Regional Forum on Climate Action and Food Systems Transformation in South Asia

Summary and Recommendations

Organized by:
Michigan State University and Farming Future Bangladesh

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I. Background

The South Asia region covers the eight countries of the South Asian Association for Regional Cooperation (SAARC) with a growing population of two billion people, a quarter of the world's population (CGIAR, n.d.). By 2050, the population of South Asia will grow by 40% (WHO, 2020). In recent years, climate change has emerged as a formidable challenge. Weather patterns have become much more variable than before and extreme weather events such as heavy rains, floods, drought, heat waves, freezes, and cyclones have become more frequent in the region (Naseer, 2023; Poudel, 2023). Regional variability causes differing vulnerability to climate change across countries (Aryal, 2019). The region is one of the most vulnerable regions to climate change (Mohan, 2022; Raiser, 2022; World Bank Group, 2022).

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Climate change affects many aspects of agri-food system (CGIAR, n.d.). The agricultural sector is the backbone of South Asian economies and because most cropping systems are rain-fed, farmers are vulnerable to the impacts of climate change (Mohan, 2022; Wang, 2017).
South Asia faces food insecurity, and a large percentage of the population are malnourished (Mohan, 2022; Naseer, 2023; WHO, 2020). Agriculture is the foundation of national development and a cornerstone of sustainable development in the region (Behera, 2024; Mohan, 2022; Mukherjee, 2022; Raiser, 2022). Michigan State University, in collaboration with the Farmer Future Bangladesh, organized a Regional Forum on Climate Action and Food System Transformation in Asia on April 16-18, 2024.

OBJECTIVES

The South Asia Regional Forum was organized with the following objectives:

1) Understand Climate Change issues that are impacting food systems in South Asia region.

2) Identify gaps, bottlenecks, and constraints in climate change research and outreach in South Asia.

3) Formulate recommendations for policy advocacy and capacity strengthening to address climate change issues in the region.

More than 60 stakeholders from 6 countries, including Bangladesh, India, Myanmar, Nepal, Pakistan, and Sri Lanka, as well as representatives from Michigan State University, Alliance for Science, CGIAR centers, and other organizations participated in this Forum. The Forum program included keynote addresses, short presentations, panel discussions, breakout groups, and a "Way forward" session to formulate recommendations for future collaboration and capacity building.

II. Keynote Addresses

The forum was opened by representatives from FFB, MSU, and senior representatives from Bangladesh. In the wake of shrinking land base and depleting natural resources, the representatives highlighted the seriousness of climate change issues impacting agricultural productivity, food security, and livelihoods, in the entire South Asia region. They highlighted that climate change is an urgent, complex global issue and no one can do it alone. It will require regional and global collaborations and partnerships among various stakeholders and sectors. The need for monitoring, evaluation, and impact indicators was strongly voiced.

III. Summary Presentations

The representatives from Nepal, India, Myanmar,

Table 1. Institutions Represented at the Forum

Institution	Country
Aga Khan Rural Support Programme-India	India
Alliance for Science	Global
Bahauddin Zakariya University	Pakistan
Bangladesh Agricultural Research Institute	Bangladesh
Bangladesh Agricultural University	Bangladesh
Bangladesh Rice Research Institute	Bangladesh
Change Initiative	Bangladesh
Climate Analytics South Asia Office	Pakistan
Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth	India
Farming Future Bangladesh	Bangladesh
International Crops Research Institute for the Semi-Arid Tropics	India
International Water Management Institute	India
Michigan State University	U.S.A.
Ministry of Agriculture and Livestock Development	Nepal
National University of Sciences and Technology	Pakistan
Nepal Agricultural Research Council	Nepal
North South University	Bangladesh
Rice Research and Dev Institute	Sri Lanka
The Energy and Resources Institute (TERI)	India
University of Jaffna	Sri Lanka
University of Liberal Arts	Bangladesh
University of Peradeniya	Sri Lanka

Pakistan, Sri Lanka, Bangladesh, CG Centers (ICRISAT and IWMI), USA, and MSU discussed the key climate change challenges experienced by their constituents along with current programs aimed at developing solutions. They all highlighted that extreme weather events in their regions are impacting agri-food systems and other sectors that are interlinked with agriculture, such as health, education, transportation, markets, and trade, among others. Solutions suggested include disaster preparedness, development of early warning systems, modeling, development of stress-tolerant crop varieties, crop diversification, agroforestry, climate-smart agriculture, modernizing agricultural practices, renewable energy, enhancing food storage and distribution systems, and establishing social safety nets such as crop insurance schemes.

IV.   Panel Discussions

In consultation with national, regional, and international experts, five panel discussion sessions were designed and organized. A summary of the interactive discussions and recommendations of these panels are as follows:

Panel 1. Early warning and forecasting systems, modeling, remote sensing, and big data

The panel discussed the challenges South Asian countries face in agriculture due to climate change and limited technological infrastructure. Key issues presented by the panelists include inaccurate weather forecasting, poor access to
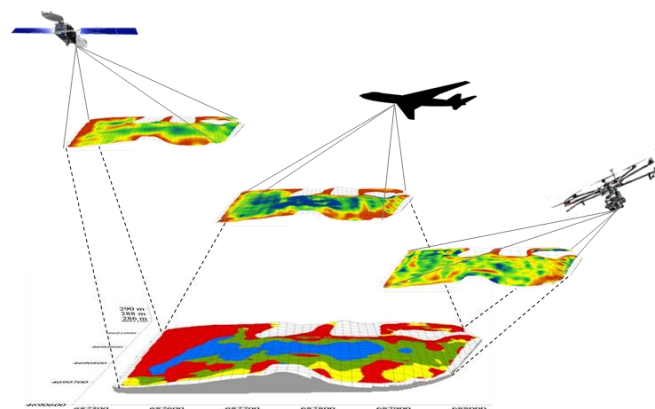

Figure 1. Remote Sensing.

Basso, B. (2024, April 16-18). *Integrating modeling, AI and remote sensing for early warning systems and crop forecasting* [Presentation]. Regional Forum on Climate Action and Food Systems Transformation in South Asia, Dhaka, Bangladesh

weather data, limited internet connectivity, inadequate technology, and ineffective communication with farmers. The panelists recommended promoting precision agriculture through collaborations with advanced nations, public-private partnerships, and multi-disciplinary teams. They emphasized the need for IoT sensors and crop modeling to strengthen early warning systems, improve forecasting accuracy, especially in dry regions, and provide tailored, relevant, and timely advisory services. The panel stressed the importance of improving data interpretation and communication to help farmers make informed decisions. The combination of technology, partnerships, and advisory services is crucial for enabling farmers to adapt to climate impacts and enhance agricultural resilience.

Panel 2. Fostering collaborative programs for climate change adaptation and mitigation strategies

The panelists discussed the need for collaborative research to address the complex, multifaceted challenges posed by climate change in South Asia, particularly in agriculture. These challenges include greenhouse gas emissions, unreliable data, the vulnerability of farming communities, and the lack of effective collaboration across sectors. The panel members explored regional vulnerabilities, especially the socio-economic impacts on farmers, and the need for tailored, multidisciplinary solutions. The panel also noted the difficulty in understanding the root causes of climate change and its drivers, which complicates formulating effective mitigation and adaptation strategies. To tackle these issues, panelists recommended diversifying cropping systems, adopting low-carbon agriculture and livestock systems, and fostering multi-stakeholder collaborations across public, private, academic, and producer sectors. They stressed the importance of interdisciplinary research, focusing on socio-economic impacts, and translating scientific research and innovations into practical applications through improved communication and knowledge sharing, including capacity building and strengthened extension and advisory services. The panelists highlighted the critical need for collaboration across sectors, regions, and disciplines to address the effects of climate change. The panel concluded that overcoming

collaboration barriers, focusing on root causes, developing multidisciplinary solutions, and adopting low-carbon, diversified agricultural systems are crucial to building resilient and sustainable agricultural practices in South Asia.

Panel 3. Policy pathways to a climate resilient future

This panel discussed the integration of climate considerations into national policies, highlighting the need for climate-friendly legislation, balanced economic development, and incentives for farmers and businesses. The panel focused on the challenges South Asian countries face, such as vulnerable communities, unreliable data, limited internet access, and inadequate collaboration. Additionally, they identified obstacles in developing climate-friendly policies, including conflicting priorities, resource and infrastructure limitations, and balancing economic growth with climate goals. To address these challenges, panelists recommended decentralized, flexible national policies prioritizing climate

Figure 2. Drought and Flooding in Nepal.

Shrestha, R. (2024, April 16-18). *Climate Change and Food Security in Nepal* [Presentation]. Regional Forum on Climate Action and Food Systems Transformation in South Asia, Dhaka, Bangladesh

resilience, enhancing early warning and forecasting systems tailored to farmers and other end users, and incentivizing climate-smart practices through subsidies or tax benefits. Strengthening capacity-building programs, promoting knowledge-sharing initiatives, and fostering regional collaborations were also emphasized, along with seeking international financial and technical support. The panel stressed the importance of integrating climate considerations into national policies and ensuring regional and international cooperation. Key recommendations included incentivizing climate-smart agriculture practices, enhancing early warning systems, and improving capacity-building efforts. The discussion concluded that South Asian countries must prioritize regional cooperation and leverage international support to build climate-resilient agricultural systems capable of addressing the impacts of climate change and natural disasters.

Panel 4. Socio-economic issues, risk management, and assessing impacts of climate change adaptation and mitigation strategies.

This panel highlighted the interconnectedness of climate change and socio-economic issues, particularly its impacts on food security, livelihoods, and poverty. Climate change exacerbates inequality and instability, affecting vulnerable groups, especially smallholder farmers, including women. It leads to food insecurity, malnutrition, and social conflicts. To address these challenges, the panel recommended strengthening social safety nets, such as subsidies and insurance, and providing training and extension services on climate-resilient agricultural practices. They emphasized the need for enhanced international collaboration and knowledge transfer through funding, technical support, and training. The panel also stressed improving policy coordination among government agencies and fostering collaboration between scientists, policymakers, and local communities to develop tailored risk management strategies that integrate scientific data and traditional knowledge. This panel concluded that addressing the socio-economic impacts of climate change requires a multi-faceted approach, strengthening social safety nets, promoting climate-resilient agriculture, and enhancing international collaboration, while bridging the gap between scientific and local

knowledge to create effective policies, incentives, and risk management strategies.

Panel 5. Awareness, education, training and capacity building.

This panel emphasized the role of awareness, education, training, and capacity building in empowering communities, particularly farmers, to address climate change challenges. The panel discussed how education, knowledge sharing, and capacity building can improve food security, health, and ecosystem preservation. Challenges identified included the lack of culturally relevant programs for farmers, inadequate inclusion of indigenous knowledge in modern agricultural practices, and insufficient resources for women's training. Panelists recommended strengthening and developing localized, culturally relevant educational programs in local languages that integrate traditional knowledge and translate scientific innovations into practical applications. Gender-specific training should address the needs of women farmers, offering alternate income opportunities and enhancing access to climate-smart practices. The panel stressed the importance of collaborative efforts across sectors—academia, NGOs, governments, and development agencies—to implement these strategies and including farmers and end users in climate change negotiations and decision-making processes. It also highlighted the need for monitoring and evaluating these programs to ensure they are effective, responsive, and meet local needs. Overall, education and capacity building are crucial to empowering communities to confront climate change and foster sustainable agricultural practices.

V. Breakout sessions

Following the panel discussion, participants were divided into four breakout groups to have more in-depth discussions on similar topics to validate, identify key areas, and help formulate recommendations for future programs activities.

Breakout Group 1: Early Warning and Forecasting Systems

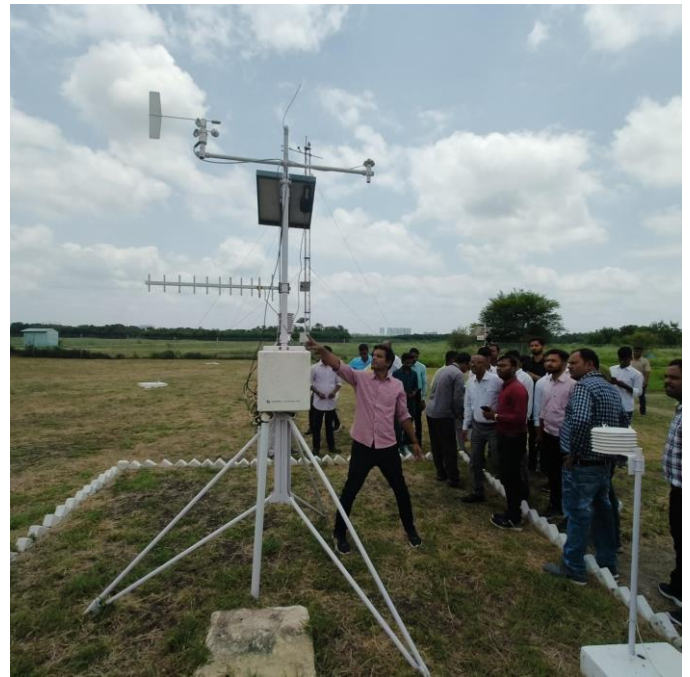This group explored how South Asian countries can collaborate on a regional early warning and

Figure 3. Automatic Weather Station at ICRISAT, Patancheru, Telangana, India. Photo credit:
https://x.com/ICRISAT/status/1826859180113723490

decision-support system using advanced technologies like artificial intelligence, machine learning (AI/ML), remote sensing, and big data. The proposed system would enhance smallholder farmers' resilience by providing tailored, impact-based advisories on irrigation, fertilizer use, pest control, and more while mitigating risks from climate variability and other challenges. A South Asian Regional Cloud platform was recommended to integrate advanced technology with local knowledge for real-time to provide real-time, actionable insights for smallholder farmers managing crops such as rice, wheat, maize, and horticultural crops. The system would ensure that solutions are not only scalable and sustainable but also grounded in the realities of diverse agricultural landscapes.

Key challenges include insufficient integration of local and advanced systems, limited data-sharing platforms, insufficient data and capacity, weak regional coordination, and weather variability. The group emphasized involving smallholders in system development, scaling pilot programs, and capacity building. Collaborative regional efforts, improved data-sharing, and public-private partnerships were identified as critical to ensuring system scalability and sus-

tainability. They concluded that the SAARC Agriculture Center should lead regional collaboration and policy alignment.

Breakout Group 2: Adaptation and Mitigation Strategies

Figure 4. Drought-tolerant Rice Varieties Developed by IRRI. Photo credit: https://www.irri.org/climate-change-ready-rice

This group focused on preparing communities and the agricultural sector for climate impacts through both adaptation and mitigation strategies. While mitigation strategies aim to reduce the severity of climate change by lowering emissions and enhancing resilience, adaptation measures are critical for addressing unavoidable damages and ensuring the sustainability of agricultural systems and communities. Key challenges include inadequate weather forecasting, limited extension services, insufficient cold storage, and poor access to drought-resistant crops. Communication barriers and over-reliance on vulnerable staples like rice further increase risks.

To address these issues, the group recommended improving forecasting capabilities through developing human resources, technical expertise, and infrastructure for accurate forecasting and timely dissemination of information; integrating indigenous and modern farming practices; and building cold storage infrastructure. They also advocated for promoting drought-resistant crop varieties, implementing efficient irrigation systems, diversifying staple crops and using crop modeling to provide farmers with accurate harvest forecasts to enhance planning and reduce uncertainty. Effective media campaigns

and outreach in local languages were identified as crucial for engaging grassroots communities and promoting climate resilience.

Breakout Group 3: Policy Enhancement and Advocacy

This group highlighted the importance of evidence-based, context-sensitive policies to build climate resilience. Misalignment between agricultural technologies, markets, and policies; poor information dissemination, and inadequate support for smallholder farmers (especially crop insurance programs) were identified as major challenges. Recommendations included strengthening monitoring systems to track the environmental footprint of agriculture, adopting high-precision climate forecasting models, introducing weather-indexed crop insurance, and promoting carbon markets to reduce greenhouse gas emissions while creating income opportunities. Strengthening digital infrastructure for climate-smart agriculture and mainstreaming climate data into local development agendas were also prioritized. Improved coordination between national and local institutions and broader stakeholder involvement are essential for effective policy implementation and resilience-building.

Breakout Group 4: Awareness Creation, Communication, Training, and Capacity Building

This group recognized that effective communication and inclusive education are essential to fostering community-level adaptation, and stressed the need for inclusive strategies that engage diverse stakeholders, ranging from farmers and traditional leaders to policymakers and media professionals, to address gaps in literacy, awareness, and capacity. Key challenges include low community literacy, lack of awareness of the connections between climate challenges and effective policy solutions for policymakers, limited training for extension workers and community leaders, obstacles faced by farmers in accessing value chains, and barriers faced by marginalized groups such as women and youth. Recommendations included organizing dialogues for policymakers, taking a holistic, multi-disciplinary approach to capacity building, ar-

ranging exposure visits and demonstration projects, training local farmers as peer educators, and tailoring awareness programs to cultural and regional needs. Leveraging local media, including radio, smartphones, and visual storytelling such as wall paintings and dramas; integrating indigenous knowledge systems; enhancing economic opportunities; and using community interaction spots, such as local markets, as venues for training and awareness activities were seen as critical for making information accessible. A 360° awareness approach was proposed to engage all stakeholders, include marginalized voices, ensure contextualized training, employ iterative improvements, and empower communities to adapt to climate impacts.

* * *

The four breakout groups collectively addressed key dimensions of building climate resilience in South Asia's agricultural sector, focusing on early warning systems, adaptation strategies, policy enhancement, and capacity building. Together, their discussions highlighted the interconnected challenges faced by smallholder farmers and proposed actionable solutions to mitigate climate risks and enhance agricultural sustainability.

Across all groups, the importance of regional collaboration, stakeholder engagement, and integrating technology with local knowledge emerged as recurring themes. Together, these discussions provide a roadmap for enhancing climate resilience in South Asia through innovative solutions, inclusive policies, and community-centered approaches.

VI. Way Forward and Recommendations

The forum participants recognized that climate change poses significant threats to food security and the livelihoods of the nearly 2 billion people in South Asia, and that impacts of climate

RECOMMENDATIONS

Through interactive discussions, the participants made the following recommendations:
1. **Foster Multi-Disciplinary and Multi-Sectoral Approaches**: Promote research and outreach programs across various disciplines and sectors to address climate change challenges.
2. **Strengthen Capacity for Early Warning Systems and Climate-Smart Innovations**: Build and enhance capabilities for developing and implementing early warning systems, climate-smart innovations, and information services.
3. **Tailor Adaptation and Mitigation Strategies**: Develop strategies that are specific to diverse agroclimatic conditions, socio-cultural contexts, and identified hazards and risks in different regions.
4. **Adopt a Landscape Ecological Approach**: Promote agricultural diversification for resilient, sustainable, and gender-responsive agri-food systems.
5. **Engage Marginalized Communities**: Include women, youth, and marginalized groups in climate change programs.
6. **Advocate for Evidence-Based Policies**: Promote coherent and people-friendly policies that integrate a climate lens.
7. **Strengthen Knowledge Sharing and Capacity Building**: Document and share best practices and success stories. Enhance knowledge exchange, education, and capacity building at various levels, incorporating indigenous knowledge and learning from local experiences.
8. **Foster Inter-Sectoral Collaboration:** Encourage collaboration and coordination among different sectors at local, national, and regional levels.
9. **Promote Regional and International Partnerships**: Strengthen partnerships and collaborations among government, industry, NGOs, academia, and international organizations in South Asia.
10. **Disseminate Findings**: Publish the forum proceedings and a policy brief to widely distribute recommendations to various stakeholders.
11. **Establish a Social Media/WhatsApp Group:** Form a WhatsApp group for continued networking and information sharing on climate change related issues, publications, training programs, and funding.

change are multi-sectoral, affecting agriculture, health, education, transportation, trade, etc. The synthesis of the forum consolidated the discussions and outcomes of the three-day event, reflecting a strong commitment from all stakeholders to work together in addressing the climate crisis. Key themes that emerged include:

- **Interdisciplinary and Multisectoral Collaboration**: A recurring theme was the need for collaborative approaches that involve multiple disciplines and multiple sectors—agriculture, environment, policy, infrastructure, trade, and economics. By fostering interdisciplinary collaborations, participants believed they could develop more holistic solutions to climate-induced challenges.
- **Capacity Building**: Capacity building at both institutional and community levels was seen as critical. Training programs for smallholder farmers on climate-smart agricultural practices, along with policy advocacy for government officials, were highlighted as crucial steps in building resilience.
- **Policy Alignment**: It was noted that many countries in South Asia have made progress in developing climate-resilient policies, but there is still a need for greater alignment between national policies and regional strategies. Governments must ensure that their national agricultural policies reflect the urgent need to address climate change and food security.

The forum participants strongly emphasized the need for all the stakeholders to work together to build climate-resilient food systems and expanded regional and international collaboration for continued sharing of expertise, experiences, information, and technologies.

VII. Acknowledgements

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