities of the government that influence funding allotments to different departments, lack of technical capacities to drive continuous actions on ground and weak institutional collaborations are strong impediments to streamlining this process. Realistically, these challenges are likely to persist unless structural reforms and institutional realignments are undertaken, as the current inefficiencies cannot be fully addressed within the existing systems.

The study identified clear gaps in understanding of how to align national and local priorities to strengthen climate smart and gender inclusive extension support to smallholders. For PlantwisePlus and CABI, this provides a strong avenue and strategic direction to continue working with national and local governments, extension networks, research organizations and farmers to design system wide transformative capacity strengthening programmes that

not only tackle pest and disease problems but also build resilience to environmental and climate related challenges.

The discussions have strongly highlighted the need for climate smart and gender sensitive technology transfer initiatives for extension networks and smallholder farmers. Through delivering targeted trainings and technology transfer activities for extension, PlantwisePlus can:

- Strengthen DAE's capacities and knowledge on climate change and the role of NAP/climate policies in their current areas of work.
- Revise current advisories to suit the climate context in the country, delivering targeted information suited to the needs of men and women farmers (validating the information from the NAP and other technical documents on current CSA practices and technologies suitable for Bangladesh). In this context, PlantwisePlus, through collaboration with the DAE, should explore the possibilities of integrating the new climate change training modules for the plant doctors (still in pilot phases) into the extension curricula for ensured sustainability of these trainings. This will also help DAE and local extension levels to update their advisories with recent guidance from policies and other relevant sources.
- Identify a priority list of crop specific CSA advisories that will be most beneficial to the men and women farmers in the specific regions – either the six climate hotspots (as identified in the Bangladesh Delta Plan 2100) and/or the agro-ecological zones.
- Identify potential partners to explore market conditions, and design bundled packages of CSA and IPM services that would incentivize farmers to naturally adopt these sustainable practices.
- Leverage the Bangladesh E-Extension Strategy to widely promote CSA and IPM advisories and the CABI digital tools, through designing inclusive messaging and outreach strategies, while being conscious of challenges around information accessibility, lack of digital literacy, mobile phone ownership.

These activities can lay the foundation for co-developing climate-smart and gender-responsive projects with the DAE and partners in the future. The activities will be grounded in learnings from PlantwisePlus and can enhance the sustainability of programme outcomes and strengthen a case for a follow-up phase of the programme in the country. Similarly, at strategic and national levels of governance, additional support could be provided to

- Rethink capacity strengthening and training programmes that enable DAE and other relevant actors to design self-sustaining infrastructure that goes beyond donor funded programme initiatives. The purpose would be to strengthen overall institutional capacity to strengthen the surveillance capacities of the National Plant Protection Organizations (NPPOs), the delivery mechanisms of the information, while also promoting effective and timely bundled advisories on CSA and plant pest and disease management at the grassroot levels.
- Leverage GIS, remote sensing and AI tools together with current CABI digital tools for early diagnosis of pests, in alignment with the E-Extension Strategy. Digitalizing advisories for faster dissemination is required as farmers are increasingly looking for quicker access to information. The CABI digital tools are useful in this context, but further exploration is needed to adapt current advisory to be more climate sensitive and user centric.
- Collaborate with international organizations such as the FAO, Standards and Trade Development Facility and International Plant Protection Convention, to support DAE and other relevant stakeholders to design and implement stronger guidelines for pest

detection, monitoring and quarantine controls, particularly considering future climate change.

- Actively engage with national policy mechanisms, ensuring that the role of Integrated Pest Management (IPM) as a climate-smart and sustainable agricultural practice are highlighted, acknowledged and promoted more widely through effective dissemination efforts.

It is also recommended that success stories and data from PlantwisePlus are made widely available through different channels, ensuring a good reach to relevant stakeholders. These can serve as evidence to advocate for further mainstreaming plant health into national and sub-national policies and action plans.

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