

# New Developments in Agricultural Insurance: A Latin American and Caribbean Perspective

Mark Wenner  
Inter-American Development Bank

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## Objectives

- Problems and Challenges
  - Inadequacy of Traditional Yield Risk Mitigation Measures
  - Grossly Underdeveloped Markets
  - Weaknesses of Multiple Peril Crop Insurance Programs
- Promise of New Products: Area Yield and Weather Based Indices
- Weaknesses of Parametric Products
- Overview of Agricultural Insurance Markets in LAC
- Experiences Promoting and Implementing Parametric Products in the Region
- Lessons Learned and Recommendations



# 1. Problem Setting:

## A. Inadequacy of Traditional Measures

- On-Farm Measures (Crop Diversification, Noncontiguous Parcels, Use of Drought Resistant-Low Yielding Cultivars and Species)
- Off-Farm Income
- Savings
- Mutual Insurance



....Inefficiency...

Lost of Productivity and Profitability



# I. Problem Setting:

## B. Undeveloped Modern Instruments

.... Modern Risk Management Instruments (Insurance (yield) Options (price)), Futures (price)) are more robust but are not readily available in developing countries.

For example , cultivated area insured in USA-72%; Canada-55%; Spain 43%; and Japan 79%.

Latin America with a relatively sophisticated food complex and two of the largest agricultural exporters in the world has a mode of 2% area insured and only had US\$309 million in agricultural premiums in 2005.

Why?.....



## I. Problem Setting:

### C. Reasons for Underdevelopment

- Lack of Statistical Independence. Agricultural yields tends to be positively spatially correlated.
- Asymmetric Information
- High Administrative Costs
- Mismatch between Farmers Preferences and Capacity to Pay
- Distorted Government Incentives
- Reluctance of Reinsurers to Enter the Market



## I. Problem Setting:

### D. Multiple Peril Insurance Programs....Unsustainable

- Moral Hazard
- Adverse Selection
- High Administration Costs
- Pricing Dilemma: Sound pricing would make it unaffordable. Control of moral Hazard requires high cost monitoring. Prevention of Adverse Selection requires subsidies to grow market. Subsidies represents fiscal cost that increases as national income levels fall and size of farm population rises.



## Agricultural Insurance Programs: Cost v. Premiums

Country	Time Period	(I+A)/P
Brazil	1975-81	4.57
Costa Rica	1970-89	2.80
Japan	1947-77	2.60
	1985-89	4.56
Mexico	1980-89	3.65
Philippines	1981-89	5.74
USA	1980-89	2.42
	1999	3.67

Source: Skees, 2003

## II. Promise of New Parametric Products:

### Strengths:

- Eliminates Moral Hazard
- Reduces Adverse Selection
- Lowers Administrative Costs
- Standardized and Transparent Structure
- Negotiable and Flexible
- MFIs can be used as platform for delivery
- Broad Market—Farmers, Traders, Banks, Governments, Suppliers, etc.



Premiums should be affordable w/o subsidies

### III. Weakness of Parametric Products

- Basis Risk
- Requires Precise Actuarial Modeling
- Data Intensive
- Regulatory Uncertainty—Insurable Interest or Derivative
- Changing Weather Cycles and Micro conditions
- Security measurements



Very High Development Costs



### IV. Overview of Crop Insurance Markets .... Grossly Undeveloped and Bimodal

In 2001, total worldwide agricultural premiums amounted to US\$6.5 billion, total agricultural production summed to US\$1.4 trillion.



# Insurance Markets are Bimodal

Region	Share of Agricultural Premiums
North America (U.S. & Canada)	55%
Western Europe	29
Australia and New Zealand	3
Latin America and the Caribbean	4
Asia	4
Eastern Europe	3
Africa	2
Source: Schuetz, 2005 (FAO)	

## Latin America and the Caribbean At a Glance

Country	Percent of Area Insured /Cultivated	Type of System	Public Subsidies
Argentina	30%	Private	No
Mexico	15%	Mixed	Yes
Venezuela	4%	Private	No
Brazil	.22%	Private	Yes
Honduras	1.5%	Private	No
Dominican Republic	<1%	Public	Yes
Costa Rica	2%	Public	Yes

Source: Wenner, 2005

# Latin America and the Caribbean At a Glance

Country	Percent of Area Insured /Cultivated	Type of System	Public Subsidies
Chile	2%	Mixed	Yes
Mexico	15%	Mixed	Yes
Colombia	<1%	Mixed	Yes
Ecuador	<1%	Private	N
Panama	<1%	Public	Yes
Paraguay	<.1%	Private	No

Source: Wenner, 2005

## Estimated 2005 Agricultural Premiums in Emerging Markets (US\$ millions)

Asia		<b>428</b>
of which	India	141
	South Korea	69
	China	69
Africa		<b>103</b>
of which	Rep. South Africa	60
	Nigeria	1
	Mauritius	19
Latin America		<b>309</b>
of which	Brazil	111
	Argentina	92
	Mexico	30
Eastern Europe and Turkey		<b>230</b>
of which	Turkey	36
	Hungary and Poland each	20
Source: Swiss Re	Czech Rep.	30

## V. Experiences with Parametric Products in LAC

- Mexico Drought Safety Net
- Mexico Earthquake Liquidity Hedge for Emergency Relief
- Caribbean Catastrophe Pool (CCRIF)
- IDB-WB-BCIE Central America Pilot Project
- IDB Project Identification Discussions: Colombia and Jamaica



### Mexico Drought Safety Net (FONDEN)

- Historic Background
  - 1995: Natural Disaster Fund (FONDEN) (Reserve Fund Evolves into Parametric)
    - 3 eligible categories for financing
      - Emergency relief and reconstruction
      - Public infrastructure
      - Productive assets for marginal populations (including low income or subsistence farmers)
        - » Target subsistence farmers: defined based on landholdings per state
        - » Eligibility criteria for small farmers: size of area under production (has.)
        - » 3 categories (5,15,20 has.); Sum Insured (US\$ 54/ ha.); Individual limit: 5 has.
        - » Premium 100% financed by government
  - 2001-2002: Special Contingency Fund for Agriculture (FAPRACC)
    - Insurance was defined as an eligible expense category of gov't resources for risk management
    - SAGARPA invested in R&D through Agroasemex for the design of the drought safety net program
      - Based on accumulated rainfall (insured: State Governments)
        - » Coverage for CAT loss: Equivalent to yield loss bigger than 70%





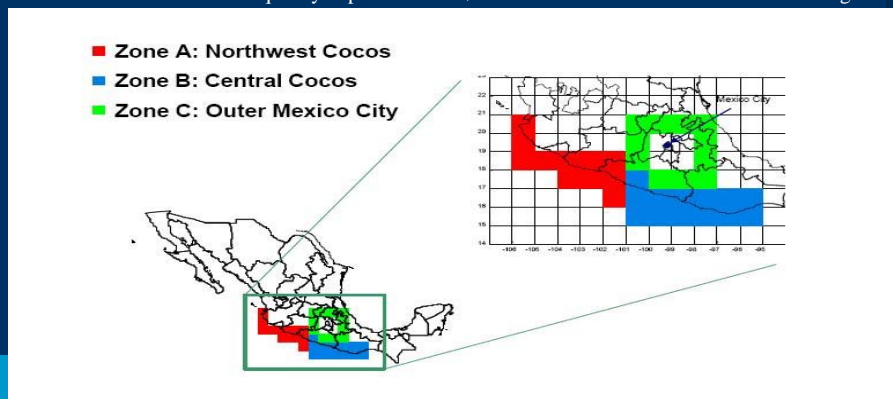
## Results ... (FONDEN)

- Evolution and Current Status
  - 2002: Pilot project (“dry run”) in one state (Guanajuato)
    - 5 weather stations, 2 crops (maize and sorghum)
    - 75,000 has. insured
  - 2003 Insurance Program: One state (Guanajuato)
    - 6 weather stations, 2 crops (maize and sorghum)
    - 110,000 has. Insured
    - Limit: US\$ 3.9 million
    - No risk transferred to international markets
  - 2004: Two States (Guanajuato, Puebla)
    - 26 weather stations, 3 crops (maize, sorghum, barley)
    - 250,000 has. Insured
    - Limit: US\$ 18.6 million
    - Participation of international markets (50%)
  - 2007: 12 States
    - 269 weather stations, 4 crops (maize, sorghum, barley, beans)
    - 1.5 million has. Insured
    - Limit: US\$ 80 million
    - Participation of international markets (60%)



## Mexico Earthquake Hedge for Emergency Relief

- Evolution and Current Status (Macro Level Product)
  - Government sought to transfer liquidity risk
    - Preference for parametric structure
    - Commissioned a risk analysis of their exposure (AIR)
      - Review of vulnerable areas (origination of big earthquakes)
      - Analysis of potential impact in major population centers and the relationship with emergency relief
        - » A liquidity exposure of US\$ 150 million dollars was estimated for a big earthquake



- Evolution and Current Status
  - Risk transfer selected strategy
    - US\$ 150 million risk transfer for each area identified (3 in total)
  - Aggregate limit: US\$ 450 million
  - Combination of reinsurance and capital markets (CAT BOND)
    - 64% and 36% respectively
  - Aggregate ROL: 1.9%
    - Reinsurance was cheaper than capital markets, even adjusting for credit risk

**Loss Probabilities by Zone**

Zone #	Trigger Magnitude (M <sub>w</sub> )	Max Focal Depth (Km)	Annual Expected Loss
A	8.0	200	0.63%
B	8.0	200	0.96%
C	7.5	150	0.30%

**Loss Probabilities for the Notes**

Notes	Zones	Annual Expected Loss
Class A	B	0.96%
Class B	A and C	0.93%

	Class A Notes	Class B Notes
Notional:	\$150,000,000	\$10,000,000
Covered Territory:	Zone B	Zones A and C
Annualized Expected Loss <sup>(a)</sup> :	0.96%	0.93%
Principal Reduction Mechanism:	Binary	Binary, first Zone to Trigger
Rating (S&P):	BB+	BB+
Interest Spread:	LIBOR + 2.35%	LIBOR + 2.30%

## Caribbean Catastrophe Insurance Facility (CCRIF)

- Evolution and Current Status (Macro Level Product)
  - 2007: First year of operation
    - 16 countries: Anguilla, Belize, Bahamas, Barbados, Bermuda, British Virgin Islands, Cayman Islands, Dominica, Haiti, Grenada, Jamaica, Montserrat, St. Kitts, St. Lucia, St. Vincent, Turks & Caicos
    - Limit by country: US\$ 50 million
    - Market based premiums
    - Start up capital: equivalent to one year premium
    - Risks: Windstorm and earthquakes
    - Beneficiary: Ministry of Treasury, no private market impact:
    - Independent triggers for each country
      - » Hurricane (location, speed, strength, etc.)
      - » Earthquake (epicenter, depth, strength, etc)
    - IDA soft financing for Dominica, Grenada, St. Lucia and St. Vincent
    - Donor co-financing for start-up capital

# Central America Retail Pilot Project

## •Historic Background

- Late 90's: WB approached Nicaragua regarding the potential of using index based insurance mechanisms. Priority was given for a macro hedge against earthquakes
- 2004: WB sponsored project identification mission to Nicaragua to investigate potential of private market development for parametric insurance
  - Presentation of basic concepts
  - Identification of potential partners
  - Identification of areas and market segments of interest
  - Investment in initial technical work for contract designs
- 2005-2006: IDB led project (co-sponsored by WB and BCIE) for the development of local private insurance markets (parametric applications)
  - Executed by FIDES (Federation of Private Insurance Companies)
  - Targeted four countries: Guatemala, El Salvador, Honduras y Nicaragua
    - Current participation; More than 10 companies throughout the region
  - Three project components:
    - Public policy and regulatory environment
    - Investment in data availability
    - Financing of pilot project design of local insurance companies



## Evolution and Current Status

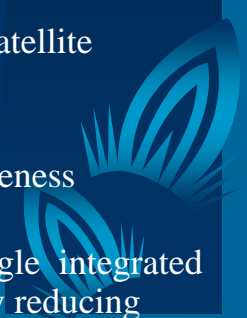
- 2005: INISER (Nicaragua local insurance company) makes expression of interest (EOI) to implement a pilot project for groundnut (based on the TA work from WB)
  - EOI main area of focus: Technical assistance need for commercial capacity
    - Structure insurance/reinsurance contracts
    - Underwriting
    - Contract settlement
    - Marketing plan
    - Filing for approval with local regulator
- 2007: First year operation of pilot project
  - Linked to credit provided by formal financial institutions
    - Included as an eligible financing category of credit package
    - Favorable interest rate terms
    - Lower collateral requirements
  - Cover: 1% of area under production (US\$ 160,000 limit)
  - Risks: drought, excess rainfall (both before harvest and after harvest)
  - Weather stations used: main automatic network (mainly linked to airports)



## VI. Lessons Learned:

- Retail parametric products have theoretical appeal but with the clear exception of ICICI Lombard-Basix most have encountered difficulties in scaling up.
  - Donors have initiated retail level projects, not reinsurers and insurers. Need to create a more compelling business value proposition. Challenges to overcome :
    - Poor data
    - Contracts designs easy to copy “Free Rider Problem”
    - Regulatory uncertainty
    - Pilots that are too small-Too Difficult to Scale Up
    - Weak financial intermediaries
    - Lack of technical know-how on staff of insurers.
    - Other lines of insurance represent “lower hanging fruit”.
  - Most successful parametric projects in LAC are at macro level.
  - Most promising future area of work is at meso level—with suppliers, traders, financial intermediaries (portfolio insurance). To date very little done. Only ENSO in Peru is a meso level product. Product has not reached market, however.
  - Need very specialized human capital to develop products and oftentimes not present in local markets. Donors need to focus on developing information systems and human capacity.
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## VII. Recommendations and Needs

- Political Clarity on Subsidies. Avoid Premium Subsidies. Use scarce public monies on creating favorable market conditions—overcoming information and training hurdles.
  - Cost-benefit analyses to motivate private insurance companies
  - Forge linkages between insurance companies, banks, and MFIs.
  - Government or International Reinsurance Capability,
  - Pressure Regulators to recognize parametric products as insurance products and make accommodations for agriculture.
  - Accurate and Sufficiently Long Time Series Data on Weather and Yields to Construct Actuarial Tables (30 years +). Gov’t can play a large role in creating appropriate databases.
  - Acquire more automatic tamper-proof weather stations, and/or satellite images.
  - Develop more local computer and actuarial modeling capability.
  - Diminish ad hoc Disaster Relief Programs or Farm Debt Forgiveness Programs as insurance products emerge.
  - All parties need to work in more coordinated fashion using a single integrated layer approach to risk management and focusing on dramatically reducing development costs and better educating farmers.
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**Thank you**

