Farmer acceptability of a bean variety with high iron content: The case of ICTA Superchiva in Guatemala

Byron Reyes, Carolina González, Salomón Pérez, Mizael Vásquez, Gustavo Mejía, Manuela Tucux, Josue Santos

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Outline

• Motivation for the study
• Methodology
• Results and discussion
• Concluding remarks
Motivation for the study

- Guatemala’s population is approximately 14 million:
  - 54% live in rural areas
  - 41% are indigenous
  - >50% lives in poverty (13% in extreme poverty)
- Highly food insecure
- High levels of chronic malnutrition (micronutrient)—"hidden hunger" (iron deficiency is a problem—40% anemia prevalence among children in dry corridor)
- Many ways to address latter, and GoG is using bio-fortification as one alternative to produce micronutrient-rich foods
Motivation for the study (2)

- Bio-fortification outputs include ICTA Superchiva^{ACM}: 74 ppm iron vs. 50-60 ppm iron in available bean varieties at the time
- Although target is to have varieties with 94 ppm iron, Superchiva (released in 2014) was best available option at time of study
- Plan to distribute seed of ICTA Superchiva in 2014 to benefit farmers with a high-yielding, high-iron content variety
- **Objectives** of this study were to test the variety’s acceptability by beneficiary farmers and intention to continue planting it
Methodology

• Seed was distributed in 2014 by:
  • Ministry of Agriculture and Livestock (MAG): 6,000 lbs among 1,020 beneficiary farmers in 11 departments across the country
  • Inter-American Institute for Cooperation in Agriculture (IICA): 500 lbs among 22 beneficiary farmers in 1 department

• But, serious drought problems in the region due to “El Niño” in 2014 caused losses

• Reduced sample frame from 1,042 to 498 beneficiaries in 8 departments:

• Wanted a census but only 347 farmers interviewed (in 8 departments)
Methodology (2)

- Sampled farmers were interviewed face-to-face using structured questionnaires
- Data collection from April 15-May 2, 2015
- Four teams: 1 supervisor and three enumerators
- Enumerators had previous experience with rural bean surveys
- For analysis, data disaggregated by region:
  - West region: Huehuetenango, Quetzaltenango, Quiché and San Marcos
  - East region: Alta Verapaz, Chimaltenango, Jalapa and Sololá
## Preliminary results

- **Respondent and HH characteristics**

<table>
<thead>
<tr>
<th>Respondent and HH characteristics</th>
<th>West</th>
<th>East</th>
<th>Total</th>
<th>ttest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male HHH (%)</td>
<td>88.37</td>
<td>78.88</td>
<td>83.78**</td>
<td></td>
</tr>
<tr>
<td>Age (years)</td>
<td>43.99</td>
<td>43.45</td>
<td>43.73</td>
<td></td>
</tr>
<tr>
<td>Years of education completed</td>
<td>3.91</td>
<td>3.84</td>
<td>3.88</td>
<td></td>
</tr>
<tr>
<td>Respondent is active member of a farmer group (% yes)</td>
<td>47.7</td>
<td>46.29</td>
<td>47.02</td>
<td></td>
</tr>
<tr>
<td>Dependency Ratio</td>
<td>0.77</td>
<td>0.71</td>
<td>0.74</td>
<td></td>
</tr>
<tr>
<td>Likelyhood of HHs being below national poverty line (%)</td>
<td>58.77</td>
<td>66.38</td>
<td>62.6**</td>
<td></td>
</tr>
<tr>
<td>Land size (cuerdas)</td>
<td>6.86</td>
<td>3.309</td>
<td>5.51***</td>
<td></td>
</tr>
<tr>
<td><strong>Number of observations</strong></td>
<td><strong>172</strong></td>
<td><strong>161</strong></td>
<td><strong>333</strong></td>
<td></td>
</tr>
</tbody>
</table>
Preliminary results

About the acceptability of the high-iron content variety...

- Reasons why farmers planted the seed they received

<table>
<thead>
<tr>
<th>Reason</th>
<th>West</th>
<th>East</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wanted to test a new variety</td>
<td>67.5</td>
<td>0</td>
</tr>
<tr>
<td>I was told or I knew it has good yield</td>
<td>9.38</td>
<td>3.75</td>
</tr>
<tr>
<td>I was told or I knew it has nutritional benefits</td>
<td>2.5</td>
<td>0</td>
</tr>
<tr>
<td>Because I was given the seed for free</td>
<td>16.88</td>
<td>4.38</td>
</tr>
<tr>
<td>Other</td>
<td>3.76</td>
<td>0.63</td>
</tr>
</tbody>
</table>
Preliminary results

- Performance of high-iron content variety vs. variety usually grown

<table>
<thead>
<tr>
<th>% of farmers who said that Superchiva is better than variety normally grown in...</th>
<th>West</th>
<th>East</th>
<th>Total</th>
<th>ttest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yields</td>
<td>53.9</td>
<td>58.1</td>
<td>56.5</td>
<td></td>
</tr>
<tr>
<td>Crop management</td>
<td>39.5</td>
<td>44.0</td>
<td>42.3</td>
<td></td>
</tr>
<tr>
<td>Drought resistant</td>
<td>36.5</td>
<td>30.9</td>
<td>33.0</td>
<td></td>
</tr>
<tr>
<td>Pest resistant</td>
<td>32.9</td>
<td>34.9</td>
<td>34.2</td>
<td></td>
</tr>
<tr>
<td>Disease resistant</td>
<td>28.2</td>
<td>30.6</td>
<td>29.7</td>
<td></td>
</tr>
<tr>
<td>Storage properties</td>
<td>26.2</td>
<td>25.5</td>
<td>25.7</td>
<td></td>
</tr>
<tr>
<td>Market value</td>
<td>25.6</td>
<td>5.7</td>
<td>16.2 **</td>
<td></td>
</tr>
<tr>
<td>Number of observations</td>
<td>76</td>
<td>125</td>
<td>201</td>
<td></td>
</tr>
</tbody>
</table>
Preliminary results

• How did seed received changed crops planted?

Among farmers reporting that replaced beans or another crop partially:

<table>
<thead>
<tr>
<th>Share of area that was replaced (%)</th>
<th>West</th>
<th>East</th>
<th>Total</th>
<th>ttest</th>
</tr>
</thead>
<tbody>
<tr>
<td>38.7</td>
<td>29.4</td>
<td>33.7 **</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of observations</td>
<td>49</td>
<td>56</td>
<td>105</td>
<td></td>
</tr>
</tbody>
</table>
Preliminary results

About the intention to continue planting the high-iron content variety...

Will plant following year

% Increase in qty. of seed to be planted***
Preliminary results

% farmers WTP for seed of Superchiva*

Amount (Q/Lb) WTP for seed

West | East
---|---
68.7 | 56.8

Average price of grain: red line

West | East
---|---
6.6 | 6.1
Preliminary results

• Early diffusion of high-iron content variety

![Bar chart showing the number of farmers recommended and given free or sold seed of Superchiva in the West and East.](chart.png)
Concluding remarks

- Farmers in both regions have similar socioeconomic characteristics except in a few (key) ones: sex of HHH, PPI (poorer in the East), land size
- Most farmers (74%) wanted to plant the high iron content variety because they wanted to test a new variety
- Around 42-56% of farmers mentioned that Superchiva performed better in terms of crop management and yields, but not so good on market value
- Seed given was planted in one-third of the area planted to other varieties/crops
- More than two-thirds of farmers said they will plant Superchiva the following year, and will increase the amount of seed planted by 69%
- 63% of farmers are WTP for seed of Superchiva, but the amount WTP is not too high (28-39% premium)
- Early diffusion estimates suggest adoption may increase over time
Acknowledgements

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THANK YOU FOR YOUR ATTENTION!

(b.reyes@cgiar.org)