IMPACTS OF MANGO PULP WEEVIL ON PALAWAN’S AGRICULTURAL SECTOR

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Agriculture and Development Seminar Series
SEARCA, Los Banos, Laguna
October 11, 2011
Agriculture plays an important role in the economy of the Philippines.

- 13.9% of GDP
- 33% of labor force

Market for mangoes, mangosteens, and guava.

- 462 million USD in production
- Philippines ranked 10th globally in production value and production weight in 2009

(CIA Factbook, 2010)  
(FAOSTAT, 2011)
National Level

- Data from 1990-2009 (CountryStat, 2011)
  - Yield
  - Production
  - Area Planted
Area Planted to Mango

- Luzon
  - Pangasinan
- Mindanao
  - Maguindanao
  - Davao del Sur
  - Zamboanga del Norte
Pangasinan has the most area planted
- 8,485 ha (1990)
- 13,819 ha (2009)

Mindanao is an emerging supplier
- Maguindanao increased area planted 21 fold
  - 495 ha (1990) to 10,501 ha (2009)
  - Province with the 6th highest area planted in 2009
- Davao del Sur had the 2nd highest area planted
  - 12,992 ha (2009)
- Zamboanga del Norte had the 4th highest area planted
  - 11,715 ha (2009)
Yield

- Luzon
  - Pangasinan
- Mindanao
  - Misamis Occidental
Yield

- Pangasinan had the highest yield in 2009
  - 540 kg per tree
  - 92 kilograms per tree higher than next province

- Misamis Occidental
  - Largest growth in yield from 1990-2009
    - 160 kg/tree to 447 kg/tree
    - Increase of about 280%
  - 148 kilograms per tree higher than next province, Quezon
Production

- Luzon
  - Pangasinan

- Visayas
  - Cebu

- Mindanao
  - Davao del Sur
  - Zamboanga del Norte
Pangasinan highest mango producing province
- 247,308 metric tons

Cebu second highest producer
- 39,375 metric tons

Mindanao has high growth in production
- Davao del Sur
- Zamboanga del Norte

Producing approximately 6 times more mangoes in 2009 than they did in 1990.
Palawan

- **Land Area**
  - Total: 1,789,655 has
  - Forested: 1,041,850 has
  - Agricultural: 454,405 has

- “Last ecological frontier”
  - 232 Endemic species
  - 11,000 sq. km of coral (35% of Philippine total)
Palawan

- **Extractive services**
  - Fishing
    - Largest supplier in Philippines 2nd quarter
  - Mining
    - Nickel
    - Copper
    - Manganese
  - Farming
    - Palay
    - Corn
    - Coconut
  - Natural Gas and Oil
During the study period of 1990-2009

- **Production**
  - Palawan mango production down 30%
  - National mango production up 70%

- **Yield**
  - Palawan yield per tree down 50%

- **Area planted**
  - Palawan area planted to mango almost doubles
Mango Pulp Weevil
   - *Sternochetus frigidus*
Mango Quarantine
   - Bureau of Plant Industry Order No. 20 (1987)

Photo By: ipmimages.org
Palawan Production

- Palawan (1990)
  - 15th highest mango producing province in the Philippines.

- Palawan (2009)
  - 29th highest producing province of mango in the Philippines.

- Production (1990-2009)
  - Palawan down 30%
  - National up 70%
Why continue planting with the quarantine?
- Mango trees take 10-15 years to become economically viable
- Highest growth rate is until 1999, 12 years after the MPW discovery and sequential quarantine
- Pre-MPW trees

Why plant so much with the quarantine?
- 1980s project through the Department of Agriculture
- Pushed for intensive and widespread planting of mango trees throughout Palawan

Palawan’s area planted to mango has nearly doubled during the study period
Declining average yields (1990-2009)
- National down 25%
- Palawan down 50%

Yield Gap (National vs. Palawan)
- 16.88 kg/tree (1990)
- 121 kg/tree (1998)
- 42.9 kg/tree (2009)
- Decline in yield gap, 1998-2009
  - National (down 46%)
  - Palawan (Up 2%)

With no access to external markets, Palawan mango farmers have no incentive to produce
Economic Impacts

- How much has the mango quarantine cost the farmers of Palawan?
- How much has the mango quarantine cost the retail economy of Palawan?
- Answered in two ways
  1. What if Palawan grew like its neighbors?
  2. What if Palawan maintained its national position in mango production?
Economic Impacts

- All values are reported in 2010 dollars
  - Adjusted for inflation using US-CPI
    - Philippine Agricultural CPI (too high)
    - Report all values in USD rather than PHP
  - Farm gate price is for green, carabao mango
  - Retail price is for ripe, carabao mango
    - Causes some overestimation
    - Receives high market price
    - No post harvest losses were calculated
Economic Impacts

\[ TL = AV - TV \]

Total Loss = Attainable Value – Total (actual) Value
Economic Impacts

\[ TV = \sum_{i=1}^{20} (P_i \cdot \hat{R}_i) \]

Total (actual) Value is the summation of the actual production of Palawan multiplied by the real price.
Economic Impacts

\[ AV = \sum_{i=1}^{20} (\vec{P}_i \cdot \vec{R}_i) \]

Attainable Value is the summation of the attainable production of Palawan multiplied by the real price.
How much has the mango quarantine cost the farmers of Palawan?
How much has the mango quarantine cost the retail economy of Palawan?
Answered in two ways
1. What if Palawan grew like its neighbors?
2. What if Palawan maintained its national position in mango production?
Attainable production is the growth rate of MIMAROPA, applied to the base year production (1990) for Palawan.

If Palawan grew like its neighbors...
Neighbor’s Growth

![Graph showing production growth over time in Palawan with actual and attainable metrics.]

- **Production (metric tons)**
  - 1990: 5000
  - 1995: 10000
  - 2000: 15000
  - 2005: 20000

- **Year**

- **Legend:**
  - **Palawan actual**
  - **Palawan attainable**
## Farm gate price

- **Actual**: $71.85 million USD
- **Attainable**: $144.63 million USD
- **Difference**: $72.28 million USD
- **Annual loss**: $3.64 million USD
Retail price

- Actual $142.55 million USD
- Attainable $295.09 million USD
- Difference $152.54 million USD
- Annual loss $7.63 million USD
Economic Impacts

- How much has the mango quarantine cost the farmers of Palawan?
- How much has the mango quarantine cost the retail economy of Palawan?
- Answered in two ways
  1. What if Palawan grew like its neighbors?
  2. What if Palawan maintained its national position in mango production?
Mean

Std. dev.

1990
Attainable Production

NEIGHBOR’S GROWTH

NATIONAL POSITION
National Position

<table>
<thead>
<tr>
<th></th>
<th>Palawan (tonnes)</th>
<th>Value (million USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual</td>
<td>126,114.74</td>
<td>$71.85</td>
</tr>
<tr>
<td>Attainable</td>
<td>310,619.96</td>
<td>$178.42</td>
</tr>
<tr>
<td>Difference</td>
<td>126,062.12</td>
<td>$106.57</td>
</tr>
</tbody>
</table>

- **Farm gate price**
  - **Actual** $71.85 million USD
  - **Attainable** $178.42 million USD
  - **Difference** $106.57 million USD
  - **Annual loss** $5.33 million USD
# National Position

<table>
<thead>
<tr>
<th>Production (tonnes)</th>
<th>Palawan Value (million USD)</th>
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<tr>
<td>Actual</td>
<td>$142.55</td>
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<tr>
<td>Attainable</td>
<td>$372.97</td>
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<tr>
<td>Difference</td>
<td>$230.43</td>
</tr>
</tbody>
</table>

- **Retail price**
  - Actual: $142.55 million USD
  - Attainable: $372.97 million USD
  - Difference: $230.43 million USD
  - Annual loss: $11.52 million USD
Economic Impacts

- How much has the mango quarantine cost the farmers of Palawan?
  - $3.64 million USD (Annually)
  - $5.33 million USD (Annually)
  - $72.28 to $106.57 million USD total

- How much has the mango quarantine cost the retail economy of Palawan?
  - $7.63 million USD (Annually)
  - $11.52 million USD (Annually)
  - $152.54 to $230.43 million USD total
What now?

- Policy makers
  - End of mango quarantine under strict regulation
- Private Enterprise
  - Creation of value-added mango processing
Technology has changed immensely since 1987

Utilization of x-ray in post harvest

- Non-destructive
- Value-added
- Safe for export

Requires strong supervision

- Serious consequences to MPW export

Will require future study on impact assessment of MPW export
Mango Quarantine is on fresh mangoes, not processed mangoes

Creation of value-added mango processing
- Provides farmers with a new market for mangoes
- Provides Palawan with jobs in a new industry

Products
- Dried mangoes
- Mango pulp
- Mango Puree
- Mango juice
- Etc.
National production is falling
Palawan production has room to expand
Technology is available
Mango Growers Association of Palawan has formed
Conditional lifting is already being sought by the Mango Growers Association
  - Citing large financial and job losses (Pia.gov.ph)
It is time for Palawan to adopt new technologies to move their mango industry forward
Special Thanks to:

- Dr. Valerien O. Pede
- Dr. Adam H. Sparks
- Dr. Bart Duff
Maraming Salamat Po!