

Structural Changes in the Thai Economy

Bhanupong

Lecture 10

A new normal growth path

- GDP growth in 2013 declined to 2.9% from 6.5% in the previous year.
- In 2013, Investment and exports contracted by 1.9% and 0.2 % respectively.
- What went wrong in Thailand
- In 2014, GDP grew only 0.6 %.
- In 2015, GDP grew 2.8%

Main themes

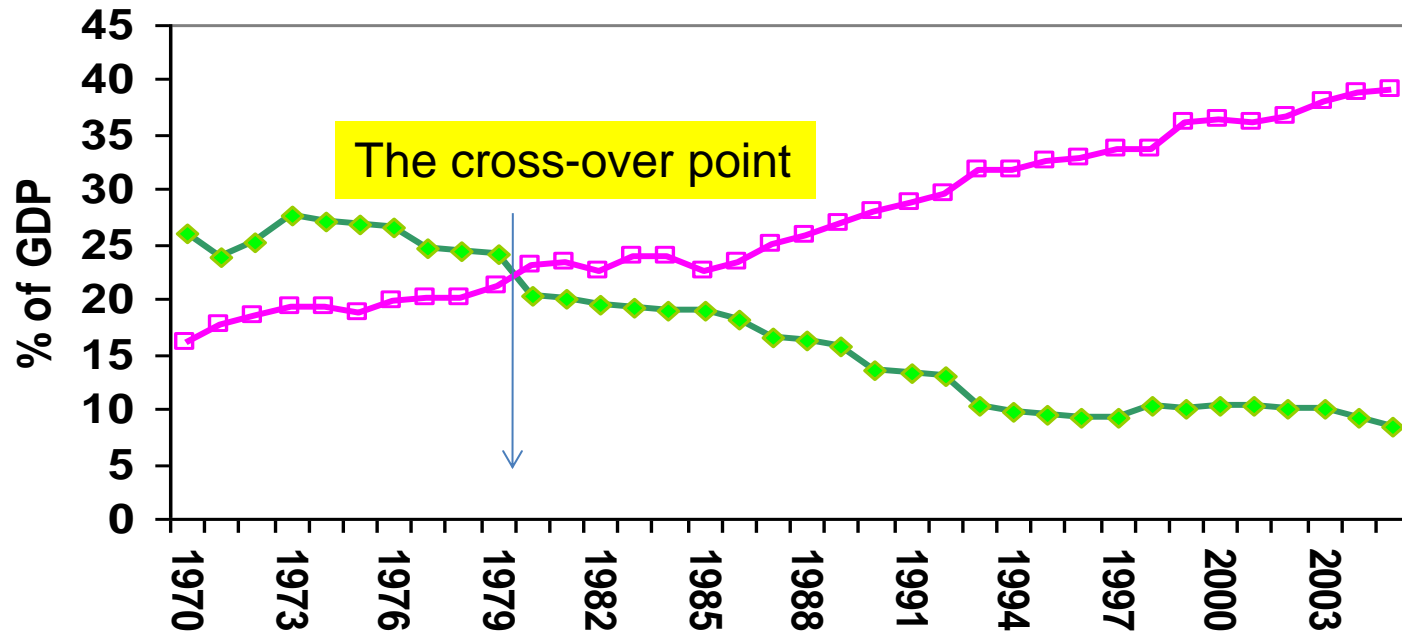
- Changing structure: output, employment, and exports
- A pessimistic view: Dutch disease
- Agricultural productivity
- Long-term declining price trends and volatility

Stylized facts of Economic Development

- **Shares of agriculture in GDP and agricultural exports in total exports have been declining continuously over the past four decades.**
- **Thailand's agricultural export share declined from the average of 54.3 percent during the period 1979-1981 to 24 percent during the period 1989-91.**
- **By 2002, agricultural exports declined further to 12.2 percent of total exports and has remained since then.**
- **Until recently, the terms of trade of between agriculture and manufacture had been generally unfavorable to farmers.**

1. Thailand's output structure

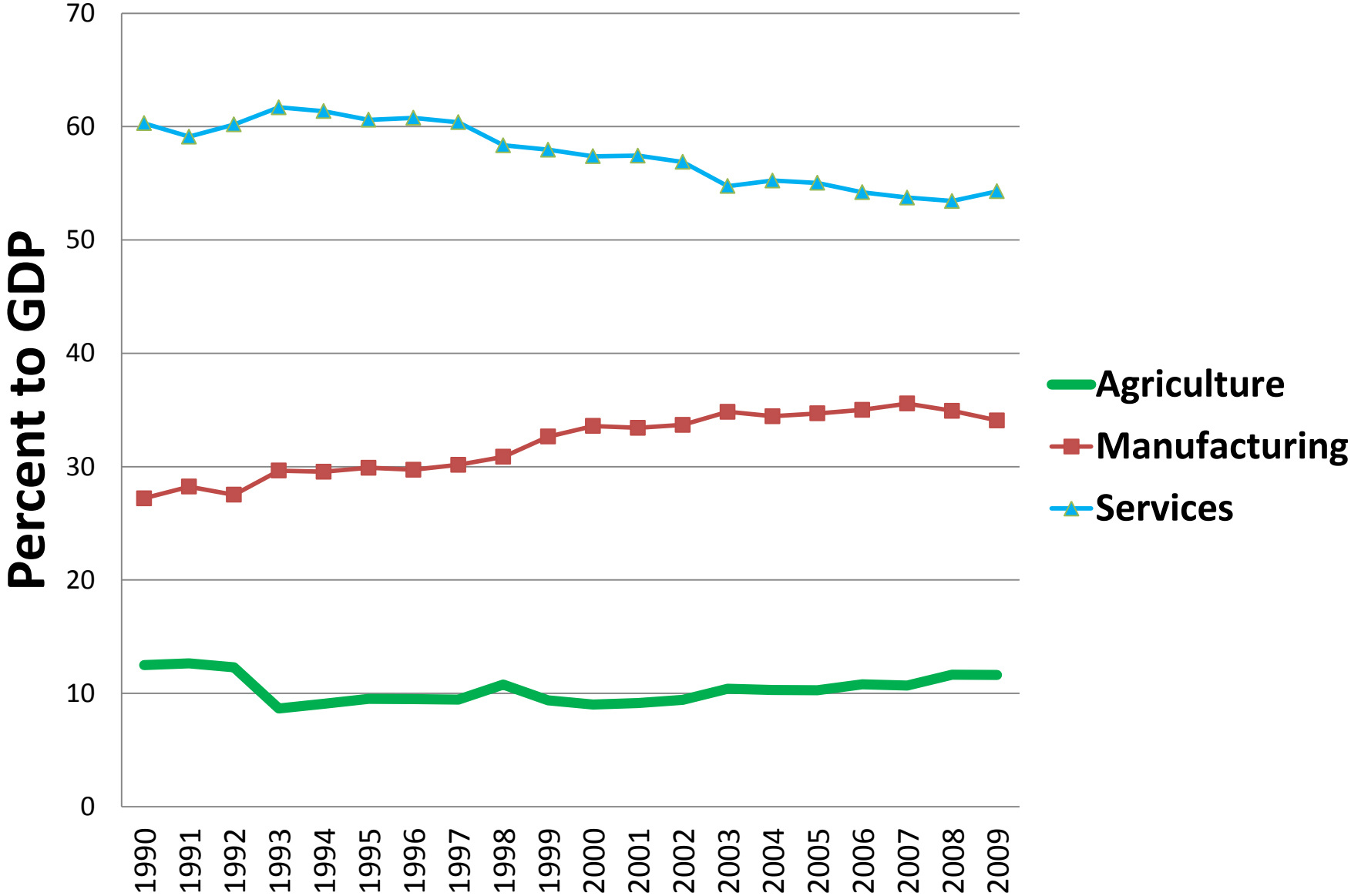
Changing Output Structure



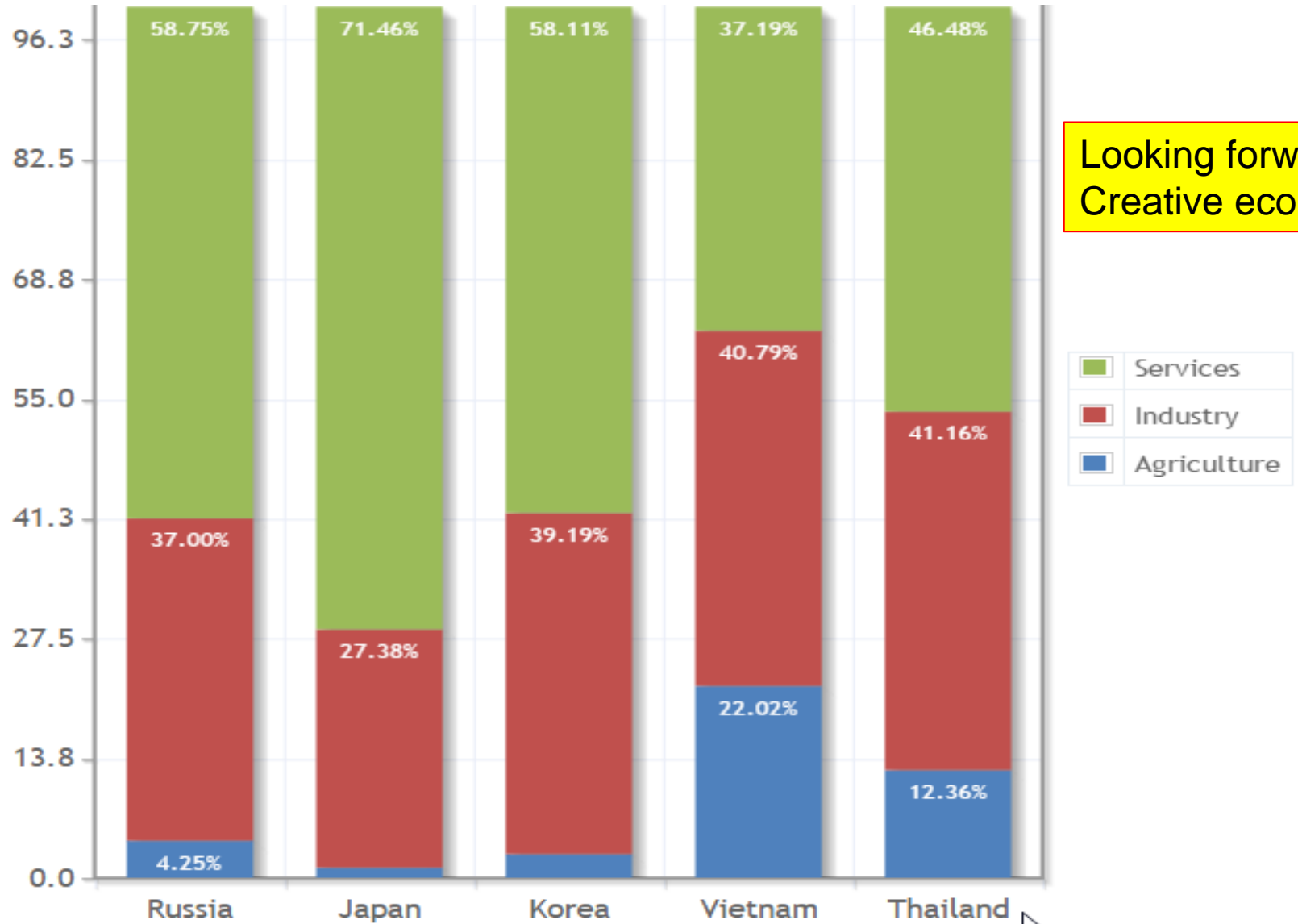
Source: Bank of Thailand, Quaterly Report

—◆— Agriculture —□— Manufacture

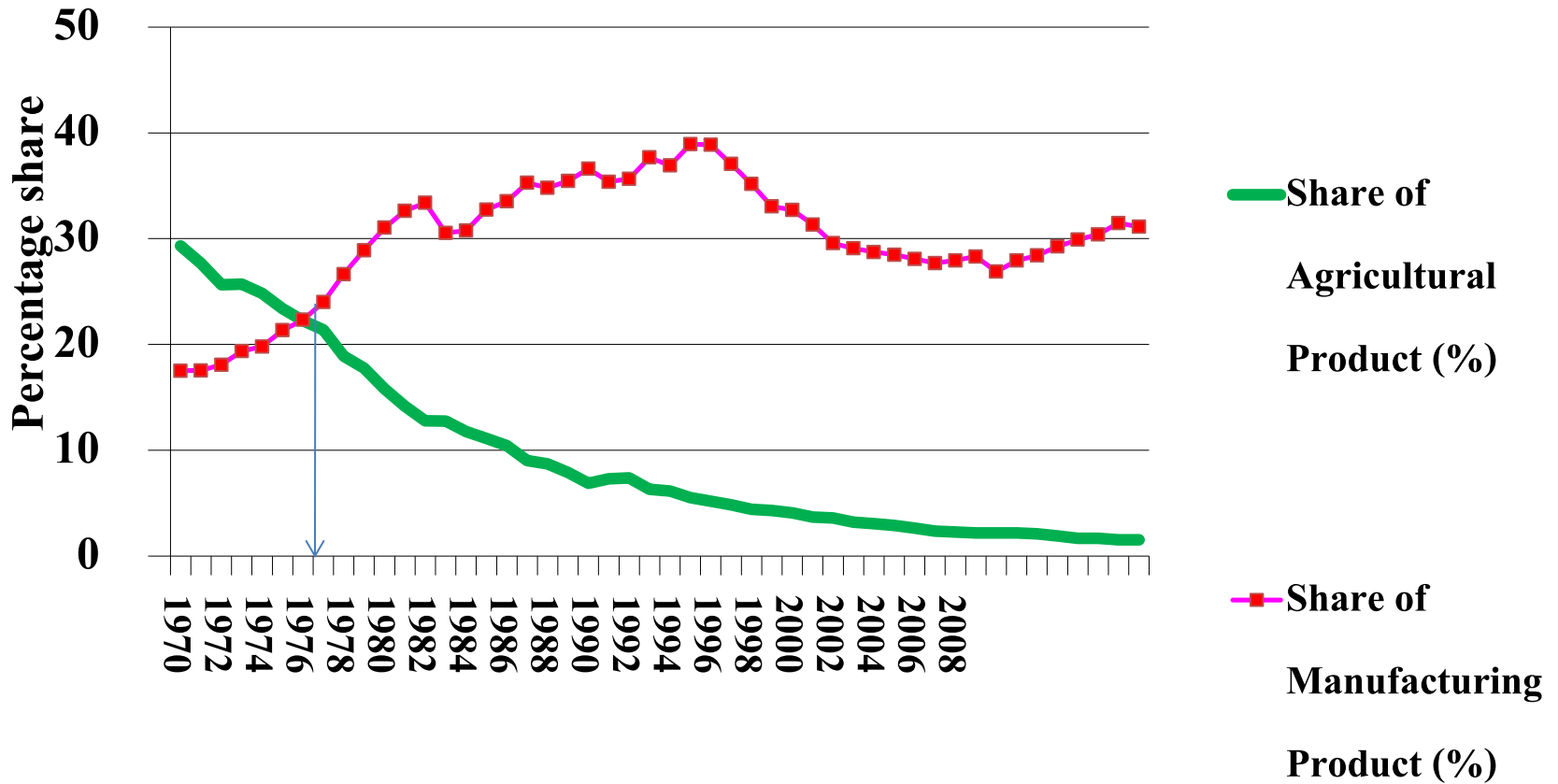
Thailand's output structure: 1990-2009



GDP Composition by Sector

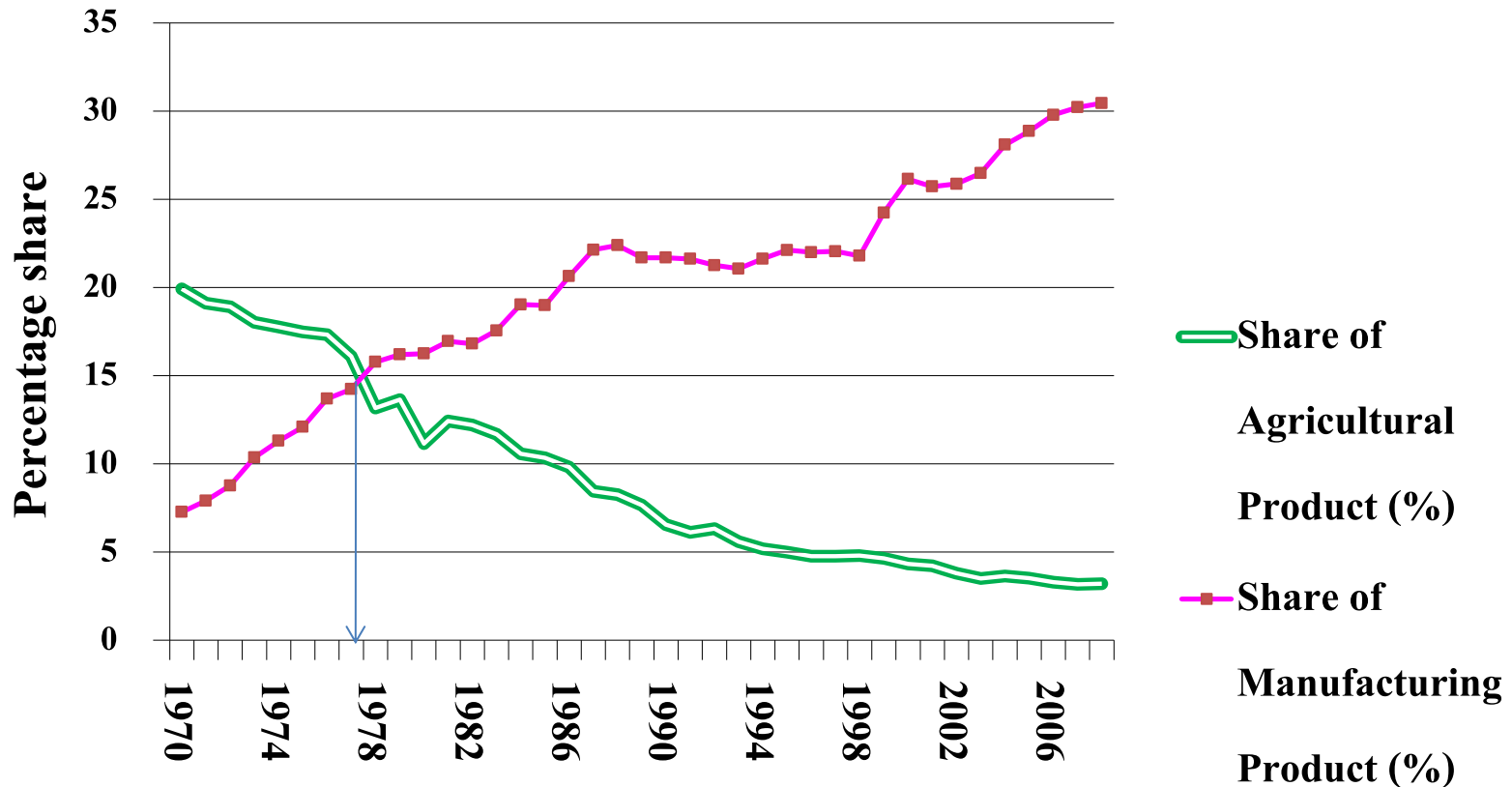


Taiwan



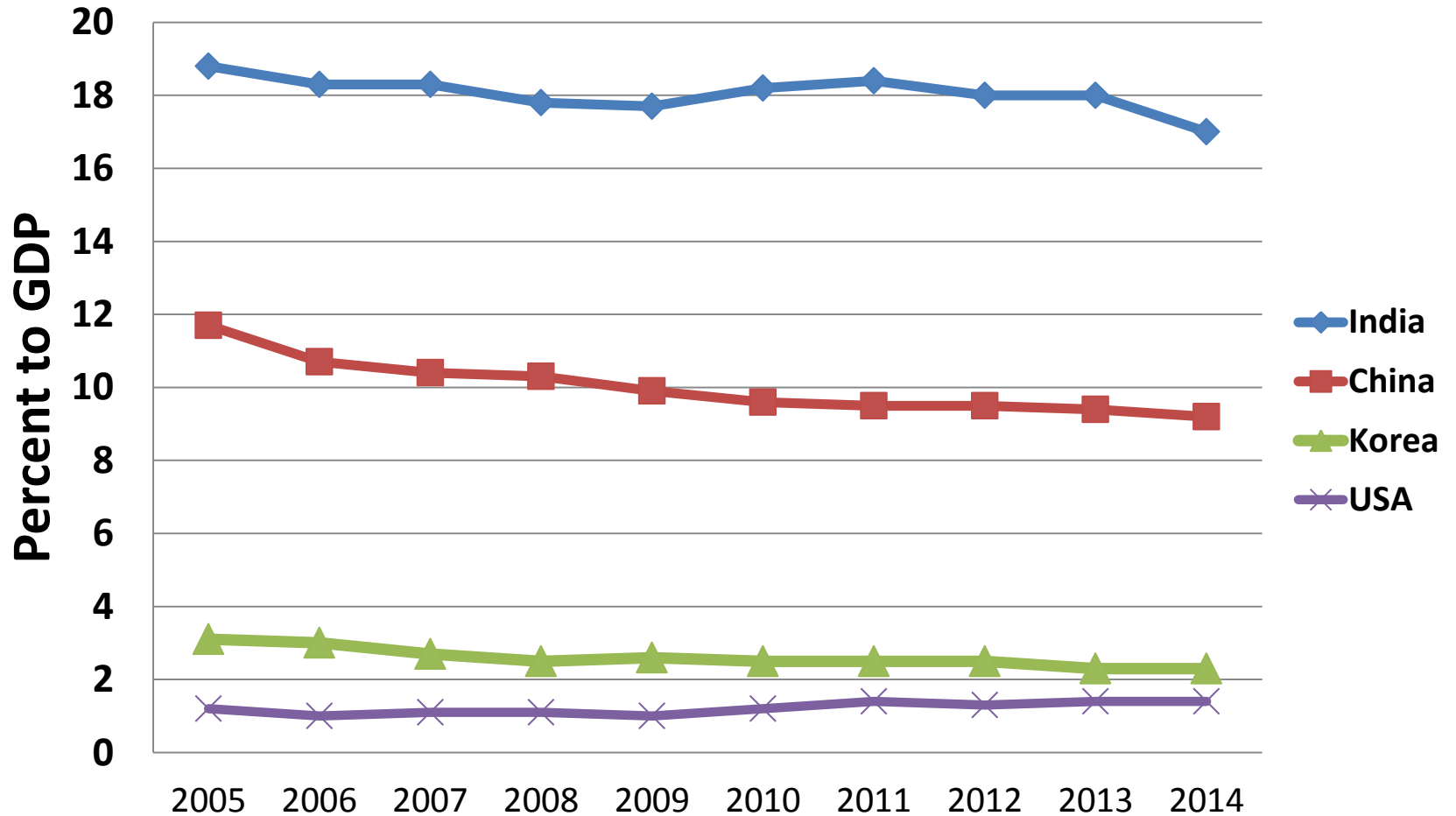
The cross-over point

South Korea



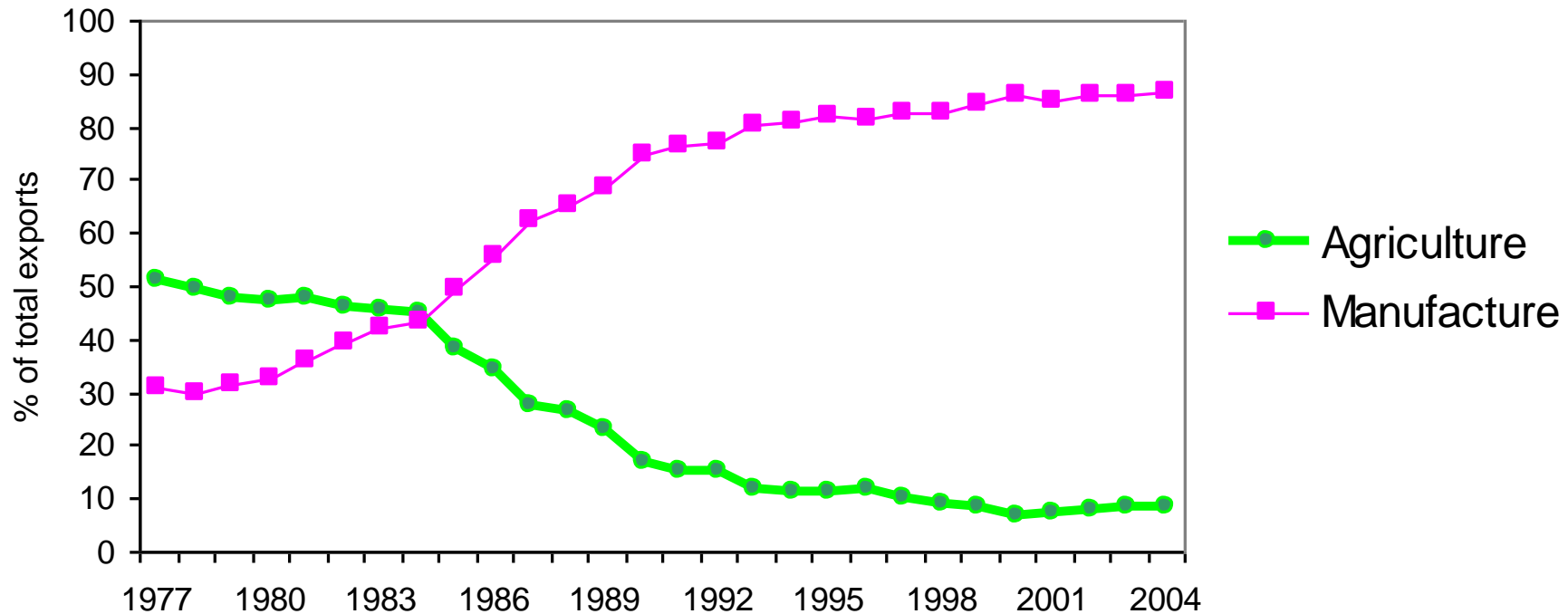
Taiwan, Korea, and Thailand experienced similar changing structure of output in the late 1970s BUT...

As per capita income rises, the importance of Agriculture declines



2. Structure of Thai exports

Declining importance of agricultural exports

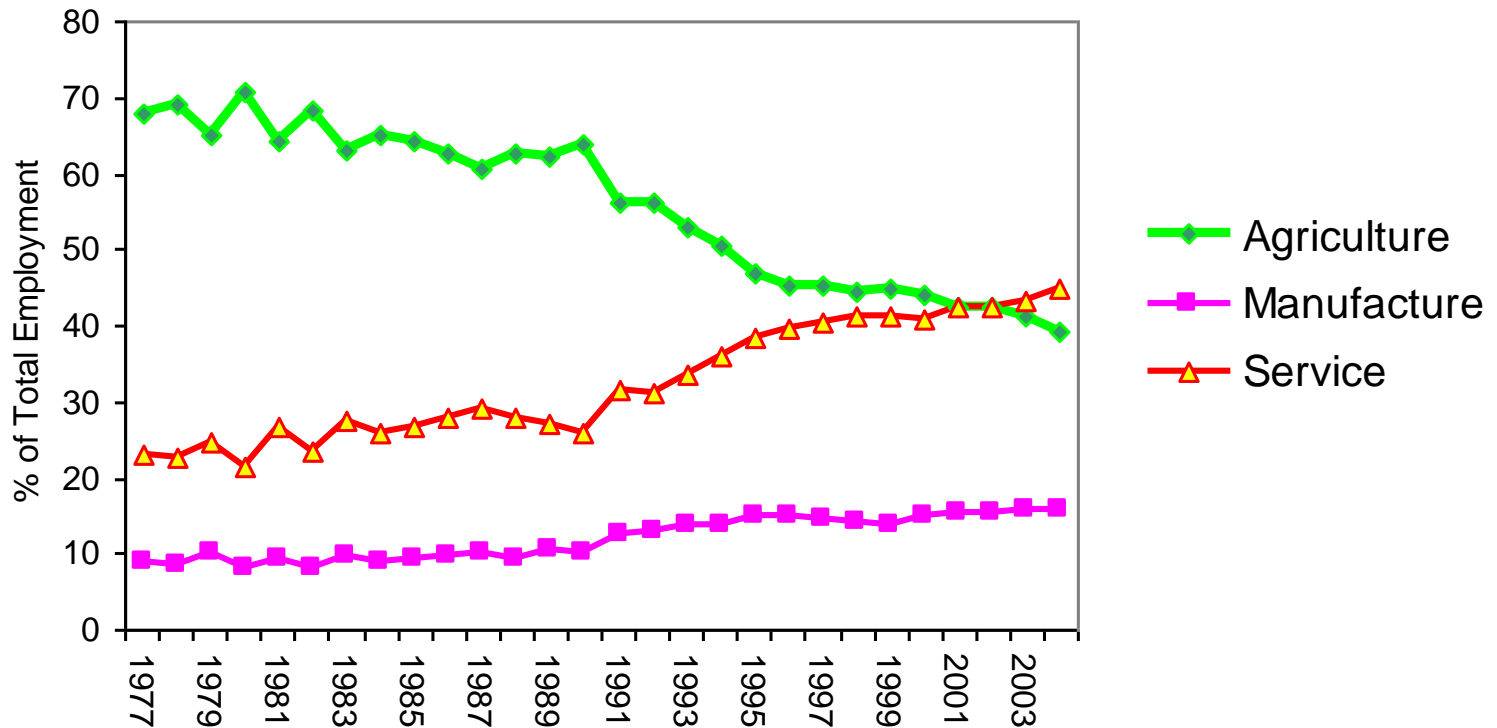


Source: Bank of Thailand

Exports are a mirror image of output structure

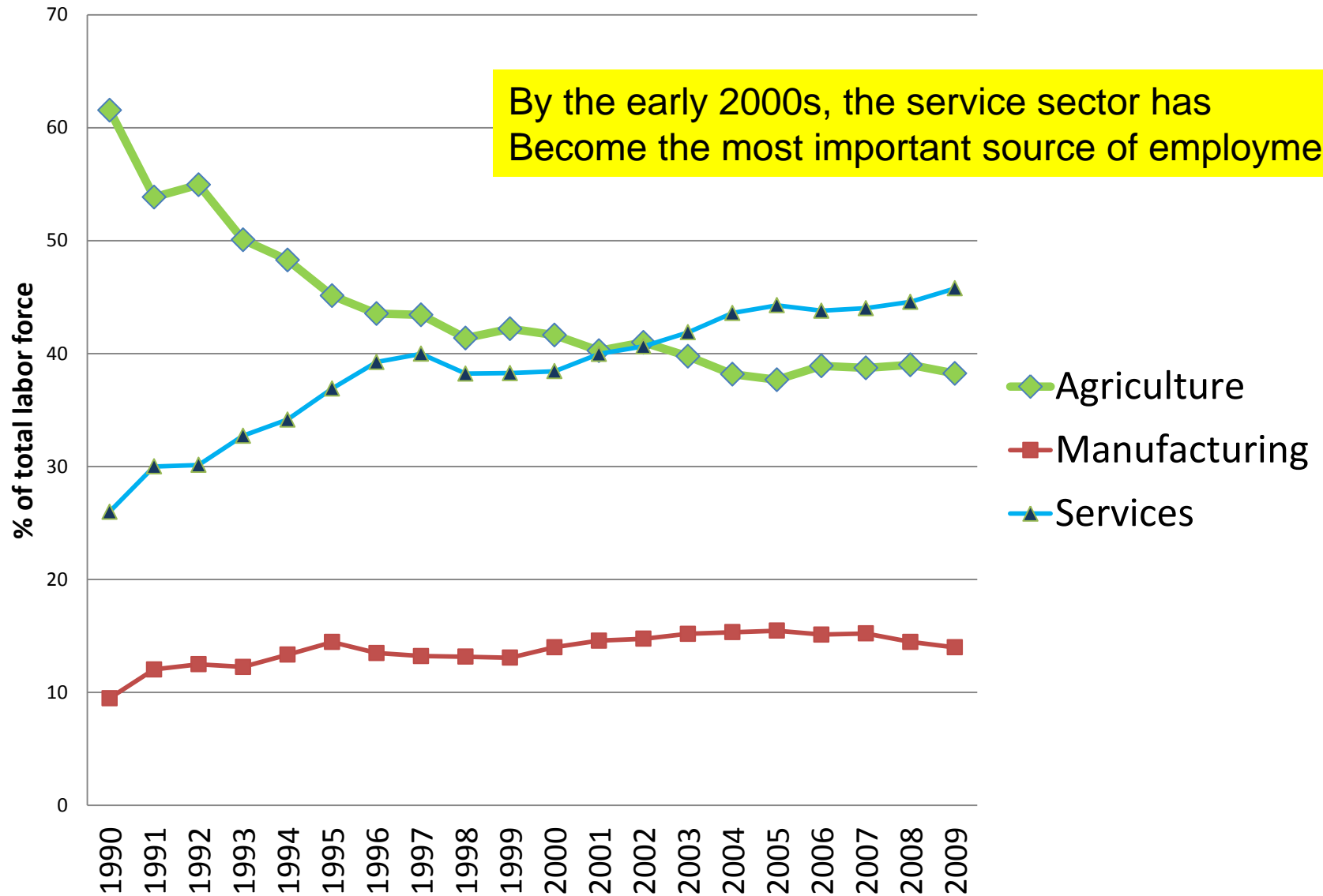
3. Employment Structure

Changing Employment Structure



Source: Bank of Thailand

Thailand's Employment structure: 1990-2009



A dismal view

- “Thailand would lose comparative advantage in agriculture as manufacturing has increasingly become more important than agriculture”.
- “Due to the shortage of labor and water during the dry season, with the disappearance of land in the 1980s, the future of Thai agriculture would look bleak”.
- Ammar Siamwalla (1996) “Thai Agriculture: From engine of growth to *sunset* status”
- TDRI Quarterly review Vol. 11, no.4

Blame the Dutch disease

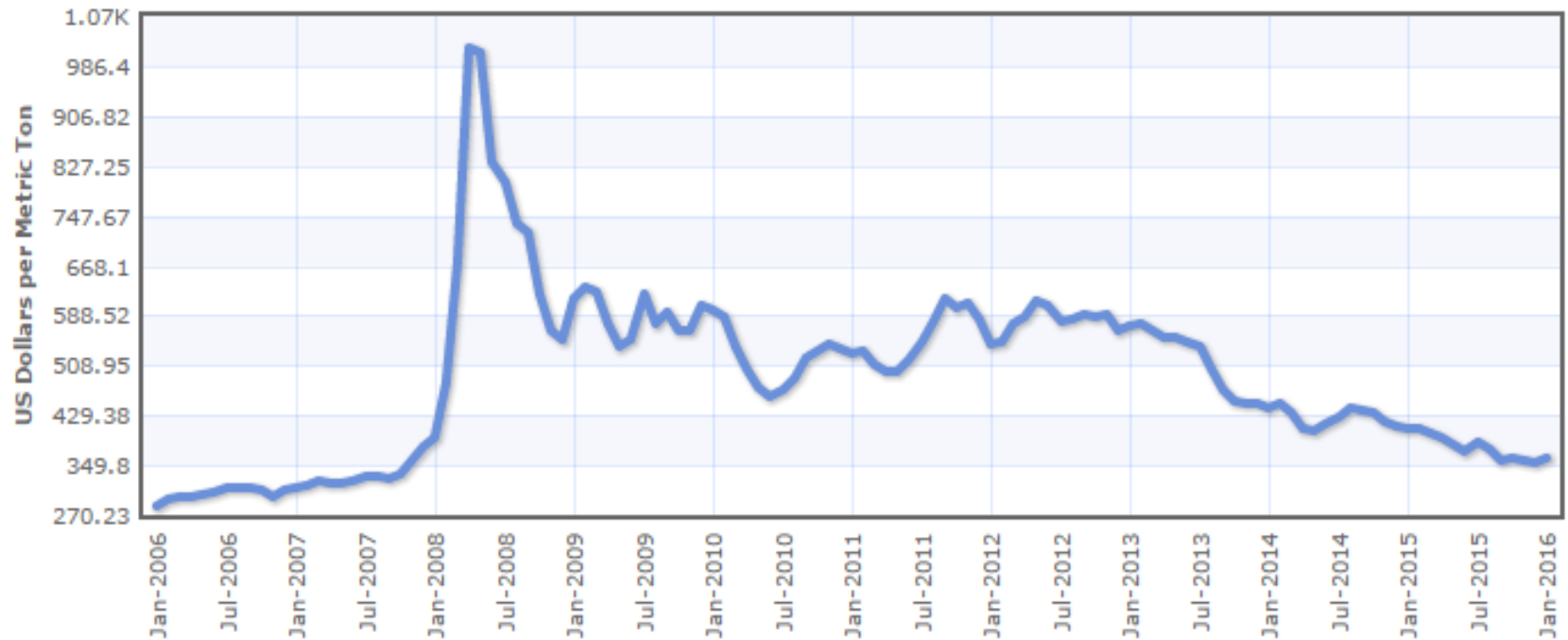
- The boom in the non-agricultural sector led to higher wage rates in urban areas.
- As a result of migration, the lack of labor intensified ***farm mechanization***, which in turn diminished employment opportunities in agriculture.
- Wage pressure and ***declining agricultural prices*** squeezed farm profits, discouraging investment and further reducing agricultural growth.

Price of 5% broken milled white rice (USD/MT) 2006-2016

Rice Monthly Price - US Dollars per Metric Ton

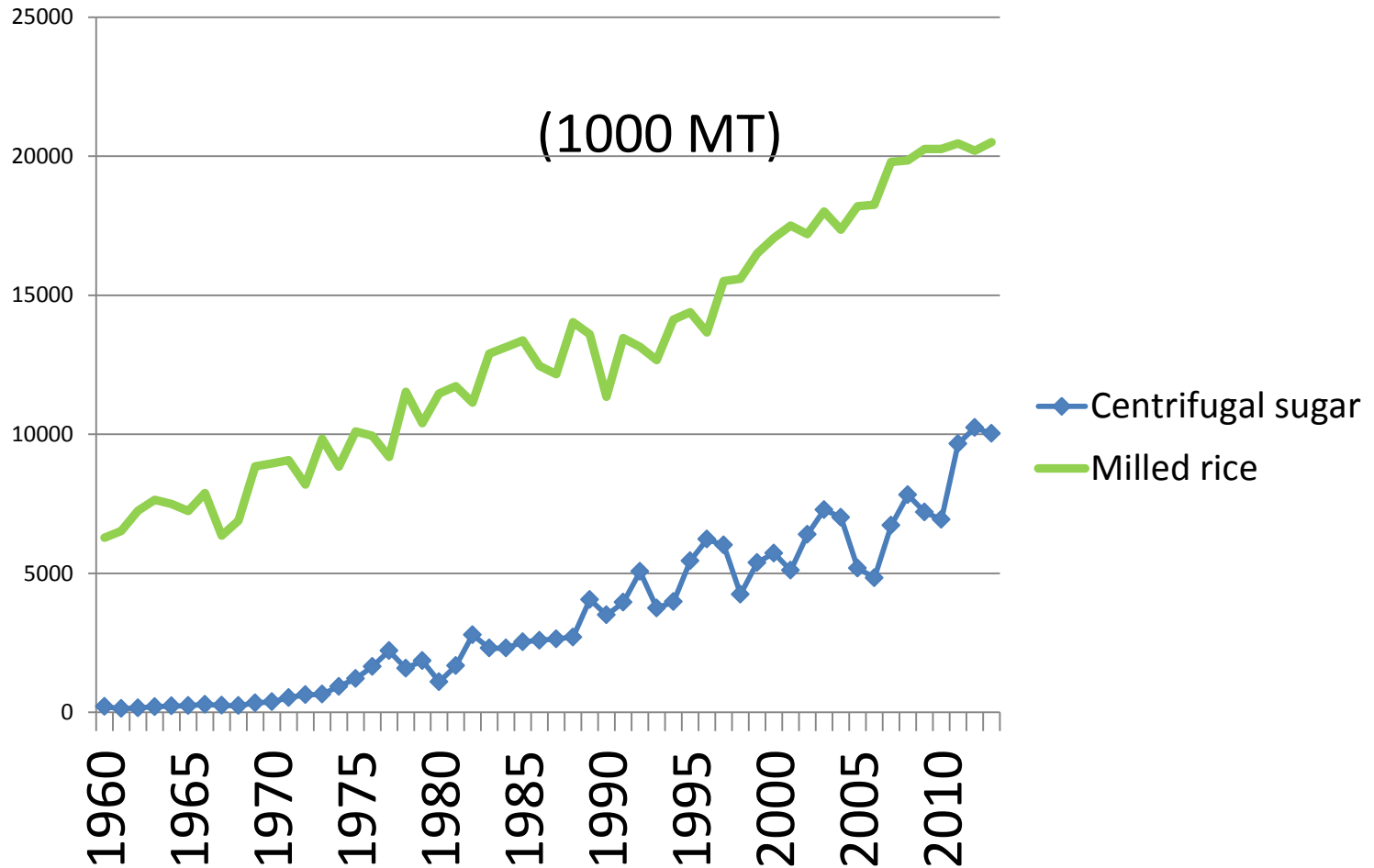
Range

Jan 2006 - Jan 2016: 75.030 (26.38 %)



Thailand's rice and sugar production

The rising trend continues



Top 15 rice growers

Milled Rice Production by Country in 1000 MT

Switch to: [Growth Rate](#) [Map](#)

Rank	Country
1	China
2	India
3	Indonesia
4	Bangladesh
5	Viet Nam
6	Thailand
7	Philippines
8	Myanmar
9	Brazil
10	Japan
11	United States
12	Pakistan
13	Cambodia
14	Egypt
15	Korea, Republic Of

Production (1000 MT)



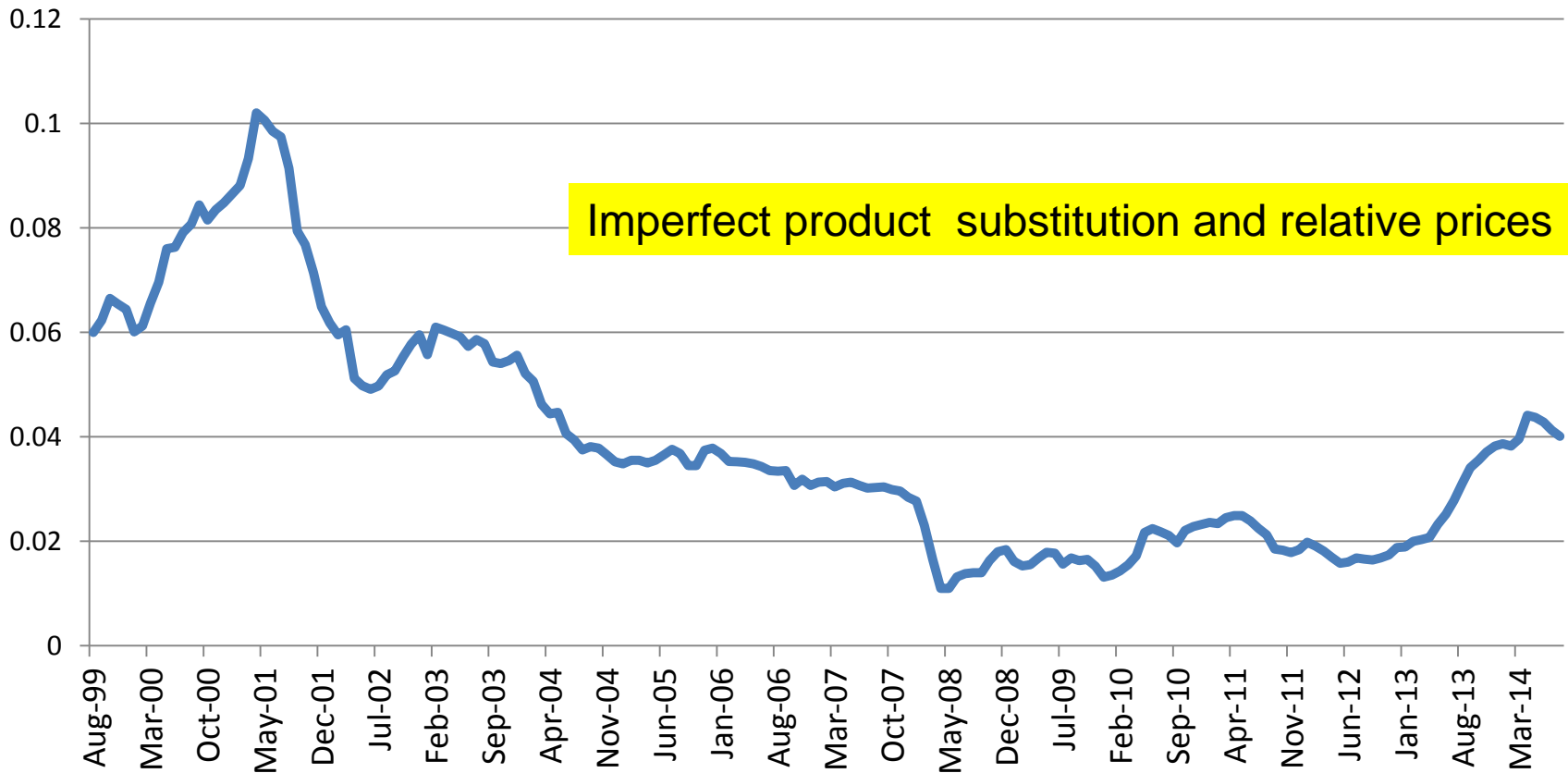
Palm Oil Production

Rank	Country	Production (1000 MT)
1	Indonesia	33,500.00
2	Malaysia	21,250.00
3	Thailand	2,250.00
4	Colombia	1,070.00
5	Nigeria	930.00
6	Papua New Guinea	630.00
7	Ecuador	575.00
8	Honduras	440.00
9	Côte D'ivoire	400.00
10	Guatemala	355.00
11	Brazil	340.00
12	Costa Rica	270.00
13	Cameroon	270.00

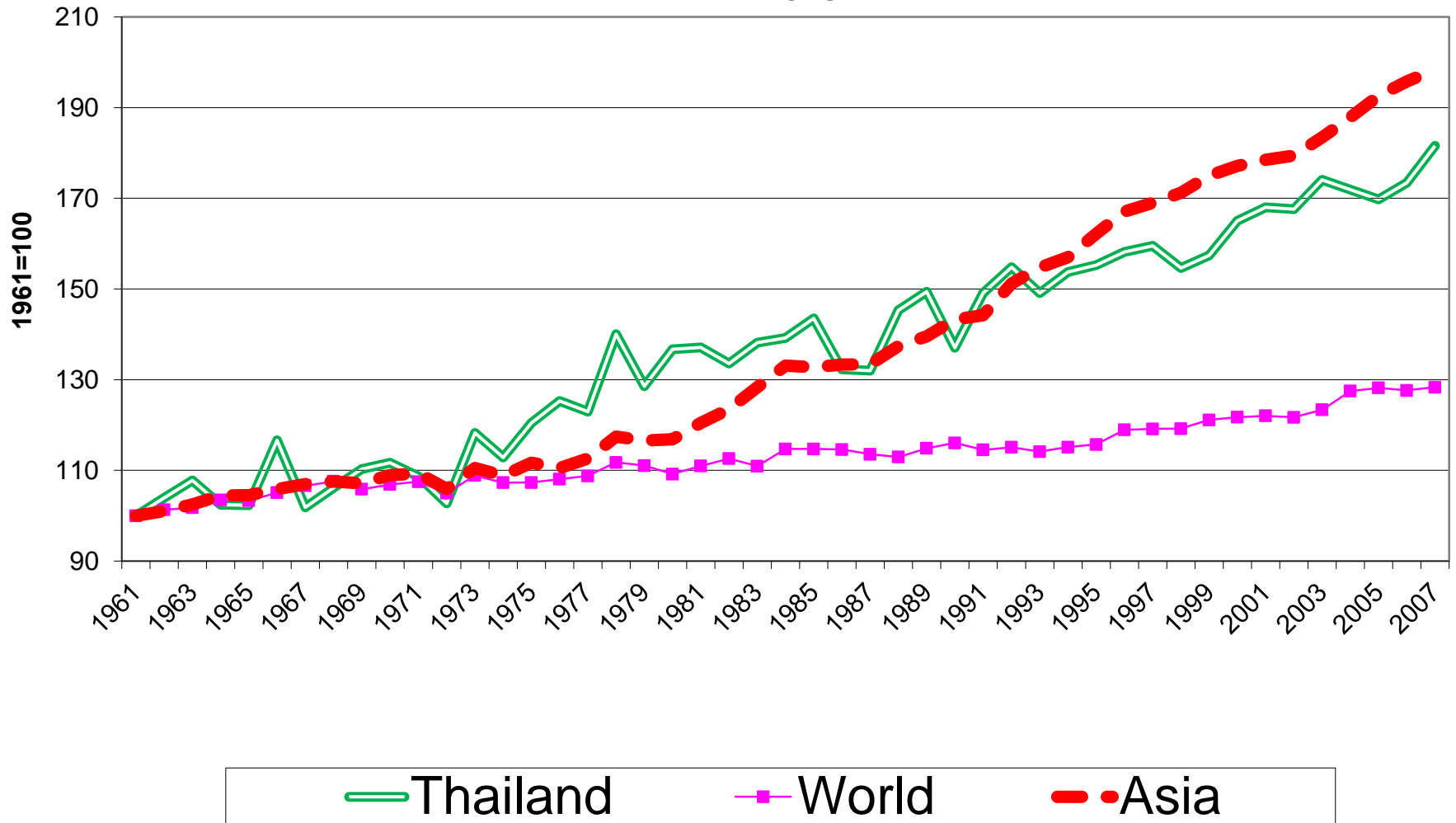


Monthly Price ratio of Shrimp to Rice

Shrimp / Rice Price Ratio



Agricultural Production per Capita Index

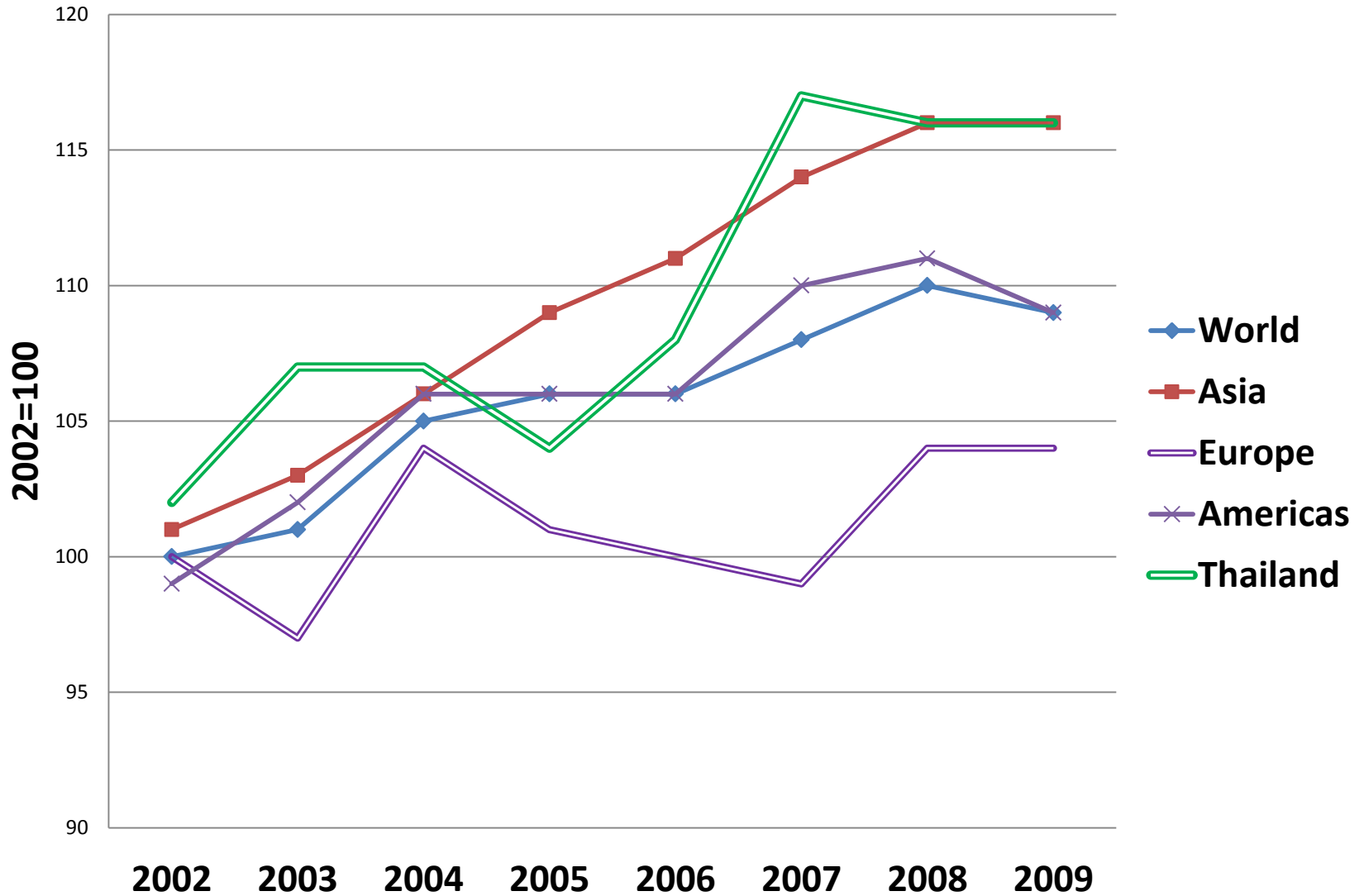


Thai agriculture over the last 50 years

- Per capita agricultural output in Thailand increased **faster** than the world average and industrialized countries.
- *The rapid improvement has become more pronounced since 1990s.*
- But Thailand still lags behind other countries in Asia, possibly due to the explosive growth of Chinese agriculture since 1970.
- There are still very large productivity gaps, though declining, between Thailand and developed countries.

Per capita agricultural output

Not that bleak



Yields of major crops

- A remarkable productivity surge in rubber after 1985.
- There were some productivity gain in maize and rice, but those increased yields were relatively small.
- For cassava, yields remained relatively low and did not show any sign of improvement from the level in 1960s.



Why did farm productivity increase in rice?

- Farm mechanization, fertilizer, and irrigation are responsible for such improvement.
- Large declines in imports of agricultural machinery can be attributed to large currency depreciations and expansion of domestic production of farm machinery.

Factor Intensities

- Continued increases in factor intensities of farm input factors, which are complement to improvement in irrigation (e.g., water pumps, threshing machine, two-wheeled and four-wheeled tractors).
- The irrigated area as a percentage of arable land increased from 15 percent in 1960 to more than 30 percent in 2000.
- Improved High-Yielding Varieties (HYV) of rice also resulted in yield improvement.
- Irrigation made it possible for these input factors become complement to each other.

Factor Intensity in Agriculture: 1961-2002

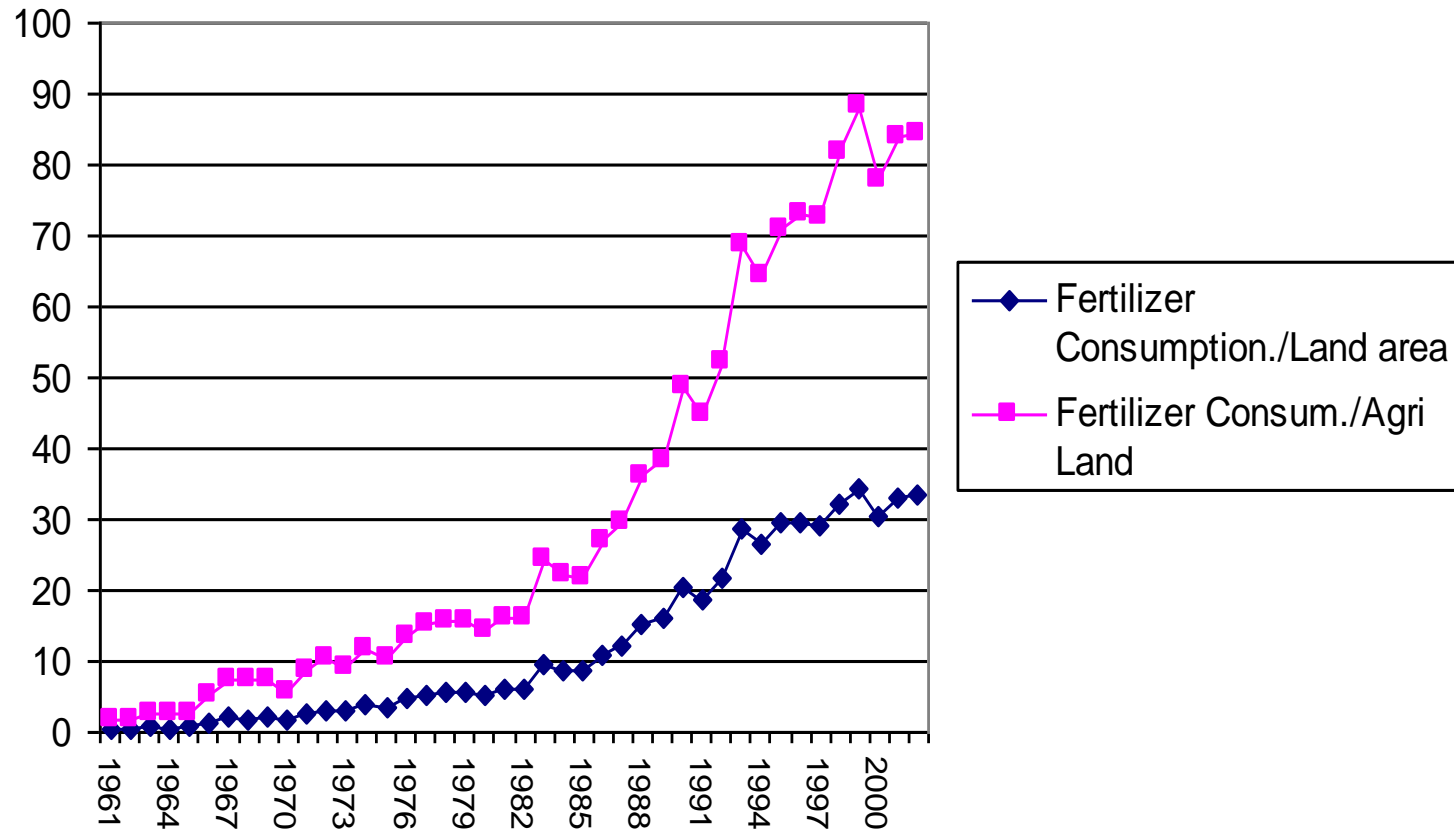
(percentage change)

Arable Land/Worker (land-man ratio)	0.8
Fertilizer/Land	62.3
Irrigated/Arable Land	2.0
Imported Machine/Worker	16.3

Source: calculation made from FAOSTAT

High time for organic farming

Fertilizer Consumption per land
(Mt/1000 Ha)



Martin and Mitra (2001)

Agriculture vs. manufacturing productivity growth

- Employing panel data from **50 countries** over the period 1967-92, Martin and Mitra found that productivity growth has been ***higher for agriculture*** than manufacturing sector in both industrial and developing countries.
- The shift away from agriculture in developing countries has been driven by **higher productivity growth in agriculture.**

Martin and Mitra (2001)

Agriculture vs. manufacturing productivity growth

- “Rapid accumulation of **human capital** contributed to a strong *shift out* of agricultural activities and into export-oriented manufacturing industry in East Asian economies.”
- NICs = Newly Industrializing Countries
- The four Asian Tigers

Concentrated FDI and Productivity

- **Although human capital accumulation in Thailand has increased rapidly in the last decade, physical capital accumulation increased at a much faster pace.**
- **Foreign direct investment and capital inflows **concentrated** in the manufacturing and services sectors; thereby substantially raising capital-labor ratios in both sectors.**

Thus productivity increase in manufacture was *higher* than the increase in the agricultural sector--in particular prior to the 1997 financial crisis.

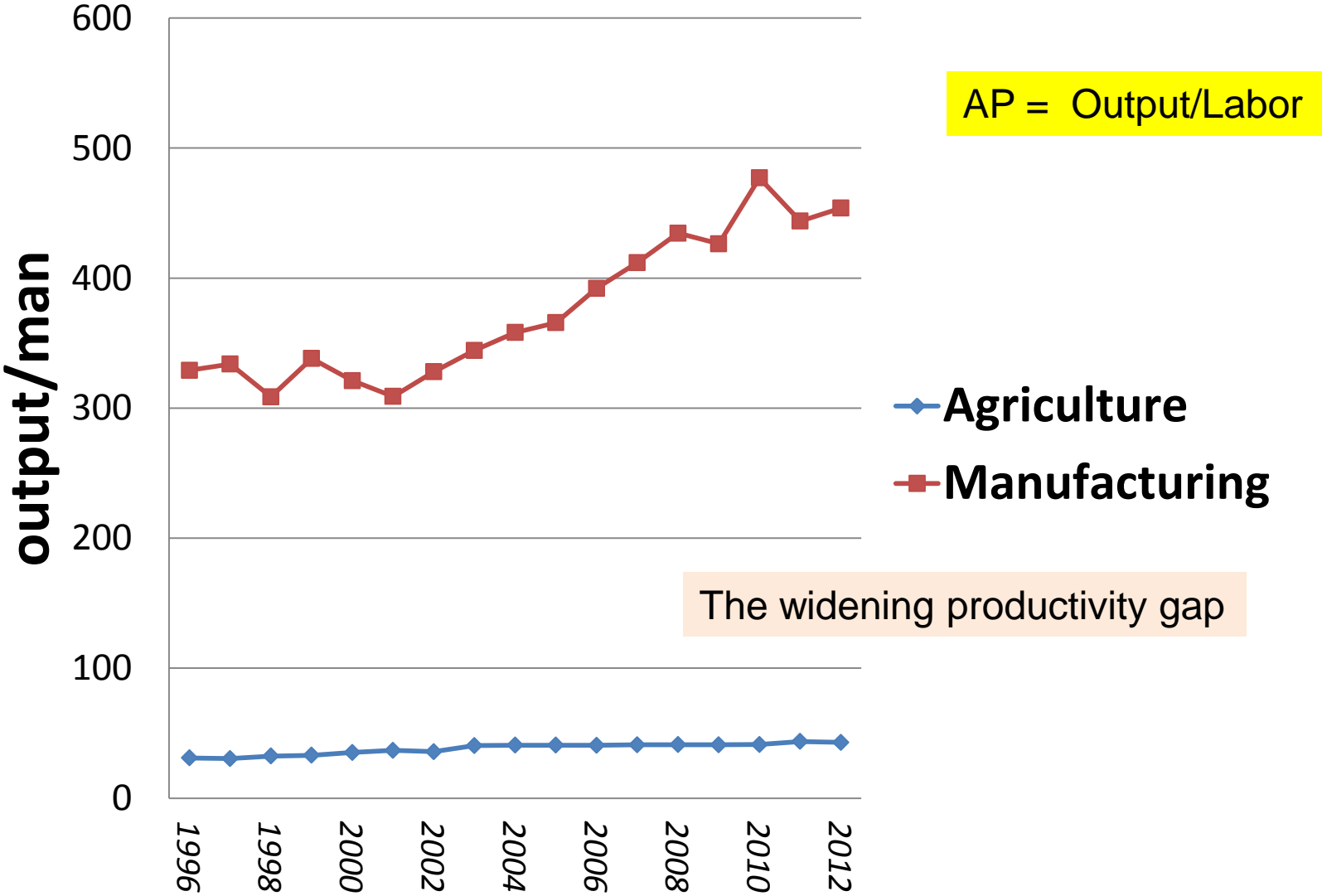
In general for both LDCs and developed countries

$$(MP_L)^a > (MP_L)^m$$

But in the case of Thailand

$$(MP_L)^a < (MP_L)^m$$

Average Product of Thai Labor



Median Ages Various Countries

- Philippines 23
- India 25
- Thailand 34
- China 35
- Japan 45

Average age of farmers

USA 58

Japan 66

Declining demand for farm labors

- In 1935, the number of farms in the United States peaked at 6.8 million as the population edged over 127 million citizens.
- As the number of farmers has declined, the demand for agricultural products has increased, which has been met (and exceeded) with the aid of **large-scale mechanization** (the use of large, productive pieces of farm equipment), improved crop varieties, commercial fertilizers, and pesticides.
- The need for human labor has also declined as evidenced by the increase in agricultural labor efficiency over the past century – from 27.5 acres/worker in 1890 to 740 acres/worker in 1990.

John Deere: Combine Harvester



The graying of American farm population

- As the U.S. farm population has dwindled, the average age of farmers continues to rise.
- In fact, about sixty percent of the farmers in this country are 55 years old or older (Bureau of Labor Statistics).
- The average age of a principal operator of a farm has increased from 54 years old in 1997 to 57 years old in 2007. (USDA, 2007 Census of Agriculture).
- The percentage of principal farm operators who are 65 years or older has increased almost 10 percent since 1969
- The graying of the farm population has led to concerns about the long-term health of family farms as an American institution.

Why has the majority of labor force remained in Thailand's agriculture?

- From 1985 to 2003, the ratio of output per worker in manufacturing sector increased by **eightfold**, while the same ratio in the agricultural sector increased less than twofold.
- **Productivity gap** between the two sectors remains as large as before if not widening.
- High capital-labor ratio in the manufacturing sector implies **limited capacity** to generate employment.
- The shift out of the agricultural sector has been ***painfully slow***.

In the case of Thailand

$$\left(\frac{K}{L}\right)^a < \left(\frac{K}{L}\right)^m$$

Heterogeneous production function

- According to Johnson (1991), American agriculture has a capital-labor ratio that is **six** times the ratio in manufacturing.
- Agriculture in developed countries are **more** capital intensive than developing countries.



Heterogeneous production function and demand for grains

- What happens when Thai agricultural labors are deprived of vital inputs: water, fertilizer, machinery, and irrigated land?
- Output per land (yield per rai), and output per farmer is very low, yet Thailand is a major exporter of rice.
- Exports = output - consumption
- The need to keep agriculture alive, despite high production cost is the desire for food security
- Historical accidents: China (1956) and North Korea famine, potato famine in Ireland (1850s)

Food security

China Famine: 1956-1961.

LIFE

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May 12, 1961



SOLE FOOD FOR THIS CHINESE FAMILY IS IN BASKET; RICE HUSKS, WEEDS AND URINARY SLAY FOR FLAVOR

CHINA FAMINE

MILLIONS ARE STARVING IN THE ONCE-RICH "RICE-BOWL"

Famine. Like a three-headed beast, today stalks China. The splendors of drought, starvation and war's aftermath rear over her richest lands. Her peasant people, long trained to suffering, are starving by the million because there is not enough food. Famine prevails, once so rich with green fields of growing rice that it was called "China's rice bowl," is now her most devastated area. Hunan's fields are silent dead by drought. All but a few of her railroad bridges are rubble, having been blown up to reward the Japanese. An estimated 30,000,000 of Hunan's 27,000,000 people rely for sustenance on a diet (above) of green weeds, rice husks, grasses and ordinary clay which they call "Godson of

Money." The province leader of the small Hunan village of Chi Ho told LIFE Correspondent William Gray, "The clay adds bulk to the weeds and rice husks and makes their meal more heavy." But no matter what the Chinese add to their gear food they do not magically change it into rice. And that is China's greatest trial, for normally rice farms up to 70% of her people's daily diet.

From the Great Wall to French Indo-China, wherever Chinese lands were gripped by occupying Japanese, the story is virtually the same as in Chi Ho, which had a population of 140 people two months ago and now has only 60 left. Of the remainder, 30 died from starvation and 30 went to

the neighboring city of Hongyang, 12 miles distant, to beg in the streets.

The grim facts of China's famine are like an actor's tale that has suddenly taken on terrible meaning. Because the land is ruined there is not enough rice in China; and because the Japanese killed the waxy buffets that pulled the plow, the farmers themselves must now pull the plow as men the land by hand; and because half-starved men cannot do such heavy work, few fields of China's rice fields in parts of Hunan are sown; and because the land is sown there is not enough rice. What happens to China when there is not enough rice is shown on the following pages.

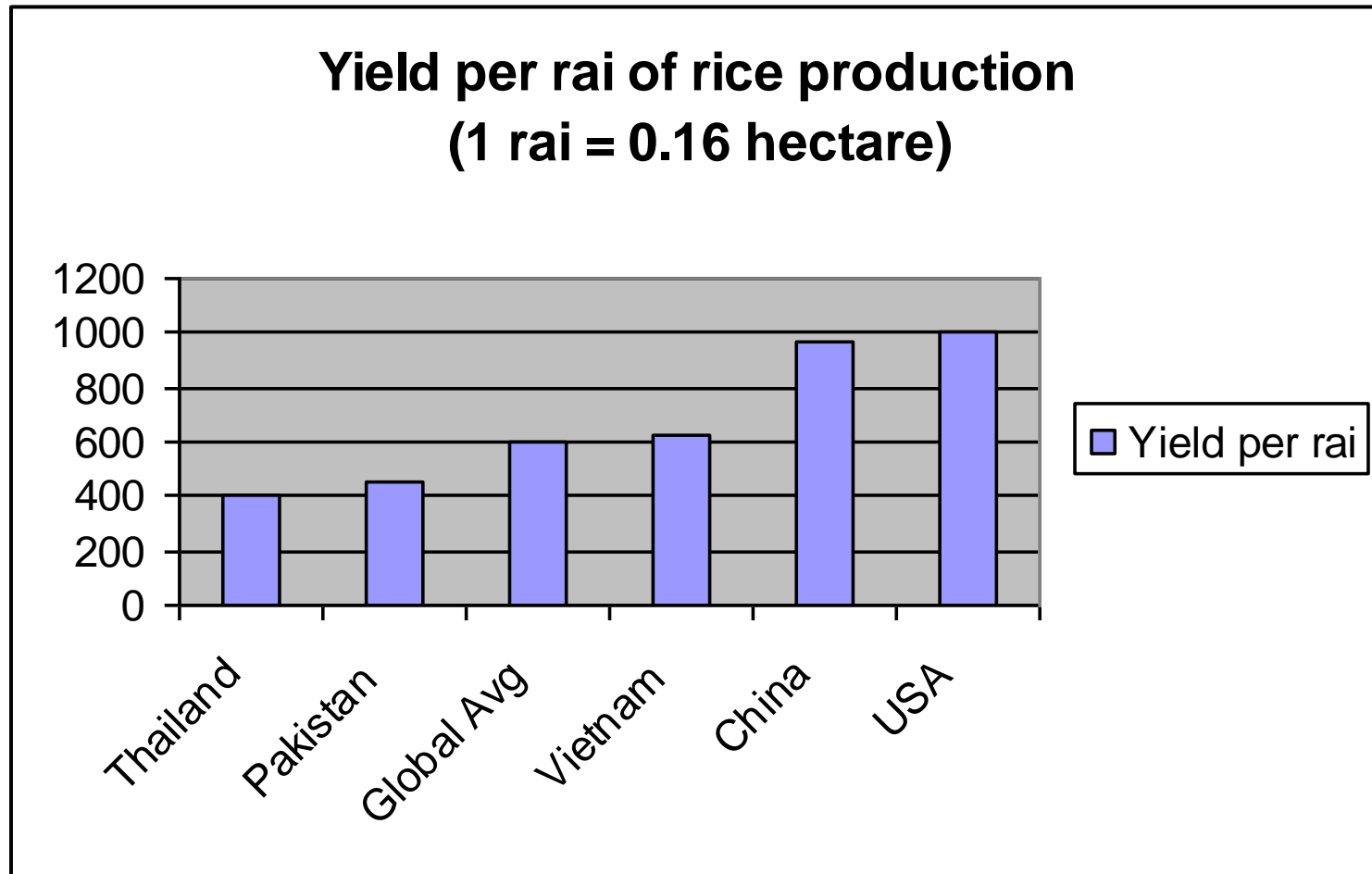
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Presently,
China is still a net importer
Of rice

The objective of China
Is to reduce grain dependency

Explain why Thailand has the lowest yield in rice production but managed to be number one rice exporter in the world.



To increase crop yield

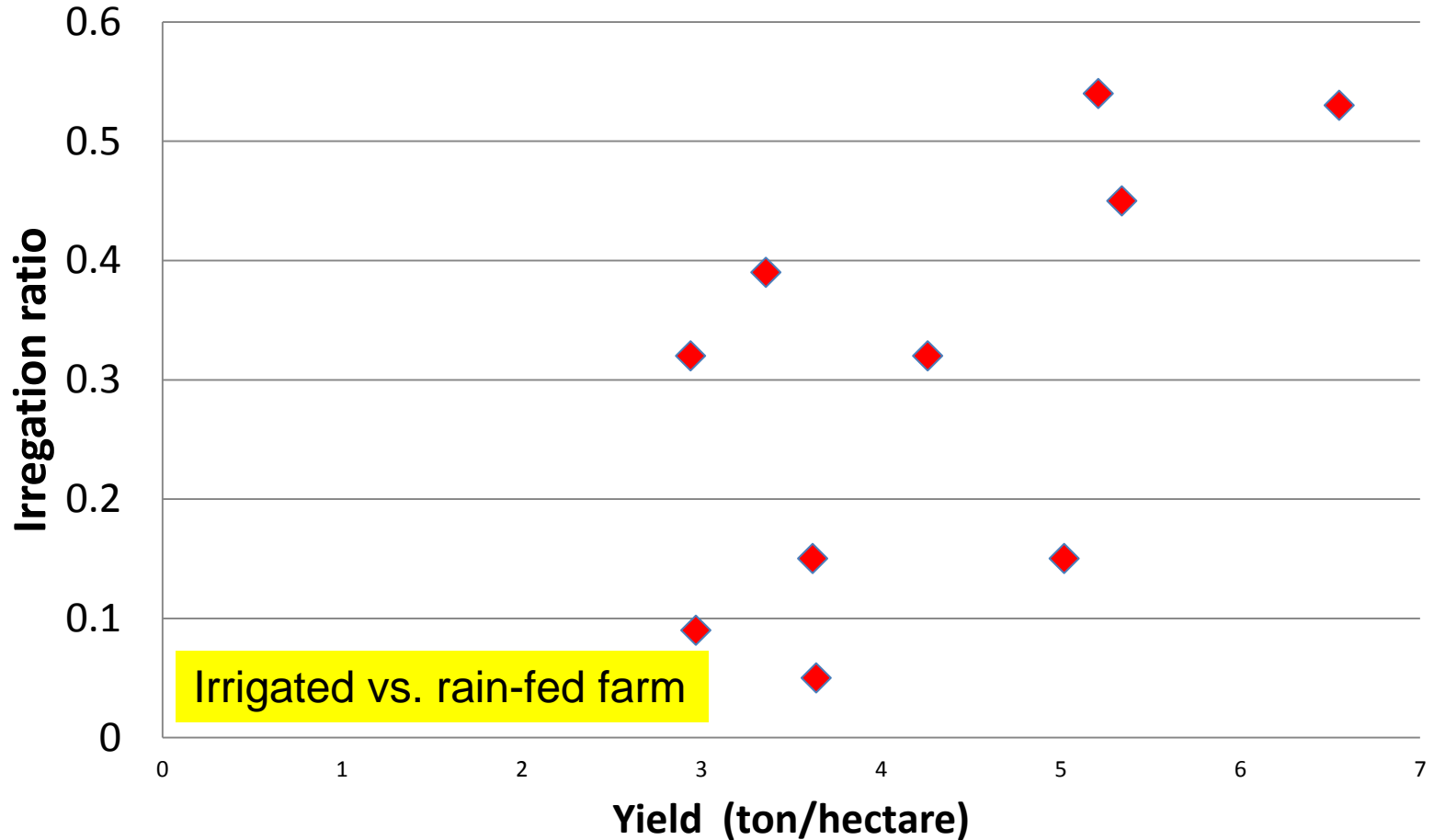
- Irrigation is necessary if farmers can grow more than one crop a year, rather than depends on rain
- Fertilizers are required, in addition to pesticides and insecticides.
- High-yielding rice strains: super rice

	Yield(ton/hectare)	Irrigation ratio
Myanmar	3.64	0.05
Cambodia	2.97	0.09
Indonesia	5.02	0.15
Philippines	3.62	0.15
South Korea	4.26	0.32
Thailand	2.94	0.32
India	3.36	0.39
Vietnam	5.34	0.45
China	6.55	0.53
Japan	5.21	0.54

Irrigation ratio = ratio of irrigated
Land over total farm land

Rice yield and irrigation: International Comparison

correlation coefficient = 0.63



Super rice

- The new Chinese rice breed yields 1,000 kg per rai (0.16 hectare) or 2,000 kg per rai.
- Thai farmers harvest only 400kg per rai.
- “*Pathum Thani 1*” one of the best cross-breeds yields only 500kg per rai.
- A dilemma: Since investment in new breeds leads to falling price, which might spark protests, the government was reluctant to invest in rice growing.

What determines farm income fluctuations (% Change)

