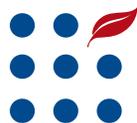




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Trade and Food Security Implications From the Indonesian Agricultural Experience

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Abstract

As the Indonesian Government transitioned from a food (rice) self-sufficiency focus to an industrial export-oriented development strategy in the mid-1980s, the agricultural sector responded by diversifying production to include cash crops. Sharp currency devaluation and trade liberalization following the Asian financial crisis in 1997 provided incentives for Indonesian agricultural producers to assert their comparative advantage in tropical perennial crops. This report evaluates the ensuing impact on Indonesia's agricultural productivity growth and consumer food demand and lifestyle. Shifting agricultural production and consumption patterns have led to improving agricultural trade patterns and food security. These developments have contributed to increased export opportunities for U.S. agricultural suppliers.

Keywords: Indonesia, agricultural productivity, food security

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Contents

Introduction	2
Indonesian Agriculture's Shifting Production Patterns	4
Agricultural Demand Transitions	7
Agricultural Trade	12
Outlook and Implications ...	17
References	18

Approved by USDA's
World Agricultural
Outlook Board

Introduction

Indonesia's resilient economic growth, expanding middle class, and strong domestic demand have led some economists to see the country as a potential fifth member of the BRIC group—Brazil, Russia, India, and China—of rapidly growing developing nations (Aglionby, 2009). Investments in the Indonesian agricultural research system, including U.S. foreign aid, assisted in establishing agricultural research capacity, raising productivity, and supporting stronger growth. The agricultural sector underwent some realignment in response to policy changes that shifted focus from food crop production to an industrial, export-led development strategy. Coupling this market reorientation with the devaluation of the rupiah and trade liberalization following the Asian financial crisis allowed Indonesian producers to exploit their comparative advantage in tropical perennial crop production. Strong economic growth and vibrant trade have increased consumer demand for higher valued foods and have expanded U.S. export opportunities for fruit, dairy, other packaged food, and feed and fodder.

This report examines the evolution of Indonesia's agricultural sector and the ensuing impact on agricultural productivity growth and consumer food demand and lifestyle. The report further examines how the development of the agricultural sector has affected Indonesian agricultural trade patterns, the country's food security status, and the outlook for these trends. At a time when food security initiatives are being developed to reduce poverty and hunger in some of the poorest nations in the world through growth in agricultural productivity, Indonesia can provide an illustration of the wide-ranging possibilities for improving agricultural productivity and food security.

Background

In the mid-1960s, Indonesia was the world's largest rice importer (Fuglie and Piggott, 2006). From the 1970s until the mid-1980s, the country focused its efforts on reducing its reliance on food imports and directed investments toward increasing food crop (mainly rice) production. Growth in the agricultural sector coincided with the "Green Revolution" as seed-fertilizer technologies and substantial Government subsidies allowed increased production through crop intensification. Bolstered by a buoyant food sector in the 1980s, Government sentiment began shifting toward a new industry-first policy. Indonesia's 1983-93 market transformation restructured the economy to assist producers in competing with low commodity prices observed in world markets (Timmer, 2004).

The Asian financial crisis shocked the Indonesian economy, plunging its 1998 gross domestic product (GDP) growth rate to -13 percent (World Bank, 2008). Regaining macroeconomic stability required instituting specific policy measures, negotiated with the International Monetary Fund (IMF), such as reducing food crop tariffs to no more than 5 percent, deregulating the movement of interprovincial agricultural commodities, and breaking the Government Logistical Agency's (Badan Urusan Logistik) monopoly over the trade rights for rice, wheat, soybeans, sugar, and garlic (USDA, Economic Research Service, 2000; Timmer, 2004). Trade liberalizing policies and currency devaluation promoted a greater market-oriented economy and allowed Indonesia's

tropical perennial crops to assert their comparative advantage.¹ By the late 1990s, Indonesia emerged as the second largest exporter of rubber and palm oil and the third largest exporter of cacao and coffee (Fuglie and Piggott, 2006). Despite diversifying away from food crops, the country improved food security, largely by increasing access to food with a revitalized economy and rising income levels. In a sample representing 40 percent of the lowest income group in both rural and urban areas, a United Nations' (UN) analysis found that the proportion of Indonesian households experiencing severe food insecurity decreased from nearly 31 percent in 1999 to just under 11 percent in 2002 (United Nations, 2008, p. 30-2).²

¹Note that Indonesia, as of January 2008, altered its import duty on rice to 450 rupiah/kilogram.

²Household food insecurity is defined in this UN analysis as a food expenditure share greater than 60 percent and energy intake less than 80 percent of the standard requirement of 2,100 kilocalories/capita/day.

Indonesian Agriculture's Shifting Production Patterns

Total agricultural output in Indonesia grew through land expansion, increased labor and capital investments, and intensified use of intermediate inputs, such as fertilizer.³ Average annual agricultural output growth in Indonesia increased 3.6 percent between 1961 and 2006, with roughly half accounted for by farms increasing input usage (Fuglie, 2009). The remaining portion of output growth is attributed to total factor productivity growth—that is, growth from improved technologies and more efficient allocation of farm resources. While technical changes and improved information may come from various sources, both international and domestic, a country's own agricultural research system bears the burden of improving its farmers' productivity.

Although Indonesian agricultural research dates to the early 1800s, the Great Depression, World War II, the War of Independence (1945-49), and nationalization of many foreign-owned plantations (1957) decimated research capacity. To assist in rebuilding domestic public agricultural research capabilities, the World Bank, the U.S. Agency for International Development (USAID), and the Asian Development Bank have accounted for nearly a third of total annual research expenditures between 1974 and 2003 (fig. 1).⁴ Despite these international contributions, low funding for agricultural research in Indonesia has historically been a constraint to improving agricultural productivity growth (Agency for Agricultural Research and Development, 1987; Fuglie and Piggott, 2006; Mellor et al., 2003). Private agricultural research is increasing but from a very small base: It accounted for about 3 percent of all agricultural research expenditures in 1985, about 7 percent in 1996, and has continued to grow since (Pray and Fuglie, 2002).

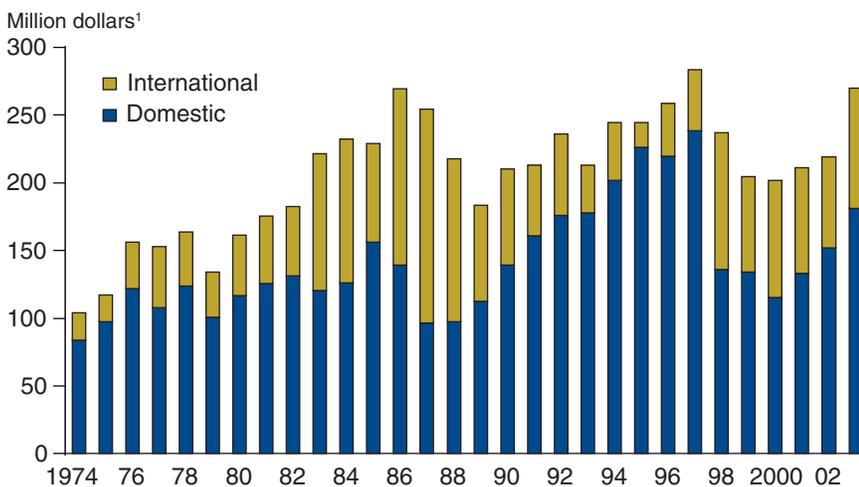
Empirical evidence indicates that research investments have benefited Indonesian agricultural development. Agricultural research investments on rice

³Secondary data employed in this report are from Indonesian Government statistical publications and non-Indonesian sources. The Indonesian data sources are the Buro Pusat Statistik (BPS), or the Central Statistics Office; the Ministry of Agriculture (MOA); and the Director General of Estate Crops, or DG Estate. Non-Indonesian sources are the Food and Agricultural Organization FAOSTAT Agricultural Databases, the World Bank's World Development Indicators, the U.S. Census Bureau, and USDA's Economic Research Service.

⁴Indonesia's domestic public agricultural research expenditures entail funding sources from the Agency for Agricultural Research and Development (AARD) and the Indonesian Planters Association for Research and Development (IPARD).

Figure 1

Sources of funding for Indonesian agricultural research, 1974-2003



¹In 1999 international dollars.

Source: Fuglie and Piggott (2006).

were estimated to generate a rate of return, which is the ratio of money gained relative to the amount invested, of 151 percent annually between 1965 and 1977 (Salmon, 1991). Similarly, other studies have estimated at least a 100 percent return for dryland rice, wetland rice, maize, soybeans, sweet potatoes, cabbage, potatoes, garlic, mustard, onions, shallots, bananas, papayas, pineapples, and milk (Evenson et al., 1994). However, elevating agricultural total factor productivity (TFP) growth is generally the goal of any public agricultural research investment. TFP provides the most complete productivity measure, compared with partial land or labor productivity measures, because it accounts for all farm inputs, rather than a single input, related to production.

Fuglie's (2009) TFP estimates—which account for crops, livestock, and cultured fisheries—indicate that Indonesia's agricultural productivity increased 2.18 percent per year during the early years of investment when the focus was on food (rice) self-sufficiency. A shift in focus favoring industrial development resulted in a dramatic slowdown of agricultural productivity growth to less than 1 percent between 1985 and 1997. Market liberalization and sharp currency devaluation following the Asian financial crisis promoted the development of export-oriented tropical perennial crops. Subsequently, TFP estimates more than tripled to 2.41 percent between 1998 and 2006.

Analysis by Rada et al. (2010) finds that agricultural technology growth between 1985 and 2005 has varied across subsectors, being greatest in perennial (export) crops (2.20 percent), followed by livestock (1.70 percent), and least in annual (food) crops (0.67 percent). This analysis suggests that policy reforms and currency devaluation created incentives for increased agricultural trade and generated growth in agricultural productivity. Furthermore, Rada et al. indicate that technology growth was driven more from private and other nongovernment sources than from public agricultural research investments. One such example is provided by Pray and Fuglie (2002), who note that new palm oil clones destined for Indonesia originate from Malaysia, with private rather than public research facilitating the technology transfer.

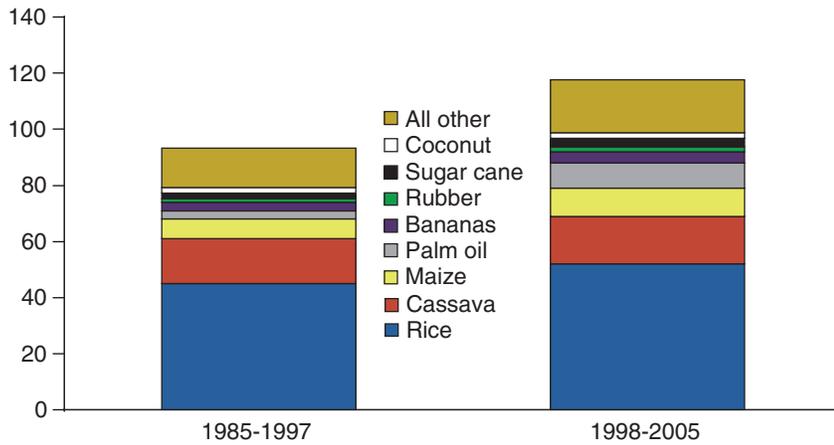
The realignment of the Government's development focus, accompanied by increased private and nongovernment research investments in perennial crops—which experienced the greatest productivity gains—has contributed to changing Indonesia's agricultural composition. Although most crops and livestock experienced growth in total production levels, their relative shares of total agricultural output changed over the years.

Total agricultural output in Indonesia grew from an average level of 93 million metric tons during 1985-1997 to 117.5 million metric tons during 1998-2005 (fig. 2). The eight commodities presented in figure 2 accounted for over 85 percent of total agricultural production in both periods. Between these two periods, average rice production increased over 13 percent, which is significant in the face of low annual crop technology growth during this timeframe. In contrast, palm oil production—a principle driver of perennial crop technology growth—increased 110 percent between the two periods.

Figure 2

Average Indonesian agricultural production, 1985-1997 and 1998-2005

Million metric tons



Source: Rada (2009).

Just as changes in development focus and market liberalization have impacted Indonesian agricultural productivity trends and production composition, these forces have combined with overall economic growth to drive changes in consumer food demand and lifestyles. These factors are briefly described in the following section.

Agricultural Demand Transitions

Growth and development in the agricultural sector have increased agricultural value added from \$17 billion in 1985 to almost \$29 billion in 2003, in constant 2000 dollars (World Bank, 2008). However, because the rest of the economy grew even faster, agriculture's share in the general economy has declined by nearly half (table 1). Agriculture accounted for over 30 percent of the country's GDP in 1985 but less than 17 percent in 2003. Agricultural productivity growth reduced labor needs in the sector, promoting greater labor participation in other sectors of the economy. Additionally, higher wages in urban areas have stimulated rural labor migration (World Bank, 2007). As a result, agriculture accounted for only about 44 percent of total employment in 2003 compared with almost 55 percent in 1985 (table 1). Furthermore, the urban population rose to account for nearly 50 percent of the overall population in 2006; it accounted for only 15 percent in 1961 (fig. 3).

Economic growth and greater urbanization have contributed to lifestyle changes, evidenced by a more educated labor force with greater female participation (table 1). Increasing employment opportunities have coincided with higher per capita wealth. GDP per capita (in 2000 international dollars) nearly tripled from \$1,150 in 1975 to almost \$3,200 in 2003 (table 1). Past ERS research indicates that higher income levels are associated with a greater demand for more expensive sources of calories, such as meat, fruit, vegetables, and processed food products (Seale et al., 2003). For example, if Indonesian income levels rose 10 percent, the demand for higher valued foods, such as dairy and fish, would rise by about 8 percent for each, whereas cereal demand would increase by only 5 percent.

Urbanization affects food consumption patterns in a number of ways (Regmi and Dyck, 2001). Calorie requirements of urban and rural residents differ, with sedentary urban lifestyles requiring fewer calories to maintain a given body weight. Improved transportation technology offers a wider range of food products in urban areas year-round than in rural areas. Moreover, urban areas are centers of economic opportunity where a greater percentage of women work outside their homes, in turn generating larger household incomes.

Table 1
Indonesian economic development indicators, 1975-2003¹

Year	GDP growth	GDP per capita, PPP ²	Agricultural GDP share	Agricultural employment ³	Female labor	Literacy rate ⁴
	<i>Percent</i>	<i>Constant 2000 U.S. dollars</i>	<i>Percent</i>	<i>Percent</i>	<i>Thousands</i>	<i>Percent</i>
1975	7.8	1,148	30.2	—	—	68.7
1985	6.0	1,735	23.2	54.7	25,414	76.1
1995	7.1	2,987	17.1	45.2	31,796	81.9
2003	4.7	3,182	16.6	44.3	37,979	85.8

¹Each indicator is provided as a 5-year centered average to net out year-to-year fluctuations.

²Gross domestic product (GDP) per capita, purchasing power parity (PPP) measured in constant 2000 U.S. dollars. 1975 employs a 3-year uncentered average as data begin in 1975.

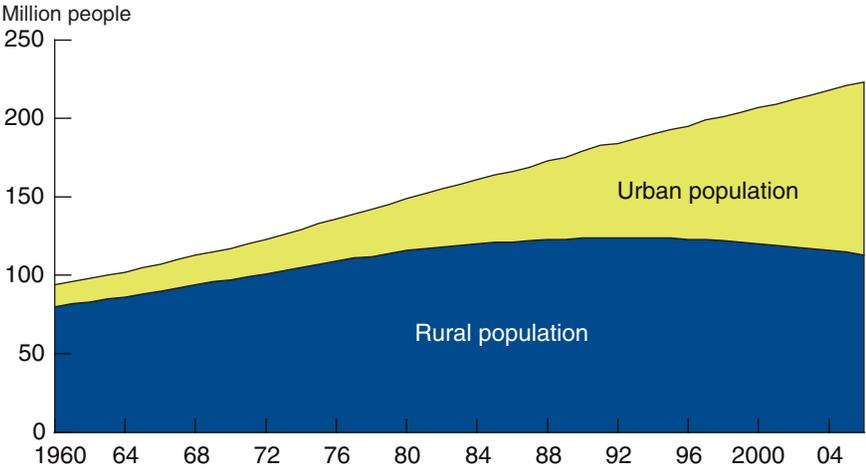
³— = Not applicable. 1985 is the first data point.

⁴1975 employs only 1976 data. 2003 employs a 3-year average as data end in 2003.

Sources: World Bank (2008), Fuglie and Piggott (2006), Euromonitor (2009).

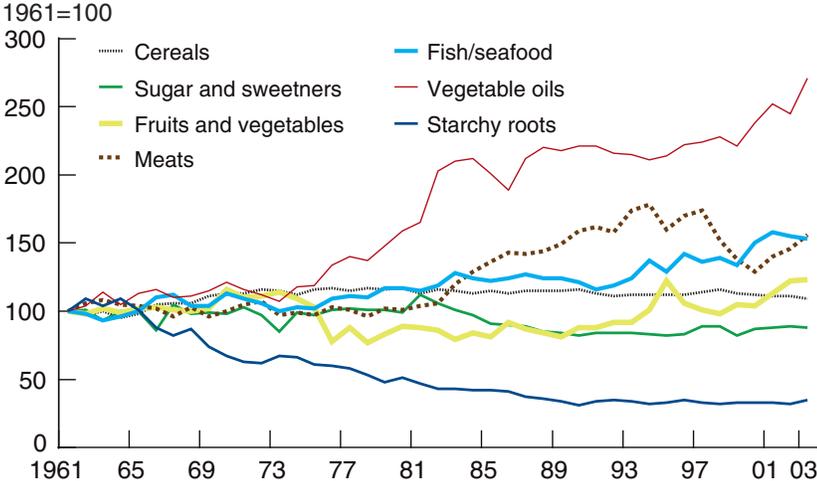
Greater food consumption and increased purchasing power have contributed to average Indonesian per capita food availability growing from 1,726 calories per capita per day in 1961 to 2,890 calories in 2003 (FAO, 2009). While the increase in total per capita calories has been remarkable, the changes in food sources providing these calories are equally noteworthy. The total calorie share of starchy roots, a low-value product, has been consistently replaced by high-value foods, such as vegetable oils, meats, fish/seafood, and fruits and vegetables (fig. 4). Between 1961 and 2003, starchy root crops as a share of total calories consumed per capita per day fell an annual average 2.5 percent, from 20 percent to 7 percent. Cassava, long considered an inferior food in Indonesia, is the dominant starchy root. Vegetable oil's share nearly tripled between 1961 and 2003, peaking at more than 9 percent. Meat and fish/seafood as a share of calories modestly rose 1.1 percent and 1 percent, respectively. Sugars and sweeteners and vegetables and fruits remained constant.

Figure 3
Indonesian population growth, 1960-2006



Source: World Bank (2008).

Figure 4
Changes in Indonesian food sources as a share of total calories consumed per capita per day, 1961-2003

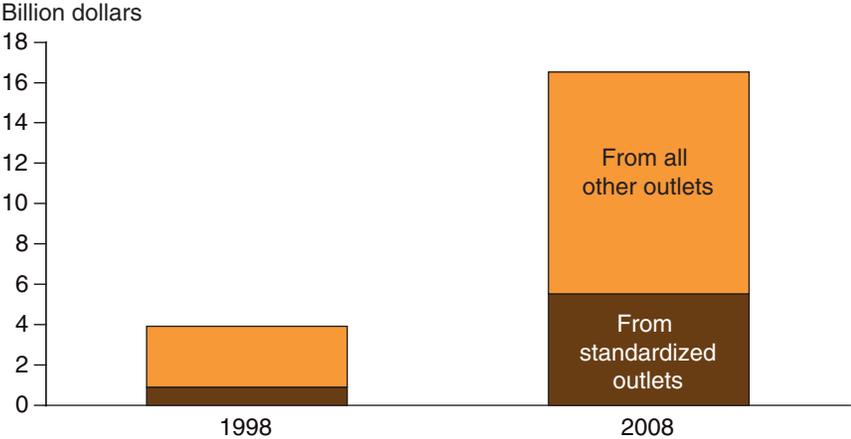


Source: World Bank (2008).

Income growth and lifestyle changes caused by greater urbanization have also changed the manner in which consumers purchase food in Indonesia. Increasingly, Indonesians are purchasing packaged food with some value added, rather than purchasing unprocessed products from local wet markets. The total value of such purchases grew from \$4.2 billion in 1998 to over \$16 billion in 2008 (fig. 5). In addition to the changes in the actual consumer food basket, the outlets through which these products are purchased have also undergone a change. In 1998, less than 22 percent of packaged food was sold in standardized retail outlets rather than in independent corner “mom-and-pop” stores.⁵ In 2008 over 34 percent of sales were through standardized stores. These standardized outlets are often owned by such companies as Carrefour and Makro (recently purchased by Lotte), who play a key role in introducing new food products to the market. In this manner, changes in the food retail sector further contribute to the evolving food demand pattern of the Indonesian consumers.

⁵Standardized outlets denote supermarkets, hypermarkets, and discount and convenience stores.

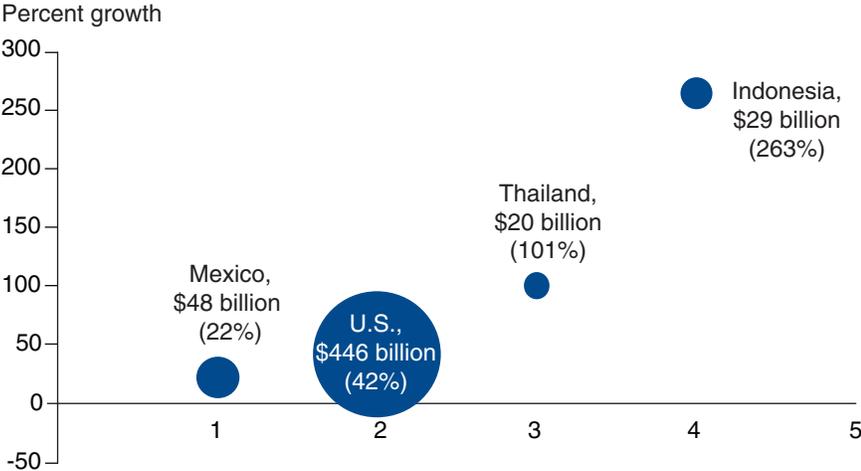
Figure 5
Rising packaged food sales in Indonesia, 1998-2008



Source: Euromonitor (2009).

With a surge in the number of dual-income urban households Indonesians are finding less time to shop for food or cook their meals, registering a dramatic growth in sales from the foodservice sector (fig. 6). Although the size of the Indonesian market at \$29 billion is relatively small compared with that of the United States, it is one of the world’s fastest growing markets. As with food retail outlets, a large number of foodservice outlets that have proliferated in recent years are foreign affiliates of companies, such as fast food outlets McDonald’s and Pizza Hut, as well as sit-down restaurants, such as TGI Friday’s, Tony Roma’s, and Planet Hollywood.

Figure 6
Indonesian foodservice market: Size in value, 2008, and percentage growth, 1999-2008



Source: Euromonitor (2009).

Food Security

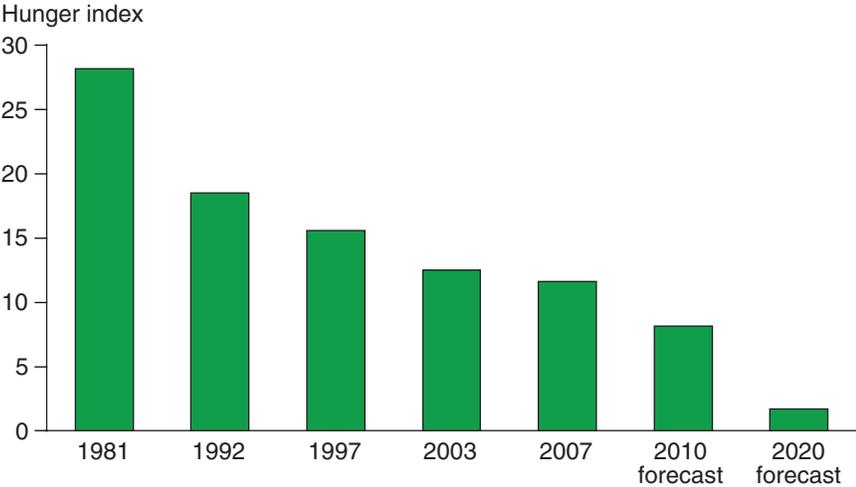
Although Indonesian agriculture has diversified away from food crops, overall food security has improved. Food security generally implies that a country has sufficient food available (target of 2,100 calories per person per day) that can be readily accessed (physically available as well as affordable) and utilized by its citizens (nutrients consumed and absorbed by individuals). Growth in agricultural production has increased food availability in Indonesia, while higher income levels have improved food accessibility for most of its citizens. Increased education, better nutrition, and improved food safety and sanitation have contributed to better food utilization in the country.

With increased availability, accessibility, and better utilization, food insecurity in Indonesia has declined since 1981 (fig. 7). Food insecurity results in undernourished citizens, with children being the clearest indicator of this crisis. Thus, food security measures commonly tend to focus on indicators involving children. The International Food Policy Research Institute’s (IFPRI) global hunger index provides a measure that reflects all three pillars of food security: availability, accessibility, and utilization. The hunger index is an equally weighted index of three measures: the proportion of undernourished population as a percentage of the total population; the prevalence of underweight children under the age of 5; and the under-5 mortality rate

(IFPRI, 2006). The hunger index score for Indonesia has declined from a high of over 28 in 1981 to less than 12 in 2007 (IFPRI, 2006, 2007). If one assumes food availability, agricultural trade, and economic development to continue their historical trends, the hunger index is expected to decline to 8 in 2010 and below 2 by 2020.

Marginal growth in annual crop productivity suggests that imports may have played a key role in improving consumer availability and accessibility to food. The following section examines how transitions in Indonesia’s agricultural production patterns and consumer food demand patterns have affected agricultural trade.

Figure 7
Improving food security in Indonesia, 1981-2020



Source: The hunger index is from the International Food Policy Research Institute; values for 2010 and 2020 are authors' trend line forecast.

Agricultural Trade

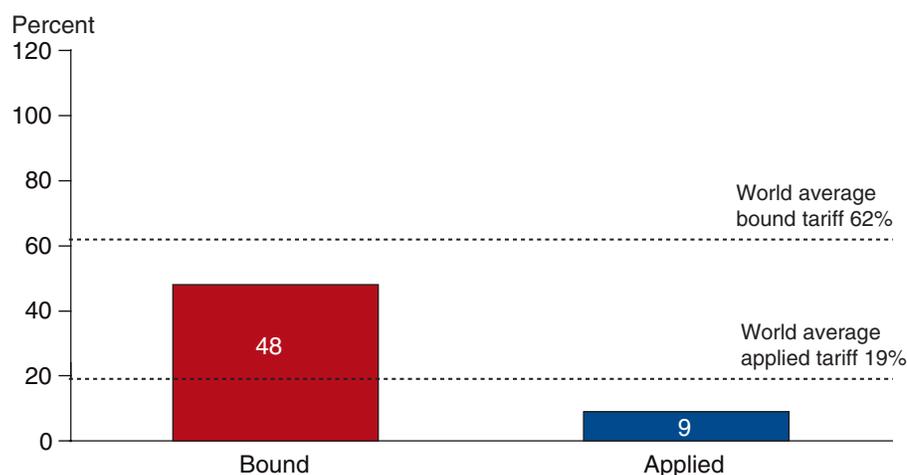
With import tariffs below world average levels, Indonesia has one of the most open markets for agricultural imports in Asia (fig. 8). For example, in 2006, the average bound rate, a set tariff level above which import tariffs cannot be raised, was 48 percent in Indonesia compared with the global average of 62 percent. More importantly, the actual tariffs that were applied to agricultural imports averaged only 9 percent in Indonesia compared with the world average of 19 percent.

Reflecting the changes in agricultural production and consumer demand patterns, Indonesia has focused agricultural exports primarily on tropical perennial products in which it has comparative advantage, whereas its imports have included feed for its growing poultry sector (in response to greater consumer demand for meat) and food for its citizens.

Agricultural Exports

Indonesia's agricultural export value has grown on average almost 9 percent annually, from a base of nearly \$900 million in 1975 to nearly \$18 billion in 2007 (FAO, 2009). Growth has been driven by increases in tropical perennial crops, such as rubber, cocoa, coffee, and palm oil. As of 2008, Indonesia was the second largest exporter of palm oil and the fourth largest exporter of coffee (USDA, 2008). While growth was evident in palm oil and rubber following Indonesia's move toward industrialization in the mid-1980s, growth was exponential following the economy's recovery after the Asian financial crisis (fig. 9). Between 1975 and 2007, palm oil and rubber accounted for nearly half of total export value, with rubber's share alone nearing a third. Between 2000 and 2007, shares associated with palm oil and rubber switched, with palm oil representing nearly 33 percent of total export value.

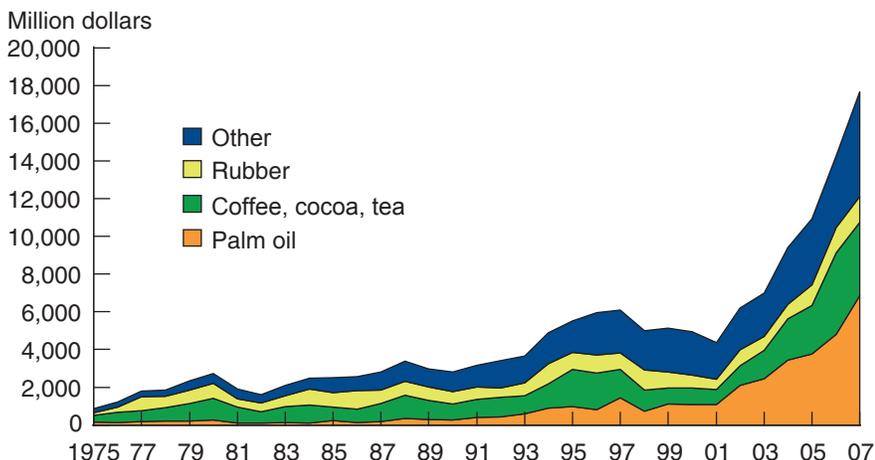
Figure 8
Indonesia's agricultural tariffs, 2006



Source: Calculations by USDA, ERS using the Agricultural Market Access Database and the World Trade Organization's member-submitted ad valorem-equivalent estimates; simple averages are calculated.

Figure 9

Indonesian agricultural export values, 1975-2007



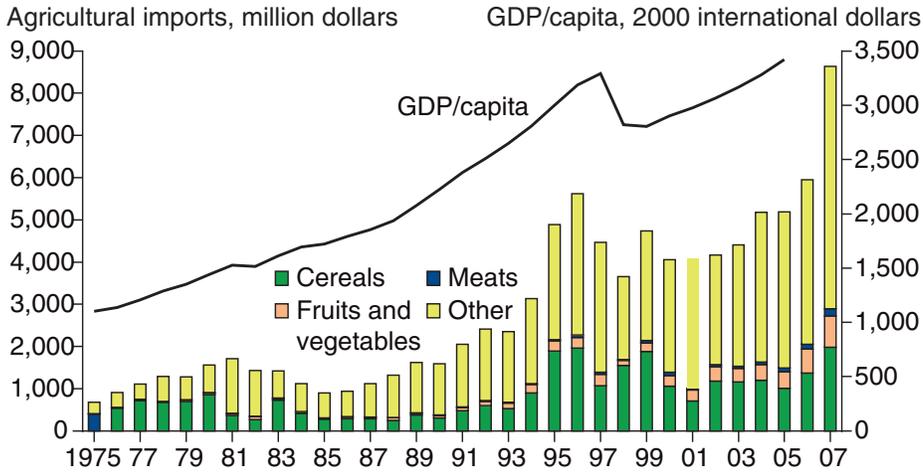
Source: Food and Agriculture Organization of the United Nations, FAOSTAT Agricultural Databases (2009).

Agricultural Imports

Despite growth in agricultural production, population and income growth have contributed to Indonesia’s agricultural import increases (fig. 10). Indonesia’s agricultural import value grew from over \$650 million in 1975 to over \$8.5 billion in 2007, an 8-percent average annual increase, to meet the needs of a swelling population that increased from less than 100 million in 1961 to nearly 230 million in 2009 (FAO, 2009). In addition to the overall growth in imports to meet expanding food demand, Indonesian food import trends reflect food preferences and lifestyle changes of an increasingly educated, urban, and wealthy consumer. Cereals, which accounted for over 60 percent of total imports in 1975, have accounted for only about a quarter of agricultural imports since 1991 (fig. 11). Instead, imports of feed and fodder to meet the needs of the growing poultry sector and foods to satisfy Indonesia’s newly discerning consumers have risen. For example, feed and fodder import value increased an average 34 percent each year between 1967 and 2007. Similarly, soybean (food item) import value increased an average 12 percent per year between 1975 and 2007.

Figure 10

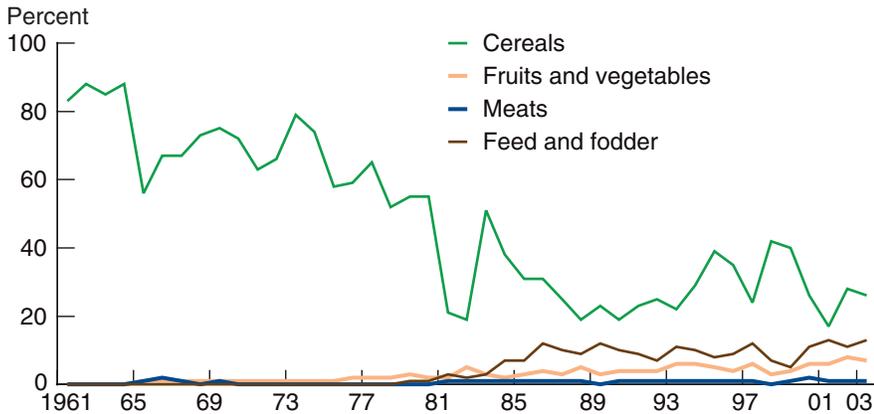
Indonesian income growth and agricultural import value, 1975-2007



Source: Food and Agriculture Organization of the United Nations, FAOSTAT Agricultural Databases (2009); World Bank (2008).

Figure 11

Selected agricultural products as a share of total Indonesian imports, 1961-2007



Source: Food and Agriculture Organization of the United Nations, FAOSTAT Agricultural Databases (2009).

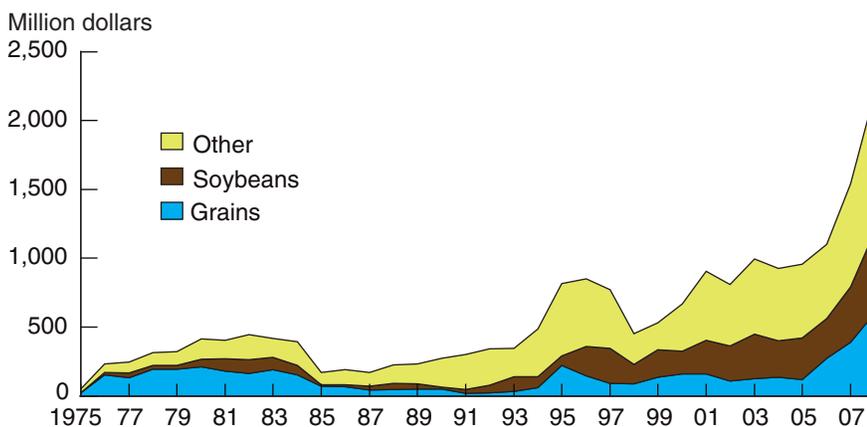
U.S. Agricultural Exports to Indonesia

Indonesia's agricultural transformation has provided opportunity for U.S. agricultural exports. Since 1975, grain and soybeans have averaged 50 percent of all U.S. agricultural exports to Indonesia (fig. 12) (U.S. Census Bureau, 2009). Most noticeable in figure 12 is the sharp growth starting just before 2000. To provide more detail of which U.S. exports have grown since 1997, table 2 displays the increasing values of bulk, intermediate, and consumer-oriented agricultural items exported to Indonesia between 1998 and 2008. Although the value of bulk items far exceeded that of intermediate or consumer-oriented items, each category experienced impressive growth. Furthermore, the average annual value of at least six individual items—wheat, hide and skins, feed and fodder, snack foods, dairy products, and fresh fruits—grew more than 20 percent. Dairy products, the fastest growing export item to Indonesia, grew at an annual average rate of almost 40 percent.

Increased U.S. export values after 1998 reflect changes in the composition of trade (table 2). Export volumes follow value trends for most commodities/groups. The significant average annual decline in "other bulk items" is largely explained by a nearly 40-percent average annual decline in rice quantities between 1998 and 2008. In contrast, strong average annual growth of U.S. export volumes to Indonesia in feed and fodder (28 percent), dairy products (31 percent), and snack foods (20.5 percent) exemplifies the Indonesian consumer's rising demand for animal feed and high-value food items.

Whereas figure 12 illustrates the high share that grains and soybeans represent in U.S. exports, table 2 traces new growth to specific agricultural items. Moreover, the growth in export quantities indicated in table 2 confirms that rising U.S. export values are not completely price driven. Indonesia's rising demand for high-value foods has provided a boon for U.S. agricultural exports.

Figure 12
U.S. agricultural exports to Indonesia, 1975-2008



Source: U.S. Census Bureau (2009).

Table 2

United States-to-Indonesia agricultural export growth, by commodity, 1998-2008

Commodity	1998	2001	2005	2008	Average annual growth, 1998-2008	
					Value	Volume
	<i>Million dollars</i>				<i>Percent</i>	
Bulk:						
Wheat	44.9	72.4	26.8	364.0	20.9	10.2
Cotton	154.6	194.0	277.6	455.0	10.8	10.7
Soybeans	139.2	244.7	302.2	589.3	14.4	7.9
Coarse grains	1.8	43.8	1.2	10.4	17.8	7.5
Other	33.2	19.2	27.0	43.8	2.8	-17.3 ¹
Total	373.6	574.0	634.7	1,462.0	13.6	8.3
Intermediate:						
Hide and skins	0.2	4.0	3.2	3.0	28.4	N/A ²
Soybean meal	11.7	167.5	22.5	20.8	14.7	-1.5
Feed and fodder	9.7	21.4	72.8	189.1	29.7	28.2
Other	34.6	61.0	55.4	138.6	13.9	N/A ³
Total	56.2	253.9	153.8	381.5	19.2	N/A
Consumer-oriented:						
Snack foods	0.7	1.7	9.3	6.3	22.1	20.5
Dairy products	4.2	14.5	61.4	209.2	39.0	30.8
Fresh fruit	4.9	29.5	37.6	59.6	24.9	17.1
Meats	3.8	10.9	19.1	9.8	9.4	10.1
Processed fruits and vegetables	9.2	11.6	16.4	27.5	11.0	6.5
Tree nuts	0.4	1.0	2.2	3.0	19.5	19.7
Pet foods	0.5	1.9	1.8	3.3	19.4	12.6
Other	5.1	7.8	21.8	32.8	18.5	N/A
Total	28.9	78.9	169.5	351.5	25.0	N/A
Total agricultural exports	495.4	949.5	1,025.3	2,268.3	15.2	N/A

¹Excludes peanuts and pulses due to lack of data availability.

²N/A = Not available.

³Due to differing units of measurement, volume aggregates are available only for bulk items.

Source: U.S. Census Bureau (2009).

Outlook and Implications

Indonesia has recorded one of the fastest agricultural transformations in history, trailing only Korea and Turkey, in shedding 27 percent of agriculture's share of GDP in 35 years (World Bank, 2008).⁶ Incentives induced through the market reorientation of the mid-1980s and the currency devaluation and market liberalizing policies after the Asian financial crisis may have been the main productivity driver. With greater income, Indonesians are increasingly urbanized and gains have been made in improving their food security. These consumers increasingly demand higher valued food and have attracted multi-national stores as well as U.S. agricultural exporters, retailers, and foodservice outlets.

Under the expectation that population and income trends will continue upward, Euromonitor International forecasts that average consumer food expenditures per capita will increase 7.5 percent per year over the next decade, with average packaged food sales growing over 9 percent per year between 2009 and 2014. These forecasts bode favorably for U.S. agricultural producers, who can expect their growing export trends to continue, particularly for poultry feed, dairy, and other high-value food products.

While this historical account of Indonesia's agricultural development and transformation provided the platform for its trade and food security outlook, future expectations are contingent upon the continuation of the policies that thrust it into its present situation. The Indonesian experience provides some insight to donors who are contemplating investments to increase agricultural productivity in less-developed countries in order to reduce global poverty and hunger. Indonesia provides an example of a country in which improvements in food security are not inconsistent with export crops leading agricultural productivity growth. As such, it is important to consider any country's particular geoclimatic characteristics and agricultural comparative advantages before predetermining its food security strategy. Indonesia also indicates that increasing productivity, and thereby food availability, is not sufficient for improving food security; food accessibility also has to be increased by raising the purchasing power of citizens and allowing greater mobility of goods and services.

⁶Indonesia decreased agriculture's share of GDP between 1971 and 2006 from 40 percent to 13 percent, whereas Korea only required 19 years and Turkey 31 years. These statistics are adapted from Kim and Lee (2003) and Organization for Economic Co-operation and Development (2009).

References

- Agency for Agricultural Research and Development. 1987. *5 Years of Agricultural Research (1981-1986)*, Jakarta.
- Aglionby, J. 2009. "Economists split on Jakarta's Komodo power," *Financial Times*, September 10.
- Euromonitor. 2009. Euromonitor International, Accessed August, available at <http://www.euromonitor.com/>.
- Evenson, R., E. Abdurachman, B. Hutabarat, and A.C. Tubagus. 1994. "Economic Impacts of Agricultural Research in Indonesia," Economic Growth Center, Yale University.
- Food and Agriculture Organization of the United Nations (FAO). 2009. FAOSTAT Agricultural Databases, Rome.
- Fuglie, K.O. 2009. "Sources of Growth in Indonesian Agriculture," *Journal of Productivity Analysis, Online First*, September 16.
- Fuglie, K.O., and R.R. Piggott. 2006. *Indonesia: Coping with Economic and Political Instability*, P.G. Pardey, J.M. Alston, and R.R. Piggott (eds.), Washington, DC: International Food Policy Research Institute, pp. 65-104.
- International Food Policy Research Institute (IFPRI). 2006. *The Challenge of Hunger*, Ordering No. 460-9329, Bonn.
- International Food Policy Research Institute (IFPRI). 2007. *The Challenge of Hunger 2007*, Bonn.
- Kim, H., and Y. Lee. 2003. "Agricultural Policy Reform and Structural Adjustment: Historical Evidence from Korean Experience," Policy Reform and Adjustment Workshop, October 23-25, Imperial College London, Wye Campus.
- Mellor, J., W. Falcon, D. Taylor, B. Arifin, E. Said, and E. Pasandaran. 2003. *Agricultural Sector Review, Indonesia*, U.S. Agency for International Development.
- Organization for Economic Co-operation and Development. 2009. *Agricultural Policy Design in Developing Countries: Interim Report*, Working Paper No. 32, Paris.
- Pray, C., and K.O. Fuglie. 2002. *Private Investments in Agricultural Research and International Technology Transfer in Asia*, Published jointly by International Potato Center, Rutgers University, and the U.S. Department of Agriculture, Economic Research Service.

- Rada, N. 2009. "International Comparison and Evaluation of Agricultural Productivity Growth," Ph.D. Thesis, Agricultural and Resource Economics, Oregon State University.
- Rada, N., S. Buccola, and K. Fuglie. 2010. "Uncovering Productivity Growth in the Disaggregate: Indonesia's Dueling Agricultural Sub-Sectors," Agricultural and Applied Economics Association, Canadian Agricultural Economics Society, and Western Agricultural Economics Association Joint Annual Meeting, Denver, CO, July 25-27, 2010.
- Regmi, A., and J. Dyck. 2001. "Effects of Urbanization on Global Food Demand," *Changing Structure of Global Food Consumption and Trade*, A. Regmi (ed.), WRS-01-1, pp. 23-30, U.S. Department of Agriculture, Economic Research Service, <http://www.ers.usda.gov/publications/wrs011/wrs011e.pdf>
- Salmon, D. 1991. *Rice Productivity and the Returns to Rice Research in Indonesia*, R. Evenson and C. Pray (ed.), Ithaca, NY: Cornell University Press.
- Seale, J., A. Regmi, and J. Bernstein. 2003. *International Evidence on Food Consumption Patterns*, Technical Bulletin No. 1904, U.S. Department of Agriculture, Economic Research Service, <http://www.ers.usda.gov/publications/tb1904/tb1904.pdf>
- Timmer, C.P. 2004. *The Road to Pro-Poor Growth: The Indonesian Experience in Regional Perspective*, Working Paper Number 38, Center for Global Development.
- U.S. Census Bureau. 2009. Foreign Trade Statistics, Compiled by the U.S. Department of Agriculture, Economic Research Service, Accessed in December 2009.
- United Nations Economic and Social Commission for Asia and the Pacific. 2008. *The Impact of Support for Imports on Food Security in Indonesia*, Working Paper Number 101.
- U.S. Department of Agriculture (USDA), Economic Research Service. 2000. *International Crises and Agriculture*, WRS-99-3.
- U.S. Department of Agriculture (USDA), Foreign Agricultural Service. 2008. Production, Supply and Distribution Database.
- World Bank. 2007. *Horticultural Producers and Supermarket Development in Indonesia*, Working Paper 38543.
- World Bank. 2008. World Development Indicators On-Line, Accessed January 2010, available at <http://publications.worldbank.org/subscriptions/WDI/WDI.html>.