Using satellite data to improve index insurance: Lessons from the IRI's NASA interdisciplinary science project
Engaging remote sensing scientists at NASA, USDA, NOAA, Michigan Tech Univ., with index insurance projects in Africa that IRI supports.

Aim: How can linking satellite data providers and RS scientists to real index insurance projects improve the design process?
Satellite data in index insurance

We work with projects that use these products:

**MODIS NDVI**
Dominican Republic
Chile
Uruguay

**CHIRPS Rainfall:**
Honduras
Colombia
Uruguay

**ARC2 Rainfall:**
Ethiopia
Malawi
Zambia
Senegal
NASA Interdisciplinary Science Project

-Smallholder crop area mapped with wall-to-wall WorldView sub-meter panchromatic image texture: a test case for Tigray, Ethiopia

In Review, Remote Sensing of Environment

-Exploiting the convergence of evidence in satellite data for advanced weather index insurance design

In Review, Weather Climate & Society

-Farmer Perception and Index Design in Weather Insurance for Agriculture in the Developing World: an Ethiopia Case Study

Working Paper
Very High Resolution
~1m data
Cropped Area
Estimation Mapping

© DigitalGlobe 2014
Multi-resolution, multi-sensor satellite dataset comparisons for use in index design
Multi-resolution, multi-sensor satellite dataset comparisons for use in index design

Ethiopia
Multi-resolution, multi-sensor satellite dataset comparisons for use in index design
Multi-resolution, multi-sensor satellite dataset comparisons for use in index design.
Farmer perceptions in Ethiopia

• Participatory design process produces essential information, but noisy data

• Can we aggregate information about historic drought events by space and time to get clearer results?
Table 6. Spatially-aggregated results for First + Second (21 Villages)

<table>
<thead>
<tr>
<th>DEP VARIABLE</th>
<th>Time</th>
<th>Village</th>
<th>Woreda</th>
<th>Zone</th>
<th>Tigray</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early Rainfall</td>
<td>-0.00492***</td>
<td>-0.00524***</td>
<td>-0.00720***</td>
<td>-0.00886***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.00175)</td>
<td>(0.00184)</td>
<td>(0.00212)</td>
<td>(0.00270)</td>
<td></td>
</tr>
<tr>
<td>Late Rainfall</td>
<td>-0.00653***</td>
<td>-0.00708***</td>
<td>-0.00825***</td>
<td>-0.00969***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.00170)</td>
<td>(0.00183)</td>
<td>(0.00205)</td>
<td>(0.00237)</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-0.0979</td>
<td>-0.0276</td>
<td>0.188</td>
<td>0.423</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.191)</td>
<td>(0.203)</td>
<td>(0.228)</td>
<td>(0.266)</td>
<td></td>
</tr>
</tbody>
</table>

Observations 693

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. Rainfall data is aggregated at the 4 different levels.
Farmer perceptions in Ethiopia

Table 6. Spatially-aggregated results for First + Second (21 Villages)

<table>
<thead>
<tr>
<th>DEP VARIABLE</th>
<th>Bad Year First + Second</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Village</td>
</tr>
<tr>
<td>Time</td>
<td></td>
</tr>
<tr>
<td>Early Rainfall</td>
<td>-0.00492***</td>
</tr>
<tr>
<td></td>
<td>(0.00175)</td>
</tr>
<tr>
<td>Late Rainfall</td>
<td>-0.00653***</td>
</tr>
<tr>
<td></td>
<td>(0.00170)</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.0979</td>
</tr>
<tr>
<td></td>
<td>(0.191)</td>
</tr>
<tr>
<td>Observations</td>
<td>693</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. Rainfall data is aggregated at the 4 different levels.
Where can this take us?

- The power of understanding the story of a season
- Streamlining RS data processing, increasing accessibility
- Bringing data providers closer to real world projects