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Scoping Report: Current status of index-based insurance in Bangladesh



ICCCAD



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1. Introduction

1.1 More intense and less predictable extreme weather events

With current and anticipated increases in magnitude of extreme weather events and a declining consistency in weather patterns, particularly challenging for agriculture, there has been a growing interest in weather index-based insurance (IBI) schemes in Bangladesh. A number of weather index-based insurance products have already been tested and applied across Asia and Africa, with varying degrees of success, as a mechanism to improve livelihood security by enabling vulnerable populations to transfer risk associated with climate change, extreme weather events and other hazards. In the process, these efforts have generated important new knowledge on how these schemes can be designed and implemented for optimal results. However, the practice of index-based insurance is still limited in Bangladesh, and the experience and knowledge generated by the different stakeholders involved needs to be better communicated.

To identify and facilitate the diffusion of knowledge and best practices in this unique field, Worldfish will hold a two-day workshop for experts and practitioners who are working on this issue in Bangladesh. This event aims to map past and present index-based insurance schemes that have been undertaken in Bangladesh, and to facilitate knowledge sharing and capacity building among relevant organizations. Prior to this event, the International Centre for Climate Change and Development (ICCAD) has conducted this scoping study to inform the design and objectives of the two-day workshop.

1.2 Challenges of traditional indemnity based insurance

The state owned insurance company Shadharan Bima Corporation (SBC) first offered a crop insurance product in 1977, but discontinued it in 1996 as a result of persisting problems with the scheme.

Some of the reasons SBC's crop insurance failed include:

- The program was introduced without adequate preparation, and lacked a clear policy with defined structure and proper training and understanding of crop insurance by the SBC staff and other relevant stakeholders.
- The project was not integrated with mainstream agriculture development policy, but was simply created as an insurance scheme.
- The program was expanded too fast, without adequate evaluation of the pilot project.
- There was no grassroots level monitoring of the program.
- The program was made voluntary and was based on an individual approach rather than working with groups of farmers and the average losses they experienced in a specified homogeneous area. This led not only to adverse selection in which only those in high risk areas opted for insurance, but also led to a uniform premium rate for all types of land. In other words, there was no risk pooling, where farmers are selected from diverse agro-ecological zones to ensure that not all of the insured suffer from disaster at once.
- At the initial stage of introducing crop insurance there were too many perils covered instead of a more manageable one or two.
- Weak and unscientific visual estimation methods of damage calculation allowed scope for moral hazard, inaccuracies and anomalies among different assessors.

Some of the failures of SBC demonstrate why traditional insurance methods are not suitable for agricultural products in Bangladesh. It highlights the context-specific character of crop damage and the complexity of adequately assessing and compensating for real damage. Index-based insurance, on the contrary, is not based on

individual plot assessments but on a specified pre-defined level of weather variable which, when reached, automatically leads to reimbursement, reducing moral hazard and administrative costs.

But IBI also brings new challenges in the form of creating a robust index model and supplementing it with good quality weather and land data. More lessons can be learned from the problems faced by SBC in implementing new crop insurance projects, such as integration with wider agricultural policy and implementation through organizations with grassroots networks.

2. Current index-based insurance projects in Bangladesh

As Bangladesh has not had any crop insurance products since the failure of the SBC, there are no successful schemes to draw lessons from and any new schemes will require piloting to make adjustments and a fit-for-purpose product. A handful of IBI projects have been identified in Bangladesh, however they are all at a very early stage with the most advanced project commencing piloting in July 2013. Due to the early nature of these projects, conclusions for best practice cannot be formed, however the design of these projects reveal many issues which require attention.

2.1 Asian Development Bank (ADB)

ADB proposes to pilot weather index-based crop insurance (WIBCI) for farm households affected by risks associated with climate change and extreme weather events. The project will have an iterative process of product improvement based on partner and client feedback during a 3-year period in which product design and pricing will be followed by pilot testing, product evaluation, and sharing of feedback with all partners, leading to further modification that will feed into the pilot loop. To encourage uptake of WIBCI, the option of Government of Bangladesh subsidies to farmers that are in line with its existing credit support will be explored.

The pilot will provide insurance cover for inadequate or excess rainfall at the time of sowing or harvesting for a small number of communities in at least three selected districts. A detailed demand and feasibility analysis will assess potential crops, weather-related perils specific to the crops, and the locations where the project will be piloted. Specific districts will be identified on the basis of insurability, ensuring that the project tests schemes that benefit farmers (especially small and marginal ones) and that are operationally sustainable to engage the private sector and scale-up the schemes after the project period.

The project will provide assistance to the Insurance Development and Regulatory Authority (IDRA) in drafting a regulatory framework for implementing a non-traditional insurance scheme such as WIBCI. Regulations for WIBCI have been drafted and are awaiting approval by IDRA and the Bank and Financial Institutions Division, along with standards related to weather data quality, product design, and underwriting and claim settlement.

ADB will collaborate with agriculture research institutions and with weather and meteorological departments to construct a crop-specific risk index from statistical analysis of historical weather data for the past 25–30 years. Technical support will be provided through assessment of available infrastructure and enhancement of capacity to facilitate a smooth flow of standardized, reliable data from accredited weather stations. This will involve upgrading weather stations and preparing maintenance plans to improve the near-real-time weather data collection and reporting system. Related training will be offered to the Bangladesh Meteorological Department (BMD), the Bangladesh Water Development Board and other concerned agencies. In addition, to improve the accuracy of weather data, the use of

space technology through remote sensing will be explored in collaboration with the Japan Aerospace Exploration Agency.

SBC will be the lead project implementing agency, managing day-to-day expenditures and transactions under the project. Implementation will also be supported by the BMD and in the field by NGOs, Microfinance Institutions (MFIs), farmer cooperatives, or agricultural banks. Possible distribution partners will be shortlisted as insurance agents, and private insurance companies as insurers. Distribution partners will be selected on the basis of their rural presence and their operational capacities to educate rural clients and to distribute WIBCI to them. Private insurers will be selected on the basis of their interest in piloting WIBCI products and their existing portfolio in rural areas.

In some cases, piloting WIBCI will be bundled to microcredit by selected MFIs. WIBCI will also be offered to farmers who are shifting to high-value agriculture production to protect them from weather events in selected districts.

The measurable aims of ADB are:

- Capacity development of weather data agencies and agriculture research institutions for at least 100 staff members.
- At least 20 weather stations upgraded to provide reliable data.
- Insurance literacy and climate risk awareness for at least 6,000 farmers.
- WIBCI sales, administration, and operational skills training for at least 300 staff members from insurance companies and distribution partners.
- Development of an operational module on how to design and pilot WIBCI, particularly related to underwriting, distribution and claim management for use by insurers, regulators, and other intermediaries.

2.2 International Center for the Improvement of Maize and Wheat (CIMMYT)

In February 2013, CIMMYT began the first phase of their IBI project, which was to design and evaluate weather index-based insurance instruments that are responsive to the needs of maize farmers in the coastal districts of Bangladesh. Since voluntary participation in these insurance programs tends to be much lower than anticipated, the second phase of the project will develop a viable savings component that can be bundled with the insurance product. This is expected to increase the attractiveness of these schemes to farmers, who will be able to benefit even if there is no crop loss. The final phase of the project will be randomized controlled trials (in the production seasons that follow the preparatory project) specifically designed to evaluate the performance of index-based micro-savings insurance. Ultimately, the desired outputs derived from such an intervention should be that insured maize farmers will significantly reduce their production risk, expand the area that they devote to maize cultivation and invest in more productivity-enhancing technologies and/or value-adding post-harvest options. The intended impact should be increased incomes for farm households and their communities, as well as greater economic resilience in the face of adverse weather and market-related shocks.

The sample frame consists of more than 5,000 farmers working with CIMMYT as part of the Cereal Systems Initiative for South Asia in Bangladesh (CSISA-BD) project. These farmers are organized into groups of 25-35 farmers (on average) and offer the potential to design and test insurance/savings instruments at the group level as well as on an individual basis.

CIMMYT is implementing the project with local NGOs that they are currently working with as part of the maize farming group concept through which trainings and demonstrations are implemented. The pilot project will be located in Bhola district

(greater Barisal area) alongside a local partner organization called Grameen Jano Unnayan Sangstha.

The product design process will include focus group discussions with maize farmers, key informant interviews with various stakeholders (including NGOs, banks, etc.), collection and analysis of yield and weather data for index development, and collection and analysis of longitudinal household data to estimate correlations between extreme weather, yield losses and household expenditures. This should enable development of one or more indexed-based (e.g., wind-/flood-index) insurance instruments by structuring the contract in terms of:

- i. determining trigger payout levels.
- ii. pricing of the contract premium.
- iii. ensuring that payout is sufficient.
- iv. estimating the basis risk.

A small-scale choice experiment will be undertaken with about 200 farmers to better understand the demand for specific instruments, as well as to quantify farmers' willingness to pay for them.

The data required to establish the various weather indices (and design the proposed insurance contracts) will be collected from secondary sources. This includes long-term climatic data (ca. 30 years of daily time-step weather station records) from the BMD, data from CIMMYT's 44 independent field plot trials during the 2011-2012 maize production season as well as from other sources.

2.3 International Finance Corporation (IFC)

IFC has completed a scoping study on the technical and commercial feasibility of piloting index-based weather insurance (IBWI) for farmers in Bangladesh. Following the study, IFC hosted a round table discussion in May 2013 to investigate possible future actions to design and construct IBWI, its delivery channels and pricing. Currently, the IFC is reviewing two to three IBWI models which it intends to pilot. The focus for IFC is on partnering with private insurance companies and building their capacities.

2.4 International Food Policy Research Institute (IFPRI)

IFPRI is currently conducting an experimental study in Bogra, offering IBI against drought for the *aman* rice crop. They are collaborating with an NGO called Palli Karma-Sahayak Foundation (PKSF) to implement the pilot. The insurance coverage is from 14 July to 15 October 2013-the period that farmers are most susceptible to risk. In Bogra, most farmers have access to irrigation in order to counter the impacts of drought, but many are still willing to purchase insurance coverage as the premium paid out for drought will cover irrigation costs.

The index used is based on a similar model developed for India by Daniel Clark from Oxford University. The extreme drought index is binary: it pays either zero or the full sum insured and has a claim payment with an estimated probability of 10 per cent (that is, 1-in-10-year events are covered by the index). To calculate the appropriate threshold, IFPRI uses the definition of a dry day typically adopted in India (that is, a dry day is a day with recorded rainfall of fewer than 2 millimeters, which usually evaporates before entering the soil). In Bogra, the total number of consecutive dry days for the *aman* and *boro* rice seasons does not exhibit a statistically significant trend. Thresholds are calculated by using historical consecutive dry days data before determining the trigger threshold.

Prior to implementing the pilot, IFPRI first conducted an experimental demand-elicitation exercise with more than 300 farmers in Bogra and Manikganj to find out about smallholder farmers' interest in formal insurance products. The study found that because farmers



Farmers ploughing their field in Khulna district, Bangladesh

are subject to a variety of risks, they do not focus on only one type of insurance. Instead, they evenly split their endowment between life and disability insurance and agricultural insurance. In addition, group savings were found to be a particularly popular risk management tool, especially when decisions are made in groups.

2.5 Oxfam

Oxfam will be piloting an IBI project in late August 2013. The project aims to design a commercially pragmatic catastrophic flood insurance scheme for the poor and vulnerable, targeted to sensitize meso-level investors who are working in pro-poor river basin flood prone areas. It will be a tool to improve calamity response of Community Based Organizations (CBOs), NGOs and government. The underlying principle of the scheme is that, if the Government, Local Government Elected bodies, Private Sectors and Development agencies transfer risk—especially catastrophic risk—to a formal risk carrier (Financial or Social Institution), then the Disaster Management and Risk Reduction efforts of the country will improve, along with the ability of the government and development agencies to invest more in Disaster Risk Reduction.

Oxfam is working with the Center for Insurance & Risk Management (CIRM) to research, design and develop a Meso-level Catastrophic Flood Insurance Scheme in Bangladesh. The Institute of Water Modeling (IWM) Bangladesh has built the Flood Hazard Model used to generate flood data. The scheme will be implemented in Sirajgonj district by Manab Mukti Sangstha (MMS). Sirajgonj district was chosen for the pilot as it is centrally located and is not

prone to flash and coastal floods. The scheme will be piloted in fourteen villages, spread across four unions in Sirajgonj Sadar and Chowhali upzilas of the district.

The flood hazard model designed by IWM, predicts only the flood water level/depth instead of flood losses. Developing this kind of model is relatively cheaper and time effective. The data generated by this model will be used in determining the premium for the insurance scheme. The model will also act as a flood water level/depth measuring tool to calculate compensation based on pre-determined formulae, eliminating requirement of physical monitoring of flood depth and claim filing by the client. Distribution of compensation to individual household is impossible during floods. In this project the compensation will reach the poor and extremely poor CBO member households through the local Oxfam partner MMS. After the monitoring and evaluation phase of the pilot, Oxfam will work with PKSf and other agencies to scale the catastrophic flood insurance scheme beyond the project area.

2.6 Project collaborations

ADB and IFC agreed that close coordination will be ensured to avoid duplication, although IFC's focus is only on partnering with private insurance companies and building their capacities. Unlike ADB, IFC does not intend to provide assistance to the public sector and will not engage in strengthening the regulatory framework, investing in weather infrastructure, or building capacity. The IFPRI study could serve as a reference for ADB and others during product design.

2.7 Summary of IBI projects in Bangladesh

Organization	Delivery partners	Type of weather	Type of produce	Location	IBI product user	Bundle products	Capacity building	Current project status
Asian Development Bank	<ul style="list-style-type: none"> SBC Bangladesh Meteorological Department NGOs MFIs Farmer cooperatives, or agricultural banks 	Inadequate or excess rainfall	Demand and feasibility analysis will assess potential crops	At least three districts	Farm households	In some cases microcredit	<ul style="list-style-type: none"> At least 20 weather stations upgraded Insurance literacy and climate risk awareness for farmers Training and development for weather data agencies, agriculture research institutions, insurance companies, distribution partners Operational module for use by insurers, regulators, and other intermediaries 	Grant proposal for funding approved. Pilot in 2014
International Center for the Improvement of Maize and Wheat (CIMMYT)	Grameen Jano Unnayan Sangstha (GJUS)	Various weather indices	Maize	Bhola district (greater Barisal area)	Maize farmers	Savings component		Design and evaluation of index
International Finance Corporation (IFC)	TBD	TBD	TBD	TBD	TBD	TBD	Capacity building for private insurance companies	Scoping study complete, developing modeling of index
International Food Policy Research Institute (IFPRI)	Palli Karma-Sahayak Foundation (PKSF)	Drought	Aman	Bogra	Smallholder farmers			Piloting for three months until October 2013
Oxfam	Manab Mukti Sangstha (MMS)	Catastrophic flood		Sirajgonj district	Community Based Organizations in river basin flood-prone areas			Pilot to start late August 2013

3. Requirements for successful IBI implementation in Bangladesh: current status

3.1 Governance and organizational partnerships

In the context of Bangladesh it is essential to have partnership between private and public sectors and NGOs to implement IBI. The public sector role would be to set a policy and regulatory framework in place to ensure reliability of insurance services and protection of those purchasing insurance products. SBC and larger private banks can serve as re-insurers as private companies will want re-insurance support before introducing crop insurance. NGOs and MFIs are best placed to implement at the grassroots level due to their existing network and reach in rural areas.

3.2 Data

The Bangladesh Meteorological Department has collected high quality data since 1952. Rainfall is recorded every three hours from 35 weather stations throughout Bangladesh, primarily for the purposes of weather forecasting. The ADB is proposing to upgrade at least 20 weather stations and is preparing maintenance plans to improve the near-real-time weather data collection and reporting system. However, the IFC scoping report is the only study to identify the need for more granular infrastructure of weather stations to ensure that settlements are fair with low basis risk.

Over the past 30 years, the Flood Forecasting and Warning Center of the Bangladesh Water Development Board has collected daily water height data at 342 water level stations in order to assess the timing and duration of river flooding during the monsoon season. These data are used to identify the days when water levels were higher than the official danger level for each station.

The Bangladesh Bureau of Statistics has collected yield data for major crops for several decades. District level yield estimates are publicly available. The sampling is sufficient to allow yield estimates at the sub-district level or yield estimates for distinct varieties of major crops at the district level. For example, for the *boro* season, separate yield estimates for local paddy, high-yielding paddy, and *paijam* paddy are available per district.

3.3 Modeling

The index model will be dependent on the type of risk, i.e., drought, excess rain, etc. Constructing a model requires a multi-disciplinary approach that includes meteorologists, hydrologists, agriculture specialists and insurance experts. The model will define the level at which insurance payouts will be triggered, for example, excess rain could be defined as more than 80 mm rain within 1 to 2 days. Some models pay out zero or the full sum insured, while other models have different levels of payout correlated to the severity of the risk. IFPRI is using the zero or full sum model for drought insurance while CIMMYT is considering a triggered payout model.

IBI can be designed for different levels. At micro level, farmers are targeted directly for insurance. At meso level, insurance is taken out by MFIs to cover their credit risk based on crop loss. At macro level, government institutions or disaster relief organizations use IBI to fund extreme weather relief efforts. All current IBI projects in Bangladesh are at micro level except Oxfam's meso level flood insurance.

3.4 Contract

Contracts for IBI should be transparent, fair and reasonably priced, and must be easy for farmers to know what is and what is not covered by the insurance. When the contract is designed, farmers, local decision makers and experts should be involved so that all perspectives are considered. All contracts have a defined start

and end date to limit the period for which the underlying index is calculated. The IFPRI pilot is from July to October, the period in which farmers face the greatest risk of incurring crop damage.

3.5 Capacity and community building amongst farmers

It is important to make sure that farmers have ownership of the insurance product through consultation with them throughout the design of the product. Farmers can be an integral part of validating and addressing any subsequent issues to adapt or improve the index or contract.

In some circumstances it may be possible that the weather risk is just below the trigger point for insurance payout; in these years, farmers may lose crops without compensation. In such scenarios, it is beneficial for farmers to form community groups that pool resources, such as through group savings. In addition, members of the community group can support each other when individuals are affected by household level events not covered by insurance.

4. Workshop aims

In preparation for the workshop, ICCCAD held preliminary meetings with selected experts and practitioners to inform the objectives and program of the workshop. Representatives from the following organizations were interviewed: CIMMYT, Comprehensive Disaster Management Program (CDMP), International Research Institute for Climate and Society, Columbia University (IRI), IFC and IFPRI.

It was mentioned by most of the experts and practitioners that although there has been much discussion in recent years about IBI in Bangladesh, there have been few instances of practical intervention. As a result, the workshop must be action-oriented and seek to advance the IBI agenda. Participants should leave the workshop with an improved understanding of what actions and best practices need to be undertaken for their organizations to address the many challenges of implementing IBI in Bangladesh.

There was also a desire to learn more at the workshop about on-going and future projects. Through the discussions of current and future IBI activities, participants can identify opportunities for collaboration. They may be able to offer needed expertise to a project or to work in different locations. Such discussions can help to reduce duplication and encourage information sharing. It was commented that to continue the monitoring of IBI projects and developments, experts and practitioners may wish to form a network. This can take the form of a simple emailing group or a more formal regular meeting.

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List of Acronyms

ADB	Asian Development Bank
BMD	Bangladesh Meteorological Department
CBO	Community Based Organizations
CIMMYT	International Center for the Improvement of Maize and Wheat
IBI	Index Based Insurance
IBWI	Index Based Weather Insurance
ICCCAD	International Centre for Climate Change and Development
IDRA	Insurance Development and Regulatory Authority
IFC	International Finance Corporation
IFPRI	International Food Policy Research Institute
IWM	Institute of Water Modeling
MFI	Microfinance Institutions
MMS	Manab Mukti Sangstha
NGO	Non-Governmental Organization
PKSF	Palli Karma-Sahayak Foundation
SBC	Shadharan Bima Corporation
WIBCI	Weather Index Based Crop Insurance

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