Inception Workshop on

"Enhancing the benefits of Remote Sensing Data and Flood Hazard Modeling in Index-based Flood Insurance (IBFI)"

01 August 2015, Hotel Gargee Grand
Patna, Bihar

International Water Management Institute (IWMI),
Sri Lanka

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WORKSHOP REPORT

Inauguration Event

Representatives from State and Central government agencies, NGOs, private insurance companies, farmers and development partners met on August 1st 2015 in Bihar, India to exchange ideas and expertise in an inception workshop for a new project on developing 'Index-Based Flood Insurance (IBFI) in South Asia'. The workshop saw enthusiastic participation from both government and private sector participants. The day long workshop was inaugurated by Chief Guest, Dr. C.P. Thakur, Member of Parliament, Rajya Sabha and was attended by experts from multiple organizations like Agriculture Insurance Corporation (AIC), GIZ, Department for International development (DFID), BSDMA (Bihar State Disaster Management Authority), Agriculture Department- Bihar, Flood Management Improvement System (FMISC), National Institute of Hydrology (NIH), Indian Council of Agricultural Research (ICAR), IFPRI, private insurance firms like Bajaj Allianz, Swiss Re, farmers and others.

Dr Pramod aggarwal started the proceedings by welcoming all guests and briefly talking about the CCAFS program in South Asia.

Shri Nagan Prasad remarked that IBFI was a new concept on the field and it was good to see stakeholders working in water sector who are involved in flood related work like BSDMA, FMISC, insurance indutries and experts come together for the conference. He elaborated a little on FMISC (Flood management Improvement support centre) which comes under water dept of Bihar state govt. A national hydraulic project is being launched in the basin with WB support in bihar and other states where efforts are being made to collect the data on a real time basis across major river basins. While assessing index insurance one must also keep in mind the socio-economic conditions and income periods, for example some farmers might not be recieving continous income and might have loans.

Shri C P Thakur in his opening address mentioned that the work on floods in Bihar requires a lot more attention and is a root cause of poverty. Along with research, the team should also keep in mind the ground realities of the state and how to link the poor to insurance.

Workshop Objectives and Presentations from Private Insurance representatives

After the inuaguration, presentations were made which were relevant for the project.

Dr Giriraj Amarnath who is the project leader gave a brief presentation on the project, its objectives and outputs to the participants. Dr. Amarnath also highlighted the need to link insurance product with Disaster Risk Reduction, Poverty and Sustainable development in the region to ensure the IBFI product has scaling potential and business model that suits government, insurer and farmers. Need to stregnthen how diaster emergency response funds and post-disaster relief funds can be effectively utilized in the form of paying premium before flood disasters and insurance payouts funds for reslience building among communties that are regularly exposed to floods. The programme is first of its kind to develop PPP model for successful implementation of IBFI to achieve desired targets.

Dr Nihar Jangle, Director Climate Change Program at MIA (Micro Insurance Academy) made a presentation which touched upon challenges in insurance marketing, MIA's agri index and model for agriculture insurance. Key points in the presentation –

- Duplication of product linked to agricultural loans without due regard for local risk
- Trust deficit between end users and insurance companies. Complicated process and regulatory constraints
- MIA developed an alternative model. In traditional model, a readymade product is sold by insurance companies to the end users who are farmers / govt agencies
- In the alternative model, with the technical help of MIA, the community who are end users of the product is involved in robust process to design the insurance scheme which will be provided to the insurer / re-insurer for implementation.Three main types of risks – water stress, water logging and excess heat represented by various

parameters comprising of climatic and non-climatic types. Dominant parameters are bridged to form a cumulative index called CCC

- Comparison with traditional insurance yielded 75 % cheaper premium and high correlation co-efficient
- water stress, water logging and excess heat – Index based insurance
- Hail storm and livestock – indemnity type
- Government involvement need to be much larger, communities should have larger say in final product design and link insurance with value-added services

Mr Sebabrata Sarkar from SWISS RE presented an introduction to Swiss Re, overview of the Index based agriculture insurance and work in Bangladesh. Some key points from the presentation –

- Traditional insurance traits – high transaction cost, longer payout times, subjective
- Index based – low transaction cost, short payout times, automatic payout once the threshold is breached.
- Challenges in IBFI – lack of historical data / data sharing mechanisms between stakeholders, cost of generating data from new weather infrastructure and models and reliability of the data
- IBFI - evolution of weather index crop insurance. India – long history of wide scale crop insurance implementation from indemnity to index based.
- Weather based insurance – Usually a parameter signifying water stress is used as index.
- Often calculated from remote sensing products : some of the indices are NDVI, FAPAR, LAI, VHI
- Bangladesh flood insurance case study
    - Agriculture based economy contributes 18.6% to country's GDP and employs 45% of labor force. Rice – key crop.
    - Meso level flood index cover was designed for poor and vulnerable people in the areas of Sirajganj district.
    - Solution features (rice)
    - Cover: *Flood Index* insurance to cover loss of income/livelihood due to floods
    - Flood data : Provided from hydrodynamic model developed by IWM using water discharge, rainfall, topography, landuse, historical river channel water depth
    - Payout: Trigger 1 : Flood level breaches pre defined threshold
    - Trigger 2 : Flood inundation continues over a pre defined time period
    - Sales: Insurance policy holder is Manab Mukti Sangstha – NGO providing loans to poor householders
    - Scale (pilot): 1661 Households covered in first pilot

This project is being touted as an example of successful IBFI pilot / implementation studies in South Asia.

Dr PK Joshi from IFPRI pesented briefly on the role of IFPRI in this project along with business models and scaling up possibilities. The results and lessons learnt of the Scoping assessment of IBFI and Farmers consultation undertaken was elaborated. Key takeaways include -

- Huge economic loss due to floods affecting crops in Bihar. It is a recurrent scenario.
- Existing crop insurance schemes covers millions of farmers in India. Compared to the uninsured farmers, the coverage is moderate.
- Complexity - Single *parameter does not adequately describe the flood impact on crops and a multiple parameter based index is complex. Lack of data*
- Premium price - affordability among marginal farming communities a major issue. Government subsidy needed
- Awareness - *Awareness about the benefits of insurance in the public are lacking*
- An appropriate loss model representing the risk to crop during various growth stages for various depths and duration of flooding needed.
- Lack of weather / flood parameters will be major hindrance along with policy delays in pay-outs
- IFPR's role :
    - Farmers' preferences of flood products & their feasibility
    - Financial feasibility of insurance products under different scenario
    - Develop business models acceptable to farmers and insurance industry
    - Develop institutional framework for scaling-up flood insurance product
- Specific tasks
    - Baseline socio-economic data collection
    - Analysis of social, institutional and policy arrangements that facilitate farmers' inclusion; cost-benefit sharing for sustainable operation
    - Assess the expected benefits of IBFI interventions on gender and socially disadvantage groups in flood risk zones
    - Develop an insurance market to scale-up the potential benefits of IBFI product on a sustainable basis

Apart from product design, Scale of operation, Infrastructure for monitoring flood risk, Institution arrangement for claim settlement and Capacity development and awareness of product will be determine the success of the product.

Panel Session with insurance representatives
(AIC, Bajaj Allianz, ICICI Lombard, SWISS Re, TATA AIG, MS Cholamandalam, IFFCO Tokio, MIA)

In this session facilitated by Dr Pramod Aggarwal, a group of insurance company representatives were given a set of questions to elucidate their perception and experience on the topic.

The objective of this format was to get some feedback from the industry about the challenges existing and to reflect their interest in a product of this nature. A summary of some points made during the session –

- *Swiss Re on current state of agriculture insurance in India and lessons learnt and challenges* - Mentioned about GoI scheme callled BKBY (Bharatiya Krishi Bhima Yojana) which categorically mentions that it covers pre sowing planting risk, post harvest risk and localised risks like floods in the scheme. At present stand alone flood insurance schemes does not exist. The structure of the model of how we want to reach out to the beneficiary is something to be thought about and factors like these should be considered- micro level cover, integration with other schemes, meso-level cover where a community based organisation could reach out to policy holder (the advantage here is that the disbursement of scheme becomes easier and faster) or Macro level insurance where govts buy insurance which might help in linking with DRR and Climate Change Adaptation.

- Adverse selection is big challenge especially for a high flood risk zone, how do we club other than crop factors like household, livestock with flood insurance as the loss is different

- *MIC – how can agri flood insurance link with Disaster Risk Management*
  Having a good index is not sufficient and doesn‘t guarantee that the product would be accessible, the key is to create a demand from the consumers end. we need to empower communities to manage the insurance.

- *ICICI - Comprehensive flood insurance product –*
  Flood insurance is not just for agrculture but should consider whole livelihood.

- *IFFCO- Tokio - effective incentive mechanisms*
  Incentive would be based on the the product design factors like - Risk zones – high low, flood maps and payouts. Scaling out through cooperative like IFFCO would be useful.

- *TATA AIG - which PPP index insurance would you like to highlight as a model*
  WBCIS data parameters, weather stations, data system which is above disputes and helps in settling claims quickly. TATA is working with GoB for earthquake and flood insurance, taken up as part of CSR activities.

- *Bajaj Allianz- market or potential for flood insurance and how to make it more successful*
  Potential is big as the occurence of the natural disaster especially flood has become more. Need to come up with quality product.

- *AIC –future of IBFI*
  Mentioned that NAIS was modified into BKBY, which was made into a full fledged scheme. AIC will definitely partner for this project. Raised doubt about positioning of this IBFI product as in NAIS or modified NAIS, flood is already covered in BKBY and assessment is at a farm level. Govt is already thinking of a boradbased scheme *UPIS (Unified Package insurance scheme)* for the farmers which would combine nine features including health insurance with mandatory crop insurance.

Also mentioned that pilot should be chosen in such a way that ulitimately it becomes a success so that it can be scaled up. So if sites which are perenially flooded are chosen then actuarial premium would be very high with frequent losses which would raise the premiums. Probably government would have to heavily subsidize the scheme. so some distributed sites which are not that perenially flooded could be chosen.

Some other points raised –

- We need to be clear who are the buyers ad whom are we designing the product for?
- Bundling is important and whether the product should be acturial or integrated into a social security scheme.

Technical Presentation

This session was focussed on progress and research highlights made in the program till now.

Rajesh Pandey from IWMI presented on Site Priortization and district selection for development of IBFI through skype. Couple of questions were raised in his presentation – instead of crop insurance alone whether it can be a comprehensive insurance which can be include livestock and fisheries, secondly in site prioritization if all the risk zoning or possible zonation falls under the selected location. Key points –

- Integration of data from multiple sources
- Hydrological, agriculture, economic and physical data from IWMI data base, state and central government agencies like CWC, FMISC, BSDMS, etc
- Hydrological – Long term rainfall data from IMD, inundation map from MODIS, flood characteristics data from multiple government sources.
- Inundation data from MODIS revealed Dharbhanga, Muzafarpur and Sitamarhi to be highly flood prone.
- Assessment of data from submerged total area, crop area, crop loss provided Samastipur, Darbhanga and Madhubani as priority area.

Luca Brocca, IRPI-CNR from Italy made a video presentation on Rainfall Runoff modeling to derive flood flows and explained the combination of hydrological and hydrological model for prediction of rainfall and flood forecasting to derive the flood flows as well as to work out the depth of submergence through model like Mike 11 which shows these kinds of tools can be used for the pilot area. Some aspects raised in the presentation –

- MISDc hydrological model will be used to estimate the discharge hydrograph along the river by using rainfall and air temperature as input.
- Estimated discharge will be used in Mike 11 hydraulic model to derive flood characteristics.
- Flood forecasting system will provide flood inundation maps for the region of interest from which flood characteristics will be automatically extracted.

Karthikeyan Matheswaran from IWMI presented on Flood hazard modeling to derive flood parameters. Key points raised –

- How much water and how long? – Depth and duration of crop submergence due to floods
- Also called as flood characteristics
- Flood hazard model : Input – River network, cross sections, longitudinal profile, DEM and discharge data.
- Output: 1D- water level at different river locations, 2D- flood depth over area of interest.
- Flood hazard map of Muzzafarpur district revealed sections of Bagmathi to be flood prone covering Katra, Aurai and Gaighat.
- Mike Flood model will be created for this section of River Bagmathi.

Zhiwei Shen, Humboldt-Universität zu Berlin made a recorded presentation on Flood loss module and index development for the pilot area. Some aspects touched upon –

- Traditional insurance payments are based upon actual losses incurred

- Index based payments are based on observable indices like rainfall, temperature, flood depth etc.
- Derive flood characteristics from hazard model, relate crop yield with index and payout as a function of threshold breach
- Single / multiple parameter index – complexity increases as number of parameter increases
- Pricing the index through assessment of multiple methods based on product requirements (ex: Burn analysis, index value simulation and daily value simulation)

Feedback from the chair- The stage of crop which is very sensitive to the depth of submerge. Also crops are not sown in one day, it is done in a staggered manner so the stages also changes according to the region. As we add precision to the model more complexity would be added.

Operational Planning of Project

Srinivasa Rao from eeMausam presented IBFI Implementation strategy and Components in detail.

Nitasha Nair presented on communication and uptake activities. The objectives of the presentation included elaborating what we mean by communication and uptake in the context of the project and to get a feedabck from the group of how to make the research more effective through information and knowledge sharing.

Group Discussion - Flood insurance for rural areas

The group was divided into three group to discuss below questions or so, and then summarized the discussion in plenary using chart boards.

Group I: Technical aspects and key challenges on development of flood insurance products and Role of Flood Insurance in Disaster Risk Management?

Group II: What Policy and Economics analysis are needed for implementation of flood insurance product? Could the group also focus on need for robust business model and Institutional framework for scaling potential?

Group III: The group will focus on engaging farmers and addressing their basis risks and need to develop strategy to address livelihood, improving agriculture resilience. Further the group will focus on communication strategy, engaging PPP model and capacity building and awareness programme.



Group 1

What do we know and what do we still need to learn about flood insurance? Right parameters essential for an index based product?

- Insurance coverage could be either static or dynamic. It should be decided earlier what should be the basis of flood insurance coverage. The causes of flood also needs to be understood in terms of the loss point of view including loss of crop, livestock, property etc. Flooding may also be due to surface ponding, drainage congestion, spilling of rivers etc.
- For understanding key parameters first flood hazard zoning needs to be done as it might change for different districts and then suitable/relevant parameters identified such as –
    - Onsite- rainfall
    - Spilling of river
    - Breach of canal/embankment
    - River Erosion
- Flood links should be considered as disaster and add on such as cyclone, hailstorm
- Stand-alone agriculture based flood insurance could be considered with options of add-on cover provided to have robust loss estimation model for impact of assessment of flood on different property
- Yes it can be a credit link as presently done for housing loan with life/property insurance
- It can be integrated with existing Crop Insurance schemes of Govt of India or can be positioned as stand alone
- Only a small portion of the premium should be paid by the farmer and balance by the state/central govt

Group 2

What Policy and Economics analysis are needed for implementation of flood insurance product?

** Aggregator model:

- For an Agrarian economy like India, it is difficult and perhaps improbable to imagine an aggregator model excluding the government.
- It is unlikely that the government will allow a parallel business model dominated by private players.
- Hence a PPP model like the one used for RSBY needs to be thought of.

** Subsidies:

- Yes, subsidies are required but the team is not qualified to comment on what would be a suitable level of subsidy.
- Differential subsidy was discussed – based on SEC or type of crops.
- Legal mechanism to engage a 'tenant' farmer needs attention.
- It was agreed that subsidies should be defined in a manner that does not discourage farmers from implementation of DRR activities, which they would have otherwise carried out in the absence of subsidies.
- ACRE model was referred to, as an example of non-monetary compensation (new bag of seeds, replacement saplings)

** Policy changes sought:

- An independent regulatory body for Agriculture insurance
- Community insurance scheme regulations
- Premium to be exempt from Service Tax
- Longer policy term for 3 years advocated for increased customer stickiness

Group 3

The group will focus on engaging farmers and addressing their basis risks and need to develop strategy to address livelihood, improving agriculture resilience.

- Bundle product (property/livestock/crop)
- Localised claim settlement
- Audio visuals are the best modes of communications
- Farmers have the paying capacity (subject to lower farmers share)
- SHGs can be useful in terms of instituitional setup
- A viable business model is required to distribute the product through MFIs
- Awareness strategy could include – Mass campaigns, Farmer portals/sms, Village lead memebers, focuson women SHGs, advertisement through kisan channels

Field trip to Gaighat (Bagmati Basin) - *contributed by N G Pandey, NIH*

A field visit to Gaighat village situated on the bank of Bagmati river (about 80 km from Patna in North Bihar) was undertaken on August 02, 2015 with the IWMI team. This visit was a follow up activity of the Inception Workshop 'Index based Flood Insurance-IBFI' organized at Hotel Gargee Grand, Patna on 01 Aug., 2015 by IWMI, Colombo. The objective of the workshop was -how to safeguard the interest of the poor farmers of a flood prone area on crop damage? Way out to design a farmer's friendly insurance package so as to mitigate their crop losses due to flood. A multidisciplinary team consisting of persons from insurance sector, water mangers, scientist from ICAR/NIH along with experts from IWMI headed by Dr. Giriraj Amarnath visited the area and interacted with farmers to identify socio-economic constraints and sensitive parameters for putting farmers under insurance cover.

About 30-35 farmers of the project site participated and interacted. Dr. Anoj Kumar, IWMI introduced the team to the farmers and the Mukhya was made the Guest of Honor. Dr. Rao, eeMausam briefed the purpose of the meet and explained the objectives of flood insurance on crop damage. Dr. Tyagi, Director (Retd), Indian Soil Salinity Research Institute, Karnal made the farmers comfortable and initiated interaction. The farmers explained their experiences regarding local flood menace. Rice is the main Kharif crop and in Rabi farmers grow wheat, maize, pulses (masuri, khesari). On enquiry about rice production farmers intimated good production fetches about 22 quintal/acre (1 acre=22 kattah) and 10-12 q/acre on an average. Since the rice production is below the country's average yield of 20-25 q/acre, the reasons were asked from the farmers. They explained it is due to scanty rainfall in June-July, late raising of nursery, short supply of power, flooding and standing water over the crop, pest attack etc. Dr. Tagyi wanted to know the depth of flood water and the duration upto which paddy can sustain. Farmers experiences reveal that 4-5 feet water standing over (even 6 -10 inch height of paddy) for 5-10 days imposes no problem, 11-15 days 10-15% damages and over 15 days the whole crop fails. If flood comes in October damage would be more.

We visited the site on 1st August but the area was facing scarcity of rain and if this continues transplantation would be impossible. On enquiry farmers told that small flood of 3-4 feet depth every year is a boon as it carries silts and improves soil fertility and no chemical fertilizer is needed. Further it raises the bed of the flood plain. Thus the area may be flood prone but farmers are happy with floods of small depth of 4-5 day duration except the severe floods like that of 1987, 2004 and 2008. Farmers reported that they incur losses in paddy cultivation in rainfed condition (cost of cultivation

Rs.500 and earnings are Rs. 1000 per kattah) but constrained to do so being the profession.

Insurance experts gathered information from farmer's about their interest towards insurance cover and tried to familiarize them with flood, crop damage and insurance. Farmers are acquainted with KCC and weather based crop insurance but not satisfied on settlements. Assessment by block level officials are whimsical and damage reported are not as per actual. Block level reports on crop cutting experiments is not justified and time over run (more than a year) to get claim has created loss of creditability. Dr. A Upadhaya, Principal Scientist, ICAR, Patna thereafter interacted with farmers and talked in their languages and clarified farmer's doubts. Farmers were satisfied but we need a way out to sort out the complex issues of flood indexing, damage assessment procedure, easy and quick settlement so that farmers appreciate our motive. Once farmer's confidence is gained they will adopt and advocate the scheme in neighboring villages but seeing is believing.

In this context we recommend the following:

1. Definition of flood damage of crops need be revisited. Dr A. Upadahaya expressed incorporation of waterlogging at crop root zone (rise in sub surface water table due to infiltration of flood water) as a parameter of flood indexing for sensitive crops.
2. Insurance cover should be comprehensive and add on for example damage of livestocks/property/heatlh etc need to be considered.
3. Procedure to bypass block level harassment to farmers and easy settlements. A robust procedure of damage calculations and fixing responsibility (to whom?) to be decided.
4. Establishment of Gauge at defined river cross section at various locations of the reach and generate own data employing local village people. Assign responsibility for upkeep of the instruments paying honorarium.
5. Formation of self help group and let the people understand and keep the project operational on completion of the scheme. Training in this regard needs to be provided.

This is the beginning. Let us think Big, act Wisely and get Results. The meeting ended with vote of thanks from Dr. Anoj Kumar and group photograph was taken with the farmers. We ended a successful farmers meet and exchange views among ourselves, friendly relation developed.

Action Arising from the workshop

1. Completion of site prioritization report in Bihar that includes risk zoning at district level, engage stakeholders discussion to set up pilot trials;
2. Collaboration with NIH, Patna in support for development flood hazard model, establish guage stations through communtiy engagement;
3. Coordination with CWC – New Delhi, Patna for water level data sharing in settting up flood hazard model and insurance index development;
4. A draft scoping report on IBFI in South Asia need to be compelted by IFPRI/IWMI for sharing among partners;
5. MoU among multiple partners project lead-re(insurer)-implementer for designing the product and implemention in pilot trail;
6. The revised Operational Matrix for the project to be shared to all team members;
7. Completion of detail work plan among partners (including IWMI) and need to be submitted to PL for review and finalization. This will be reviewed and compiled to develop project level plan (partitioned according to activity and country). Workplans received from partners will form the basis for the ToRs.
8. Communication &Uptake Plan needs to be further fine-tuned taking on board input from the workshop and prioritizing the handful of key strategies (Nitasha/Giriraj) including promotional materials (e.g. video clip, blogs, websites);
9. Follow up stakeholder engagmenet workshop to be held in Dhaka possibly in the October 2015 to initiate project activities; Already IWM is initiate the modeling activities and engage and briefing other partners to stregnthen activities;

Annex – 1 Workshop Agenda

Inception Workshop on

"Enhancing the benefits of Remote Sensing Data and Flood Hazard Modeling in Index-based Flood Insurance (IBFI)"

01 August 2015, Hotel Gargee Grand (Patna-Bihar)

Program Outline

Time	Program	Resource Persons
09:00 – 09:30	Registration	Nirmal Sigtia
Session 1: Inaguration ceremony Facilator: Nitasha Nair, IWMI Delhi Office		
09:30 – 10:15	Welcome Remarks and CCAFS South Asia Programme	Pramod Aggarwal, IWMI Delhi
	Workshop introduction and Index-based Flood Insurance (IBFI) Project concept	Giriraj Amarnath, IWMI HQ
	Remarks from FMIS-Water Resources Department	Nagan Prasad, FMISC Patna
	Opening Remarks by Chief Guest	Shri. Dr. C. P. Thakur, Member of Parliament, Rajya Sabha
	Vote of thanks	Pramod Kumar Joshi, IFPRI India
10:15 – 11:00	Group photos / Morning Tea with Chief Guests	
Session 2: Project overview and Plenary Talk Chair: Mr. E Chakraborty, NIH Patna		
11:00 – 11:15	Project Overview and Strategy	Giriraj Amarnath, IWMI HQ
11:15 – 11:35	• Risk Transfer Financing Mechanism to address Disaster Risk Management • Agriculture Index Insurance in India - with focus on Weather & Flood Index	Nihar Jangle, MIA Sebabrata Sarkar, SwissRe - India
Session 3: Insurance Perspective on Flood Insurnace for Rural Farmers Chair: Pramod Aggarwal, IWMI-Delhi		
11:35 – 12:30	• Industry perspectives on flood insurance for rural areas	AIC, Bajaj Allianz, Swiss Re, ICICI-Lombard, IFFCO-TOKIO, MIA, Chola-MS, TATA AIG
Session 4: Progress and Research Highlights Chair(s): Sunil K. Ambast, ICAR-IIWM and Nagan Prasad, FMISC-Patna		
12:30 – 13:30	• Site Priorization and district selection • Rainfall Runoff modeling to derive flood flows • Flood hazard model to derive flood parmaters • Flood loss module and index development	Rajesh Pandey, IWMI HQ Luca Brocca, IRPI-CNR, Italy Karthikeyan Matheswaran, IWMI CA Zhiwei Shen, Univ. Humboldt Berlin Pramod Kumar Joshi, IFPRI India

	• Business Models and Institutional Framework for Up-scaling	
13:30- 14:30	*Lunch*	
Session 5: IBFI Implementation Strategy and Outreach Chair: Nagan Prasad, FMISC-Patna		
14:30 – 14:40	• IBFI Implementation strategy	Srinivasa Rao, eeMausam
14:40 – 14:50	• Communication and outreach activities	Ms. Nitasha Nair, IWMI
Session 6: Group Discussion		
14:50 – 15:45	Group discussion and reporting to refine key outputs for each activity	
15:45- 16:00	*Tea break*	
16:00- 16:30	Group presentation	
16:30	Next Steps & Closing remarks	
19:00 – 21:00	***Project Dinner @ Gautam Hall, Hotel Gargee Grand***	

02 August, 2015 (DAY 2)		
Time	**Program**	**Coordinators**
All Day from early morning	One day field trip to Northern Bihar to inspect proposed focus site for IBFI pilot trial activities *(refer logistic guide document)*	Matheswaran Karthikeyan and Anoj Kumar

Annex 2 – List of participants

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Annex 3 – media release and coverage

PRESS RELEASE

Space technology to help develop flood insurance for India's farmers

Experts meet in Patna to discuss new initiative that could "future-proof" one million smallholders

Patna, (August 1, 2015): Representatives from State and Central government agencies , NGOs, private insurance companies, farmers and development partners met today to exchange ideas and expertise in an inception workshop for a new project on developing 'Index-Based Flood Insurance (IBFI)'. The project aims to develop effective payout schemes to protect low income communities in flood prone area by improving their ability to cope with flood risks. The day long workshop was presided by Dr. C P Thakur, Member of Parliament, Rajya Sabha and was organized by International Water Management Institute (IWMI) and CGIAR research program on Climate Change, Agriculture and Food Security (CCAFS). Speaking at the workshop Dr Thakursaid, "Bihar has suffered a lot due to floods, this kind of product is very much needed. The product should go beyond a scheme and see how it can address overall socio-economic development to reduce poverty"

Many states in India face huge losses due to floods every year. Bihar is the most flood-prone state in the country and has suffered an agricultural loss of almost 22 Billion Rupees in the past twelve years due to flood disasters. In addition to economic and agricultural losses, floods severely impact people and their livelihoods, according to government reports, around 3.3 million people were affected in the state alone due to the floods in the Kosi River in 2008.

The IBFI project is being undertaken in Bihar, India and in Sirajganj and Gaibandha districts in Bangladesh. It aims to integrate technologies like remote sensing images and geographic information system (GIS) along with flood hazard model to develop reliable flood parameters to index insurance. Researchers hope the scientific approach would help in speedy and more effective compensation payouts.

The pilot regions fall in the Ganga, Brahmaputra and Meghna (GBM) river basin region, which is one of the most populated regions in the world with almost 650 million people living there. Climate change and high frequency of natural calamities such as

floods has further increased the vulnerability of the poor in this basin. The rivers in these regions create flood problems in their respective basin areas during monsoon months almost every year. As the monsoon season begins, water comes down from the Himalayan hills with enormous force, causing rivers like Kosi, Bhagmati, Ganga, Mahanadi to rise above the danger level. This results in severe floods especially in North Bihar. According to Flood Management Information System (FMIS), Muzaffarpur district alone suffered over 3 Million USD loss per year from 2001 to 2012 due to floods.

The workshop served to inform relevant stakeholders on the steps toward the commencement of the full scale project in the pilot regions identified, introduce the project team and establish a key working group made up of government, experts, NGO and private insurance company stakeholders. “Through this project we want to increase the agriculture resilience of the vulnerable farmers in flood prone regions. This is a first of its kind attempt at such a large scale, we are hoping that this project will lead the way for more effective catastrophe insurance in a natural disaster prone region” Said Giriraj Amarnath, Project Leader and Senior Researcher at IWMI.

The workshop was attended by experts by participants from multiple organizations Agriculture Insurance Corporation (AIC), GIZ, Department for International development (DFID), BSDMA (Bihar State Disaster Management Authority), Agriculture Department- Bihar, Flood Management Improvement System (FMISC), National Institute of Hydrology (NIH), Indian Council of Agricultural Research (ICAR), private insurance firms like Bajaj Alliance, farmers and others.

For further information please contact Giriraj Amarnath (a.giriraj@cgiar.org) or Nitasha Nair (n.nair@cgiar.org)

The Indian media coverage also extensively covered this event which can be viewed here - https://storify.com/nnair/ibfi-inception-workshop.

Annex 4 – Project Brief Brochure (2 page)

Increasing agricultural resilience and flood-proofing livelihoods

Remote sensing innovations for index-based flood insurance

Index-based flood insurance (IBFI) is an innovative approach to developing effective payout schemes for low-income, flood-prone communities. This project aims to integrate hi-tech modelling and satellite imagery with other data to predetermine flood thresholds, which could trigger speedy compensation payouts. Effective end to-end solutions will be developed in collaboration with a range of organizations and experts from central and state government bodies, private insurance firms, community-based organizations (CBOs) and nongovernmental organizations (NGOs). The project will cover India and Bangladesh, making it the first attempt to develop IBFI at a large scale

Why index-based flood insurance (IBFI)?

A growing population and an increasingly unpredictable climate have left a large number of people vulnerable to floods. According to a report by the United Nations Office for Disaster Risk Reduction (UNISDR) in 2011, about 800 million people are currently living in flood-prone areas, and 70 million are experiencing floods each year. Floods particularly affect agriculture, and can lead to widespread destruction and human tragedy, severely impacting communities, businesses, public services and ecosystems.

Traditionally, flood-risk management has focused on engineered responses, such as dams and flood walls, or rebuilding and compensation after the event. However, over the last few decades, evidence has emerged that a broader approach through planning, building regulation and early warning schemes can significantly reduce flood losses. IBFI is one such solution that is both cost-effective and can better target post-disaster relief.

5 facts about floods in Bihar

1. Bihar is India's **most flood-prone state.**
2. **73%** of the total geographical area is annually flooded.
3. **76%** of the population in North Bihar is at risk of flooding.
4. **Major flood events have occurred in 1987, 1995, 1998, 2002, 2004 and 2007.**
5. Muzaffarpur District, alone, incurred **losses of over USD 3 million** per year from 2001 to 2012 due to floods.

Source: Flood Management Information System (FMIS) and Disaster Management Department, Bihar.

Pilot locations

Muzaffarpur, Darbhanga, Samastipur or Katihar districts in Bihar, India, and Sirajganj and Gaibandha districts in Bangladesh.

Project

Duration: 2015-2018

Goal: Contribute to sustainable approaches to index-based flood insurance that can help smallholders better manage their production risks.

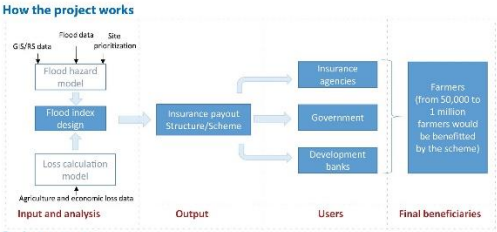
Objective: Develop remote sensing products for IBFI that can accurately depict yield loss in smallholder farming due to weather and/or other perils, and be scalable in insurance schemes delivered at micro and meso levels.

Flooding in eastern India as viewed by a Moderate-Resolution Imaging Spectroradiometer (MODIS) satellite image, August 2007 (*Source:* National Aeronautics and Space Administration [NASA]).

IWMI International Water Management Institute

CGIAR RESEARCH PROGRAM ON Climate Change, Agriculture and Food Security CCAFS

How the project works



Project outputs

- **Proof-of-concept on IBFI** coupled with the flood hazard model and remote sensing (RS) data in selected districts of South Asian countries.
- **Digital flood mapping tool** to monitor and quantify the impact of floods on crops, and its application in insurance schemes.
- **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.
- **Obtaining feedback** 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).
- **Policy and institutional guidelines** for the implementation of flood insurance.
- **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.

If the solutions proposed by the project are scaled up, by 2025, approximately 1 million farmers will have agricultural flood insurance, creating new and different types of jobs supported by strong public-private-partnership business models and delivering INR 10 billion in flood protection.

Project partners

Further information: This leaflet has been produced by the International Water Management Institute (IWMI). For more details, contact:

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