Food Security vs. Food Self-Sufficiency: The Case of the Philippine Goal of Self-Sufficient Rice Production

Justin D. McKinley, Dr. Lanier Nalley, and Nate B. Lyman

Department of Agricultural Economics and Agribusiness
University of Arkansas

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Outline

• Introduction
  – Current Situation
  – Why the Philippines imports Rice
• Stated Objective and Projection of the Philippines Food Self-Sufficiency Program (FSSP)
• Definition of Model
• Results of Model
• Conclusion
Introduction

• Importance of rice in the Philippines:
  – Staple food of the Philippines
  – Politically sensitive commodity
  – Supply disruption causes people distress
  – Philippines consumes about 33,000 tons of rice daily
  – Approximately 80% of the total population spends almost 1/4 of their income on rice alone.
  – Slight increase in the price of this commodity will greatly affect the standard of living for most Filipinos.

http://ateneoeconomics.wordpress.com/2008/05/31/analyzing-rice-crisis-in-the-philippines/
Introduction

• Example: not so distant past
  – Rice-price crisis of 2008 (not production)
  – Thailand export ban
  – Aggressive buying in Philippines

[Diagram of rice price crisis with a graph showing the month-end price of white rice in Thailand, per metric ton]
Introduction

• Philippines President Aquino targets 2013 for self sufficient rice (2011)
• Through the Dept. of Agriculture
• Food Self-Sufficiency Program
  – 2011-2016
• 2013 named National Year of Rice

http://irri-news.blogspot.com/2013/01/philippine-president-declares-2013-as.html

http://www.time.com
How can you help?

Everyone and anyone can help make NYR2013 a success.

If you plant rice, adopt recommended technologies. Higher yield means more rice to feed the country.

If you are a policy-maker, you can help create or reinforce policies that would support or promote productivity among farmers and responsible rice consumption among consumers. These policies could include the institutionalization of the serving of half-cups of rice in the foodservice industry to prevent wastage and giving of incentives to productive farmers, among others.

If you eat rice, you can help by reducing rice wastage; trying-out brown rice and other food staples such as banana, sweet potato and corn; and by eating just the right amount of rice.

http://www.nyr2013.com/
Current Situation

• In 2010, the Philippines was the largest importer of rice in the world (FAOStat)
  – 2,378,045 Metric Tons
  – 1,499,223,000 USD

• Average annual population growth change from 2000-2010 is 1.9% (Philippines Census)

Philippines surpassed by Indonesia and Nigeria in 2011 for net imports
Current Situation

Rice self-sufficiency status

Source: Philippine Rice Research Institute
Why the Philippines Imports

- The Philippines is an archipelago
Why the Philippines Imports

- Historically there have been importers and exporters in Asia
  - Exporters
    - Thailand
    - Vietnam
    - Cambodia
    - Myanmar
  - Importers
    - Island Nations
Why the Philippines Imports

- Difference is largely attributed to arable land resulting from river deltas (Dawe, 2005)
- Thailand has four times the amount of arable land per capita as the Philippines
- The Philippines has imported rice almost every year since 1869
Why the Philippines Imports

- Beyond lack of deltas, the Philippines suffers from numerous typhoons each year.
- Philippines was self-sufficient
  - 1970s
  - 1980s (even exported small amount)
- Result of Filipino farmers adopting green revolution technologies
Most Filipino farmers have already adopted technologies.

Reasons for Import:
- Land endowment
- Weather
- Diet
- Population
Food Self Sufficiency Program

Objectives

1. Raise farm productivity and competitiveness
   - Irrigation
   - Best management practices
   - R&D investment
   - Mechanization
   - Post-harvest management
   - Milling Quality
2. Enhance economic incentives and enabling mechanisms
   - Free market
   - Reduced role of NFA
   - Improved credit
   - Crop Insurance
3. Manage food staples consumption
   – Diversify consumed foods
   – Brown (unpolished) rice consumption
     • Milling rates of 75% compared to 65% (FSSP)
   – Reduce food waste
Food Self Sufficiency Program Projections

Assumes:
Area Harvested up 2%*
Yield up 4%*
*per annum
A different story…

THIS STUDY’S MODEL
Model Specifications

• Primarily addresses objective one of the FSSP, raise farm productivity and competitiveness
  – Irrigation – yes
  – Best management practices – yes
  – R&D investment – yes
  – Mechanization – no
  – Post-harvest management – yes
  – Milling Quality – yes
Model Specifications

• Based off of the Arkansas Global Rice Model
  – Dr. Eric Wailes and Dr. Eddie Chavez
• Constantly updated. Tracks and projects the world rice economy: production, consumption, stocks, trades, and prices
Model Specifications

- Solves for Production – Consumption = 0
  - Three years
    - 2013
    - 2018 (+5)
    - 2023 (+10)
  - Two milling rates
    - 63% Philippines current (Arkansas Global Rice Model)
    - 70% USA current (Arkansas Global Rice Model)
Model Specifications

- For three variables (one changes while other two are held constant)
  - Annual yield growth (agronomic and genetic)
  - Annual transformation from non-irrigated to irrigated
  - Annual rate of new lands to rice production
- Data comes from Philippines Bureau of Agricultural Statistics
  - Area harvested and production
- And the Arkansas Global Rice Model
  - Consumption
Irrigation

% Area Harvested Irrigated

Yield diff. Irrigated and non

Please note: Area Harvested includes same lands in wet and dry seasons.
Irrigation
Irrigation

From: Dawe et al. (2005) “Why Does the Philippines Import Rice?”
Yield

Total Production

Yield Diff. from Natl. Avg.
Model Results

- At 63% (Philippines current) milling rate
- To achieve self sufficiency in 2013:
  - 19.46% increase in yield
  - 92.56% reallocation of non-irrigated area harvested to irrigated area harvest, which is impossible
  - 19.46% increase in total area harvested
  - By changing one variable at a time, holding all others constant

<table>
<thead>
<tr>
<th>63% MR</th>
<th>2013</th>
<th>2018</th>
<th>2023</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yield growth</td>
<td>19.46%</td>
<td>4.10%</td>
<td>2.96%</td>
</tr>
<tr>
<td>Irrigation change</td>
<td>92.56%</td>
<td>14.87%</td>
<td>9.81%</td>
</tr>
<tr>
<td>New Ag Land</td>
<td>19.46%</td>
<td>4.10%</td>
<td>2.96%</td>
</tr>
</tbody>
</table>

% change per year to attain self-sufficient rice
Model Results

- At 70% (USA Current) milling rate
- To achieve self sufficiency in 2013:
  - 7.52% increase in yield
  - 35.75% reallocation of non-irrigated area harvested to irrigated area harvest
  - 7.52% increase in total area harvested
  - By changing one variable at a time, holding all others constant

<table>
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<th>70% MR</th>
<th>2013</th>
<th>2018</th>
<th>2023</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yield growth</td>
<td>7.52%</td>
<td>2.29%</td>
<td>1.98%</td>
</tr>
<tr>
<td>Irrigation change</td>
<td>35.75%</td>
<td>9.16%</td>
<td>7.18%</td>
</tr>
<tr>
<td>New Ag Land</td>
<td>7.52%</td>
<td>2.29%</td>
<td>1.98%</td>
</tr>
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</table>

% change per year to attain self-sufficient rice
Model Results

- At 63% (Philippines current) milling rate
  - Self-sufficient rice in 2013:
    - Requires 0.82 kg/ha increase in irrigated yield
    - Requires 0.59 kg/ha increase in non-irrigated yield
    - Requires impossible transformation of non-irrigated land
    - Requires 912,814 hectares of new area harvested

<table>
<thead>
<tr>
<th></th>
<th>Irrigated</th>
<th>Non-irrigated</th>
<th>Irrigated</th>
<th>Non-irrigated</th>
<th>Irrigated</th>
<th>Non-irrigated</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2013</td>
<td>2013</td>
<td>2018</td>
<td>2018</td>
<td>2023</td>
<td>2023</td>
</tr>
<tr>
<td>Yield (kg/ha)</td>
<td>5.06</td>
<td>3.63</td>
<td>5.39</td>
<td>3.86</td>
<td>5.84</td>
<td>4.19</td>
</tr>
<tr>
<td>Area Harvested Irrigation (,000 ha)</td>
<td>6091.07</td>
<td>-1401.11</td>
<td>7266.06</td>
<td>-2576.10</td>
<td>8857.78</td>
<td>-4167.82</td>
</tr>
<tr>
<td>Area Harvested New Land (,000 ha)</td>
<td>3778.84</td>
<td>1823.94</td>
<td>4025.91</td>
<td>1943.19</td>
<td>4360.60</td>
<td>2104.74</td>
</tr>
</tbody>
</table>
Model Results

- At 70% (USA current) milling rate
  - Self-sufficient rice in 2013:
    - Requires 0.32 kg/ha increase in irrigated yield
    - Requires 0.23 kg/ha increase in non-irrigated yield
    - Requires impossible transformation of non-irrigated land
    - Requires 352,537 hectares of new area harvested

<table>
<thead>
<tr>
<th>70% MR</th>
<th>Irrigated 2013</th>
<th>Non-irrigated 2013</th>
<th>Irrigated 2018</th>
<th>Non-irrigated 2018</th>
<th>Irrigated 2023</th>
<th>Non-irrigated 2023</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yield kg/ha</td>
<td>4.55</td>
<td>3.26</td>
<td>4.85</td>
<td>3.48</td>
<td>5.25</td>
<td>3.77</td>
</tr>
<tr>
<td>Area Harvested Irrigation (,000 ha)</td>
<td>4293.96</td>
<td>396.00</td>
<td>5351.45</td>
<td>-661.49</td>
<td>6783.99</td>
<td>-2094.03</td>
</tr>
<tr>
<td>Area Harvested New Land (,000 ha)</td>
<td>3400.95</td>
<td>1641.54</td>
<td>3623.31</td>
<td>1748.87</td>
<td>3924.54</td>
<td>1894.26</td>
</tr>
</tbody>
</table>
• Improvements in milling rates alleviates tremendous pressure on yield, irrigation, and area harvested.

• Easier to access mills than farm. 
  – Ie. There are fewer mills than farms

• This alone cannot make the Philippines self sufficient

<table>
<thead>
<tr>
<th>Difference 63% - 70%</th>
<th>Irrigated 2013</th>
<th>Non-irrigated 2013</th>
<th>Irrigated 2018</th>
<th>Non-irrigated 2018</th>
<th>Irrigated 2023</th>
<th>Non-irrigated 2023</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yield kg/ha</td>
<td>0.51</td>
<td>0.36</td>
<td>0.54</td>
<td>0.39</td>
<td>0.58</td>
<td>0.42</td>
</tr>
<tr>
<td>Area Harvested Irrigation (,000 ha)</td>
<td>1,797,112</td>
<td>-1,797,112</td>
<td>1,914,610</td>
<td>-1,914,610</td>
<td>2,073,788</td>
<td>-2,073,788</td>
</tr>
<tr>
<td>Area Harvested New Land (,000 ha)</td>
<td>377,883</td>
<td>182,394</td>
<td>402,591</td>
<td>194,319</td>
<td>436,060</td>
<td>210,474</td>
</tr>
</tbody>
</table>
Conclusions

- The potential dangers of self-sufficiency…
Conclusions

- Depleting National Food Authority Stocks

In 0,000 metric tons, graph constructed using Philippines BAS data.
Conclusions

- Self-sufficiency in the Philippines (and other nations) can disrupt the global rice market
- “The global rice market, which is relatively small compared with that of other major crops such as wheat, corn (maize), and soybeans, is likely to become even smaller if rice-consuming countries vigorously pursue self-sufficiency. A consequence of a smaller market is greater price volatility and, the smaller the market size, the more the prices have to move in response to any supply and demand shock.” – Sam Mohanty, IRRI

Conclusions

• More volatile domestic market
  – Smaller markets have to move more in response to any supply and demand shock
  – Volatile weather = volatile supply
    • Floods
    • Monsoons
    • Drought
Conclusions

• Potential for higher domestic prices
  – IRRI book, “Why does the Philippines Import Rice?” calls for trade liberalization because:
    • Filipino farmers do not have a comparative advantage in rice
      – Poor infrastructure and high interest rates cause prices to be higher than countries like Thailand and Vietnam
Conclusion

• Attainment of self-sufficient rice does not appear feasible in 2013.
• The current milling rate of 63% would require:
  – 19.46% yield increase this year
  – Impossible transformation of non-irrigated to irrigated
  – 19.46% increase in area harvested
• Investment into milling quality seems to be the, “lowest hanging fruit”
Conclusion

• More studies should be conducted to investigate:
  – Volatility of rice prices of the Philippines as a closed rice-economy
  – Marginal costs associated with all investments
    • Milling
    • Irrigation
    • Yield increases
    • Food waste reduction
    • Dietary changes
THANK YOU