

# Agriculture Index Insurance in India

With focus on Weather & Flood Index August 01, 2015

#### Agenda

- 1. An Introduction to Swiss Re
- 2. Overview of Index based Agriculture Insurance
- 3. How Weather Index Crop Insurance works?
- 4. Role of Remote Sensing in Index Insurance
- 5. Case Study: Flood Index Insurance in Bangladesh
- 6. Final Thoughts



#### Swiss Re at a glance

- Leading and highly diversified global reinsurer
- Founded in Zurich (Switzerland) in 1863
- 150 years of experience
- Both traditional and innovative offerings
- Pioneer in insurance-based capital market solutions
- 11,000+ employees across 28 countries







#### **Our Portfolio**



- **50%**
- Corporate Solutions
- Admin Re



#### Crop Insurance – An Overview





### **Evolution of Crop Insurance Schemes in the World**





#### **Index Based Insurance**

#### **Merits**

- 1. Easy to understand parameters
- 2. Weather variables are observable, measurable and transparent
- 3. Independently verifiable by sources such as Government Met. Dept.
- 4. Reported in a timely manner
- 5. Can be combined allowing for many different solutions

#### Challenges

- 1. Basis risk
- 2. Availability of historical data
- 3. Cost of data generation (e.g. setup of weather stations etc.)
- 4. Reliable data to determine payoffs
- 5. Understanding of & Trust in the index

#### **Evolution of Crop Insurance Schemes in India**



#### Weather Index Based Crop Insurance - Structure



🖬 Swiss Re

#### **An Illustration**

Example for deficit and excess rainfall cover				
Сгор	Soya bean	District	Indore	
Reference weather Station	IMD : Indore	Policy Cover Period	15th June 2010 to 31st July 2010	
Index	Aggregate rainfall in mm during cover period	Index Objective	To cover losses to farmers due to deficit and excess rainfall during germination phase	
Phase period	15-June-2010 to 31-July-2010			
1. Deficit rainfall cover				
Strike Index (mm)	175.00			
Exit Index(mm)	50.00			
Notional payment rate (Rs/mm/acre)	20.00			
2. Excess rainfall				
Strike Index (mm)	600.00			
Exit Index(mm)	900.00			
Notional payment rate (Rs/mm/acre)	8.33			
Sum Insured (Rs/acre)	2500.00			

#### **Claims Settlement Process**



#### **Remote Sensing in Parametric Crop Insurance**



#### **Complementing Satellite Data with Ground based** Intelligence





## **Case Study: Flood Index Insurance in Bangladesh**

#### Situation

- Agriculture is the single largest producing sector of the economy, contributes 18.6% to country's GDP and employs 45% of labor force
- Rice is the key crop with Bangladesh being the fourth largest rice producing country in the world.
- Bangladesh is a flood prone country and suffers from large-scale flooding periodically
- Meso level flood index cover was designed for poor and vulnerable people in the areas of Sirajganj district.
- Swiss Re acts as a development partner/advisor and is the key reinsurer

#### **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
- Premium subsidies : Provided by Swiss Development Corporation (2013), Oxfam (2014)
- Advantage: covers regional calamities, fast payout, lean costs for distribution / administration
- Disadvantage: basis risk















#### Flood Hazard Model used



Compensation Payment Schedule (per household in reference area)			
Continuous 10 or lesser days of flood	Tk 0 /-		
Continuous 11 days of flood	Tk 2800 /-		
Continuous 21 days of flood	Tk 4400 /-		
Continuous 26 days of flood	Tk 8000 /-		
# A flood day is when average water level of the reference area is higher than the corresponding water level trigger			

Water Level Triggers for Compensation			
Reference Area	# of Households	Water Level Trigger (mPWD)	
Aknadighi	148	14.35	
Boro Chouhali	56	11.35	
Chakbayra	54	12.70	
Choto Chouhali	105	11.10	
Fulbari	119	12.85	
Fulhara	168	11.00	
Khasborosimul	98	12.80	
Mollikpara	200	14.35	
Muradpur	379	10.90	
Panchosona	334	12.75	

#### **Parameters defined**



Flood Level	Index Level
0	0
11.00	1

0 = No breach, 1 = Breach

Date	Level (m)	Breach	Duration	Level	Payout
Sun, Sept 09, 2013	10.78570	No	0	1	0
Mon, Sept 10, 2013	10.96616	No	9	1	0.35
Tues, Sept 11, 2013	11.03798	yes	19	1	0.55
	•		23	1	1

### **Prerequisites for Index Implementation**

DESIGN	UTILITY	IMPLEMENTATION		
<ol> <li>Historical data with good length</li> <li>Good quality Rainfall &amp; River Runoff data</li> <li>Combining satellite data with ground based observations may increase the accuracy</li> <li>Quality controlled, cleaned, enhanced</li> <li>Reliable ongoing collection and reporting procedures</li> <li>Third-party settlement data</li> </ol>	<ol> <li>Ability to index risk</li> <li>Basis Risk or "How good is this insurance?"</li> <li>Quantification of losses due to impact of Flood</li> <li>Loss data that shows strong correlation with Flood event (in case of Flood index)</li> <li>Reasonable coverage through a single weather station/ loss assessment sample</li> </ol>	<ol> <li>Reliable distributors</li> <li>Strong Reinsurance support</li> <li>Local insurance company willing to intermediate product</li> <li>Favorable regulation</li> <li>Further research and investments are necessary</li> </ol>		

#### India: Key Success Factors for Scalability

- Huge farming population around 120 mn farm holdings and 2/3<sup>rd</sup> of population dependent on the sector.
- Support from government through premium subsidies, policy framework pre-existing PPP approach
- Fast growing agriculture/allied sector credit portfolio banking network used for distribution
- Robust network of weather stations having historical data States and Central government continuously upgrading the weather infrastructure and yield assessment machinery, private weather data providers
- Use of Remote Sensing encouraged
- Active private sector participation long term commitment from reinsurers like Swiss Re





#### **Thank You!**



## Legal notice

<sup>©</sup>2015 Swiss Re. All rights reserved. You are not permitted to create any modifications or derivative works of this presentation or to use it for commercial or other public purposes without the prior written permission of Swiss Re.

The information and opinions contained in the presentation are provided as at the date of the presentation and are subject to change without notice. Although the information used was taken from reliable sources, Swiss Re does not accept any responsibility for the accuracy or comprehensiveness of the details given. All liability for the accuracy and completeness thereof or for any damage or loss resulting from the use of the information contained in this presentation is expressly excluded. Under no circumstances shall Swiss Re or its Group companies be liable for any financial or consequential loss relating to this presentation.

