

IMPACTS OF MANGO PULP WEEVIL ON PALAWAN'S AGRICULTURAL SECTOR

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National Level

- ▣ 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

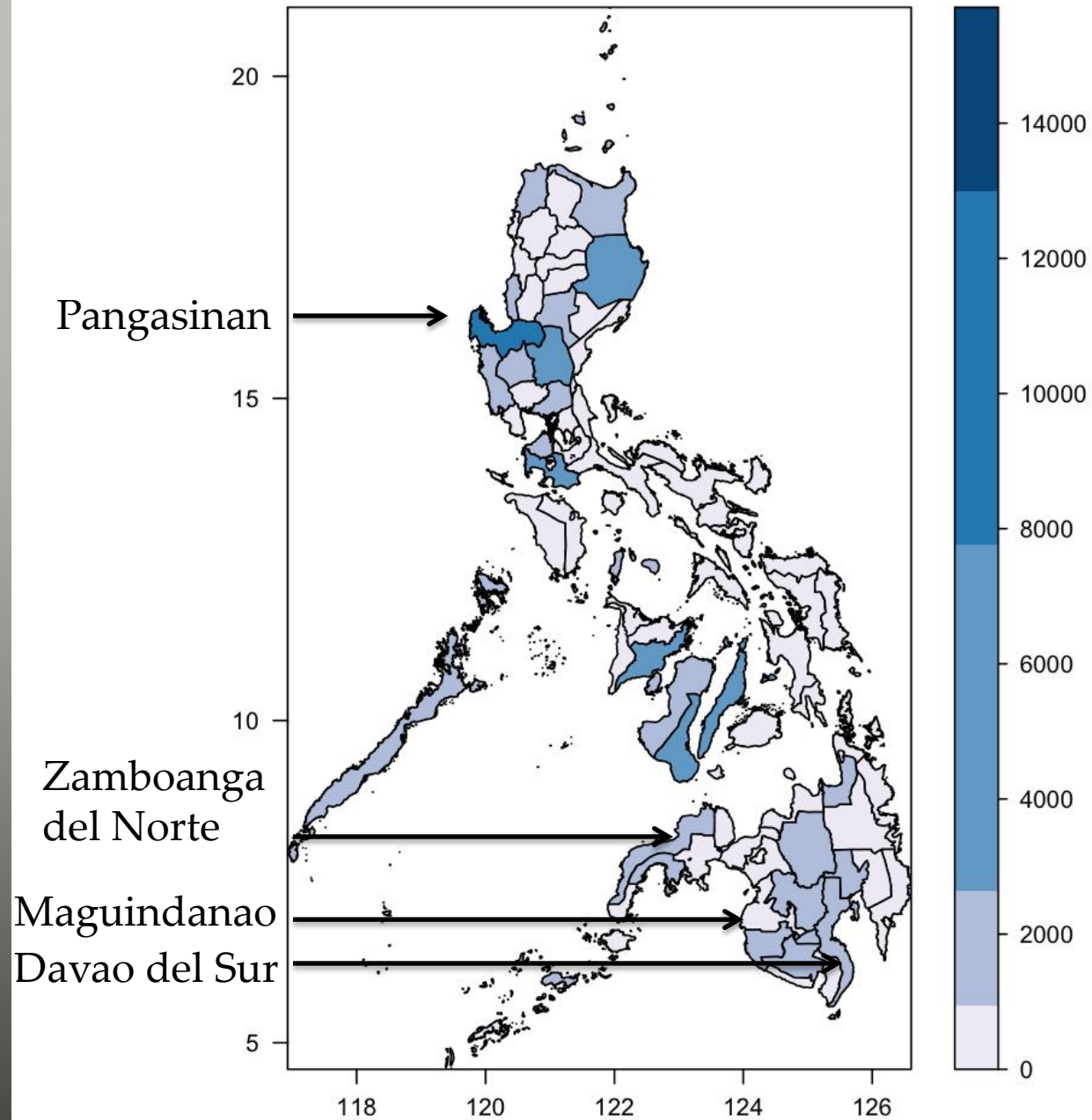
National Level

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

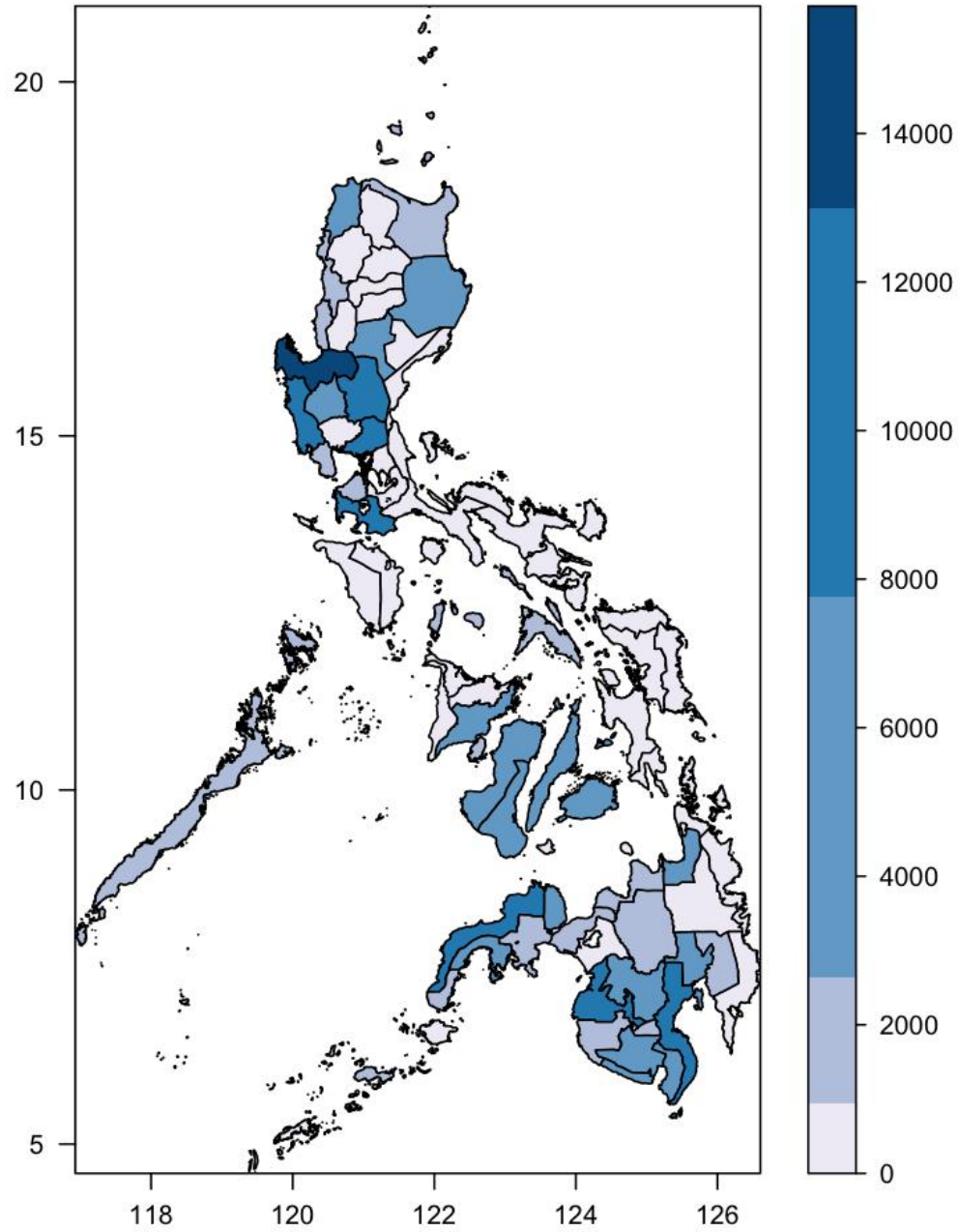
Area Planted to Mango

- ▣ Luzon
 - Pangasinan
- ▣ Mindanao
 - Maguindanao
 - Davao del Sur
 - Zamboanga del Norte

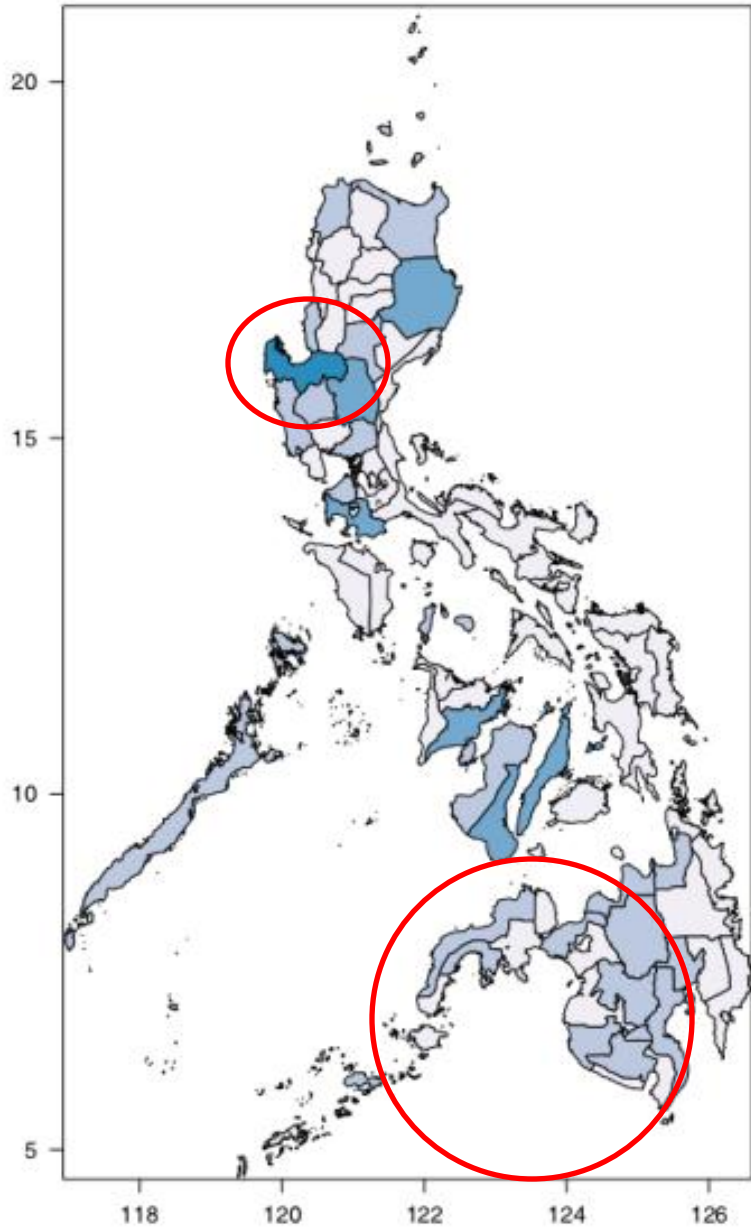
1990



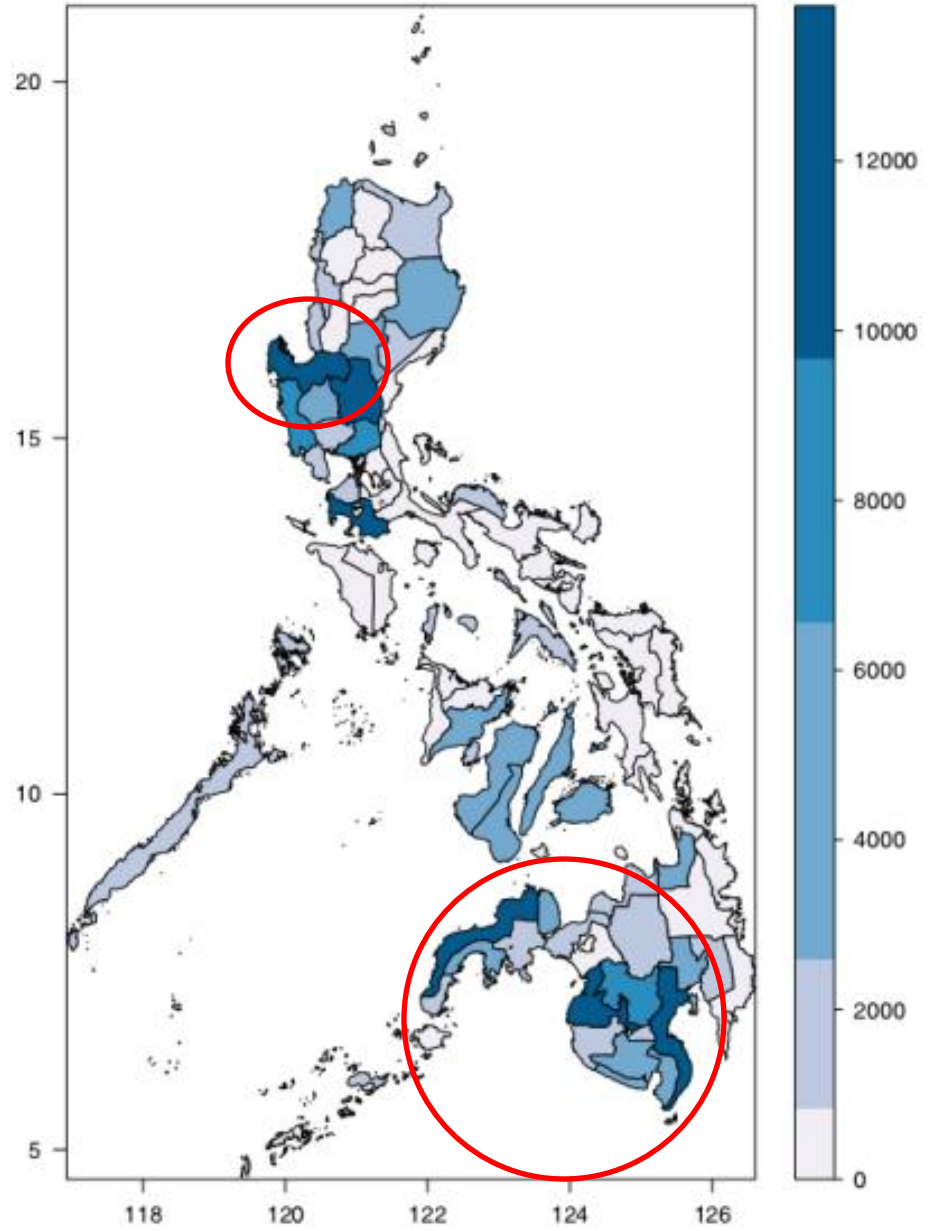
2009



1990



2009



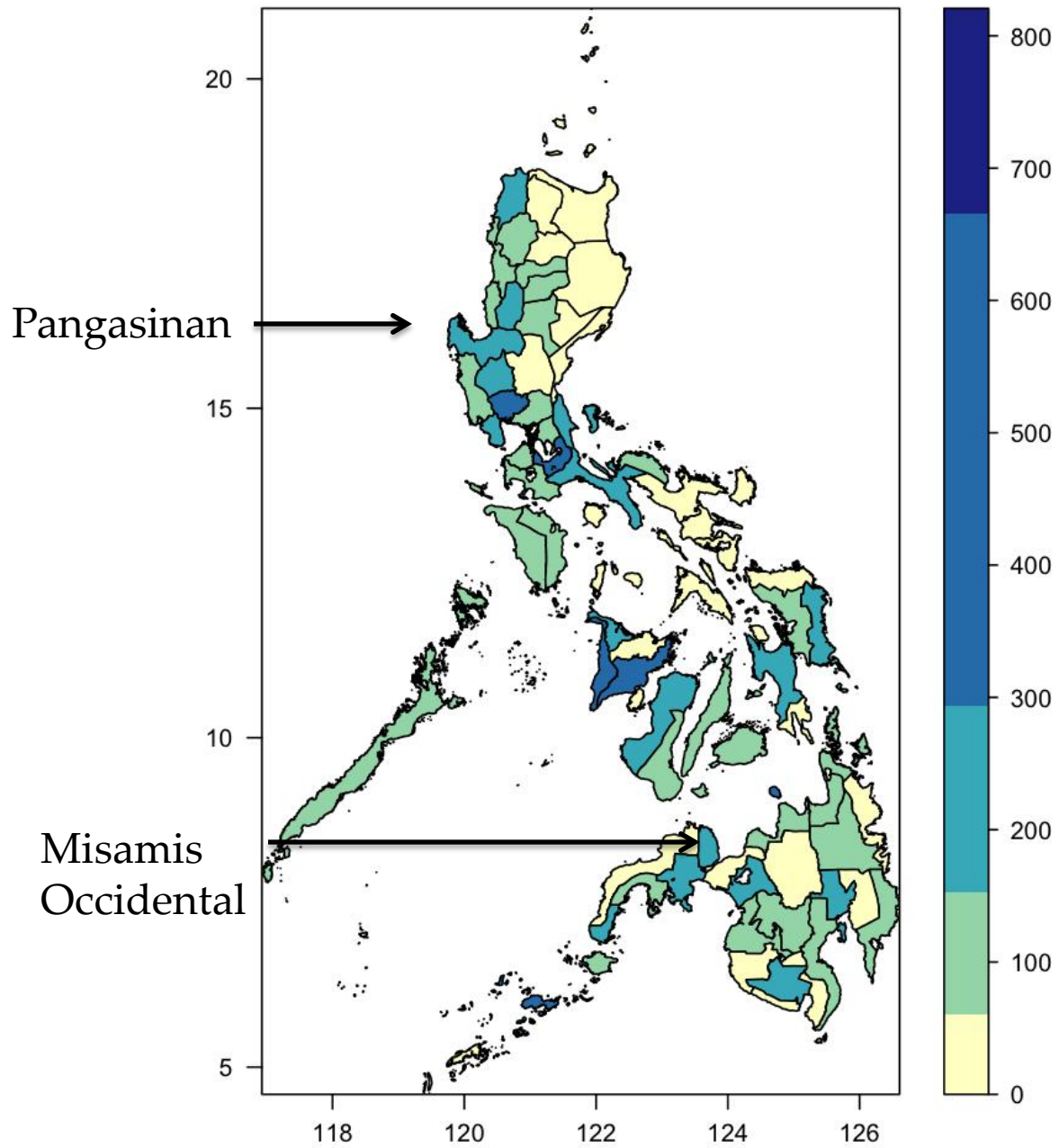
Area Planted

- ▣ 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)

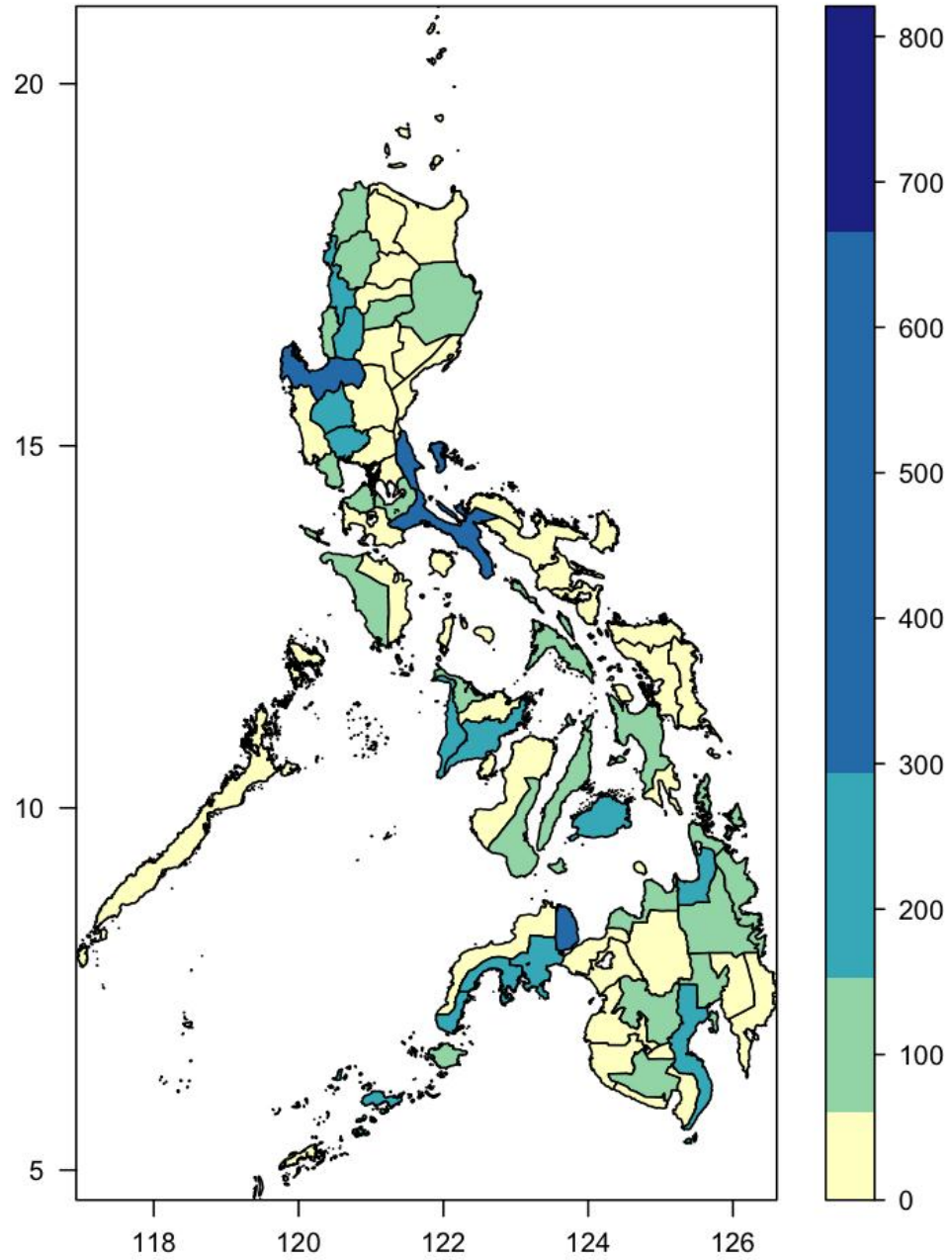
Yield

- ▣ Luzon
 - Pangasinan
- ▣ Mindanao
 - Misamis Occidental

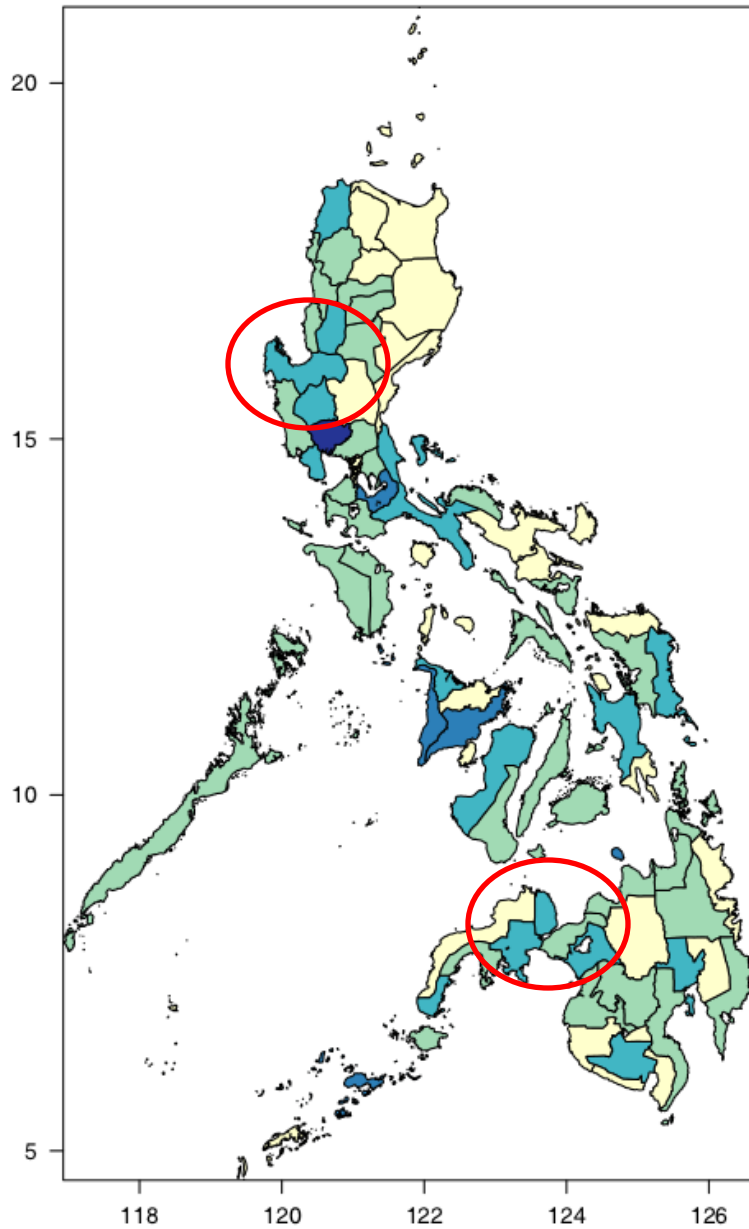
1990



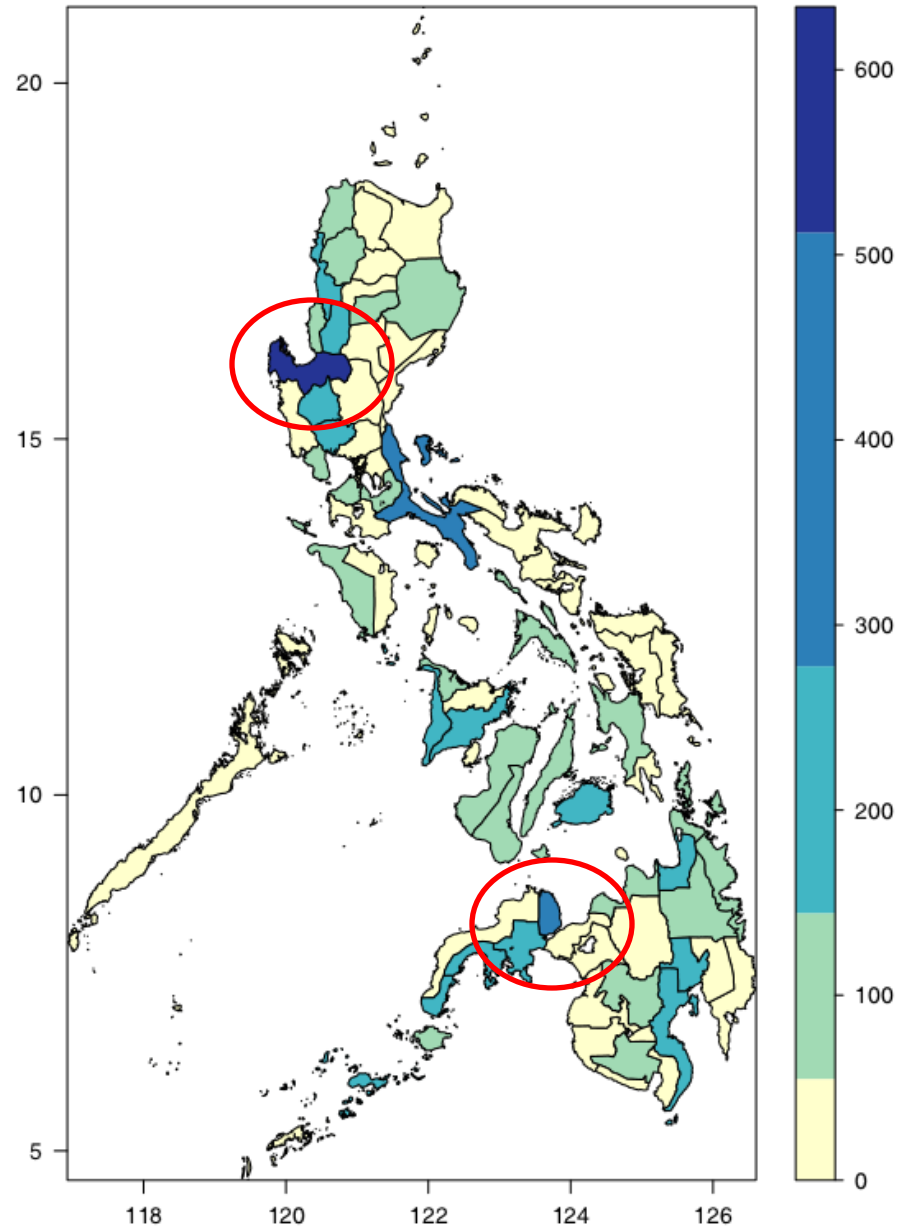
2009



1990



2009



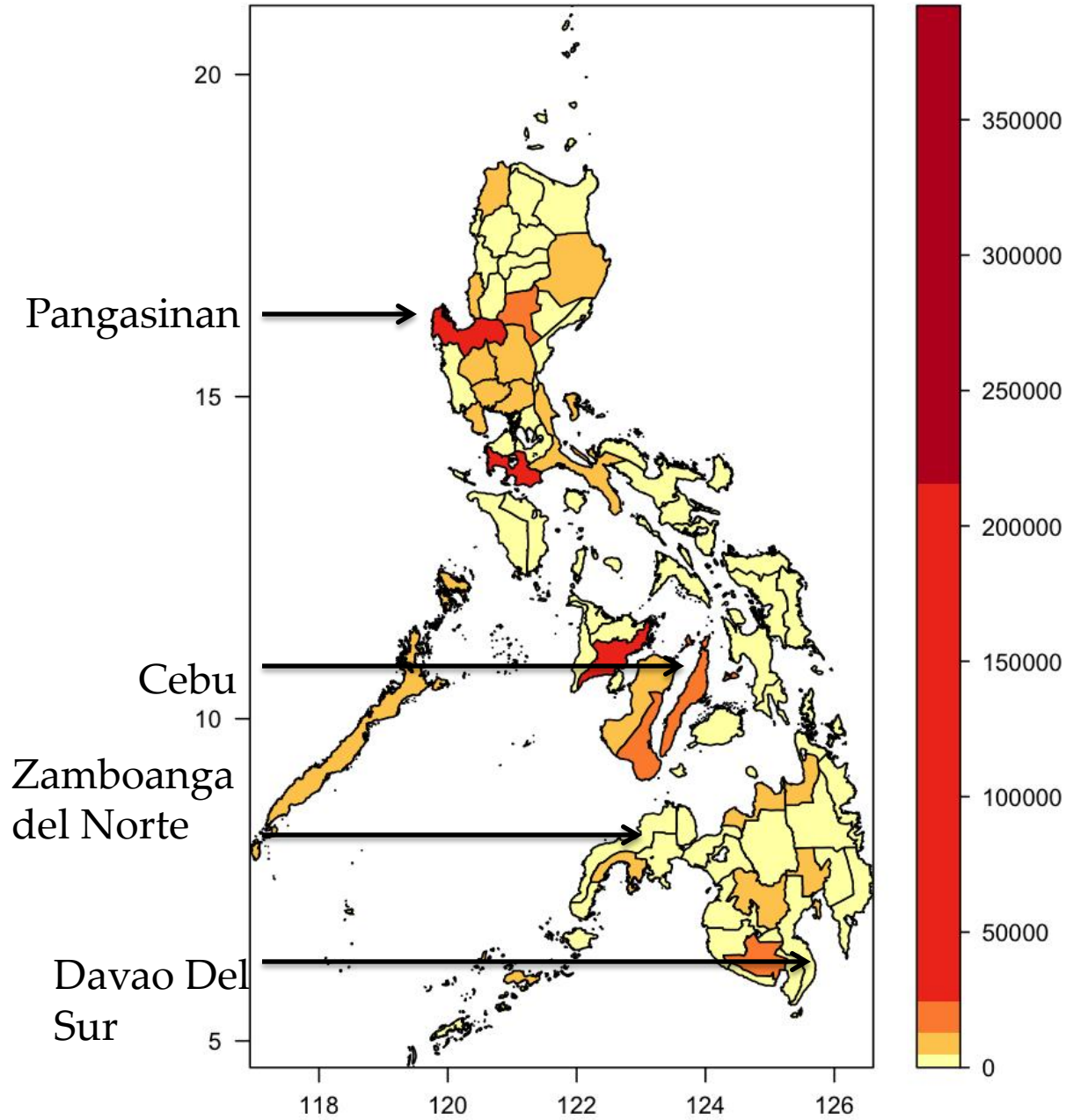
Yield

- ▣ 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

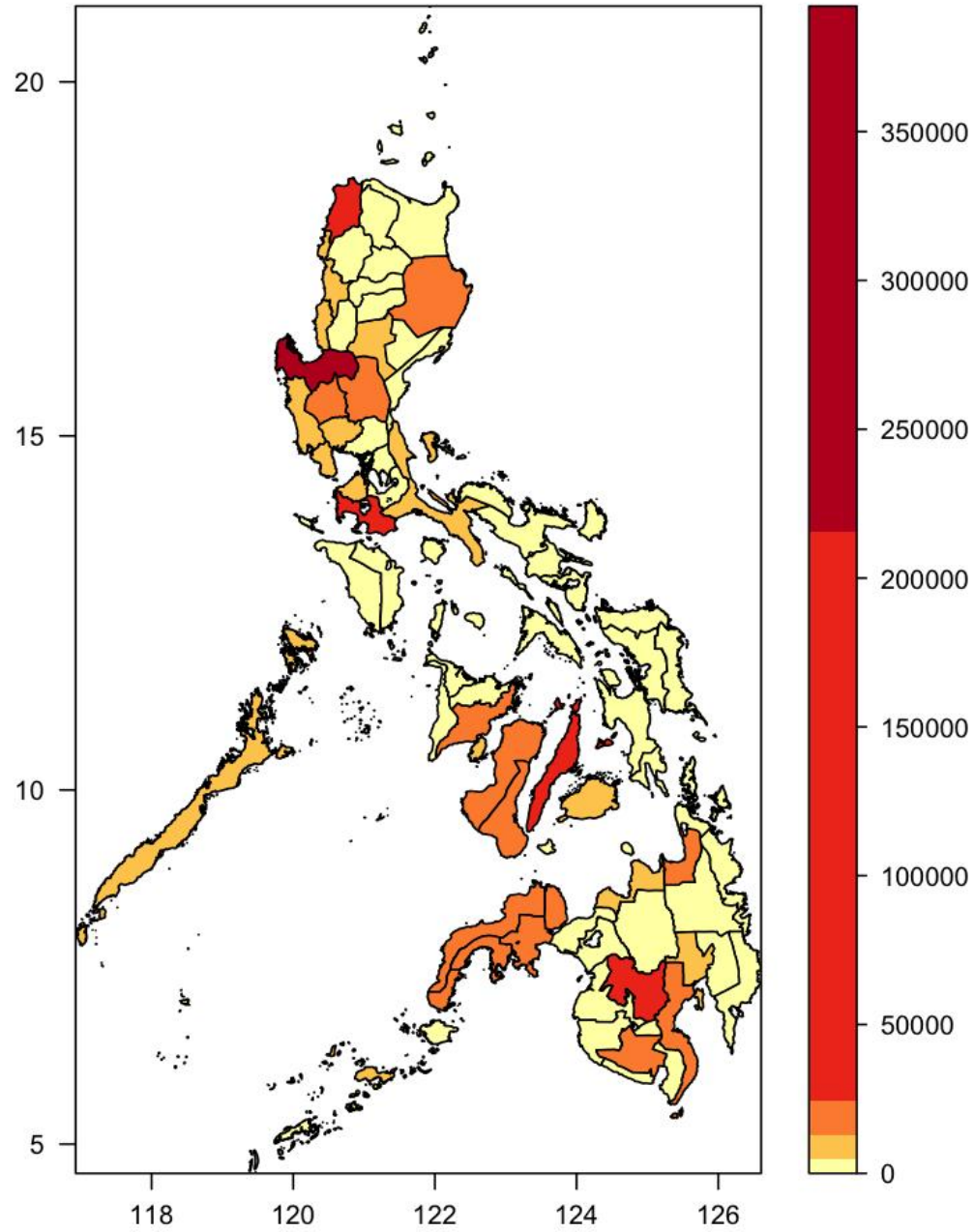
Production

- ▣ Luzon
 - Pangasinan
- ▣ Visayas
 - Cebu
- ▣ Mindanao
 - Davao del Sur
 - Zamboanga del Norte

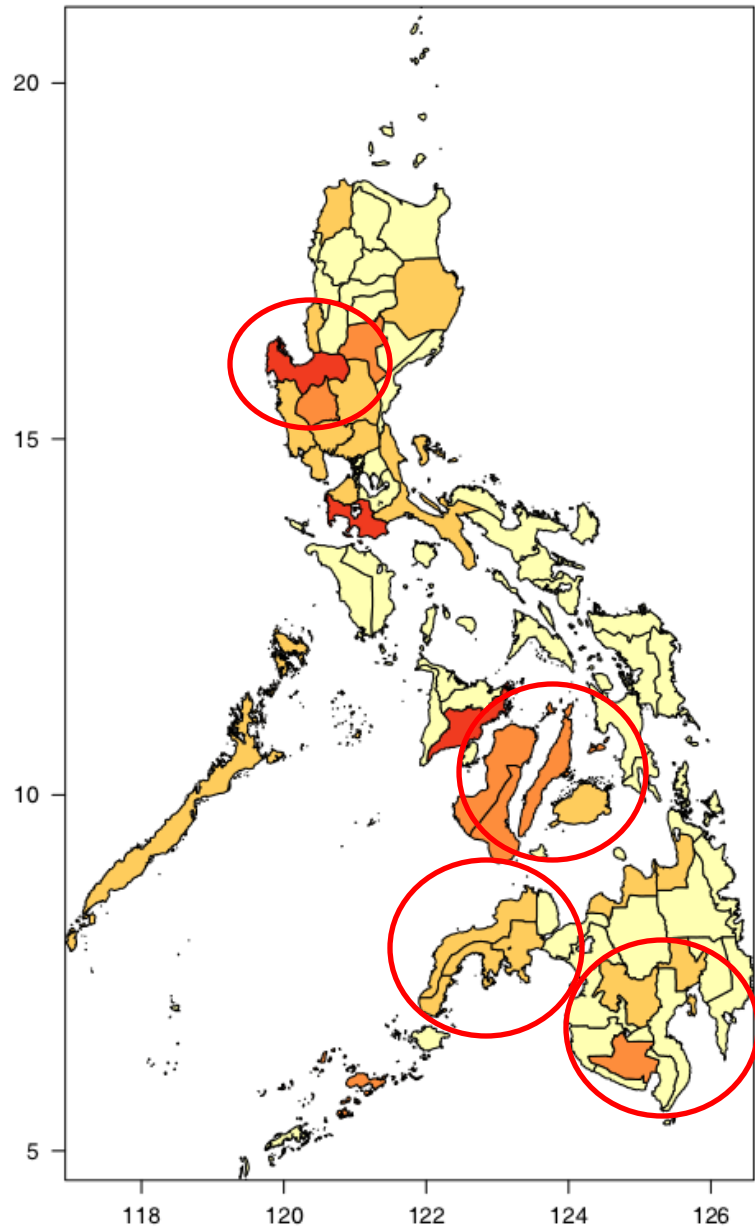
1990



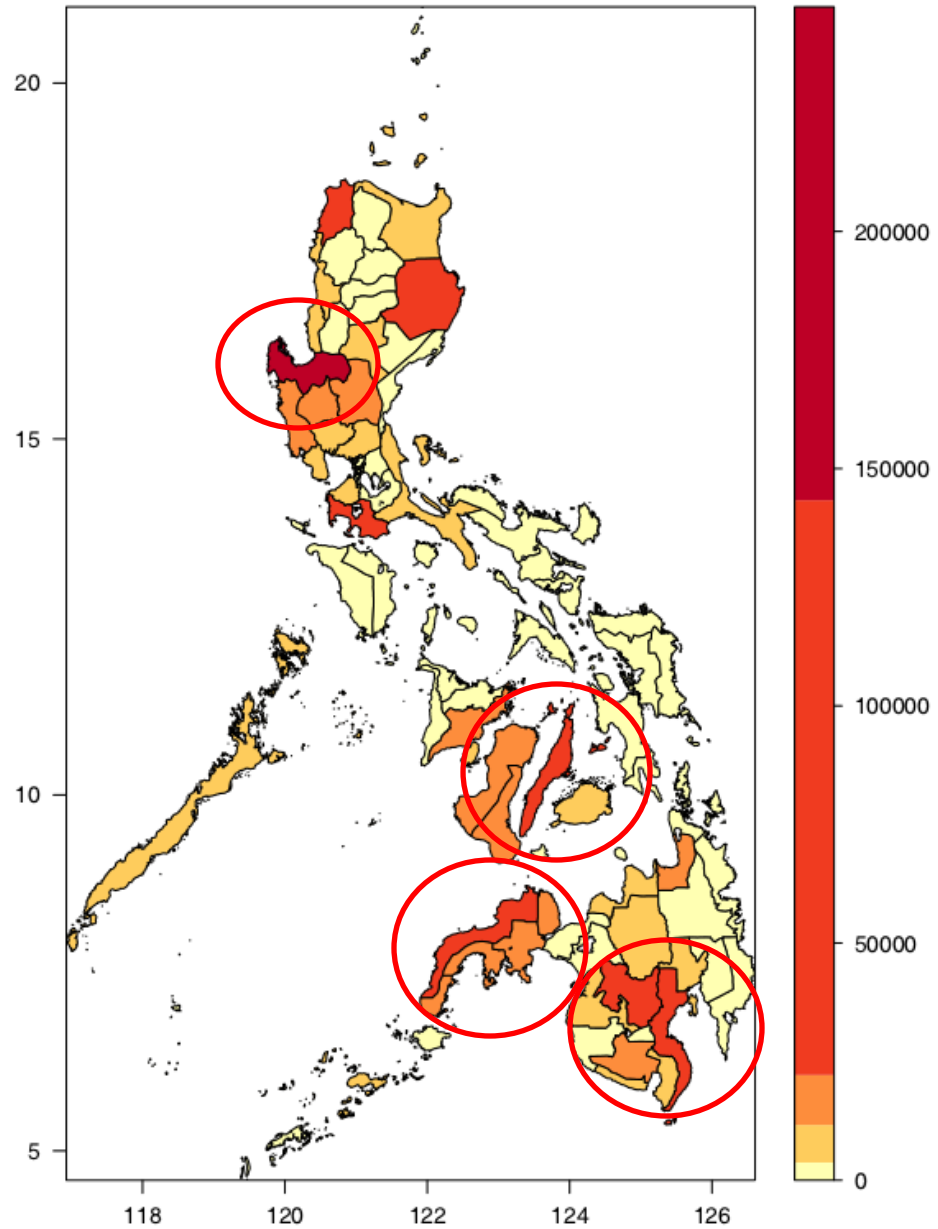
2009



1990



2009



Production

- ▣ 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

Palawan

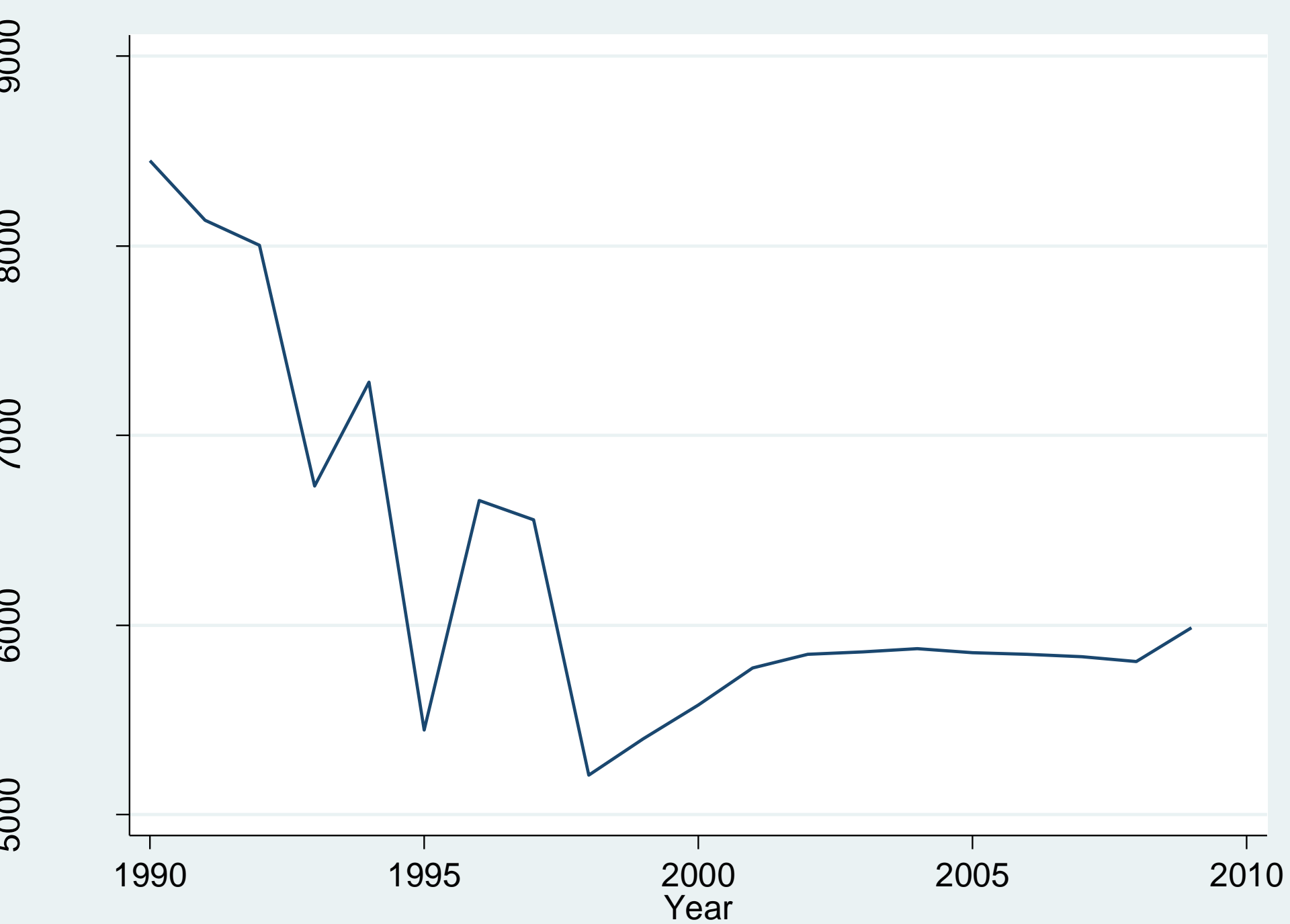
- ▣ During the study period of 1990-2009
 - Production
 - ▣ Palawan mango production down 30%
 - ▣ National mango production up 70%
 - Yield
 - ▣ Palawan yield per tree down 50%
 - Area planted
 - ▣ Palawan area planted to mango almost doubles

Palawan

- ▣ Mango Pulp Weevil
 - *Sternochetus frigidus*
- ▣ Mango Quarantine
 - Bureau of Plant Industry Order No. 20 (1987)

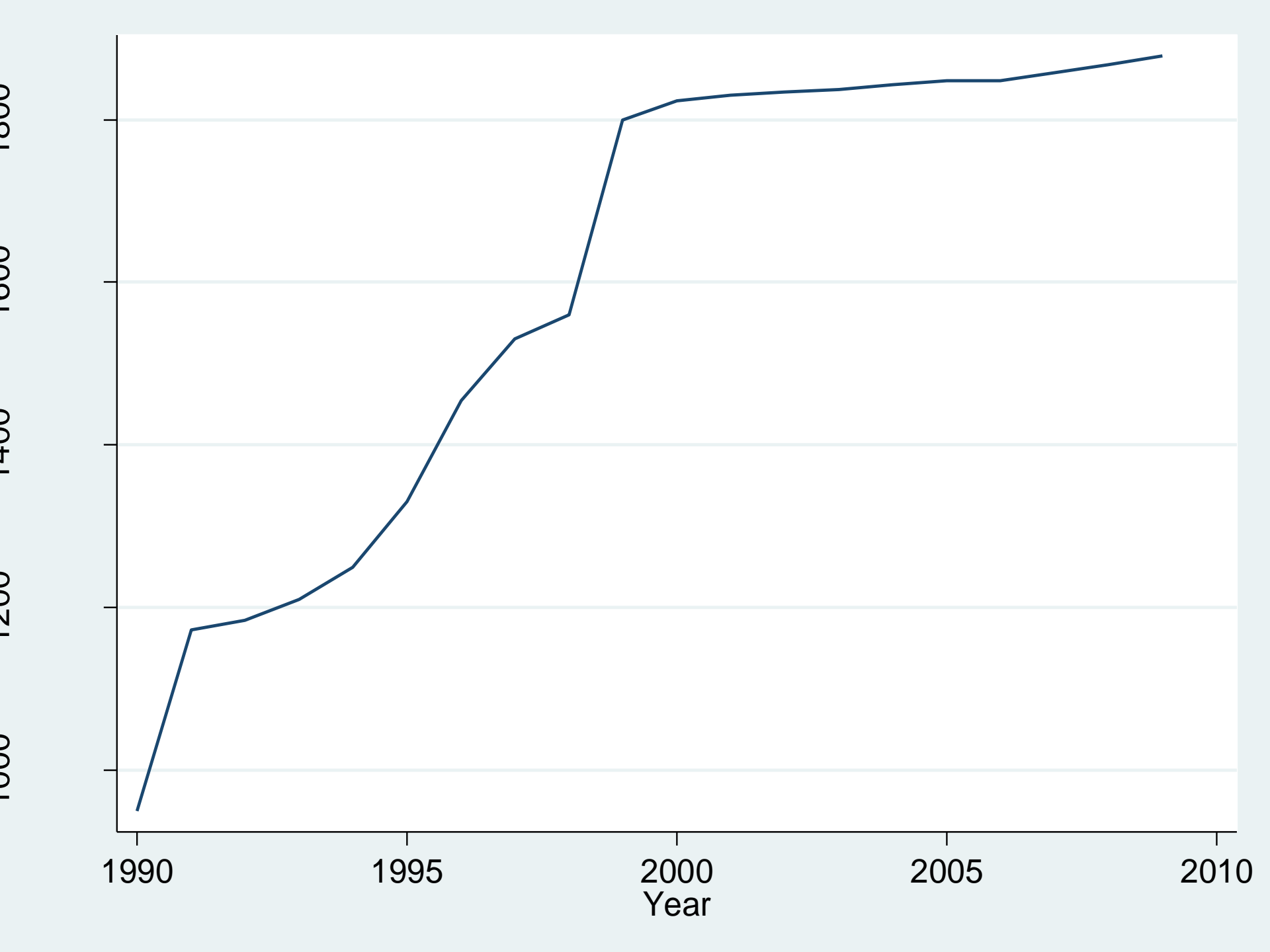


Photo By: ipmimages.org



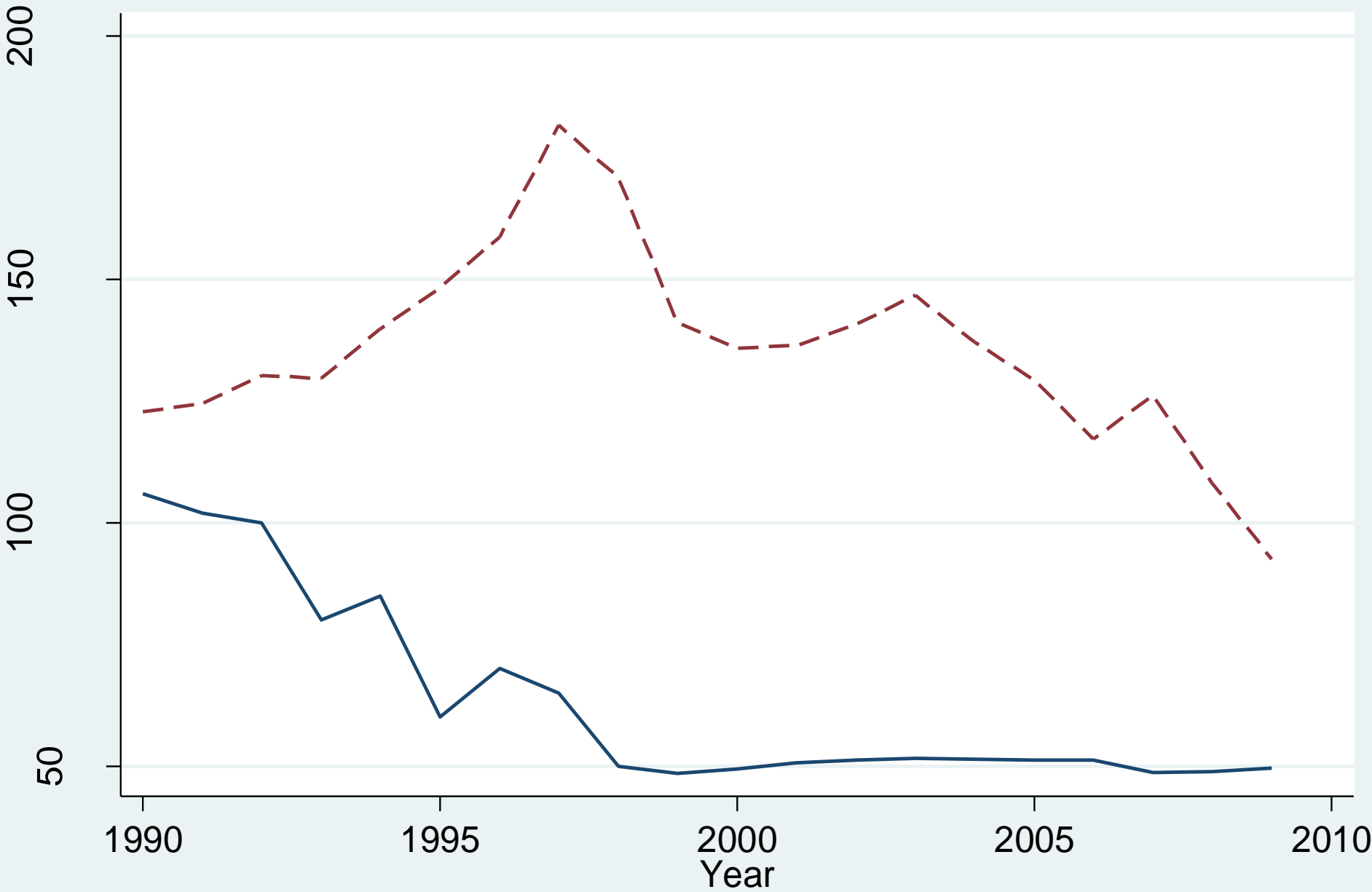
Palawan Production

- ▣ 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%



Palawan Area Planted

- ▣ 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



— Palawan - - - Philippines

Palawan Yield

- ▣ 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

$$TV = \sum_{i=1}^{20} (P_i \bullet \tilde{R}_i)$$

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

Economic Impacts

$$AV = \sum_{i=1}^{20} (\hat{P}_i \bullet \hat{R}_i)$$

Attainable Value is the summation of the attainable production of Palawan multiplied by the real price.

Economic Impacts

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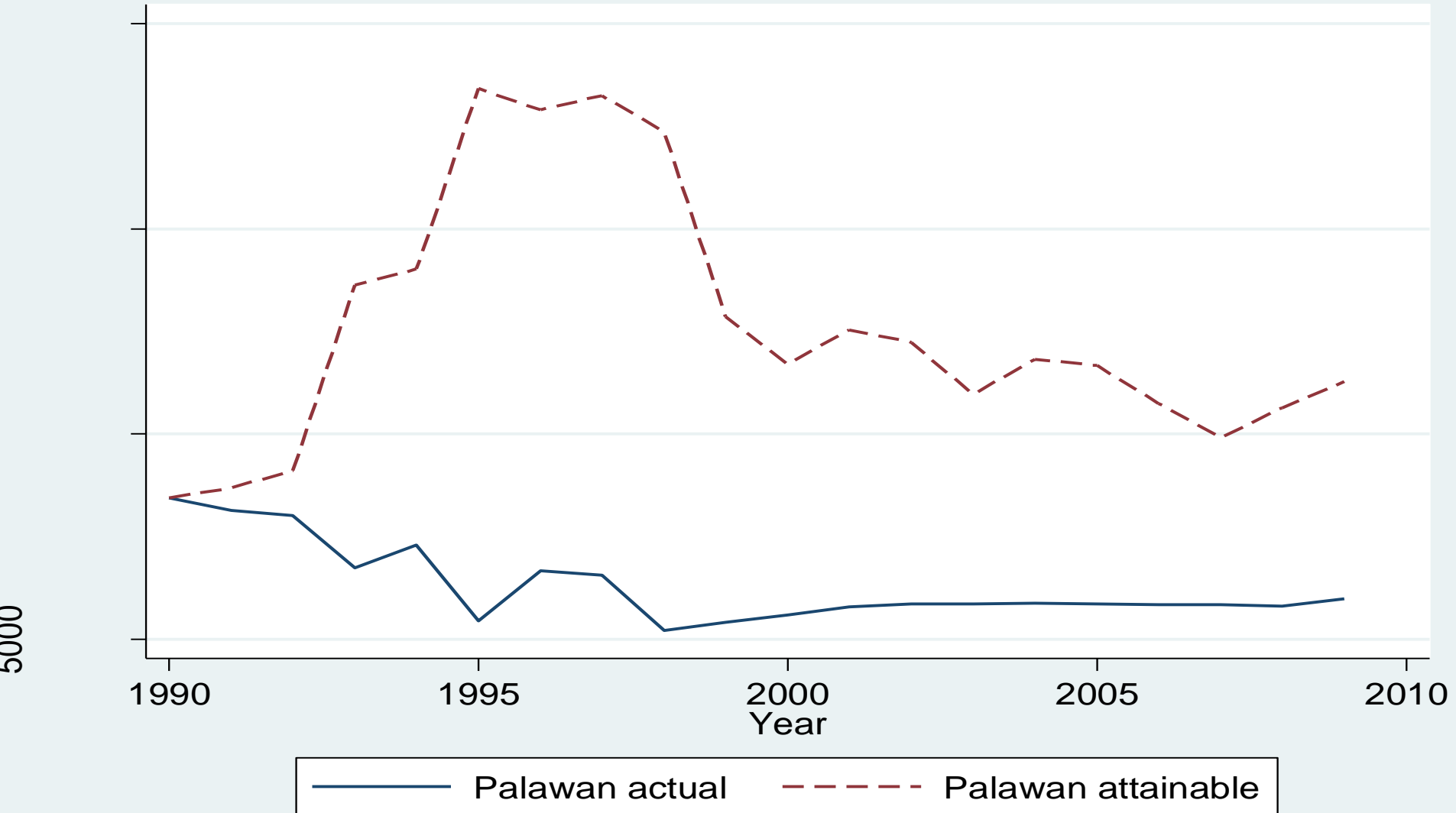
Neighbor's Growth

$$\hat{P}_i = P_{i-1} + P_{i-1} \left(\frac{MP_i - MP_{i-1}}{MP_{i-1}} \right)$$

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



Neighbor's Growth

	Production (Tonnes)	Palawan Value (Million USD)
Actual	126,114.74	\$71.85
Attainable	252,176.86	\$144.63
Difference	126,062.12	\$72.78

▣ Farm gate price

- ▣ Actual \$71.85 million USD
- ▣ Attainable \$144.63 million USD
- ▣ Difference \$72.28 million USD
- ▣ Annual loss \$3.64 million USD

Neighbor's Growth

	Production (Tonnes)	Palawan	Value (Million USD)
Actual	126,114.74		\$142.55
Attainable	252,176.86		\$295.09
Difference	126,062.12		\$152.54

▣ Retail price

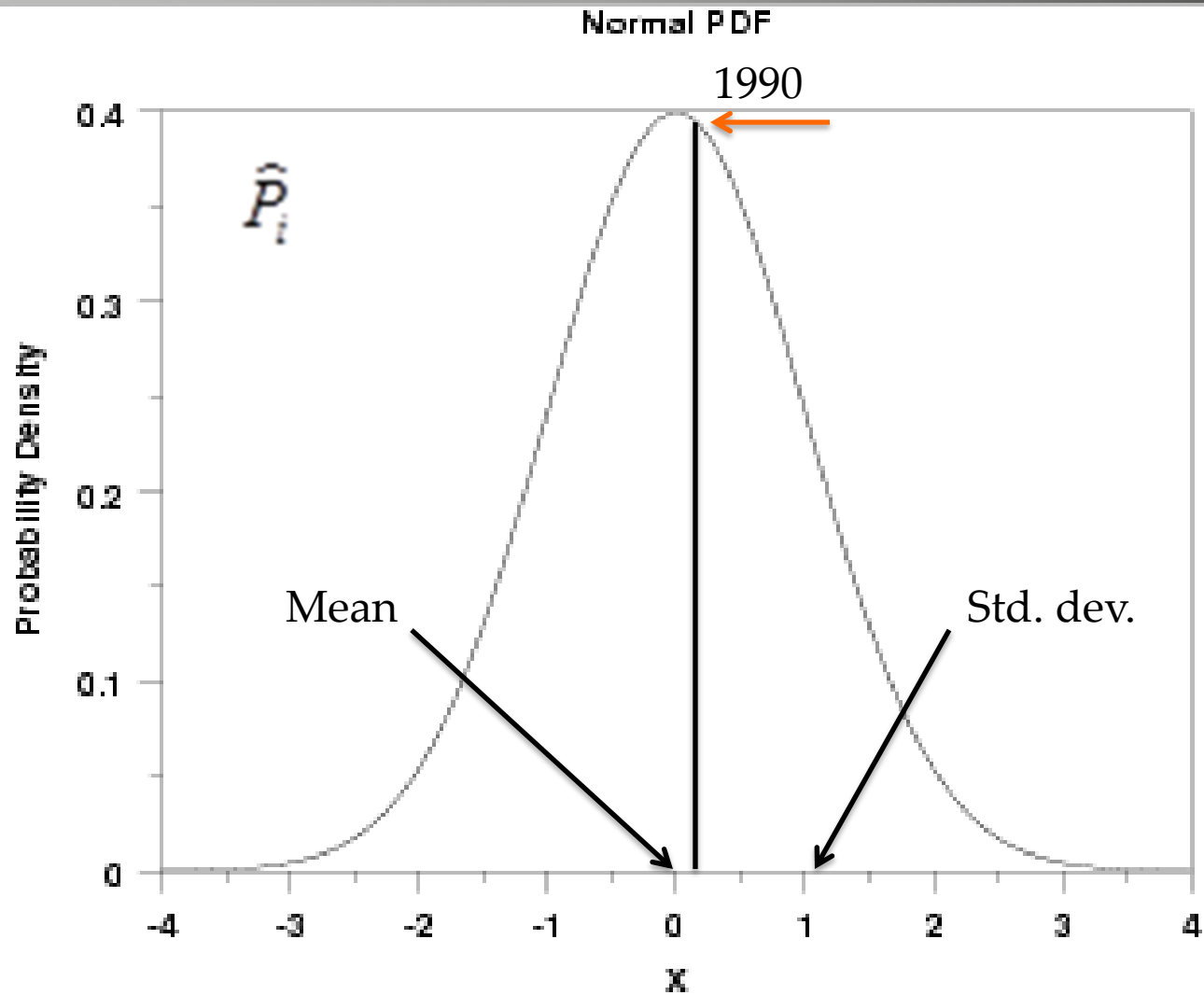
- ▣ Actual \$142.55 million USD
- ▣ Attainable \$295.09 million USD
- ▣ Difference \$152.54 million USD
- ▣ Annual loss \$7.63 million USD

Economic Impacts

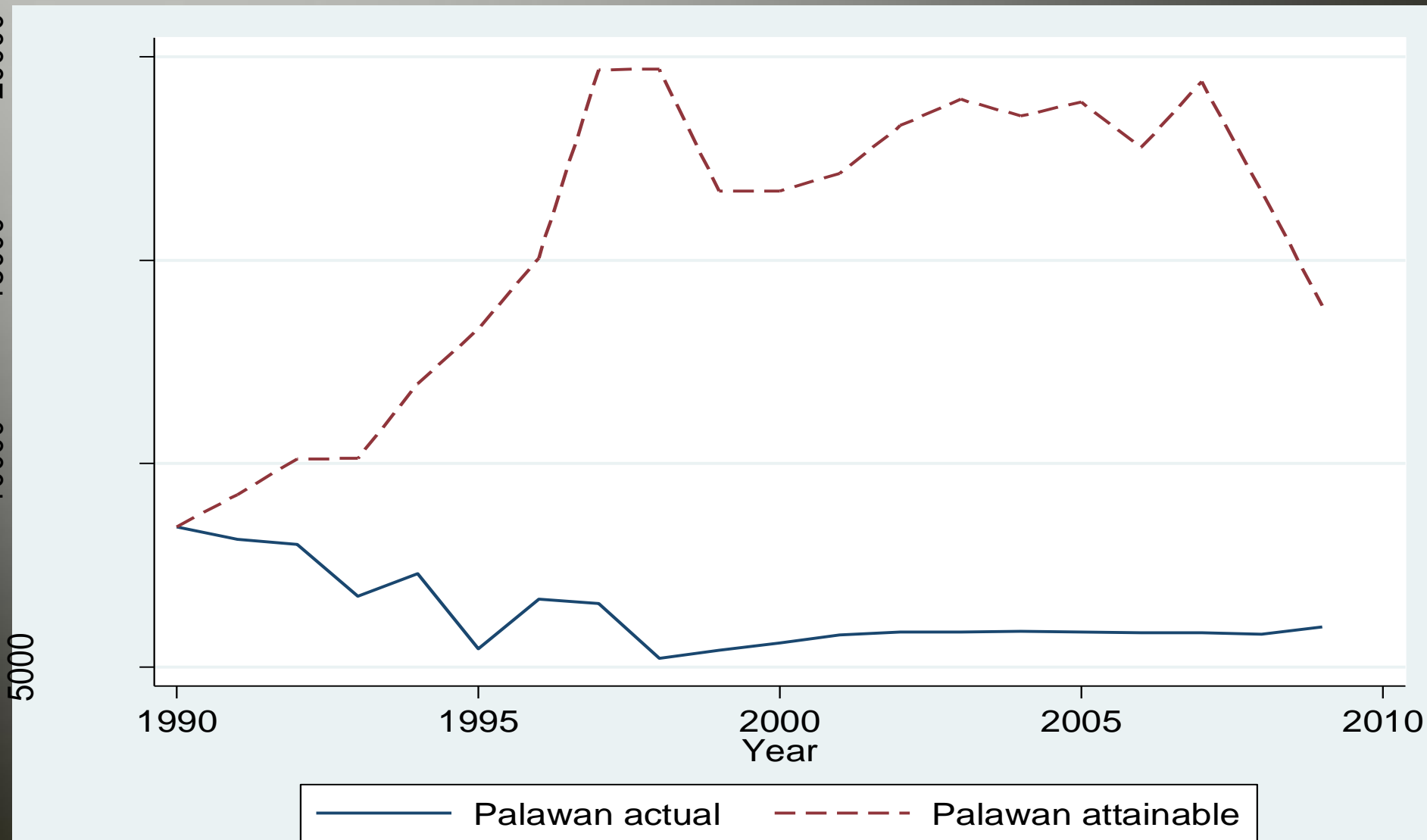
- ▣ How much has the mango quarantine cost the farmers of Palawan?
- ▣ How much has the mango quarantine cost the retail economy of Palawan?
- ▣ Answered in two ways
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National Position

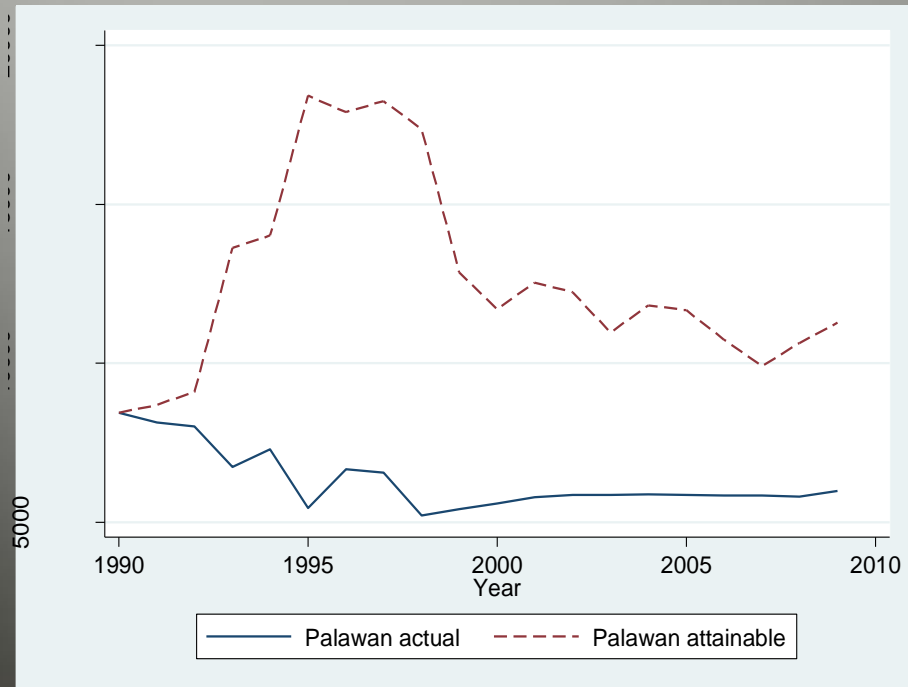


National Position

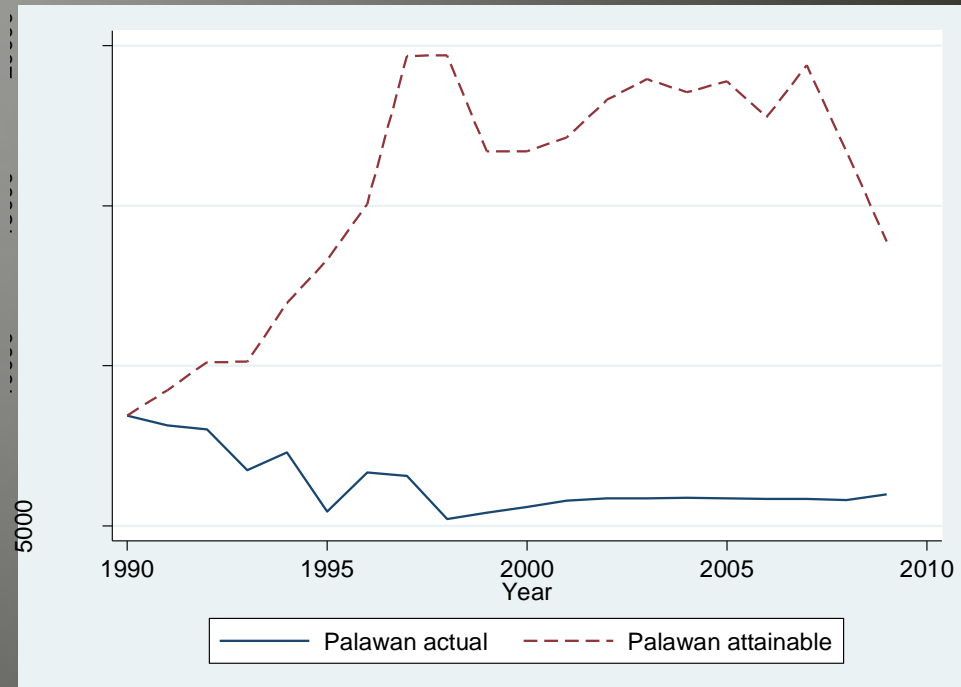


Attainable Production

NEIGHBOR'S GROWTH



NATIONAL POSITION



National Position

	Production (tonnes)	Palawan	Value (million USD)
Actual	126,114.74		\$71.85
Attainable	310,619.96		\$178.42
Difference	126,062.12		\$106.57

▣ 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

	Production (tonnes)	Palawan	Value (million USD)
Actual	126,114.74		\$142.55
Attainable	310,619.96		\$372.97
Difference	126,062.12		\$230.43

▣ 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



Policy Makers

- ▣ 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

Private Enterprise

- ▣ 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.

The time is now

- ▣ 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

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Maraming Salamat Po!

Sabang, Palawan

