

ASIA'S JOURNEY TO PROSPERITY

Policy, Market, and Technology over 50 Years

Chapter 4: Modernizing Agriculture and Rural Development



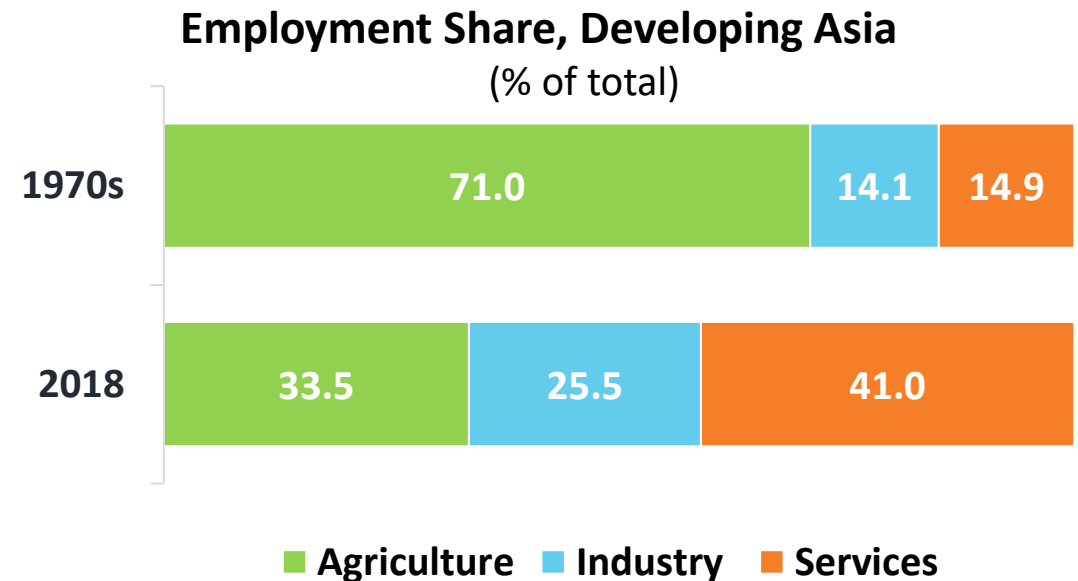
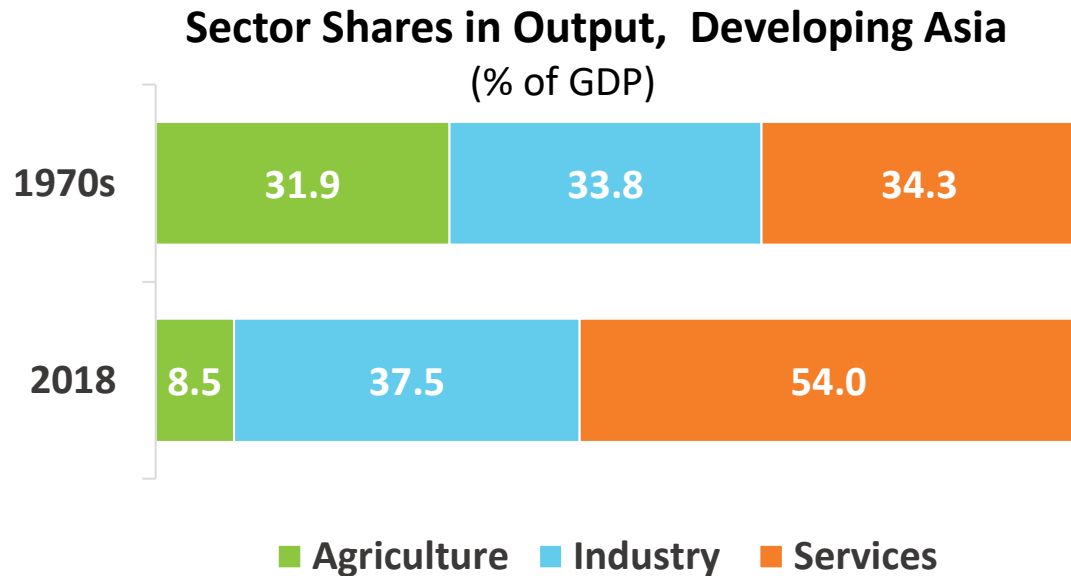
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1. Overview of Asia's agricultural development

- Economic growth is typically accompanied by declining shares of agriculture in total value added and employment. The same pattern is observed for Asia.



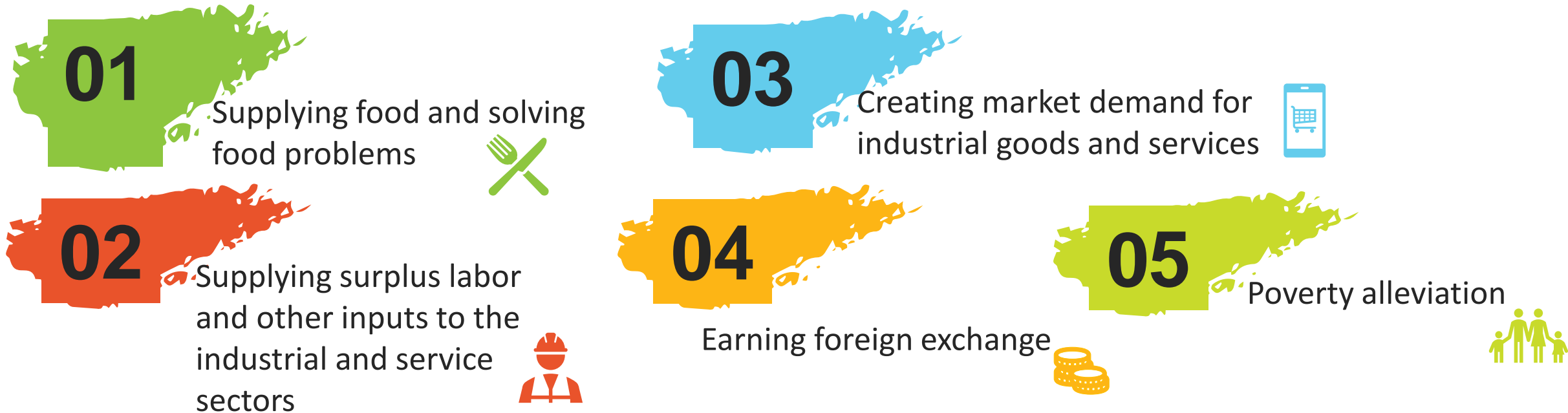
GDP = gross domestic product, US = United States.

Notes: The years of data for each economy vary depending on availability, with 1970 as the earliest year and 2018 as the latest. Sector shares are rescaled to sum to 100.

Sources: For output shares: World Bank. World Development Indicators. <https://data.worldbank.org/indicator> (accessed 2 August 2019); United Nations (UN). UN Statistics Division Database. <https://unstats.un.org> (accessed 28 August 2019); national sources; and Asian Development Bank estimates. For employment shares: International Labour Organization (ILO). ILOSTAT Database. <https://www.ilo.org/ilostat> (accessed 28 August 2019); Organisation for Economic Co-Operation and Development (OECD). OECD Employment and Labour Market Statistics. https://www.oecd-ilibrary.org/employment/data/oecd-employment-and-labour-market-statistics_lfs-data-en (accessed 28 August 2019); Timmer, M. P., G.J. de Vries, and K. de Vries. 2015. Patterns of Structural Change in Developing Countries. In Weiss, J., and M. Tribe, eds. *Routledge Handbook of Industry and Development*. Abingdon: Routledge. pp. 65–83 (for the Groningen Growth and Development Center 10-Sector Database) (accessed 28 August 2019); and Asian Development Bank estimates.

1. Overview of Asia's agricultural development (cont.)

- The decreasing share of agriculture in gross domestic product (GDP) masks its importance in supporting Asian growth over the last 50 years. Agriculture played an important role in:

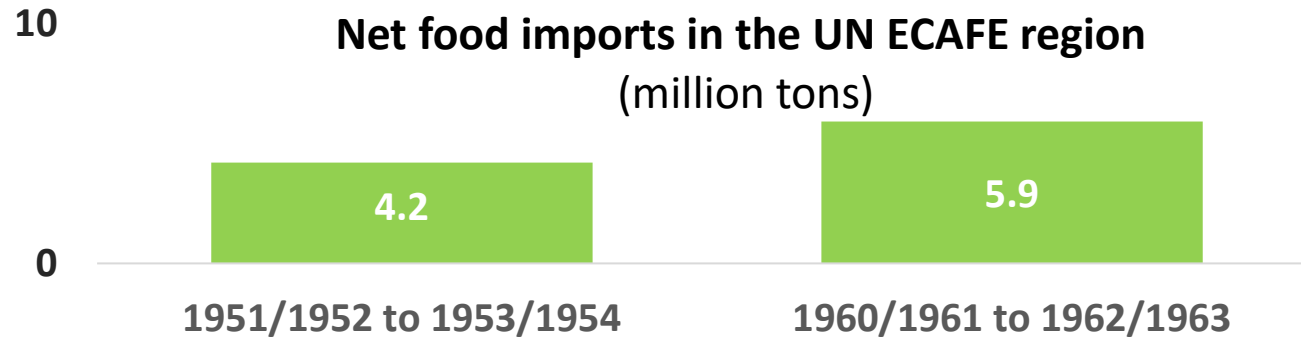


- Asia's experience shows that a productive agriculture and dynamic rural economy are key factors to its successful structural change and inclusive development. Institutional and policy changes—including land reform, market liberalization, and public investment—have facilitated the transformation process.

2. Asia's food problems in the 1950s and 1960s

- After World War II, the agriculture sector in many Asian countries was weak and vulnerable. Food production was a primary concern.

... Many Asian countries had to rely on food aid and imports.



... During the early 1960s, cyclical food shortages and speculation precipitated food crises in a few Asian countries.

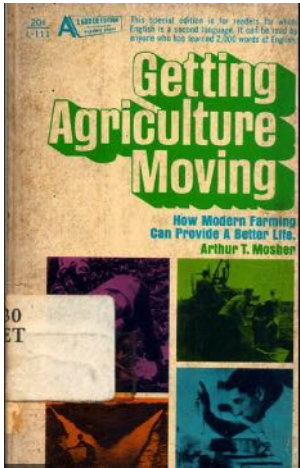
Note: UN ECAFE = United Nations Economic Commission for Asia and the Far East

Source: United Nations ECAFE. 1964. *Annual Economic Survey*, Bangkok. p.1.

- ❖ India had to deal with the 1942–1944 Bengal famine during the last few years of British rule. After independence in 1947, India was unable to feed its population and had to depend on imports and food aid from the US.
- ❖ The People's Republic of China (PRC) experienced significant food shortages in early 1960s following the Great Leap Forward, floods, and the People's Commune movement.
- ❖ Indonesia and the Philippines also relied on large volumes of food-grain imports. In the Philippines, imports peaked at 18% of consumption in 1965. In Indonesia, rice imports tripled in the second half of the 1950s, and despite large imports, prices doubled in 1957–1958. Fluctuating international prices of staple crops and rapid population growth raised fears of food shortage and potential famine.

2. Asia's food problems in the 1950s and 1960s (cont.)

- “Getting agriculture moving” became a strategic priority. But some countries were further ahead in recognizing agriculture’s role in economic development.



- Asia’s sluggish agriculture in the 1950s and early 1960s was due to a failure to invest in rural development. But Japan and Taipei,China were exceptions.
 - ❖ As early as the late 19th century, **Japan** introduced new technology, extension services, and better education. It also developed transportation networks and logistics services.
 - ❖ Since the 1950s, **Taipei,China** supported agriculture through land reform, large investments in irrigation and rural infrastructure, and establishment of rural cooperatives.
- Soon, Asian economies realized that transforming traditional agriculture required changing mindset of policymakers; designing and implementing modern farming technology; and removing barriers.
 - ❖ According to ADB’s 1969 Asian Agriculture Survey, transforming traditional agriculture required (i) modern farming technology; and (ii) removing institutional and infrastructure constraints to farmers adopting new technology.

3. Land reform: experiences and lessons

- Land reform in Asia had two phases: late 1940s to 1970s; and 1980s to 1990s. There were some lessons gained from Asia's experience of land reform, especially in the earlier years.

First wave of land reform: 1940s-1970s

- ❖ In Japan, the Republic of Korea (ROK), and Taipei, China, land reform was carried out swiftly (in 5-10 years) because of special circumstances
- ❖ Land reform in the three economies improved rural welfare and increased agricultural productivity.
- ❖ Elsewhere in Asia, land reform progressed slowly with mixed outcomes.

Second wave of land reform: 1980s-1990s

- ❖ The second wave occurred in transitional economies involving decollectivizing agriculture.

Goals of land reform:

- Economic – To provide incentive for farmers to expand farm output
- Social – To address asset inequality
- Political – To promote political and social stability
- Economic/social/political -- To prepare better educated workers for industry

ADB's 2nd Asian Agriculture Survey in 1978 cited the following key lessons on Asia's land reform:

- (i) the need for serious commitment at the top,
- (ii) simple and clear technical design of enactments,
- (iii) effective organization among beneficiaries, and
- (iv) the provision of necessary support services to beneficiaries.



3. Land reform: experiences and lessons (cont.)

- Land reform experiences differed across Asian economies, each with a different story of success or failure.



East Asia

Japan, the ROK, and Taipei, China achieved relative success. The PRC in the 1950s confiscated land and distributed them to the landless. It also practiced collective agriculture system until late 1970s when the government started comprehensive reform in rural areas.



Southeast Asia

Philippine land reform, started in the 1940s, continues to be an unfinished agenda. In Thailand, land settlement programs encouraged rural people to settle on previously forested land. Malaysia's land allocation program sought to encourage the expansion of rubber plantations.



South Asia

Land reform was a limited success. Pakistan and India in the 1950s sought to end permanent settlement. Subsequent reforms were carried out unevenly.



Central Asia

Comprehensive reforms were introduced covering land privatization, trade liberalization, and the liberalization of input and output markets from the early 1990s.



Pacific

Customary land rights continue to be respected.

4. Green Revolution and efforts to sustain its momentum

- The Green Revolution (GR) transformed traditional agriculture. It boosted grain productivity, successfully solved the food problem, and moved Asia into a new stage of agricultural development.



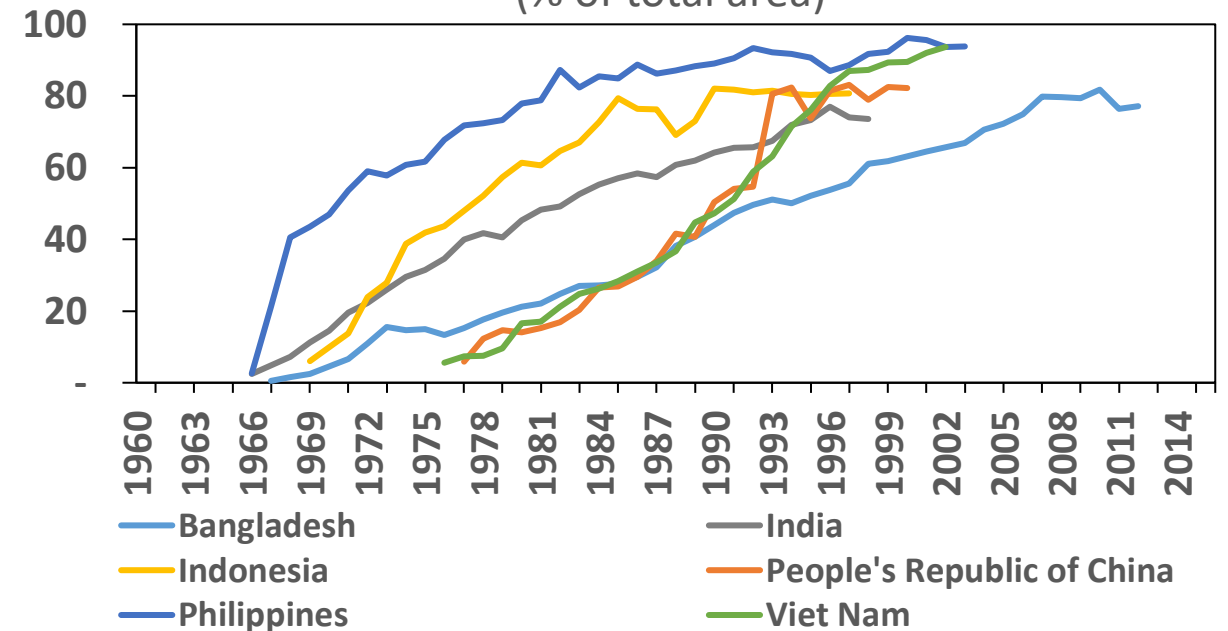
- ❖ The GR is a package of modern farming practices that includes using high-yielding varieties of primarily rice and wheat, applying modern inputs, and improving irrigation.
- ❖ The International Rice Research Institute (IRRI) was instrumental in GR. In 1966, it developed “IR8,” an improved new rice variety or “miracle rice.”
- ❖ Between 1972 to 1985, Asian countries doubled their agriculture spending.
- ❖ Modern varieties + modern inputs => higher yield & resistance to crop disease
 - ✓ The successful development of modern varieties led to subsequent improvements that enhanced resistance to crop disease. Rice yields increased from 2 tons per hectare in the early 1960s to about 7 tons per hectare in East Asia and 4 tons per hectare in South Asia and Southeast Asia in the mid-2010s. Wheat yields also increased from 1 ton per hectare in the early 1960s to over 5 tons per hectare in East Asia and 3 tons per hectare in South Asia in the mid-2010s.

4. Green Revolution and efforts to sustain its momentum (cont.)

- In the mid-1960s, the Philippines, Indonesia, and India introduced agricultural policies that offered a package of modern variety seeds, investments in irrigation systems, subsidized farm inputs, and extension services.

- ❖ Philippines: created the Rice and Corn Production Council; adopted the modern varieties released from IRRI; and began using chemical fertilizers.
- ❖ Indonesia: introduced in 1967 programs to increase rice production and stabilize food supply. It created the *Badan Urusan Logistik*, a food logistics agency that set a high floor price for rice to encourage production and a ceiling price for consumers.
- ❖ In India, areas using modern varieties of wheat and rice and fertilizers gradually increased throughout the 1970s and 1980s.

Share of Sown Area of Modern Rice Variety
(% of total area)



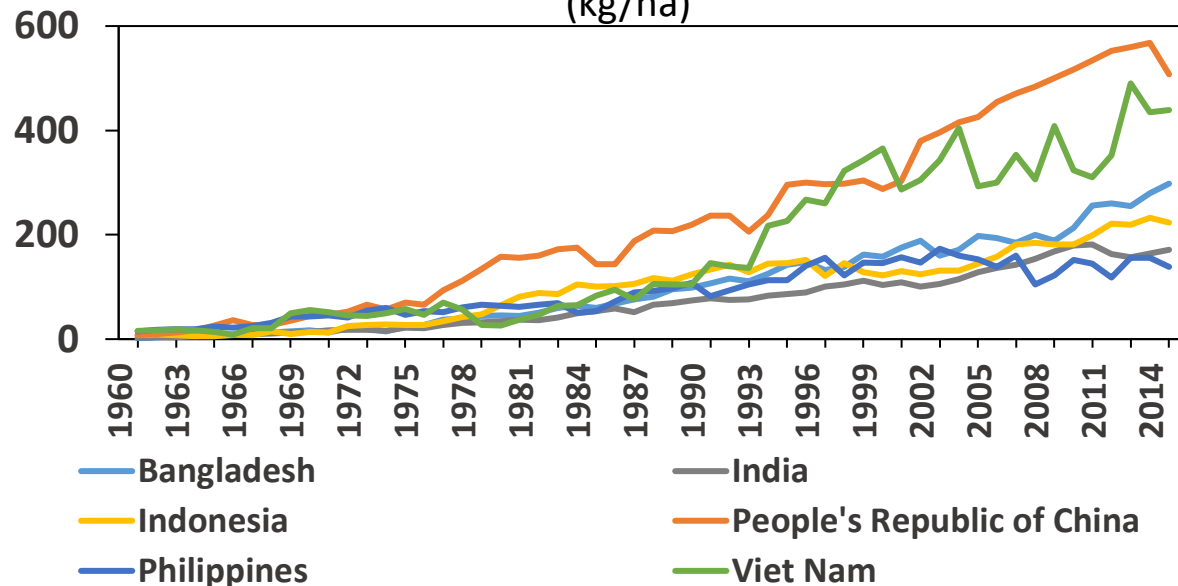
Sources: International Rice Research Institute. World Rice Statistics. <http://ricestat.irri.org:8080/wrsv3/entrypoint.htm> (accessed 1 May 2019); and Food and Agriculture Organization of the United Nations. 2019. FAO Statistics (FAOSTAT). <http://www.fao.org/faostat> (accessed 1 May 2019).

- Because of modern agricultural technology and strong policy support, the Philippines, Indonesia, and India increased rice and wheat production and reduced cereal imports.

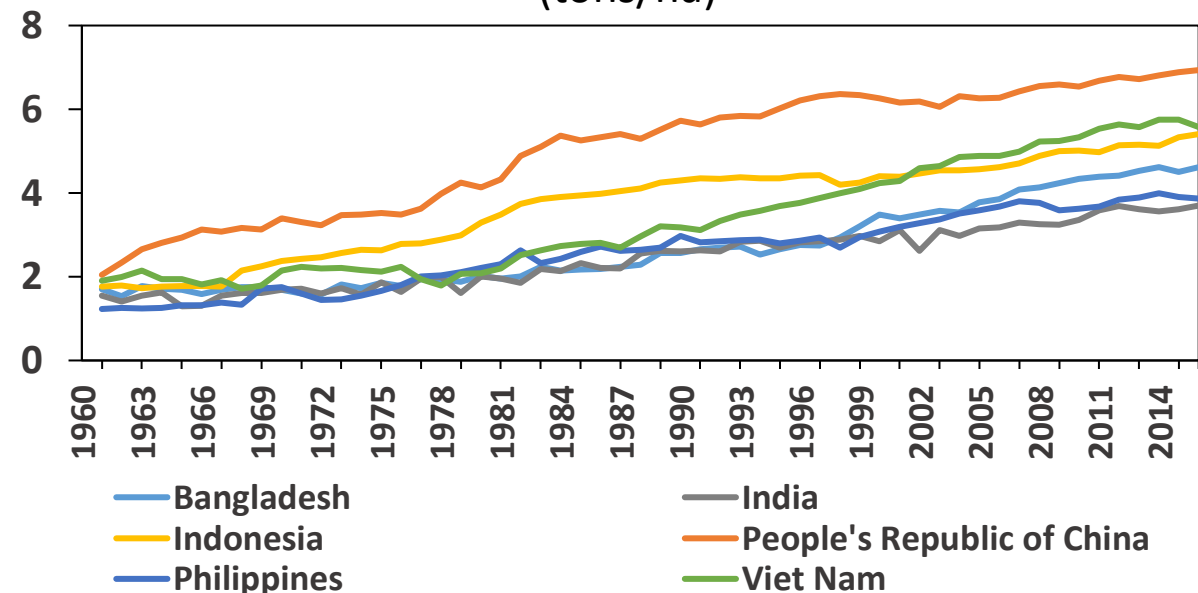
4. Green Revolution and efforts to sustain its momentum (cont.)

- In the Philippines, by the mid-1970s, more than 60% of land devoted to rice used modern varieties, and fertilizer use increased to more than 50 kilograms per hectare, achieving rice self-sufficiency periodically in the late 1960s and early 1980s.
- In Indonesia, by the mid-1980s, with investment and input subsidies, 60% of the rice area cultivated used modern varieties and fertilizer application, with yields reaching 3.9 tons per hectare. Indonesia briefly achieved self-sufficiency in the mid-1980s.
- India's rice production more than doubled from the late 1970s to the 2000s, helping the country achieve self-sufficiency in the 1980s. In 2016, India became the world's largest rice exporter, surpassing Thailand.

Fertilizer Use
(kg/ha)



Rice Yield
(tons/ha)



ha=hectare, kg=kilogram

Sources: International Rice Research Institute. World Rice Statistics. <http://ricestat.irri.org:8080/wrsv3/entrypoint.htm> (accessed 1 May 2019); and Food and Agriculture Organization of the United Nations. 2019. FAO Statistics (FAOSTAT). <http://www.fao.org/faostat> (accessed 1 May 2019).

4. Green Revolution and efforts to sustain its momentum (cont.)

- Bangladesh, the PRC, and Viet Nam also implemented significant agriculture reforms.

Bangladesh

Bangladesh liberalized agricultural inputs in 1979. Low-cost well irrigation pumps and new rice varieties expanded rice production, even during dry season. Still, challenges remain, including chronic flooding, worsening salinity, and overexploitation of underground water supply.



People's Republic of China (PRC)

In late 1950s, the PRC cross-bred short, high-yielding rice varieties, on a limited scale. By 1975, the PRC established a wider high-yielding variety rice seed system. Green Revolution advanced after 1979 reforms due to: (i) active research exchange with other countries; (ii) rapid adoption of high-yielding rice variety under the household responsibility system; (iii) investments in rural infrastructures; and (iv) extension of production to maize and other crops (other than rice and wheat).



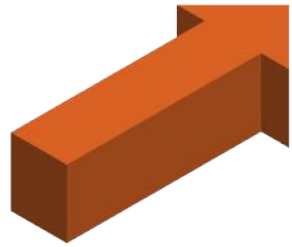
Viet Nam

In Viet Nam, the number of modern varieties rose rapidly in 1981–1990 after the *Doi Moi* liberalization in 1986. Agricultural reform made Viet Nam a major rice exporter. Hybrid and improved varieties imported from the PRC contributed to the GR in north Viet Nam while those developed by IRRI were cultivated in south Viet Nam. National agricultural research systems successfully developed location-specific varieties.



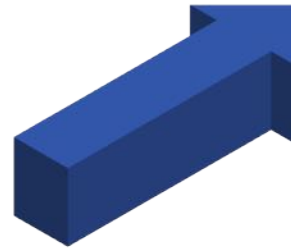
4. Green Revolution and efforts to sustain its momentum (cont.)

- In sustaining the transformative momentum of GR, two things are important: (i) the role of public policy; and (ii) research support, agricultural mechanization, and public infrastructure investment.



Role of public policy in the efficient function of markets (from Myint, 1972):

- ❖ Appropriate policies on agricultural support services such as input supply, product processing and marketing, and rural credit systems.
- ❖ A critical issue is the involvement of private entrepreneurs.
- ❖ They also refer to the pricing principles supporting food production and stimulating broad-based rural development.



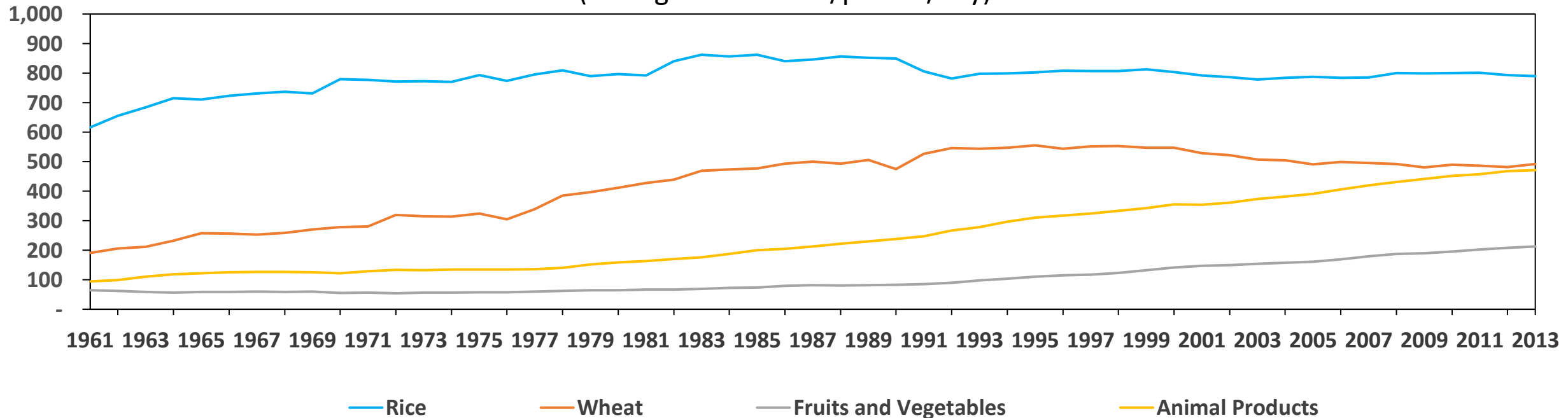
Asian countries have taken multipronged approaches to raise productivity, including through R&D, mechanization (using small machines, e.g. tractors), and public infrastructure investment

- But there are remaining challenges:
 - ❖ **First**, research support must push technological frontiers—introducing new varieties is critical, given climate change and soil salinity.
 - ❖ **Second**, more investment is needed to develop, diffuse, and adopt new technologies.

5. Changing patterns of food consumption and diversification

- Asia's food consumption patterns in terms of calorie intake changed substantially over the past few decades.
 - ❖ The changes include: (i) a decline in consumption of rice and wheat; and (ii) an increase in consumption of animal-sourced foods and fruits and vegetables.

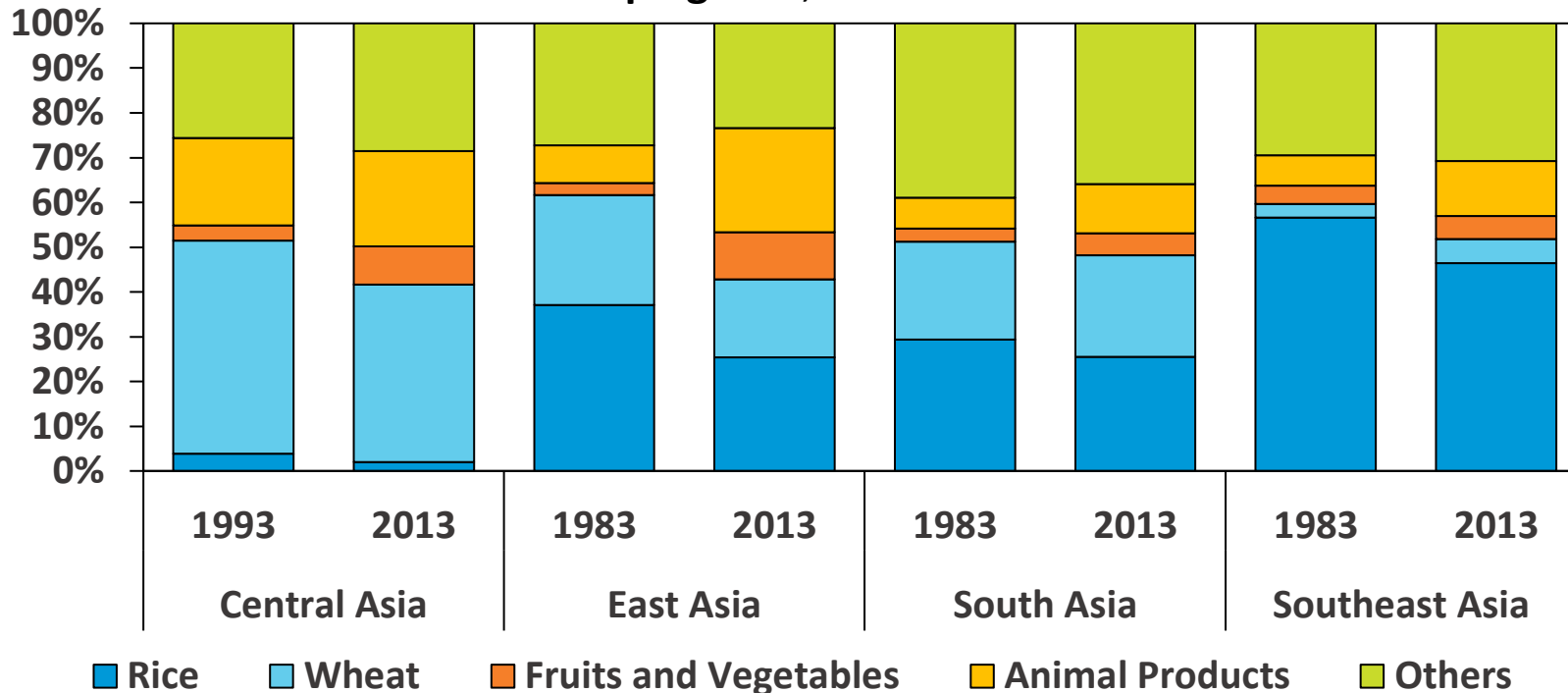
Food Consumption Patterns, Developing Asia, 1961-2013
(average kilocalories/person/day)



5. Changing patterns of food consumption and diversification (cont.)

- The decline in rice and wheat consumption is mainly due to rising incomes. It is most notable in East Asia and Southeast Asia.

**Changing Composition of Food Consumption in Calories,
Developing Asia, 1983 and 2013**



- ❖ As incomes increase, starchy staples account for a smaller share of dietary energy, reflecting a desire for dietary diversity.
- ❖ Declines in rice consumption have been greater in urban than rural areas.
- ❖ Declines have been greater for those at the upper end of the income distribution than the poor.

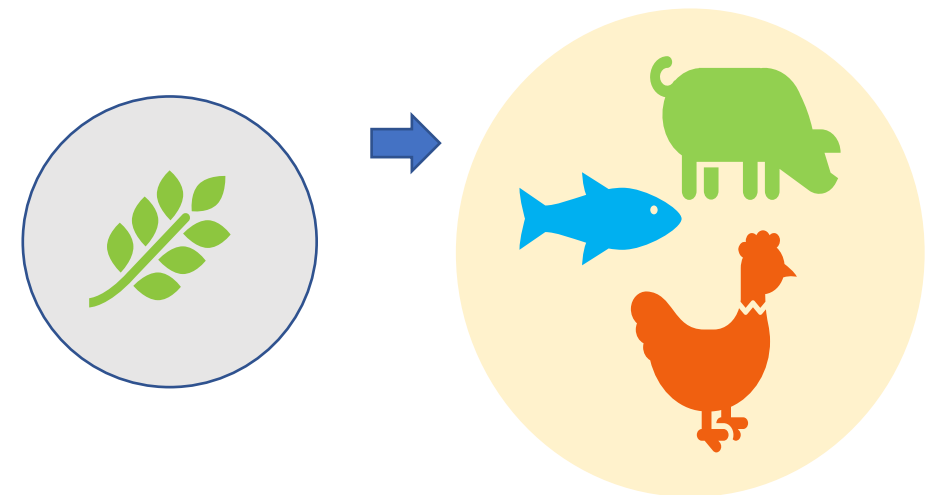
Notes: "Others" include starch and other cereals, sugar crops and sweeteners, and vegetable oils and oil crops. Pacific economies are excluded due to data unavailability of Papua New Guinea.

Source: Food and Agriculture Organization of the United Nations. 2019. FAO Statistics (FAOSTAT).

<http://www.fao.org/faostat> (accessed 1 May 2019).

5. Changing patterns of food consumption and diversification (cont.)

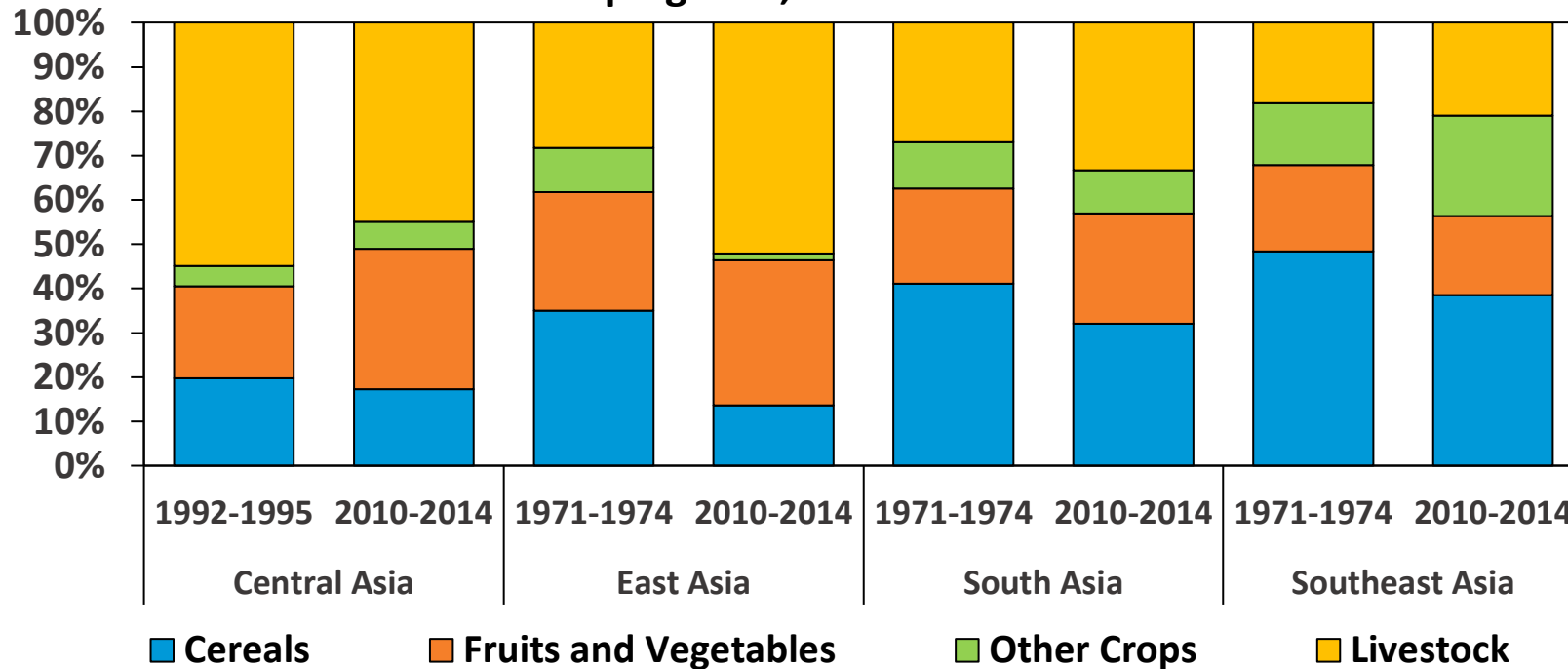
- Prices of fruits and vegetables rose more rapidly than the overall price of food in nearly all countries. These sustained price increases reflect reinforcing demand and supply:
 - ❖ First, consumers want to diversify their diets as their incomes grow (demand).
 - ❖ Second, fruit and vegetable cultivation (supply) is relatively labor intensive, implying that farmers need to find ways to use labor more efficiently.
- Asia also moved from largely cereal- or grain-based production to higher-value production—such as high-value crops, livestock, and fisheries.
 - ❖ The value of agricultural production (in 2010–2014 constant prices) increased over six times in 50 years.
 - ❖ In the 1960s, cereal production dominated, accounting for 40% of total agricultural production.
 - ❖ In the 1990s, livestock, and vegetable and fruit production significantly increased, now exceeding the value of cereal production.



5. Changing patterns of food consumption and diversification (cont.)

- These changes, however, occurred unevenly across Asia, wherein East Asia (mostly the PRC) saw the most drastic changes.

Shares of Agriculture Gross Production Value by Sector, Developing Asia, 1971-1974 and 2010-2014



- ❖ Meat production in Asia grew significantly over the past 5 decades. A large share of increased meat production occurred in the PRC, the largest producer of pork (at 45% of total).



Notes: "Other crops" include oil crops, roots and tubers, and sugar. Pacific economies are excluded due to data unavailability of Papua New Guinea.

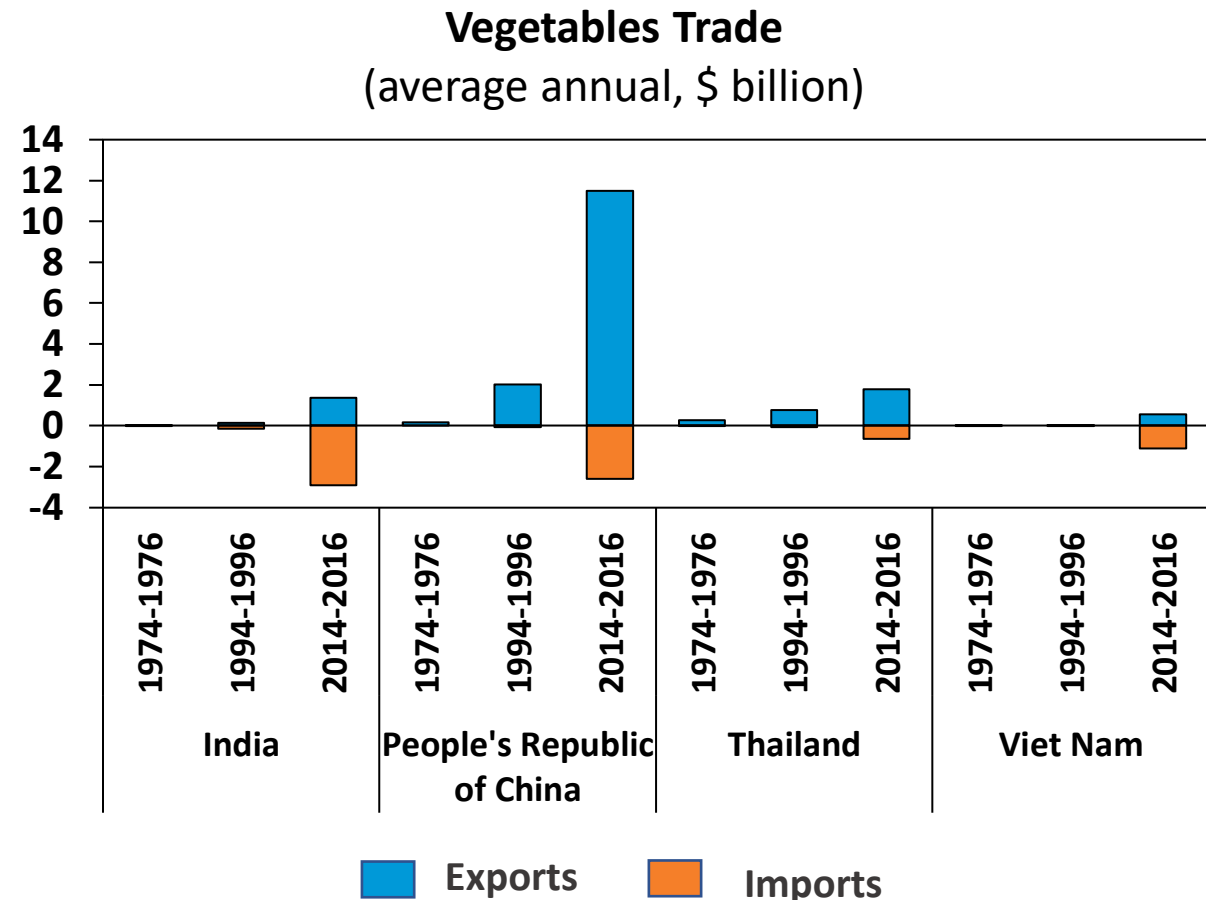
Source: Food and Agriculture Organization of the United Nations. 2019. FAO Statistics (FAOSTAT). <http://www.fao.org/faostat> (accessed 1 May 2019).

6. Agricultural trade, value chains, and rural nonfarm economy

- There have also been changes in Asia's agricultural trade, agri-food economy, and nonfarm rural economy.

❖ There have been shifts in patterns of **agriculture trade**. International trade allows countries to specialize in production based on comparative advantage.

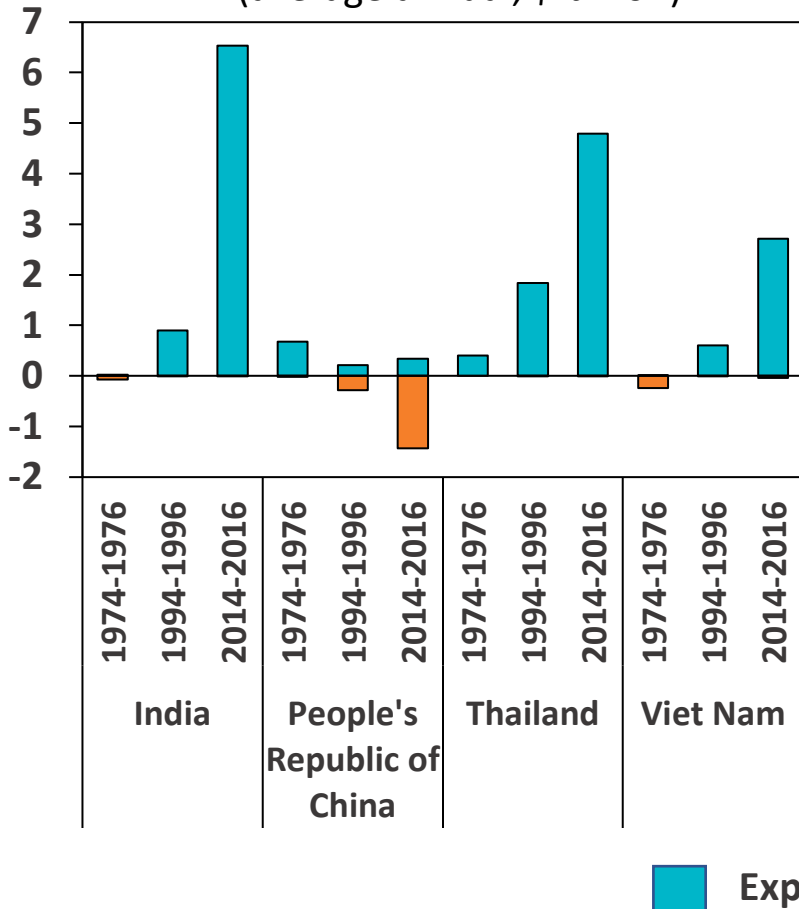
- Trade liberalization in agriculture contributed to increased external engagement.
- Trade in processed food, such as vegetables and meat, has grown significantly due to the high income elasticities of demand and where there are fewer trade barriers or quarantine-related restrictions.
- Examples where trade grew because of comparative advantage: Malaysia's palm oil production; Thailand and Viet Nam's export of rice.



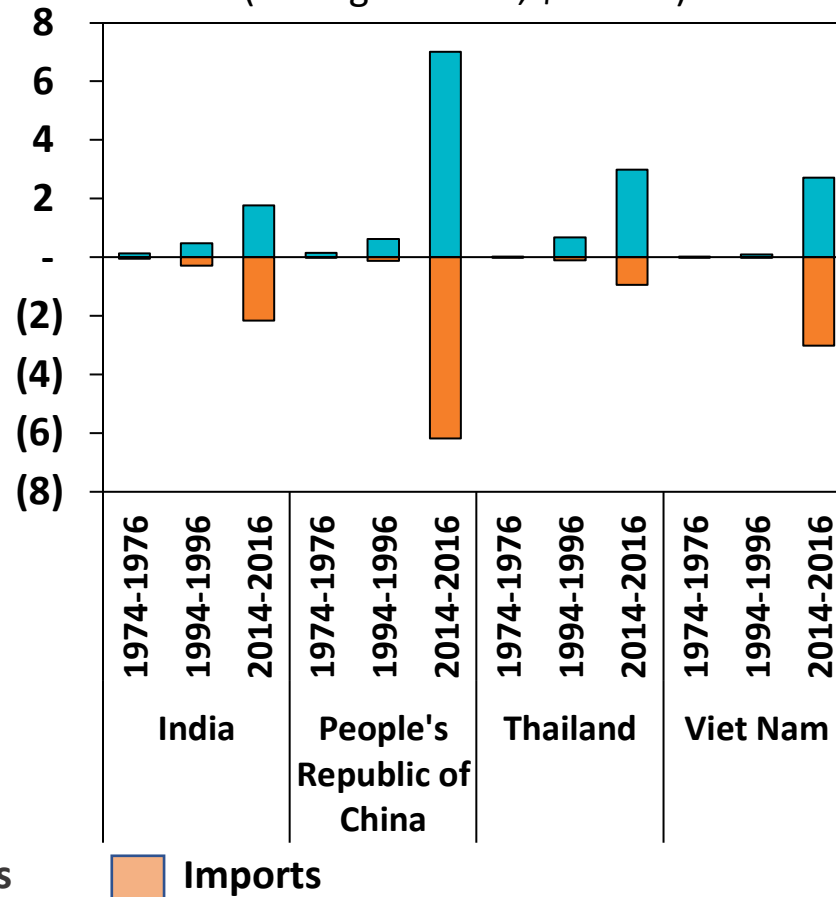
6. Agricultural trade, value chains, and rural nonfarm economy (cont.)

❖ There have been marked increases in trade of rice, fruits, and meat since the 1970s.

Rice Trade
(average annual, \$ billion)



Fruits Trade
(average annual, \$ billion)



➤ Thailand, India, Pakistan, and Viet Nam account for two-thirds of global exports of rice.

➤ Rising production of fresh vegetables and fruits resulted in increased trade of these higher-value crops, especially in the PRC.

➤ Meat production and trade have increased markedly, requiring massive imports of animal feed from outside Asia.

6. Agricultural trade, value chains, and rural nonfarm economy (cont.)

- ❖ **Food value chains.** Significant changes in consumption patterns, product diversification, and international trade have also helped transform Asia’s “agri-food” economy, especially with the rapid expansion of food value chains and agribusiness.
 - Food supply chains have shifted from locally fragmented chains to geographically integrated ones, giving way to urban wholesale markets and specialized logistics stores.
 - The steady growth of physical infrastructure such as roads and storage over the past decades greatly improved transportation, communications, and knowledge sharing for the agriculture sector.
 - Market-led value chains continue to change as well, with the private sector and new technology playing a critical role.
 - Contract farming is a special production–procurement system designed to address logistics challenges.
 - Major changes have occurred almost unnoticed, even in staple food value chains. The changes included the rapid rise of supermarkets, modern cold storage facilities, large rice mills, and commercialized small farmers using input-intensive, mechanized technology.



6. Agricultural trade, value chains, and rural nonfarm economy (cont.)

- Although the GDP share of direct “agricultural value added” has declined, “agribusiness value added” has grown significantly. Dynamic agribusiness spurs growth in an economy.

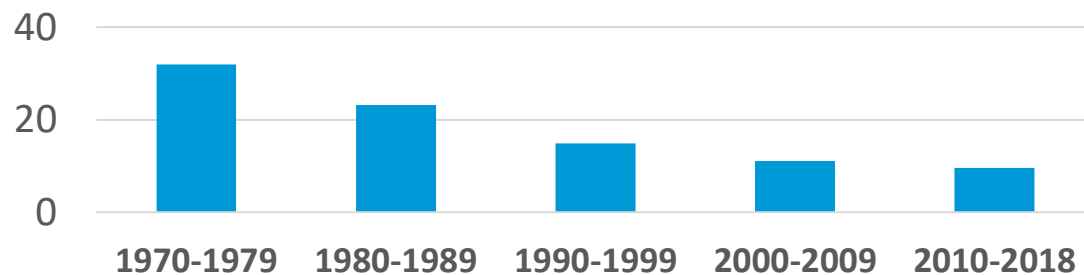


“**Agribusiness value added**” (which includes manufacturing, processing, and food value chains, such as transport, logistics, and distribution services) has **grown significantly** in Asia over the past 2–3 decades. Meanwhile, **agriculture value added declined**.



Agribusiness is an important source of economic growth. It provides **inputs** to farms and **crucial links** between farm and nonfarm sectors and consumers. Further, expanding agribusiness not only increases value added but also **absorbs surplus rural labor**.

Developing Asia, agriculture value-added (% of GDP)



There have been several **drivers of agribusiness expansion in Asia** in recent decades, including change in **consumer tastes**, rapid **technological** change, **urbanization** and increasing **women’s participation** in the labor market.

GDP=gross domestic product.

Sources: World Bank. World Development Indicators. <https://data.worldbank.org/indicator> (accessed 2 August 2019); United Nations (UN). UN Statistics Division Database. <https://unstats.un.org> (accessed 28 August 2019); national sources; and Asian Development Bank estimates

6. Agricultural trade, value chains, and rural nonfarm economy (cont.)

- ❖ **Rural nonfarm economy.** As Asia continues to transform, the rural nonfarm economy has become a critical driving force.
 - ✓ It helps integrate rural and urban economies by narrowing income gaps between farmers and office workers.
 - ✓ Nonfarm income helps households diversify income risk from different sources.
 - ✓ Historically, the rural nonfarm sector played a significant role in industrial development.
 - ✓ Nonfarm sector development helps create employment opportunities for rural labor, slow rural–urban migration, promote more equitable income distribution, and reduce rural poverty.



7. Looking ahead

- The following key priorities are critical to continue agricultural transformation and rural development.

First, **technology** remains a key driver of productivity growth. Research and the application of technology will occur both in agricultural production systems and across the entire food chain.



Second, **land reform** and **land administration** remain part of the ongoing agenda for many Asian countries.



Third, improving **food value chains** and **agribusiness** supports the promotion of agricultural trade.



Fourth, **food safety** and **nutrition standards** must be developed and enforced across the entire food system.



Fifth, remaining agricultural **price distortions** should be addressed.



Sixth, **emerging challenges** must be addressed—including **ecosystem protection** for forest, land, and water resources; **environmental management** for air, soil, and water pollution; and **climate resilience** to drought, floods, and salinization.



Finally, agricultural and rural development **policy design** and **implementation** must be better integrated into national development strategies for more balanced, inclusive, and sustainable growth.



8. Questions and further readings

- Questions

- 01** How has development thinking on agriculture and development evolved since the 1950s?
- 02** What are notable features of Asia's agriculture development? How has agriculture contributed to Asia's development?
- 03** How did Asia deal with its food problems in the 1950s and 1960s? What are key lessons from Asia's experience of land reform?
- 04** How has Green Revolution modernized agriculture in Asia? What are the reasons for its success?
- 05** How have patterns of food consumption and production evolved in Asia? What have been the reasons for these changes?
- 06** How has agriculture trade changed over the years? What has been the role of rural nonfarm economy to Asia's transformation?



8. Questions and further readings (cont.)

• Further readings

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8. Questions and further readings (cont.)

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8. Questions and further readings (cont.)

• Further readings

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