

# GLOBAL RESEARCH ALLIANCE

ON AGRICULTURAL GREENHOUSE GASES

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## Evaluation of Mitigation and Adaptation Co-benefits (MAC-B) of Agricultural GHG Emission Reduction Strategies Over Time

# Situation/Issue

**To promote climate change action and the SDGs, there is growing attention by policy-makers, stakeholders, and researchers on interventions\* that contribute to both mitigation and adaptation co-benefits, trade-offs, and synergies**



\*e.g., sustainable intensification, soil carbon sequestration, crop-livestock systems



# Flagship Project Goal(s)

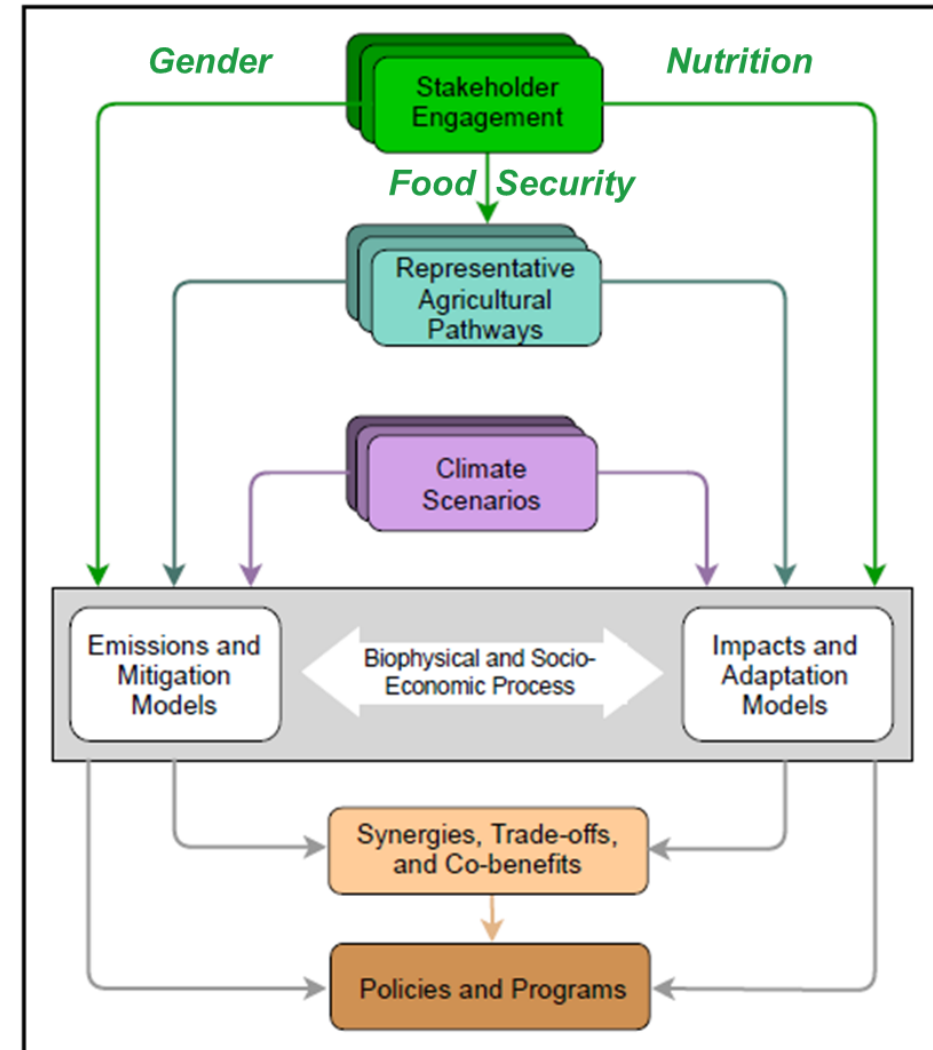
- Trial a modeling approach for quickly and efficiently determining the likely best options for changing agricultural practices in ways that deliver both mitigation and adaptation benefits.
- Accelerate the process of identifying the most promising options, and thus progress to trialing and scaling more quickly than has generally been done to date.
- Apply this methodology in many regions worldwide.

Pilot project funding  
from



# Anticipated Flagship Outcomes/Impacts

- The MAC-B Flagship Project will develop tools by which national stakeholders can learn how mitigation strategies in agriculture will interact with climate change, as well as adaptation.
- The MAC-B Flagship Project will build on the GRA expert community to develop and apply new protocol-based methods for providing country-level decision-makers the evidence base needed to ensure that mitigation strategies have lasting impact.
- The project will generate new knowledge with high scientific impact contributing to the development of NDCs.



# Flagship Project Partners

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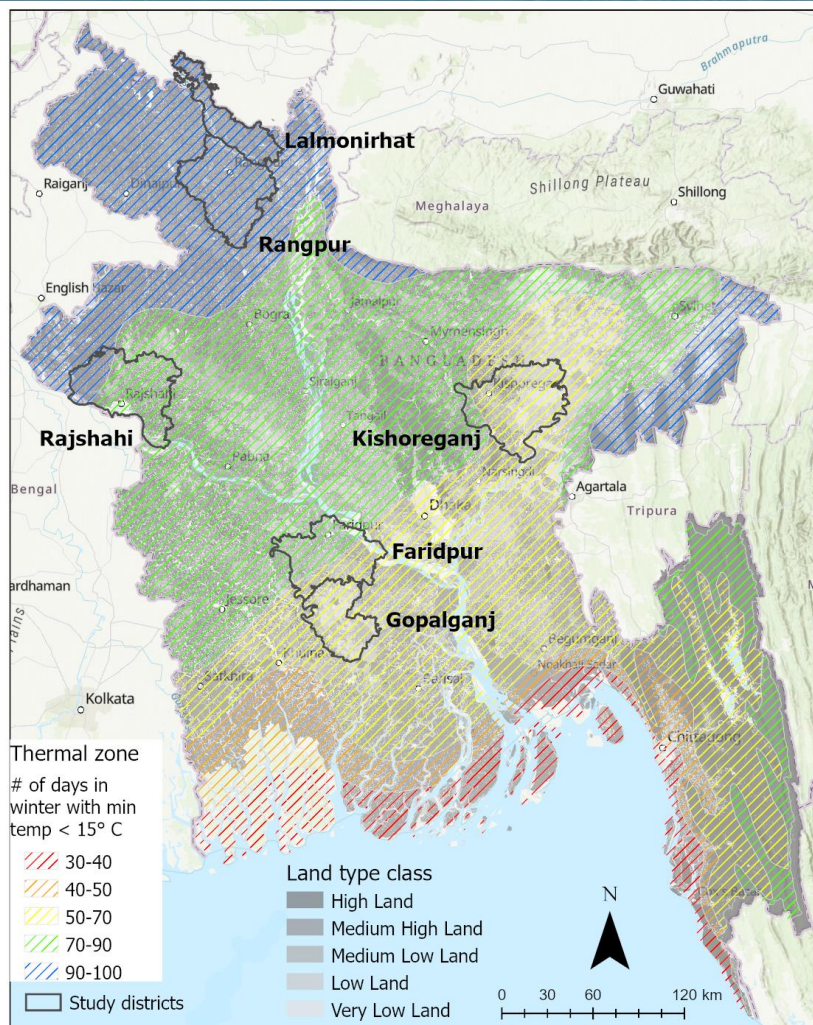
Bangladesh Rice Research Institute  
Bangladesh Agriculture Research Institute  
Bangladesh Met Department  
Bangladesh Rural Development Academy  
CIMMYT Bangladesh

AgMIP  
Columbia University/NASA  
Oregon State University  
New York University  
DNDC-ART





# Activities/Results To Date



- **Climate projections:** CMIP6 SSP2-4.5; HadGEM, MIROC6
- **Crop Models:** DNDC-Oryza, APSIM
- **Rice yield and cropping management:** Field survey conducted in Bangladesh from 2019 to 2021
- **Soil data:** Extracted from SoilGrid2.0 of ISRIC and corrected by soil profile data from field experiments
- **Economic model:** TOA-MD

**Simulations of Alternate-Wetting and Drying (AWD) technology under future climate change show strong reductions, not only on water requirements for irrigation, but also CH<sub>4</sub> emissions**

**In all cases, adoption of AWD technology increases incomes, decreases poverty rates**

# Opportunities to get involved

- Contribute data, modeling expertise
- Members of the Integrative, Paddy Rice, Croplands, and Livestock Research Groups will have opportunities to participate in applying their data and tools and developing MAC-B protocols for a range of agricultural systems
- Following the current funding model, we will seek funding from GRA country members interested in MAC-B to fund assessments in their own region or other countries of interest



# MAC-B Special Issue in CABI A&B

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## Co-Benefits and Tradeoffs to Food Security from Mitigation and Adaptation in Agriculture



This thematic series will publish in  
*CABI Agriculture and Bioscience*.



If interested, contact Dr. Sonali McDermid  
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