Enhancing the benefits of Remote Sensing Data and Flood Hazard Modeling in Index-based Flood Insurance (IBFI) for the Rural Farmers in South Asia

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Inception Workshop on “Index Based Flood Insurance (IBFI) for Agriculture Risk Management”
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PRESENTATION OUTLINE

• Human cost of natural disasters and its impact
• Flood situation in Bihar
• Linking Disaster Management and Index Insurance
• IBFI Concept, Implementation Strategy
• Project Progress and Updates from team members
  • Pilot area selection
  • Flood hazard modeling
  • Implementation process
  • Business model and institutional framework
  • Communication and IP
• Partnership for Implementation
HUMAN COST OF NATURAL DISASTERS AND ITS IMPACTS

Number of disasters and affected people reported per country (1994-2013)

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of Affected People</th>
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</thead>
<tbody>
<tr>
<td>IND</td>
<td>819m</td>
</tr>
<tr>
<td>PK</td>
<td>50m</td>
</tr>
<tr>
<td>BGL</td>
<td>127m</td>
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Source: EMDAT (2015)

Global Assessment by natural disasters

- Flood: 55%
- Drought: 25%
- Storm: 15%
- Earthquake: 3%
- Other (mass movement, volcanoes, wildfires): 2%

2.4 billion affected

Source: EMDAT (2015)
BIG FACTS ON FLOODING

Global to Regional

- Recent report by UNISDR about 800 million people are currently living in flood-prone areas, and 70 million are experiencing floods each year.
- Global flood losses in 2011 >$100 billion with major losses from Thailand, Australia and Hurricane Irene
- Recent Overseas Development Institute (ODI), UK estimates to over $450 billion by 2030
- In 2007, floods killed 3,200 people in India and Bangladesh alone. In 2010, flooding killed 2,200 people in Pakistan and another 1,900 in China, while in 2013, an exceptionally high number of 6,500 people died due to floods in India.

Bihar

- Bihar is India’s most flood-prone state.
- 73% of the total geographical area is annually flooded.
- 76% of the population in North Bihar is at risk of flooding.
- Approx. 15 million people are affected by flooding
- Approx. 300,000 metric tons of rice production damaged by floods
- For example Muzaffarpur District, alone, incurred losses of over USD 3 million per year from 2001 to 2012 due to floods.
HISTORICAL FLOOD TRENDS IN GANGES BASIN

Flood Frequency

Flood Duration

Flood Seasonality

Flood Extent
THE ROLE OF DISASTER MANAGEMENT

Short-term emergency assistance

Emergency Response

Liquidity Gap

Recovery

Long-term infrastructure & sustainable development assistance

Reconstruction & Rehabilitation

Catastrophe

Time

http://www.wmo.int/pages/prog/drr/events/Barbados/Pes/4-CCRI.pdf
PROMOTING PREPAREDNESS AND INCREASING RESILIENCE

The Tradeoff

Significant amount of money locked in disaster relief funds

The Tradeoff

Insurance can help unlock the money that is kept for relief and use it for climate change adaptation and mitigation
• Insurance is a post event compensatory mechanism
• Insurance doesn’t affect the average outcome of insured event
• Insurance spreads cost over time and geography
• Climate change induces covariate risks at a global scale
REDUCING THE FLOOD RISK

PORTFOLIO OF FLOOD MANAGEMENT OPTIONS

MULITPLE BARRIER PROTECTION

Cost-Benefit-Ratio

- Lower benefits relative to costs
- Higher benefits relative to costs
- Resettlement to lower risk zones
- Insurance
- Erosion control
- Urban development controls
- Rebuilding natural ecosystems
- Early warning systems
- Building codes
- Urban drainage systems
- Flood defences

Robustness to Uncertainties

Source: Jha et al, (2011) adapted from Ranger and Garbett-Shiels (2011)
PRIMARY INDICATORS OF A POSITIVE CHANGE

- Funds to cover the post-disaster liquidity gap faced by governments between immediate emergency aid and long-term redevelopment assistance

- A facility which would enable governments to receive money quickly, with the payout calculated in a completely objective way

- A mechanism which would minimise the burden on governments to provide exposure information prior to coverage being initiated and loss information after a disaster

- A win-win solutions on the aspect of flood index insurance to address flood risk reduction measures, improving the livelihoods and sustainable development in the region
- Case for IBFI approach communicated effectively to key stakeholders and accepted as a mainstream practice
- Investments in short-term flood relief are being replaced by longer-term upstream interventions
- Significant areas are under improved land and water management leading to livelihood improvements
- Women have directly and preferentially benefitted through IBFI interventions
- Think about others???
SHORT HISTORY OF IBFI

ACTIVITY

- Flood Risk SA
- Multi-hazard Mapping SA
- IBFI Concept Initiated and Approved
- CCAFS CRP Refresh Phase

Years:
- 2011-12
- 2013
- 2013-14
- 2015-18
## PROJECT SUMMARY

**CCAFS Project ID:** P41-F2-SA-IWMI  
**Period:** 2015 to 2018  
**Budget:** USD 1.0 Million (approx.)  
**Target Countries:** India & Bangladesh

### Research Partners:
Regional: IWMI (L), IFPRI  
International: UoB, MCII, GlobalAgRisk, UNOOSA + +  
India: ICAR-IIWM, NIH, FMISC, CWC + +  
Bangladesh: IWM, MoDM, BWDB, UoD + +

### Implementing/Co-sponsoring Partners:
AIC, eeMausam, BajajAllianz, DOA-BH, NABARD + +

### Knowledge Sharing Partners:
FMISC, BSDMA, CWC, DoA-Bihar + +
Partners

CGIAR Partners + Donors

Government + Technical Partner + Insurer

INDIA

Government + Technical Partner + Insurer

BANGLADESH

Communication, Media Partner

Knowledge Partner

United Nations
Office for Outer Space Affairs

CGIAR Partners + Donors

International Water Management Institute (IWMI)

International Food Policy Research Institute (IFPRI)

Research Program on Climate Change, Agriculture, and Food Security (CCAFS)

Research Program on Water, Land and Ecosystems (CGIAR)

Ministry of Agriculture, Forestry and Fisheries (MAFF)

India

Bangladesh

Swiss Re

BMZ und Humboldt-Universität zu Berlin

United Nations Office for Outer Space Affairs
1. Setting up pilot-scale trials to demonstrate that positive verifiable impacts emerge from IBFI in terms of agriculture resilience and improving productivity, and household incomes, locally and at the broader scale.

2. Developing tools and strategies that support IBFI development and upscaling, integrated with existing and future flood control measures.
Flood index design
Flood hazard module
Flood index design
Flood loss module
Rainfall
Water level
Flood Extent
Flood Duration
Crop Yield loss
Economic loss
Crop Damage

Remote Sensing Data for Inundated Crop Area
Insurance payout Structure/Scheme
Insurance agencies
Government
Development banks

Farmers (from 50,000 to 1 million farmers would be benefitted by the scheme)

Input, Modeling and analysis
Output
Users
Final beneficiaries
CONCEPT: INDEX BASED FLOOD INSURANCE

Peoples Participation

Flood Hazard Model

Flood Loss Model

Flood Insurance Policy

Flood Indexing Concept

Partner: IWM
## INDEX BASED FLOOD INSURANCE

### Characteristics

**Government support helps reach scale**

*Investment-wary private insurers enter the market only if they are sure of outreach and demand.*

**Donors support financially and technically.**

*Index insurance projects (and pilots) involve community based organisations.*

*Like traditional insurance, index insurances are still costly for clients.*

*Multiple distribution channels need to be employed to attain high outreach.*

### Challenges

*Weather infrastructure in the developing countries is inadequate for index insurance products.*

*Reinsurance is not available for small programmes.*

*Index insurance programmes are subsidy dependent.*

*Index insurance programmes linking with DRM aid financing*
POTENTIAL FOR SCALING UP INDEX-BASED FLOOD INSURANCE IN THE PILOT COUNTRIES

- Identification of the right parameter is essential for a successful programme
- Governments should be part of the programme
- Ensure reinsurance before piloting
- Investment in weather infrastructure is a must
- Data sharing among agencies including IMD, CWC, DoA for societal benefits
- Capacity of local stakeholders should be increased
- Bancassurance channels should be put to use
- Client literacy and education must be a priority
<table>
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<tr>
<th>COMPONENTS</th>
<th>METHODS</th>
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<tr>
<td>IBFI system planning, design, implementation and evaluation</td>
<td>site characterization, design, pilot-scale implementation, baseline data, performance monitoring and testing, hydrologic modeling and scenario analysis/forecasting, training &amp; capacity building</td>
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<tr>
<td>Institutional, economic and gender analysis</td>
<td>baseline socio-economic data, gender/social disaggregated analysis, social/institutional/policy arrangements, cost-benefit analysis</td>
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<tr>
<td>Technical guidelines and business case development</td>
<td>synthesis; cross-country comparisons, IBFI vs alternative mitigation approaches</td>
</tr>
<tr>
<td>Strategy development and dissemination</td>
<td>knowledge exchange meetings/dialogues/regional workshops for key stakeholders and potential investors, investment support tools; risk management framework</td>
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1. **Proof-of-concept on IBFI** coupled with the flood hazard model and remote sensing (RS) data in selected districts of South Asian countries.

2. **Digital flood mapping tool** to monitor and quantify the impact of floods on crops, and its application in insurance schemes.

3. **Design and pilot test** a set of farmer-friendly flood insurance contracts for at least three districts with a considerable number of marginalized female farmers/poor people to ensure contracts are not gender biased.

4. **Obtaining feedback and develop community of practice** from officials/staff of insurance regulatory authorities in countries, operating insurance companies, meteorological agencies, agricultural research institutions, micro-finance institutions or NGOs, and relevant government agencies (e.g., ministries involved with disaster management, water resources, and agriculture).

5. **Policy and institutional guidelines** translated into business models for the implementation of flood insurance product.

6. **Comparative analysis** of the cost-effectiveness of RS-based index insurance compared to traditional methods, and estimating the potential in other parts of the target countries.

7. Research papers and reports, planning guidelines, **policy/investment briefs** and other **communications** material including websites, brochures and videos.
“Let not a single drop of water received from rains go waste into the sea without benefiting the man and the beast”

King Parakramabahu (1153-1186 AD)