



Weather Based

Crop Insurance Solutions

College of Agriculture Banking, Pune

Pre-dinner discussion

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Presented by

Agriculture Insurance Company Ltd.,

Mumbai Regional Office



Weather Risks

- Many emerging economies owe their strength to favorable weather events
- These economies are also ill-equipped to deal with events - suffer the burnt of natural disasters
- No way to control weather, but a solution to the financial effects that weather can have on the incomes of economic agents



Rainfall Sensitivity

- Indian agriculture is extremely sensitive to rainfall
- Sixty five percent of Indian agriculture is heavily dependent on natural factors, particularly rainfall
- Rainfall variations accounts for more than 50% of variability in crop yields
- Indian Crop Insurance Program (CCIS and NAIS) accounted 90% claims to Rainfall



Vulnerability to Weather Risks

S.No	Countries	Popn. Living in Rural Areas	Agril. GDP
1.	Low Income	69%	27%
2.	Middle Income	50%	10%
3.	High Income	23%	2%

Source : World Bank, 2001



DROUGHT INCIDENCE IN INDIA

Number of Disaster Events		Period	People Affected (Millions)	
Total	Drought		Total	Drought
121	8 (6.6%)	1965-80	662	500 (75.5%)
181	5 (2.7%)	1980-95	849	502 (59.1%)
75	4 (5.3%)	1995-01	283	90 (31.8%)



Indian Summer Monsoon - Vulnerability

Deficit Rainfall Years	Monsoon Rainfall departure from Normal	Rainfall departure during July	Fall in Kharif food grain production
1972/73	-24%	-31%	-7%
1974/75	-12%	-4%	-13%
1979/80	-19%	-16%	-19%
1982/83	-14%	-23%	-12%
1986/87	-13%	-14%	-6%
1987/88	-19%	-29%	-7%
2002/03	-19%	-49%	-19%



Basic Tenets of Insurance

- The likelihood of event must be readily quantifiable
- The damage it causes must be easy to attribute and value
- The probability of occurrence should not be too high to make insurance unaffordable
- Occurrence of event or the damage it causes should not be affected by insured's behavior (Moral Hazard)
- Independent Risk

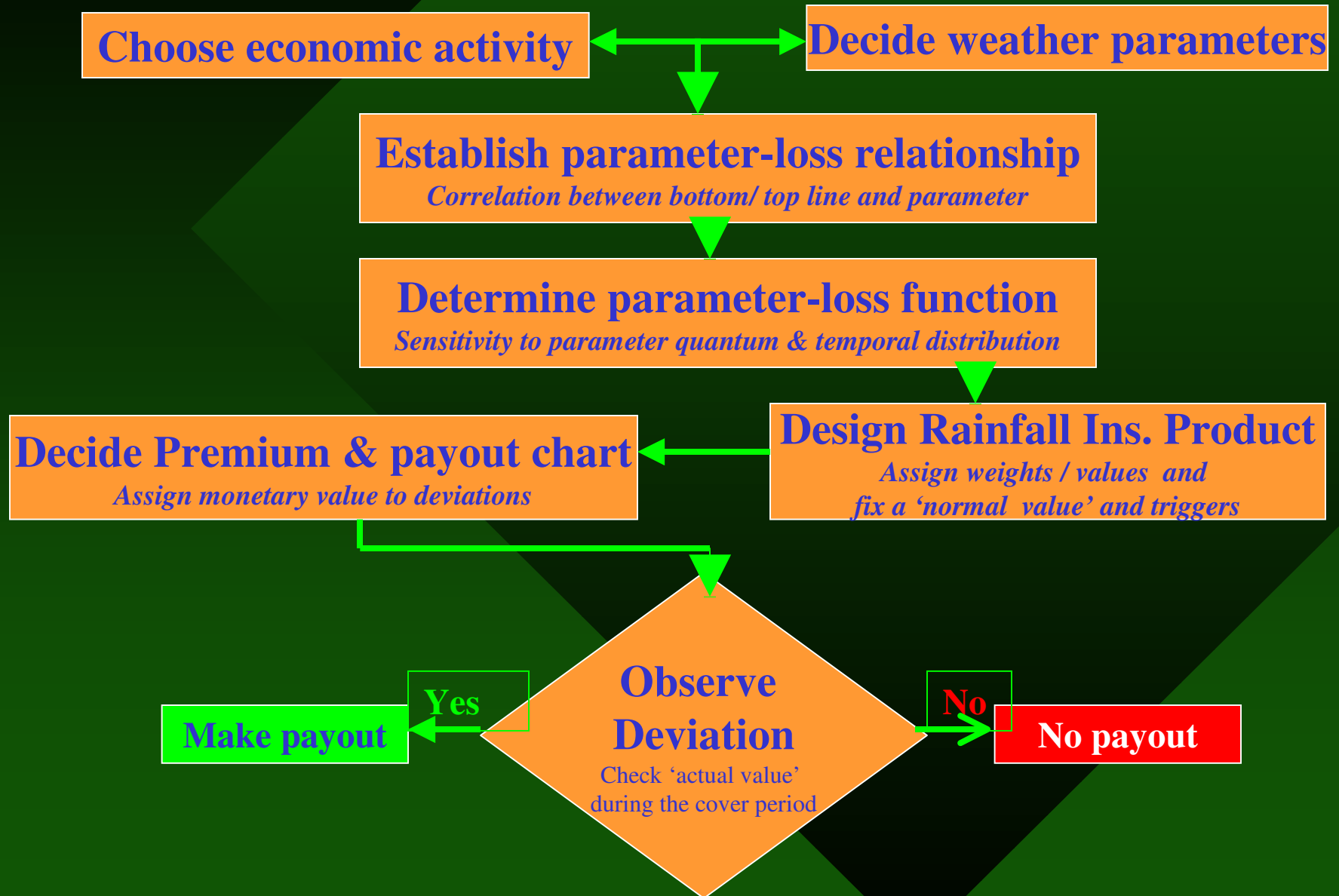


Short-comings of Traditional Insurance

- **Moral hazard, leading to high claims**
- **Adverse selection of risk by taking undue advantage of the system**
- **Involvement of multiple agencies and huge administrative cost of running the programs, hidden in Government Budgets**
- **Lack of reliable methodology for estimating and reporting crop yields**
- **Lengthy process of claims settlement**
- **Moving Average and Low Indemnity limits**
- **Programs limited only to growers (cultivators)**
- **Low Penetration of crop insurance**



Rainfall Insurance -Process Chart





Rainfall Insurance - Advantages

- **Trigger events can be independently verified**
- **No Moral Hazard, Adverse Selection problems**
- **Inexpensive to operate**
- **Wide section of people can be covered**
- **Wide variety of crops can be covered**
- **Expeditious claim settlement**
- **Can also be implemented for crops with no past yield data**
- **No adverse impact of previous low yields / lower indemnity limit**



Rainfall Insurance - Advantages

- **Reduces loan default risk - so better terms can be offered by FIs**
- **Does not encourage potential negligence on the part of insured.**
- **Heterogeneity of weather products across industries give rise to market for weather risk derivatives**
- **Wrap around / double trigger products**
- **Secondary Financial Markets**
- **International Reinsurance**



Rainfall Insurance - Challenges

- Reliable and verifiable data
- Tamper proof weather stations (OPS, Real time Telemetric Gauges, RST)
- Temporal and spatial variations in Rainfall
- Systemic nature of weather risk
- Actuarial soundness
- Insurance Regulations



Weather Parameters

Parameters Covered

- Precipitation
 - Rain
 - Snow
 - Hail
- Temperature
- Wind
- Sunshine
- Relative Humidity

Nature of losses

- Production loss
- Revenue loss
- Asset loss
- Loss of livelihood

Cover is provided for deviations from the optimum range required



Where is it applicable?

- Agriculture & Livestock
- Agri-business
 - **Agri-Inputs**
 - **Food-Processing**
- Energy
- Travel, Tourism, Sports, Leisure
- Health & Pharmaceuticals
- Consumer goods
 - **Durables: Cooling gadgets**
 - **FMCG: Beverages, Personal care**
- Events
- Construction



Which countries use this extensively?

- USA, Canada (Alberta, Ontario), UK, Netherlands, Argentina, OECD countries (including Mexico), Morocco, South Africa, Uganda
- Applications:
 - Agriculture
 - Food Processing
 - Energy (Power Utility Companies)
 - Leisure industry
 - Reinsurance of property & casualty



Varsha Bima - 2005

SEASONAL RAINFALL INSURANCE

- Coverage is against adverse deviations in “Actual Rainfall” (in mm) from “Normal Rainfall” (in mm) for the entire season beyond 20%.
- “Actual Rainfall” is the monthly cumulative rainfall from June to November (with June to September or October for short & medium duration crops).
- The pay-out structure is designed in such a way that the yield output elasticity (i.e. sensitivity of a crop to given adverse deviation in rainfall for a particular crop) is correlated to various ranges of adverse deviation in rainfall.
- The sum insured per hectare is the maximum pay-out corresponding to the maximum potential loss. The claim pay-out shall be on a graded scale (in slabs), corresponding to different degrees of adverse deviation in Actual Rainfall.



VARSHA BIMA 2005 (UTTARANCHAL)

Option: Seasonal Rainfall Insurance

District: DEHRADUN

1.	Season span / Period of insurance	:	1 ST June to 31 st October 2005		
2.	Risk Acceptance Period	:	Upto 30 th June 2005		
3.	Reference IMD Rain-gauge Station	:	Dehradun		
4.	Rain-gauge Station's jurisdiction for Rainfall Insurance	:	Doiwala, Sahaspur, Vikasnaga		
5.	Normal Rainfall (mm)	:	1969.5		
6.	Crop	:	PADDY		
7.	Maximum Pay-out (fixed per hectare)		Rs. 12000/-		
8.	Premium (fixed amount per hectare)	:	Rs 840 + Rs. 87 (Service tax @ 10.2%)= Rs. 927/-		
9.	Pay-out structure (compensation structure at various levels of Rainfall deviations)	:	Actual Rainfall	Range (mm)	Payout (Rs)
			1477	1575	995
			1378	1477	1234
			1280	1378	1529
			1181	1280	1896
			1083	1181	2350
			984	1083	2913
			886	984	3611
			787	886	4476
			689	787	5549
			590	689	6878
			492	590	8526
			393	492	10568
			0	393	12000



Varsha Bima -2005

SOWING FAILURE

- Coverage is against deviation in “actual rainfall” (in mm) from “normal rainfall” (in mm) during the sowing period, beyond 40%
- The period is reckoned as 15th June and 15th August
- Pay-out is decided on the basis of extent of deviations in the rainfall.
- Sum insured is the maximum input cost incurred till the end of sowing period



Option: Sowing Failure Insurance

District: DEHRADUN

1.	Season span / Period of insurance	:	15 th June to 15 th August																		
2.	Risk Acceptance Period	:	Upto 15 th June																		
3.	Reference IMD Rain-gauge Station	:	Dehradun																		
4.	Rain-gauge Station's jurisdiction for Rainfall Insurance	:	Doiwala, Sahaspur, Vikasnaga																		
5.	Normal Rainfall (mm)	:	1218.4																		
6.	Crop	:	PADDY																		
7.	Maximum Pay-out (fixed per hectare)		Rs. 4200/-																		
8.	Premium (fixed amount per hectare)	:	Rs. 252 +Rs. 28 (Service tax @ 10.2%)= Rs. 280/-																		
9.	Pay-out structure (compensation structure at various levels of Rainfall deviations)	:	<table border="1"> <thead> <tr> <th>Actual Rainfall</th> <th>Range (mm)</th> <th>Payout (Rs)</th> </tr> </thead> <tbody> <tr> <td>609</td> <td>731</td> <td>800</td> </tr> <tr> <td>487</td> <td>609</td> <td>1200</td> </tr> <tr> <td>365</td> <td>487</td> <td>1800</td> </tr> <tr> <td>243</td> <td>365</td> <td>3000</td> </tr> <tr> <td>0</td> <td>243</td> <td>4200</td> </tr> </tbody> </table>	Actual Rainfall	Range (mm)	Payout (Rs)	609	731	800	487	609	1200	365	487	1800	243	365	3000	0	243	4200
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609	731	800																			
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365	487	1800																			
243	365	3000																			
0	243	4200																			



WHEAT INSURANCE POLICY

(Based on Weather parameter & Biomass/Crop Vigour)

- Unique technology based product.
- Combining
 - Bio-mass / Crop Vigour (NDVI)
 - Weather (temperature and
 - Rainfall) parameters.



Important benefits of insurance linked to biomass trigger

- Trigger events are measured using high technology standards based on satellite imagery from remote sensing technology.
- These could be independently verified & measured and accurate.
- It allows for speedy settlement of indemnities, even before the crop is ready for harvesting



Coverage

- AIC shall compensate the insured against the likelihood of diminished Wheat output/yield resulting from
 - high temperature (in °C) consecutively for specified number of days above specified levels in the 1st and / or 2nd fortnight of March *and / or*
 - un-seasonal rainfall above the trigger levels during the period from 1st March to 15th April *and / or*
 - lower crop vigour (biomass) as measured using satellite imagery in terms of Normalized Difference Vegetative Index (NDVI) within the specified taluka / block during the month of February (preferably during the 2nd / 3rd week corresponding to peak crop vigour, subjected to availability of the satellite image) within a specific geographical location.



Additional Covers

- Yield loss due to **high heat energy** and **un-seasonal rainfall** particularly during maturity stage cannot be accounted for by bio-mass standards.
 - The high heat energy risk and un-seasonal rainfall risk at maturity is measured in terms of high temperatures and un-seasonal rainfall through IMD Reference Weather Stations (RWS).
 - These are again independent and facilitate early settlement of indemnities even before the crop is harvested.



Payout structure for NDVI cover

State	Punjab
District	Bhatinda
Block	Rampura
NDVI (Biomass / crop vigour)	
Average/Normal NDVI value	187.00
Actual NDVI value in the current season is less than	Payout at specific % of deviation (Rs. / acre)
175.42	500
173.59	1000
169.94	3000
Maximum Payout (Rs.)	3000
Premium (Rs.)	250



Temperature (Heat Energy)

Temperature Trigger during the month of March (in degree centigrade)

1st Fortnight

2nd Fortnight

31

35

Consecutive no. of days in which the temp.exceeds the trigger level and

Consecutive no. of days in 1st Fortnight	Payout	Consecutive no. of days in 2nd Fortnight	Payout
3	250	3	0
4	400	4	300
5	600	5	600
6	1000	6	1000
7	1500	7	1500
		Max. Payout (Rs.)	3000
		Premium (Rs.)	162



Excess Rainfall

Period	1st March to 15th April			
Daily Rainfall	20	25	30	40
Payout (Rs.)	500	1000	1500	2000
			Max. Payout (Rs)	2000
			Premium (Rs.)	188
			Total Payout (Rs.)	2000



THANK

YOU



Claims Procedure

- No claim form is required to be filled in by farmers.
- Claims process is automatic and starts immediately after receipt of data from agencies.
- Cheques are drawn and deposited in bank account of farmer specified in proposal form.