Market Based Agricultural Risk Management for the Coffee Industry

World Bank
Non-Lending Technical Assistance
Agriculture Risk Management in the Caribbean

Kingston, Jamaica
June 18, 2009

ALL ACP AGRICULTURAL COMMODITIES PROGRAMME
Agenda

- Coffee industry
- History of coffee insurance
- Index-based Insurance for Coffee farmers
  - Objective
  - Scope of technical assistance
  - Technical Challenges
- Possible Options.
  - Index weather insurance for individual farmers (Option 3)
### Structure of the Coffee Industry

<table>
<thead>
<tr>
<th>GPA</th>
<th>Total Farmers</th>
<th>Farmers with production &amp; acreage</th>
<th>%</th>
<th>Total coffee area</th>
<th>%</th>
<th>Average production 2000/01 - 03/04 (Boxes)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>St. Andrew</td>
<td>2,916</td>
<td>2,454</td>
<td>84%</td>
<td>5,822</td>
<td>44%</td>
<td>120,540</td>
<td>53%</td>
</tr>
<tr>
<td>Portland</td>
<td>2,238</td>
<td>1,710</td>
<td>76%</td>
<td>4,121</td>
<td>31%</td>
<td>58,226</td>
<td>26%</td>
</tr>
<tr>
<td>St. Thomas</td>
<td>1,878</td>
<td>1,632</td>
<td>87%</td>
<td>3,347</td>
<td>25%</td>
<td>47,567</td>
<td>21%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>7,032</td>
<td>5,796</td>
<td>82%</td>
<td>13,290</td>
<td>100%</td>
<td>226,333</td>
<td>100%</td>
</tr>
</tbody>
</table>

#### Farm Size Distribution

- **St. Andrew's GPA**
  - >10 acres: 2%
  - >5 to 10 acre: 5%
  - >4 to 5 acre: 11%
  - >2 to 4 acre: 24%
  - >0.25 to 1 acre: 29%
  - >1 to 2 acre: 34%

- **Portland's GPA**
  - >10 acres: 1%
  - 5-10 acre: 5%
  - <0.25 acre: 6%
  - 0.25-1 acre: 30%
  - 1-2 acre: 23%
  - 2-4 acre: 28%
  - >2 to 4 acre: 18%

- **St. Thomas' GPA**
  - >5 to 10 acre: 3%
  - >4 to 5 acre: 3%
  - 10 acres: 1%
  - up to 0.25 acre: 14%
  - >0.25 to 1 acre: 38%
  - >1 to 2 acre: 24%
  - >2 to 4 acre: 18%
Main causes of Coffee yield Losses

Cherry Coffee Production over 25 years Hurricanes etc.
Main causes of Coffee yield Losses

<table>
<thead>
<tr>
<th>Crop Season</th>
<th>Climate Event</th>
<th>B Mountain (Boxes)</th>
<th>% Change/year</th>
<th>NB Mountain (Boxes)</th>
<th>% Change/year</th>
<th>Total Boxes</th>
<th>% Change/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998-1999</td>
<td>Unusual heavy rainfall</td>
<td>317,843</td>
<td>-16%</td>
<td>164,404</td>
<td>-32%</td>
<td>482,247</td>
<td>-22%</td>
</tr>
<tr>
<td>1999-2000</td>
<td></td>
<td>438,036</td>
<td>38%</td>
<td>167,642</td>
<td>2%</td>
<td>605,678</td>
<td>26%</td>
</tr>
<tr>
<td>2000-2001</td>
<td>Drought, wind storm damages, flood rains.</td>
<td>312,403</td>
<td>-29%</td>
<td>180,253</td>
<td>8%</td>
<td>492,656</td>
<td>-19%</td>
</tr>
<tr>
<td>2001-2002</td>
<td>H. Michelle (Cat 4)</td>
<td>477,575</td>
<td>53%</td>
<td>116,491</td>
<td>-35%</td>
<td>594,066</td>
<td>21%</td>
</tr>
<tr>
<td>2002-2003</td>
<td>H. Isidoro and Lily</td>
<td>364,356</td>
<td>-24%</td>
<td>153,528</td>
<td>32%</td>
<td>517,884</td>
<td>-13%</td>
</tr>
<tr>
<td>2003-2004</td>
<td></td>
<td>529,704</td>
<td>45%</td>
<td>73,809</td>
<td>-52%</td>
<td>603,513</td>
<td>17%</td>
</tr>
<tr>
<td>2004-2005</td>
<td>H. Ivan</td>
<td>236,405</td>
<td>-55%</td>
<td>90,318</td>
<td>22%</td>
<td>326,723</td>
<td>-46%</td>
</tr>
<tr>
<td>2005-2006</td>
<td>TS Dennis, Emily and Wilma</td>
<td>382,421</td>
<td>62%</td>
<td>71,950</td>
<td>-20%</td>
<td>454,371</td>
<td>39%</td>
</tr>
<tr>
<td>2006-2007</td>
<td></td>
<td>475,416</td>
<td>24%</td>
<td>80,032</td>
<td>11%</td>
<td>555,447</td>
<td>22%</td>
</tr>
<tr>
<td>2007-2008</td>
<td>H. Dean</td>
<td>286,636</td>
<td>-40%</td>
<td>45,313</td>
<td>-43%</td>
<td>331,949</td>
<td>-40%</td>
</tr>
<tr>
<td>2008-2009</td>
<td>TS Gustav</td>
<td>386,425</td>
<td>35%</td>
<td>78,691</td>
<td>74%</td>
<td>465,115</td>
<td>40%</td>
</tr>
</tbody>
</table>
History of Coffee Insurance.

- Administered by trustees for CIB:
  - Purchased Commercial Reinsurance.
  - Managed the Program (Aggregated shortfall policy).

- Claims response was not properly defined
- Farmers did not understand the bases of the insurance provided.

Total Individual Coverage ≠ Comercial Policy
There was a Generalized Unhappiness with the CIBIP.

Individual Contracts vs Collective contracts.

Updating and Administering Farmer Registration and Activity Tracking System (FRAT)

Solving financial lack of liquidity at the moment of paying the premium.

Secure premiums to insurers and reinsurers.

Simplify channels to collect premiums and distributing payments (minimize/eliminate field survey).

Improve the institutional structure and capacity that already exists for reaching farmers.

Take the past experience and restructure/modify what is needed.
Index Based Insurance for Coffee Farmers

• Objective:
  ▪ Assist the CIB in designing and implementing a financial market-based mechanism for transferring weather risks to the international market.

• Scope in providing technical assistance:
  ▪ Layering weather risks,
  ▪ Designing a delivery channels for premium collection and payouts.
  ▪ Risks quantification,
  ▪ Structuring a weather insurance product,
  ▪ Reinsurance negotiations.
Technical Challenges

• Lack of data or inadequate infrastructure.
  – There are no wind gauges in the BM, for pricing and monitoring contracts.
  – There will be a need to install new wind and rain gauges in the coffee regions.
  – Statistical base (production, losses, risks).
    • Farmers deliver berries to different dealers and factories.

• Lack capacity or willingness to pay premiums.
  – Need to find a financial arrangement to overcome the financing gap problem that farmers lack liquidity at the moment premiums are due.

• Presence of huge basis risk.
  – Extreme topography in the BM area, and its impact on localized wind and rain patterns.
  – Design a mechanism to compensate genuine losses incurred by farmers, but not triggered parametrically.
  – Agronomic cycle of coffee trees varies in relation to altitude and coffee areas.
Options Considered

1. Traditional crop insurance;

2. An aggregate parametric trigger for the industry as a whole;

3. Parametric insurance with individual contracts to farmers;

4. Same as 3, but with creating a fund to deal with basis risk; and

5. Doing nothing
## Possible Options.

<table>
<thead>
<tr>
<th>Possible Options</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Observations</th>
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<tr>
<td><strong>1. Traditional Crop Insurance.</strong></td>
<td>‣ Indemnity according to individual farmer loss</td>
<td>‣ Loss assessment highly problematic, and costly</td>
<td>‣ This option has been tried and is highly challenging.</td>
</tr>
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<td></td>
<td></td>
<td>‣ Need of an insurance and claims management unit.</td>
<td>‣ There are almost insurmountable operational difficulties.</td>
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<td></td>
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<td>‣ High moral hazard</td>
<td></td>
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<td></td>
<td></td>
<td>‣ Reinsurers will not provide support</td>
<td></td>
</tr>
<tr>
<td>2. Aggregate Parametric Trigger (either (a) index based on hurricane track parameters or (b) based on triggers at a series of weather stations)</td>
<td>‣ Likely to be acceptable to reinsurers</td>
<td>‣ Cannot operate without setting up scheme to distribute aggregate payout to individual farmers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>‣ Payouts based on independent and transparent parameters</td>
<td>‣ Does not solve loss assessment needs at individual farmer level</td>
<td></td>
</tr>
<tr>
<td></td>
<td>‣ (a) would be easy to implement</td>
<td>‣ Trigger type (a) gives high basis risk even at whole-industry level and cannot capture excess rainfall</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>‣ Trigger type (b) requires new local station network in coffee areas as in (3)</td>
<td></td>
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### Possible Options

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| **3. Parametric Trigger with individual contract to farmers**  
(Based on weather stations) |  
• Transparent index  
• Rapid claims payment  
• No field loss assessment  
• Simple product allowing insurance contract to farm level  
• Likely to be acceptable to insurers and reinsurers  
• CIB act as distributor and not as insurer |  
• High Basis Risk  
• Few existing rain stations and no wind stations in coffee areas  
• Setting premium rates and triggers, and defining sub-zones, is technically challenging, and needs risk modeling  
• New automatic weather stations needed  
• Needs careful extension to farmers.  
• Premium rates and affordability unknown – increase in frequency of recent events |  
• High basis risk means that this option needs to be considered as “income supplement” and not “crop insurance”. |
| **4. As (3) but with additional Basis Risk Fund**  
|  
• Basis Risk Fund targets farmers who are genuinely affected by loss when trigger not hit |  
• Individual farm assessment required for localized damages to be compensated under the Basis Risk Fund  
• Difficult to define coverage and to limit the circumstances which the Fund is required to compensate. This depends on extent of basis risk and on the triggers levels of the parametric product as in (3) |  
• This Fund would still need conventional individual farmer loss assessment (as per previous scheme).  
• It would be essential to clearly define and limit situations in which Fund responds to claims, to be operationally and financially feasible  
• It is recognized that the Basis Risk Fund would carry operational challenges. |
| **5. Nothing**  
|  
• Decision that insurance solutions are highly challenging or “too difficult” |  
• Financial protection against major events is extremely highly demanded by the industry and ranked as a top priority |  
• Insurance is just one of many measures needed by the industry, |

- Automatic weather Stations:
  - 10 ws (US$12,000.00/ws)
- Calibration of WS and triggers.

Product Design:
- Period of coverage.
- Insured entity.
- Sum insured.
- Scale of sum insured by date.
- Trigger definition.

Source: National Meteorological Service

- Adm and contractual arrangements:
  - Who will underwrite?
  - Voluntary or automatic
  - Distribution and Enrolment
  - Premium and Claim Payments
  - Farmer extension
  - Pilot implementation
- Financial Arrangements:
  - Development costs
  - Capital funding and maintenance budget for AWS
Insurance Structures.

**Micro level insurance program**
- Insurer
- Distributor
- Policyholder is Farmer
- Policies, premiums, claims
- Policies, premiums, claims

**Meso/Macro insurance program**
- Insurer
- Policyholder is Aggregator (e.g. processor, bank)
- Farmers
- Policies, premiums, claims
- Aggregator sets the payout rules
### PHASE 1: PILOT WEATHER INDEX INSURANCE PREPARATION

**Target completion: December 2009**

**Responsibility:** Note: refers to VS staff, consultants or contracted firms

#### Mission 1 - Technical Support and Preparation

**Technically supported by:** TII and mission team

<table>
<thead>
<tr>
<th>Timing</th>
<th>Detailed timetable to be refined</th>
</tr>
</thead>
</table>

- Agree project with CIBF/VS
- Agree outline parameters for index product
- Draft consultant TDR including modeling contract
- Identify local organizations and potential stakeholders
- Formulate pilot project preparation and implementation plan
- Approve selection procedure local RMIU or consultant

#### Technical and Modeling

- Risk Modeling - wind
- Risk Modeling - rainfall
- Specification and location options for weather stations
- Assemble historical data and time series
- Develop vulnerability assessments with local experts
- Mapping of ‘blue’ Mountain geographical zones
- Develop example pricing for sample location locations

#### Mission 2 - Product Design and Stakeholder Formation

**Technically supported by:** TII and mission team

<table>
<thead>
<tr>
<th>Timing</th>
<th>Detailed timetable to be refined</th>
</tr>
</thead>
</table>

- Agree final design features of index product
- Farmer concept testing is followed piloting
- Identity key agents and pilot project organization
- From stakeholder group and hold workshop
- Finalize number and location of weather stations
- Legal and regulatory clearance

#### Analysis and Insurance Preparation

**Technically supported by:** Insurance International consultant/local consultant

- Organizational structure and operational plan
- Contract wording, documentation
- Operational procedures and manual, training materials

#### Budgeting

**Technically supported by:** TII consultant

- Provide budget and funding for implementation phase
- Coordinate for weather stations, procurement needs

### PHASE 2: IMPLEMENTATION OF PILOT WEATHER INDEX

**Pre-policy sales and pilot operation January - November 2010**

**SALES**

**Josep**

- Organizing the project and technical support
  - Prepare weather stations
  - Confirm the parties who will operate the insurance for 2009 season
  - Formalization of the Technical Support Committee attached to the CIB
  - Formalization of the Technical Support for Insurer
  - Appoint Project Coordinator/Local consultant
  - Agree the target clients and target group eligible

- Finalise product design and insurance details
  - Finalize the product design phase of the insurance product
  - Propose options for 2009 product parameters and pricing to Insurer
  - Finalize insurance pricing
  - Finalize policy wording letter
  - Set limit for policy sales volume per pilot
  - Agree the process for policy sales and premium payments
  - Provide draft operational manual for policy sales, claims payment
  - Conduct How-to-write and write operational manual for pilot

- Legal and Regulatory
  - Confirm clearance for index policy for pilot testing

- Distribution and Farmer Information
  - Organize farmer information meetings
  - Train CIB and insurance officers in product
  - Prepare product explanation materials
  - Prepare presentation and “GOA” materials
  - Test product premium/recovery options with Farmers
  - Specify responsibilities and reporting channel for sales agents

- Rainfall Recording
  - Identify rainfall monitoring methods