ACASA

ATLAS OF CLIMATE ADAPTATION IN SOUTH ASIAN AGRICULTURE

REPORT ON USE CASES

CONTENTS

BACKGROUND

With increasing climate risks, it is crucial to identify spatial and temporal risks, understand their potential impacts on agricultural commodities, and explore adaptation options that can help mitigate these negative effects. Among the 193 countries worldwide, South Asian countries rank in the top quarter in terms of climate risk. The region is experiencing a rising trend in meteorological and climate-related disasters, which could exacerbate the overall situation. Considering this, with support from the Bill & Melinda Gates Foundation (BMGF), the Borlaug Institute for South Asia (BISA) is working with national agriculture research systems in South Asia to develop the Atlas of Climate Adaptation in South Asian Agriculture (ACASA). This comprehensive Atlas aims to provide granular-scale information for South Asian countries by integrating various spatially explicit data sets. It covers climate hazards, the exposure of smallholder populations, farms, and crop and livestock enterprises, the vulnerability of these populations, impacts on critical commodities in the region, and evidence of the effectiveness of different climate adaptation interventions. The ACASA offers a unique set of tools that can facilitate improved investment targeting and priority setting, and support stakeholders' decision-making and investments in agricultural technologies, climate information services, and policies. The intended beneficiaries of this atlas include governments, insurance and agri-food industries, international and national donors, and adaptation-focused entities.

The ACASA project places significant importance on the practical applications of the Atlas, recognising it as a crucial objective. Various stakeholders could utilise Atlas to enhance investment in agricultural adaptation technologies and climate information services. During the inception meeting held in New Delhi from April 25-27, 2023, a dedicated session was conducted to explore the potential use cases of the South Asia Atlas. Representatives from multilateral agencies, governments, and the industrial sector came together to discuss how the Atlas could be effectively utilised. It built on the insights gained during the training sessions held on the first and second days of the inception meeting. Drawing from the diverse perspectives of the panellists, these experiences will enable the ACASA team and its partners to prioritise and develop use cases based on geographical and thematic considerations.

PANEL DISCUSSION

In this session, representatives of multi-lateral agencies, governments, and the industrial sector discussed the potential use cases of the South Asia Atlas. Following was the brief agenda of the session:

TABLE 1 AGENDA OF THE PANEL DISCUSSION SESSION ON ACASA USE CASES

Session 8. Use cases of the Atlas. [Chair: Purvi Mehta, Director, BMGF]		
Time	Use cases of the Atlas is an important objective. Representatives from multi-lateral agencies, governments, and the industrial sector to discuss the potential use cases of the SA Atlas, considering the work illustrated on days 1 and 2. This will guide the partners to prioritise and develop use cases by geography and thematic area.	
0900 to 0915	Potential use cases of risk and adaptation Atlas	Stanley Wood, BMGF
0915 to 0925	Donor agencies	Tess Russo, BMGF
0925 to 0935	Multi-lateral agencies	Hoe Yun Jeong, ADB
0935 to 0945	UN agencies	Pradnya Paithankar, UN-WFP
0945 to 0955	Governments	P Malathy, DG-Agriculture, Sri Lanka
0955 to1005	Crop insurance industry	K N Rao, International Reinsurance and Insurance Consultancy and Broking Services
1005 to 1015	Agrifood industry	V Vijay Vardhan, ITC Limited
1015 to 1030	General discussion on other potential use cases	
1030 to 1040	Rapid survey on potential use cases	Paresh Shirsath, BISA
1040 to 1045	Chair's remarks	Purvi Mehta, BMGF

DR. PRAMOD AGGARWAL, REGIONAL PROGRAM LEADER, BISA-CIMMYT, INDIA, provided a brief introduction to the use case session and extended a warm welcome to the panellists. The panel was chaired by Dr. Purvi Mehta, Deputy Director, Agriculture-Asia, BMGF, who facilitated the discussion on the promising potential use cases of the risk and adaptation Atlas. Esteemed experts, including Dr. Stanley Wood and Tess Russo from BMGF, offered the perspective of the donor agency; Hoe Yun Jeong from the Asian Development Bank (ADB) represented multilateral agencies; Aruna Sooriyaarachchi from the Department of Agriculture, Sri Lanka, discussed the role of government agencies; Dr. K.N. Rao from International Reinsurance and Insurance Consultancy and Broking Services shared insights from the insurance industry; and V. Vijay Vardhan from ITC Limited presented the viewpoint of the agri-food industry.

While concluding the session, Dr. Mehta raised thought-provoking questions regarding the practical application of the Atlas. She found the inception meeting and use case session engaging and expressed curiosity about how the ideas and discussions put forward would translate into tangible, real-world use cases. Dr. Mehta also reiterated the importance of ACASA use cases and the potential scalability of the Atlas for future projects.

SUMMARY OF PANEL DISCUSSION

DR. STANLEY WOOD, BMGF: Dr. Stanley Wood from BMGF highlighted the important aspects of the project in his keynote address. The project involves careful phasing, a diverse team, and multiple countries with varying experiences and capacities. Access to extensive data and multiple use cases requires a cautious and inclusive approach. Early involvement of users, including representatives from the insurance industry, is crucial for meaningful contributions and desired outcomes. Developing the infrastructure within the Atlas to address time and space is essential, particularly for use cases like the insurance industry. A comprehensive assessment of risks and adaptation solutions from diverse perspectives is necessary, allowing for a meta-analysis and valuable insights for South Asia.

The framework for this project starts with tier-zero analytical capability and then progresses to tiers 1 and 2. The first step is to get the possible datasets available and confirm that they can be physically overlayered in the special database. Then, separate the data layers like temperature stress by scenario, by time, and by exposure and vulnerability. Next, organise data layers to allow reports from the Atlas by sub-district or agroecological zone based on the data's availability. This will help provide a comprehensive picture of the size of the threats and time of exposure and do a semi-qualitative risk assessment. The hazards and exposure levels can be assessed using a semi-qualitative approach, like the exercise conducted during this meeting. With the tiered approach, starting with the availability and layering of datasets, organising data layers for comprehensive reports, and conducting semi-qualitative risk assessments at the pixel level. The Atlas' architectural feature enables flexibility for multiple countries and themes. It would provide insights into the impact of threats on the agriculture sector and offer adaptation and mitigation options. Utilising crop simulation models and econometric approaches can expedite progress in impact estimation and decision-making within the Atlas.

DONOR PERSPECTIVE

DR. TESS RUSSO, BMGF, presented the use case for donor agencies by emphasising the special focus of BMGF in maximising the impact of the Atlas. This Atlas should target topics where other entities, such as governments and private sectors, are not incentivised to work. The ACASA Atlas includes a risk section that considers how producers are prepared to respond to challenges and cope with solutions that benefit them the most. The information drawn from the Atlas can be quantitative or semi-quantitative, with relative importance ranking likely to be adopted. Vulnerability and adaptive capacity layers can provide an idea of the probability of adaptation for specific solutions and their current use. This information allows for the prioritisation of quantitative and semi-quantitative ways to mitigate climate risks and generate benefits for small-scale producers.

The Atlas should focus on sub-national levels rather than farm-scale levels, with longer-term information aimed at policy and adaptation program planning. Donors from the humanitarian side are interested in near-term information like annual or seasonal risk. The Atlas has a specific focus on small-scale farmers, pastoralists, and gender-intentional disaggregated data along with gender focused recommendations. The platform for Atlas could be a website or downloadable program, depending on the location of use, with an emphasis on quantitative output, and easy-to-extract data tables and maps for further analysis. The vision for Atlas is to create a sustainable product with partners and a mandate to maintain and update the product over time, incorporating new data sets, national survey data layers, and adaptive capacity survey layers. The product can be shared and presented with other donors, partners, and the government to demonstrate the need for specific actions in multiple areas.

MULTILATERAL AGENCY PERSPECTIVE

HOE YUN JEONG, ASIAN DEVELOPMENT BANK (ADB), discussed the potential use of the Atlas for multilateral agencies, including the Asian Development Bank (ADB). The importance of managing climatic risk for ADB investments was emphasised, along with the two major commitments made by the organisation. These commitments include a $100 billion investment in climate initiatives between 2019 and 2030, with nearly half of the food security investments in 2022 dedicated to climate adaptation and mitigation, with a particular focus on building climate resilience for smallholder farmers. Additionally, the ADB has pledged $14 billion for food security between 2022 and 2025, with half of the investments going towards adaptation and mitigation efforts. To address these challenges, it is essential to invest in a climate-resilient food system that can minimise the impacts of climate change and improve access to food for the most vulnerable populations. The ACASA Atlas is expected to provide valuable insights for the planning and design of ADB's adaptation investment projects. It can identify strategic directions for adaptation investments in South Asia and facilitate more effective project design and planning.

The potential benefits of Atlas for ADB are manifold. First, ADB is committed to aligning all its public sector investments and 75% of its private sector investments with the Paris Agreement by July 2023. In this regard, Atlas can play a crucial role in helping ADB project design teams systematically integrate the recommendations of Atlas into their planning process. Moreover, the upstream studies undertaken by ADB, and other stakeholders can identify downstream investment opportunities, which can benefit from the knowledge generated by the Atlas across countries and sectors. ADB is dedicated to increasing the number of projects with a high level of adaptation investment, such

as climate-resilient landscape and livelihoods projects in Nepal and the Maldives (2024), flood risk and watershed management projects in Bangladesh, adaptation for coastal resource management, delta, water basin, community water management, agribusiness value chains projects in India, and irrigation adaptation, community livelihood improvement projects in Nepal. The Atlas findings can be instrumental in designing such projects, and the ADB project design team can leverage this knowledge to improve the effectiveness and impact of their initiatives. To achieve the mentioned, ADB is actively seeking partnerships with various stakeholders and exploring new sources of knowledge and expertise, including the Atlas. ADB believes that the Atlas is a valuable innovation in this long journey towards a sustainable and climate-resilient future.

UNITED NATION-WORLD FOOD PROGRAM (WFP) PERSPECTIVE

SUDESHNA SEN/PRADNYA PAITHANKAR, UN-WFP, shared a written note on the use case of Atlas. They expressed that Atlas could guide the WFP program in achieving nutrition, food security, and resilience outcomes. The expectation is for the Atlas to include social stratification factors such as gender, income level, caste, and ethnicity as a layer in adaptation options. WFP also expects the Atlas to cover the inclusion of food systems such as livestock, fishery, and horticulture crops, as well as under-utilised crops, and indigenous practices.

GOVERNMENT PERSPECTIVE

MR. ARUNA SOORIYAARACHCHI, SRI LANKA, provided an overview of the government's role in his presentation. It involves utilizing the policy guidance from ACASA to address identified resource changes in a sustainable way, as well as implementing a sustainable development plan that ensures the needs of future generations are met.

REINSURANCE AND INSURANCE INDUSTRY PERSPECTIVE

DR. K N RAO, INTERNATIONAL REINSURANCE AND INSURANCE CONSULTANCY AND BROKING SERVICES, noted that Atlas is expected to identify and assess risks and propose suitable adaptation measures, including extreme options such as discontinuing crop cultivation in unsuitable areas. To be effective, the Atlas should be dynamic and have a reasonable resolution, especially since crop insurance employs a homogenous area approach with village or Gram Panchayat level insurance units. Thus, if Atlas can provide a comparable level of granularity, it could facilitate the recommendation of more effective policies for the Indian government. Currently, administrative boundaries are used, which are less homogeneous than required for effective adaptation strategies. He listed some important points on the Atlas' use case for the insurance industry which are presented below:

1. Is it possible to utilize Atlas as a framework to propose a uniform insurance unit, which would decrease the fundamental risk within the unit?
2. Can we leverage the Atlas to enhance penetration by identifying and quantifying risks, and recommending adaptations? Currently, despite all the measures and farmers paying 10-12% of the risk-based premium, the penetration rate remains at only 28-30%. The government is willing to allocate sufficient funds to increase the penetration to 40-50%. Previous research indicated that doubling the penetration rate could potentially reduce the premium rate by 25%, thereby reducing the per capita government budget required.
3. The insurance scheme utilised is parametric or index-based, with average yield based on random samples. However, the insurance industry has encountered challenges, such as numerous farmer claims for compensation even with minimal rainfall. To address this, a more effective approach would be to employ a parametric mechanism where assessment occurs only when the trigger is activated.
4. Is it feasible for Atlas to use technology or crop growth simulation models from the past 10 years to recreate a more reliable dataset based on the technologies (not exact technologies but somewhat more reliable) used by farmers? This would eliminate the model hazards of actual data and provide more accurate pricing data for the insurance industry.
5. Can we develop a risk matrix and risk analytical tool/ dashboard like ACASA using weather forecasts at the beginning of the crop season, crop growth simulation models, and other inputs to determine what can be expected during the season?
6. In the reinsurance industry, crop models are used that differ from crop growth simulation models. If the crop growth simulation model can be used to create yields that flag in the reinsurance crop model, it would be more dynamic and useful.

Dr. Rao emphasized that the insurance industry would like to collaborate and work with ACASA in implementing the above-mentioned points and creating an instance of the Atlas focused on crop insurance.

AGRI-FOOD INDUSTRY PERSPECTIVE

MR. V VIJAY VARDHAN, ITC LIMITED, discussed its strong focus on agriculture and working closely with farmers to promote sustainable and inclusive supply chains. He highlighted the challenges faced by farmers, such as small land holdings and low yields, and shared initiatives taken by ITC to address these issues. He also emphasised the importance of considering the status of natural resources and implementing climate-resilient practises for major crops during Atlas development. He stressed the need for decarbonization in agriculture through practises like solar, biogas, and biomass usage. Ensuring quality in the supply chain, particularly for crops like wheat, was highlighted as a significant concern. He encouraged the program to explore any relevant aspect of ITC's agricultural work.

SESSION CHAIR REMARKS

Dr. Purvi Mehta stressed the importance of various stakeholder perspectives and highlighted the need for a regional approach in developing an agro-climate-based Atlas. However, she also emphasised the significance of recognising diversities within the region, including climate variations, indicator requirements, national capacities, and private sector participation across different countries. Additionally, country specific diversities must be kept in consideration. She suggested prioritizing specific areas rather than attempting to include everything at once. Additional indicators may be considered for phase two.

While discussing farmers from National Crop Insurance Programme, it's also important to consider landless farmers in South Asia. Gender disparities in land ownership should also be acknowledged, as less than 11% of women farmers own land in Bihar. National and regional data are valuable for Atlas, but these factors should be incorporated despite potential data limitations.

Dr. Mehta mentioned the importance of data layer integration and interaction within Atlas. Collaboration with external initiatives like the ADB program and various dashboards was also highlighted to maximise benefits. For instance, 16 Indian states have agriculture transformation dashboards with climate-related data. Similarly, BMGF is partnering with the Sri Lankan government on a dashboard, and BARC has a dashboard in Bangladesh that could be potentially leveraged by Atlas.

The perspective of farmers, who are the ultimate users of Atlas (not immediate), should be considered. The steering committee should give importance to this aspect.

Affordability and accessibility are the key factors for scalability in this region. Rapid scalability and responsiveness to regional capacity and requirements are crucial for prompt action.

Countries with National Adaptation Plans (NAPs) and implementation boards, except Bhutan, can potentially benefit from Atlas. These countries serve as potential use cases for Atlas.

To optimize Atlas, include the use case early on and form a small working group with user representatives. Regular meetings will raise awareness of Atlas' design and cater to user requirements.

The steering committee will go beyond administrative tasks and take on a proactive role. They should focus on maximising the use of Atlas and ensuring its long-term sustainability. This includes planning for handover and preparing countries to take over the project, as well as continuously improving the Atlas design to meet country perspectives and needs.

Dr. Mehta thanked all the speakers and acknowledged the session's significance and Dr. Aggarwal expressed his appreciation for the session. The session was crucial to comprehending the viewpoint of the users for whom we are developing the Atlas.

PHOTO: CGIAR RESEARCH PROGRAM ON CLIMATE CHANGE, AGRICULTURE AND FOOD SECURITY

USE CASE SUMMARY

The ACASA project places focus on the practical applications of the Atlas, recognising use cases of the Atlas as a crucial objective. Various stakeholders could utilise Atlas to enhance investment in agricultural adaptation technologies and climate information services. During the inception meeting, representatives from multilateral agencies, governments, and the industrial sector discussed how Atlas could be effectively utilised. Drawing from the diverse perspectives of the panellists, these experiences will enable the ACASA team and its partners to prioritise and develop use cases based on geographical and thematic considerations.

Following are the key takeaways from the use case session:

Forging growth | Considering the learning from the Sub-Saharan African Atlas, South Asia Atlas (ACASA) can begin at tier zero and progress to higher tiers, allowing flexibility and accommodation of multiple countries and themes. Leveraging crop simulation models and econometrics approaches can further enable rapid progress in decision-making.

Steering donor decisions | For donor agencies, Atlas can provide information for policy and adaptation program planning at sub-national levels, specifically focusing on small-scale farmers, pastoralists, and gender-intentional adaptation options.

Guiding multilateral agencies | In the case of multilateral agencies like the Asian Development Bank (ADB), Atlas can provide valuable insights for the planning and design of ADB's adaptation investment projects.

Adopting a multisectoral approach | Atlas can guide the World Food Program (WFP) to achieve nutrition, food security, and resilience outcomes while including social stratification factors and the inclusion of food systems such as livestock, fishery, and horticulture crops, underutilised crops, and indigenous practises.

Guiding informed policy making | Atlas can help with policy guidance to address resource changes sustainably and the needs of future generations through a sustainable development plan.

Identifying and mitigating risks | For the reinsurance and insurance industry, Atlas can identify and assess risks, propose adaptation measures, and help in better targeting agricultural insurance. It can help increase the crop insurance penetration rate and reduce the insurance costs per farmer.

Ensuring quality checks | For the food industry, such as ITC, quality is a major concern in the supply chain, particularly with wheat crops, and they work to improve quality. Atlas can consider natural resource status and other relevant aspects of the food industry.

Participatory decision-making | Considering regional commonalities, stakeholder engagement, and farmer perspectives would be crucial for Atlas. Moreover, success hinges on factors like scalability, affordability, and accessibility. To ensure long-term sustainability and improvement, forming a small working group with active participation from the steering committee can be considered.

COVER PHOTO: CGIAR RESEARCH PROGRAM ON CLIMATE CHANGE, AGRICULTURE AND FOOD SECURITY

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About BISA

Borlaug Institute of South Asia (BISA) is an international research institute established through a joint initiative between the International Maize and Wheat Improvement Centre (CIMMYT) and the Indian Council of Agricultural Research (ICAR), New Delhi, to implement the vision of Nobel laureate Norman E. Borlaug. BISA aims to harness the latest genetic, digital, and resource management technologies and use research for development approaches to invigorate the region's agriculture and food systems to meet future demands.