Chapter 4

Indonesia

September 2019

This chapter should be cited as
ERIA (2019), 'Indonesia', in Kusano, E. (ed.), *Overview of Agri-food Industries in ASEAN: Basic Information on the Food Value Chain.* ERIA Research Project Report FY2018 no.12, Jakarta: ERIA, pp.54-76.

Chapter 4

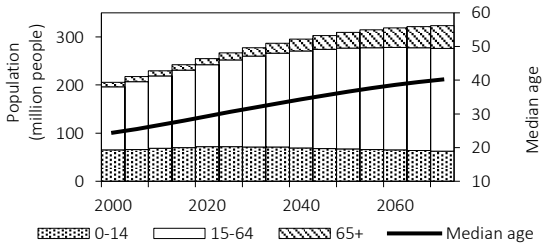
Indonesia

1. Social and Economic Conditions

Population and Per Capita GDP

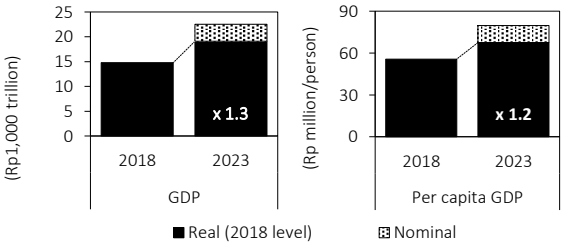
The population of Indonesia, 267 million people in 2018, accounts for 41% of the total population of the ASEAN region, placing it first amongst the ASEAN countries. It is expected to reach 322 million by 2050 (Figure 4.1). The working-age people, those between 15 and 65, are the majority of the country's population, and their numbers are expected to increase steadily until 2060. This trend may imply long-term economic growth. Indonesia's overwhelmingly large population and its strong prospect of population and economic growth suggest that the country has a high potential as a consumption market for agri-food products.

Figure 4.1. Population by Age Group, 2060



Source: United Nations Department of Economic and Social Affairs (UN DESA, 2017).

Figure 4.2. Changes in GDP and Per 2000 Capita GDP, 2018 and 2023

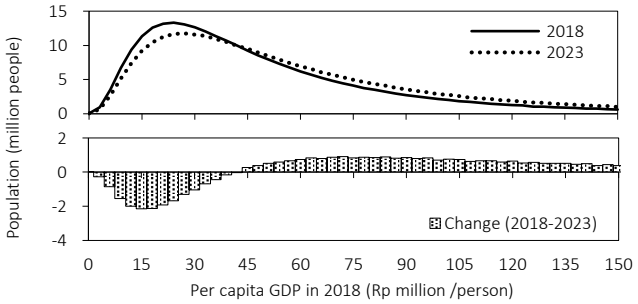


Rp = rupiah (Indonesian currency).
GDP = gross domestic product,
Source: Estimates based on data from the International Monetary Fund (IMF, 2018).

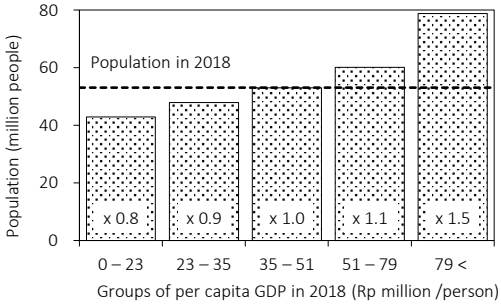
Real GDP and per capita real GDP are expected to increase steadily by 1.3 times and 1.2 times, respectively, from 2018 to 2023 (Figure 4.2). According to a projection of Indonesia's population based the level of per capita GDP (Figure 4.3, Appendix 3.1), as per capita GDP approaches Rp45 million, a boundary is crossed whereby the number of people whose annual contributions to GDP are below that value will decrease. By contrast, the number of people with per capita GDP over Rp45 million will increase across the wide range of the distribution. In particular, the population with personal incomes above Rp79 million (i.e. the 80th percentile) will expand by 1.5 times by 2023. This projection implies a rapid increase in the number of high-income people. It will thus be necessary to establish a system for supplying agri-food products to match the demand from this rapidly growing upper-income bracket.

Figure 4.3. Estimated Population of Indonesia by Per Capita GDP, 2018 and 2023

A. Distribution of Population Changes



B. Population Divided into Five GDP Groups



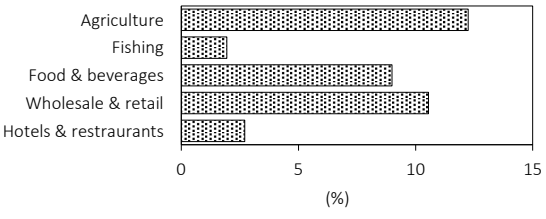
Rp = rupiah (Indonesian currency).
GDP = gross domestic product.
Note: The per capita GDP is based on constant 2018 prices. The bars in Figure B show the estimated populations of the GDP groups in 2023. The numbers in the bars show the changes in these populations from 2018 to 2023.
Source: Appendix 3.1.

The VA of FVC-related Industries

The VA of the agriculture, food-and-beverage, and wholesale and retail trade industries has been a major component of Indonesia's GDP; for instance, the VA of each amounted to about 10% of GDP in 2015 (Figure 4.4). Meanwhile, the VA of the fishing and hotel-and-restaurant industries was very limited.

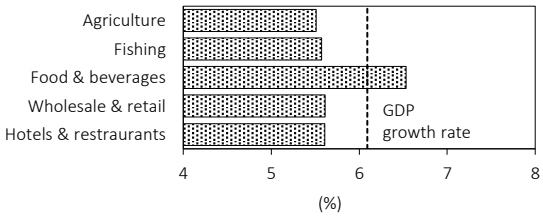
The annual growth rates of real VA in the FVC-related industries averaged around 5.5% during 2000–2015, which was lower than the average GDP growth rate; the one exception was the average rate for the food and beverage industries, which was 6.5% (Figure 4.5). While the proportion of GDP due to the VA of most FVC-related industries shrank, that due to the VA of the food and beverage industries gradually expanded.

Figure 4.4. The Proportion of VA in GDP, 2015



GDP = gross domestic product, VA = value added.
Sources: Estimates based on data from Eora (2018) and the Internatioanl Monetary Fund (IMF, 2018).

Figure 4.5. Average Annual Change in Real VA, 2000–2015

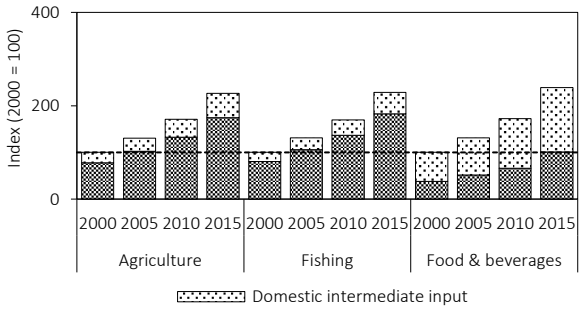


GDP = gross domestic product, VA = value added.
Sources: Estimates based on data from Eora (2018).

The production values of the agriculture, fishing, and food-and-beverage industries increased consistently, more than doubling from 2000 to 2015 (Figure 4.6). The part of production value due to the VA (i.e. the VA rate) was large in the agriculture and fishing industries, at around 80%, but smaller in the food and beverage industries, at around 40% (Figure 4.7). The food and beverage sector depended on intermediate inputs from within this sector and from other, related sectors; and production in the food and beverage sector would generally induce more production within that sector, and in related sectors, than it would in agriculture and fishing.

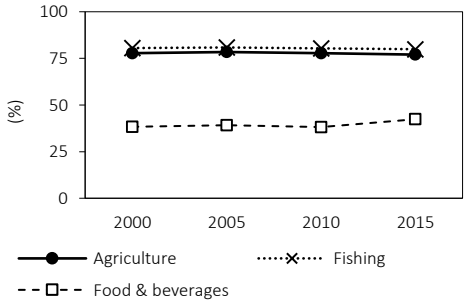
The VA rates of the agriculture, fishing, and food-and-beverage industries remained almost flat between 2000 and 2015. This may reflect the fact that the production structure stayed the same in terms of the sales-cost rates of products, the efficiency of the product mix, and/or the ability of technology to generate savings on inputs.

Figure 4.6. Values of Domestic Production, 2000–2015



Note: The results in the figure are based on real values.
Sources: Estimates based on Eora (2018) and the International Monetary Fund (IMF, 2018).

Figure 4.7. VA Rates, 2000–2015



VA = value added.
Sources: Estimates based on data from Eora (2018).

Intermediate Inputs in Agri-food Industries

Figure 4.8 shows which industries contributed to the growth of the agriculture, fishing, and food-and-beverage industries from 2000 to 2015. Intermediate inputs into all three agri-food production sectors came largely from domestic industries, and steadily increased during that period. Simultaneously, a certain value of intermediate inputs into the fishing industry was imported.

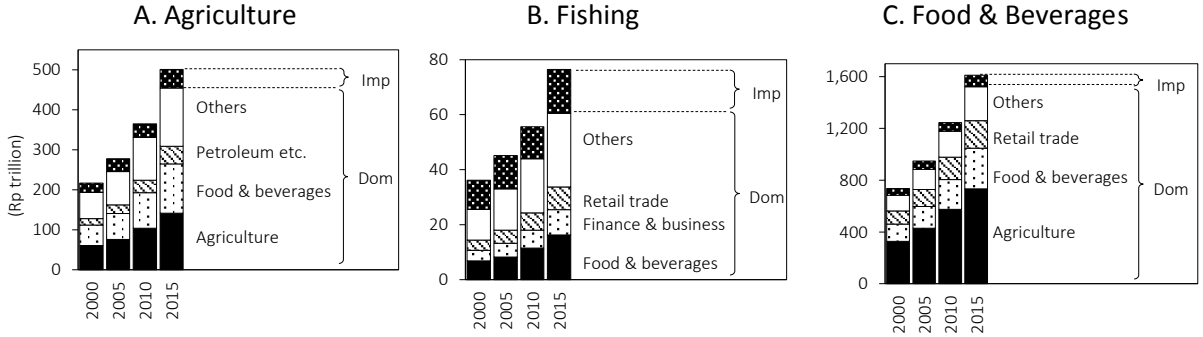
Intermediate inputs from agriculture accounted for the largest portion of inputs into agriculture, followed by inputs from the food-and-beverage and petroleum, chemical, and non-metallic mineral products ('petroleum etc.') industries.[1] The largest sources of inputs for the fishing industry were the food and beverage industries, and the largest source of inputs in the food and

[1] Table A2.1, in Appendix 2, shows the industry classifications mentioned in this section, including 'petroleum etc.' One major input from the petroleum etc. industry was fuel oil, which was needed for agriculture and for the production of chemical fertilizers.

beverage industries was agriculture. Feed for livestock and fish production can be considered an example of input goods from the food and beverage industries into agriculture and fishing.

Agriculture was by far the largest source of intermediate inputs into the food and beverage industries, especially by 2015 (Figure 4.8 C). This implies that growth in the food and beverage industries was mainly driven by the production of raw agricultural products, not by the production of processed foods. The growth of the food and beverage industries in Indonesia induced the development of agriculture through the industries' demand for intermediate inputs.

Figure 4.8. Sources of Intermediate Inputs, 2000–2015

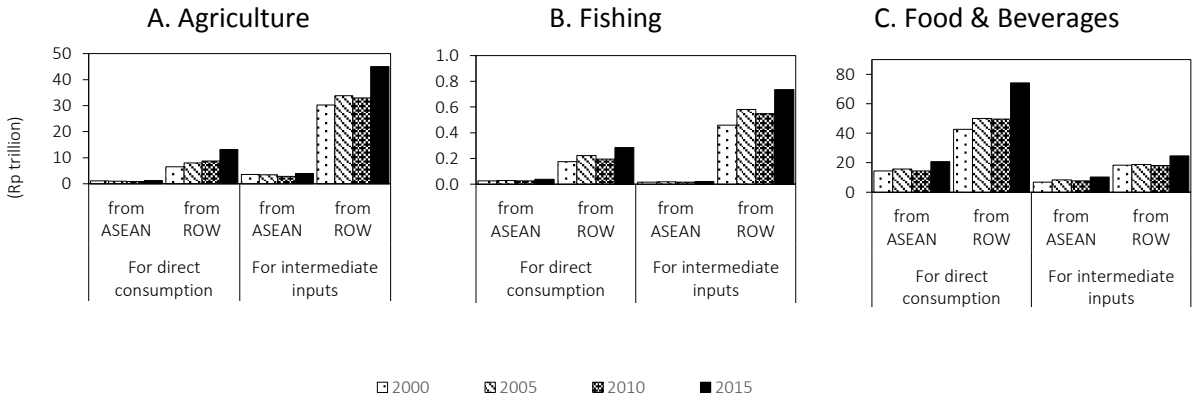


Rp = rupiah (Indonesian currency).
Dom = domestic supply, Imp = imports.
Notes: The values in these graphs are based on constant 2015 prices. 'Petroleum etc.' refers to the petroleum, chemical, and non-metallic mineral product industries.
Sources: Estimates using data from Eora (2018) and the International Monetary Fund (IMF, 2018).

The value of imports from foreign agricultural, fishing, and food-and-beverage sectors slightly increased between 2000 and 2015, though they remained limited compared with the value of products supplied by the domestic market (Figure 4.9). The volume of imported agricultural and fishery products for use as intermediate inputs was larger than that destined for direct consumption. Conversely, imported food-and-beverage products were generally destined for direct consumption. Put briefly, Indonesia imported agricultural and fishery products mainly for processing, and food and beverage products mainly for direct consumption.

Imports from other ASEAN countries were small and stagnant compared with those from the ROW. We can see from Figure 4.9 that, during 2000–2015, Indonesia gradually strengthened its linkages with the ROW as an importer, rather than deepening its integration into the ASEAN region.

Figure 4.9. Values of Imports, by Purpose, 2000–2015

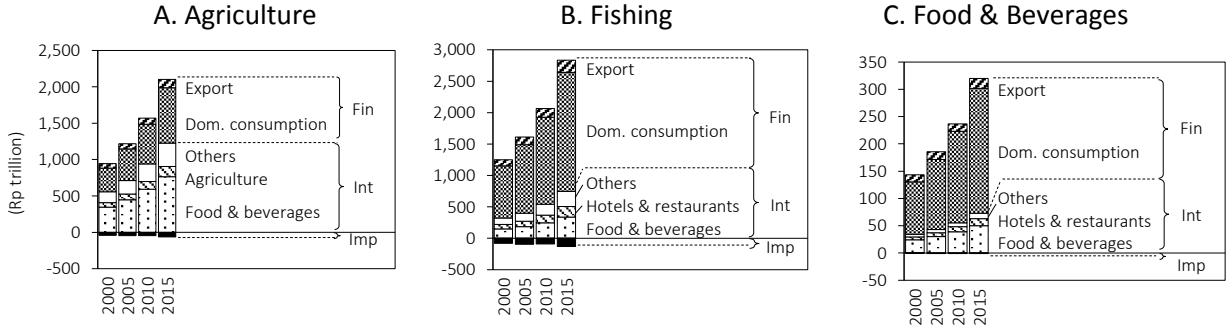


Rp = rupiah (Indonesian currency).
ASEAN = Association of Southeast Asian Nations, ROW = rest of the world.
Notes: The values of imports shown in these graphs are based on constant 2015 prices. They include imports from foreign agricultural, fishing, and food-and-beverage sectors destined for domestic final consumption and for use as intermediate inputs in all domestic industries.
Sources: Estimates based on data from Eora (2018) and the International Fund (IMF, 2018).

Destinations of Products of Agri-food Industries

Interindustry transactions involving flows of products from agriculture and fishing to the food and beverage industries increased during 2000–2015 (Figure 4.10). The flows from fishing to the hotel and restaurant industries, and from the food-and-beverage industries to the hotel-and-restaurant industries, gradually increased. The expansion of intra-industry transactions within agriculture and within the food and beverage industries is observable, as well. The FVC grew steadily in Indonesia with regard to both interindustry and intra-industry transactions.

Figure 4.10. Destinations of Domestically Produced and Imported Goods, 2000–2015

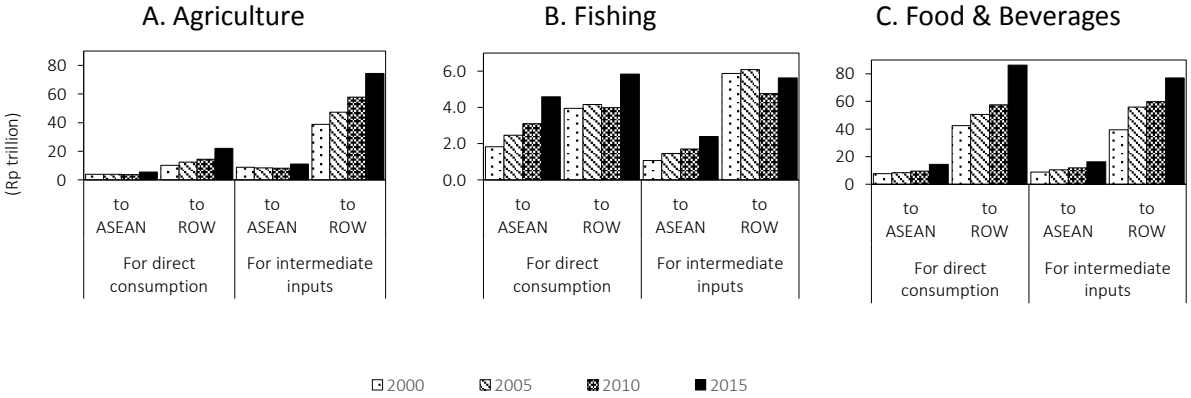


Rp = rupiah (Indonesian currency).
Dom. = domestic.
Notes: The values in these graphs are based on constant 2015 prices. 'Fin' = final demand for domestic and imported goods, 'Int' = intermediate demand for domestic and imported goods, and 'Imp' = the imports of final and intermediate goods. Total demand = Fin + Int. Domestic production = Fin + Int - Imp.
Sources: Estimates based on data from Eora (2018) and the International Monetary Fund (IMF, 2018).

Both final and intermediate demand grew in the agriculture, fishing, and food-and-beverage industries during 2000–2015. Exports gradually increased, although their share of final demand remained small. Figure 4.11 shows that, during this period, most of the agricultural products exported from Indonesia were consumed as intermediate goods. Meanwhile, the exports from the fishing and food-and-beverage industries were almost evenly divided between direct consumption and intermediate inputs.

The primary destination of exports from the agricultural and food-and-beverage sectors was the ROW. Regarding these two sectors, Indonesia deepened its linkages more with the ROW (as an exporter) than with the rest of the ASEAN region. There was a notable exception, however: Indonesia's exports from its fishing industry to the other ASEAN countries increased rapidly, especially goods intended for direct consumption, which were approaching the level of the industry's exports to the ROW.

Figure 4.11. Values of Exports, by Purpose, 2000–2015



Rp = rupiah (Indonesian currency).
ASEAN = Association of Southeast Asian Nations, ROW = rest of the world.
Note: The values in these graphs are based on constant 2015 prices.
Sources: Estimates based on data from Eora (2018) and the International Monetary Fund (IMF, 2018).

2. Linkages amongst FVC-related Industries

Final Demand in FVC-related Industries

First, let us see how final demand for domestic FVC-related industries induces the use of intermediate inputs and affects production and VA in each industry.

Table 4.1 shows the composition of final demand during 2000–2015. Final demand was particularly strong in the food-and-beverage industries, followed by the agriculture and hotel-and-restaurant industries. The average annual growth of final demand in the food and beverage industries, Rp74 trillion, outstripped the average values for the other FVC-related industries, with household consumption accounting for most of that growth. In fact, household consumption grew sharply during this period, by Rp62 trillion annually. It should be noted that

the agriculture and hotel-and-restaurant industries also experienced large values and rapid growth of household consumption.

Table 4.1. Final Demand for Products/Services of FVC-related Industries, 2000–2015

(Rp trillion)

Final demand as	Domestic production of: Agriculture Value	Agriculture Change	Fishing Value	Fishing Change	Food & beverages Value	Food & beverages Change	Wholesale trade Value	Wholesale trade Change	Retail trade Value	Retail trade Change	Hotels & restraurants Value	Hotels & restraurants Change
Domestic consupmtion												
Household consumption	655	25	211	8	1,658	62	116	4	258	10	518	20
Other consumption	56	2	18	1	141	5	10	0	22	1	44	2
Capital formation	37	1	0	0	3	0	31	1	70	3	0	0
Export												
Export to ASEAN	17	0	7	0	31	1	7	0	15	1	8	0
Export to ROW	96	3	11	0	163	5	37	1	83	2	74	2
Total	861	31	247	9	1,996	74	201	7	448	16	645	23
Annual change rate (%)		5.5		5.5		5.6		5.5		5.5		5.5

Rp = rupiah (Indonesian currency).
ASEAN = Association of Southeast Asian Nations, FVC = food value chain, ROW = rest of the world.
Notes: The values in this table are in constant 2015 prices. 'Change' refers to the average annual changes estimated based on data for 2000–2015.
Source: Appendix 3.2.

Production and VA Induced by Final Demand

Table 4.2 shows sources of intermediate inputs during 2000–2015 that came from domestic and foreign industries, and were destined for use in production by major FVC-related industries in Indonesia. The table indicates that 21% of intermediate inputs into the hotel and restaurant industries came from the domestic food and beverage sector, and that 27% of inputs into the food and beverage sector came from domestic agriculture. This suggests that hotel-and-restaurant and food-and-beverage sectors can sequentially induce a large amount of agricultural production. The table also shows that the FVC-related industries in Indonesia rarely used inputs from foreign countries, compared with domestically sourced inputs.

The small increments of annual change in the shares of inputs shown in Table 4.2 indicate a stable input–output structure in Indonesia during 2000–2015. Even if the changing trends shown in the table continue for another 10 years, the structure will not radically change. However, a decrease in the share of inputs from agriculture in the food and beverage industries, and in the share of inputs from the food-and beverage industries in the hotel-and-restaurant industries, are relatively noticeable. These trends suggest a slow weakening of linkages between the food and beverage industries and upstream sectors, and a strengthening of linkages between the hotel and restaurant industries and upstream sectors.

Table 4.2. Sources of Intermediate Inputs in Major FVC-related Industries, 2000–2015

Input from		Domestic production of: Agriculture Share (%)	Agriculture Change	Fishing Share (%)	Fishing Change	Food & beverages Share (%)	Food & beverages Change	Wholesale trade Share (%)	Wholesale trade Change	Retail trade Share (%)	Retail trade Change	Hotels & restraurants Share (%)	Hotels & restraurants Change
Agriculture	Domestic	7	0.02	0	0.00	27	-0.07	0	0.00	0	0.00	9	0.02
	ASEAN	0	0.00	0	0.00	0	-0.01	0	0.00	0	0.00	0	0.00
	ROW	0	0.00	0	0.00	1	-0.02	0	0.00	0	0.00	0	0.00
Fishing	Domestic	0	0.00	2	0.01	2	-0.02	0	0.00	0	0.00	2	0.00
	ASEAN	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	ROW	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Food & beverages	Domestic	6	0.03	5	0.03	11	0.01	0	0.00	0	0.00	21	0.09
	ASEAN	0	0.00	0	0.00	0	-0.01	0	0.00	0	0.00	0	0.00
	ROW	0	-0.01	0	0.00	1	-0.03	0	0.00	0	0.00	0	-0.01
Wholesale trade	Domestic	1	0.00	1	0.00	4	-0.02	0	0.00	0	0.00	6	0.00
	ASEAN	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	ROW	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Retail trade	Domestic	2	0.00	3	0.00	8	-0.05	1	0.00	1	0.00	14	-0.01
	ASEAN	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	ROW	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Hotels & restraurants	Domestic	0	0.00	0	0.00	0	0.00	2	0.00	2	0.00	0	0.00
	ASEAN	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	ROW	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00

ASEAN = Association of Southeast Asian Nations, FVC = food value chain, ROW = rest of the world.
Notes: 'Share' refers to the intermediate inputs as a percentage of total inputs in 2015. 'Change' refers to the average annual changes in the shares as estimated based on data for 2000–2015.
Source: Appendix 3.2.

Table 4.3 shows the VA directly and indirectly boosted by a 1% increase over the 2015 value of final demand for domestic products and services due to an increase in domestic production and intermediate inputs. For example, a 1% increase in final demand in the food and beverage sector generated a Rp5.1 trillion increase in the VA of agriculture, as well as a Rp9.5 trillion increase in the VA of the food-and-beverage sector itself.

Increases in final demand in downstream sectors of the FVC, particularly in the food and beverage industries, had some impacts on the VA of upstream sectors. This result suggests that interventions in the food and beverage industry do contribute to the development of agriculture.

Final demand in downstream industries had only a limited effect on the VA of fishing, compared with their effect on the VA of agriculture. Increases in final demand in the downstream sectors did not necessarily translate into sequential growth in the fishing industry. In the short term, interventions to directly stimulate final demand in the fishing industry may be an efficient way for to boost growth in that industry. In the long term, it can also be an effective strategy for strengthening inter-sector linkages, by increasing the use of aquatic products in downstream sectors and making the input–output structure more conductive to the beneficial ripple effects.

The inducement effect of final demand in the wholesale and retail trade sectors on the other four sectors discussed above was very small in 2015, as is shown in Table 4.3. Meanwhile, Table 4.2 indicates that FVC-related industries, especially the hotel-and-restaurant and food-and-beverage sectors, indeed depended on inputs from the wholesale and retail trade sectors in 2000–2015. It is suggested that the services provided by the wholesale/retail trade sectors are necessary, but alone not sufficient, to automatically drive the development of the FVC-related industries.

Table 4.3. VA Induced by 1% Increase in Final Demand, 2015

(Rp trillion)

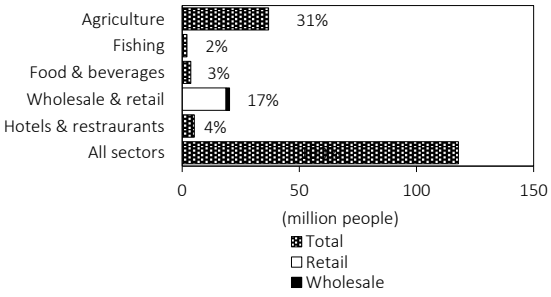
Induced value added in	1% increase in final demand for					
	Agriculture	Fishing	Food & beverages	Wholesale trade	Retail trade	Hotels & restraurants
Agriculture	7.12	0.04	5.07	0.01	0.03	0.85
Fishing	0.01	1.92	0.33	0.00	0.00	0.10
Food & beverages	0.27	0.06	9.46	0.01	0.02	0.67
Wholesale trade	0.07	0.03	0.64	1.40	0.03	0.35
Retail trade	0.17	0.06	1.41	0.03	3.15	0.77
Hotels & restraurants	0.01	0.00	0.04	0.02	0.04	2.76

Rp = rupiah (Indonesian currency).
VA = value added.
Source: Appendix 3.2.

The Relationship amongst the Number of Employees, Per Capita Compensation, and Production

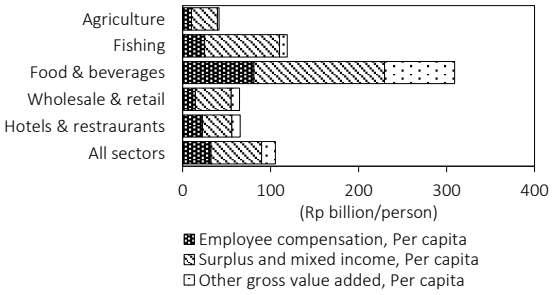
Now let us consider how an increase in production relates to changes in the number of employees and per capita employee compensation in an industry. According to figures 4.12 and 4.13, the agricultural sector in 2015 was characterized by a large number of employees, low labour productivity, and low per capita compensation compared with other FVC-related industries. By contrast, the food and beverage industries had a very limited number of employees, but much higher labour productivity and per capita compensation than the average values in Indonesia.

Figure 4.12. Number of Employees, by Sector, 2015



Rp = rupiah (Indonesian currency).
VA = value added.
Sources: International Labour Organization (ILO, 2019), Appendix 3.3

Figure 4.13. Gross VA per Capita, by Sector, 2015



Sources: Estimates based on data from Eora (2018)

Figure 4.14 illustrates the relationship amongst the number of employees, per capita compensation, and production in each agri-food sector during 2000–2015. Figure 4.14 A depicts the proportion of the average annual rate of change in production in each sector that was attributable to total employee compensation. In all the sectors, production growth averaged 5.5%, including a contribution of 1% from the increase in the total value of the compensation.

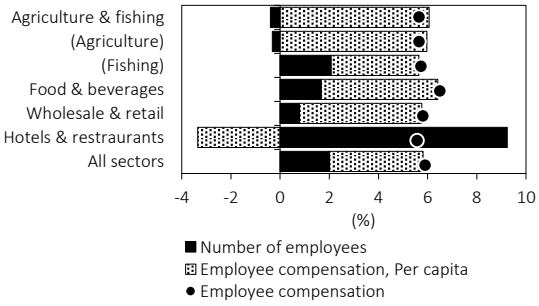
The annual rates of change in the total value of employee compensation averaged around 6% in all FVC-related sectors (Figure 4.14 B). Two factors determine the total value of employee compensation: the number of employees and per capita compensation. In the agricultural sector, the number of employees decreased, while there was an increase in per capita compensation. Although the growth rate of total compensation was similar to that of other industries, per capita compensation grew faster, accompanied by the decrease in the number of employees. Conversely, the hotel and restaurant industries showed a reduction in per capita compensation and a rise in the number of employees. In other sectors, both the per capita compensation and the number of employees, especially the former, steadily increased.

Those results suggest that production growth can accompany a rise in per capita compensation in many FVC-related industries, particularly in the agricultural sector. A particularly notable point is the decline in the number of employees in agriculture. The number of employees was still large; and that plus the sector's low labour productivity, low per capita compensation, and steep growth in per capita compensation, together with the decrease the size of the workforce, imply the existence of a labour surplus in the agricultural sector. Any interindustry movement of labourers would be deeply connected to the productivity and efficient development of agriculture. The food and beverage sector, which had a remarkably high per capita compensation, seems to have been an attractive sector in terms of labour absorption, although the number of employees was actually very limited and was increasing only slowly.

Figure 4.14. Changes in Production and Employee Compensation, 2000–2015

A. Breakdown of the Average Annual Rates of Change in Production

B. Breakdown of the Average Annual Rates of Change in Employee Compensation



Notes: Other factors include changes in the value added (VA), other than from employee compensation, and changes in intermediate inputs. The data is from selected years during 2000–2015.
Source: Appendix 3.3.

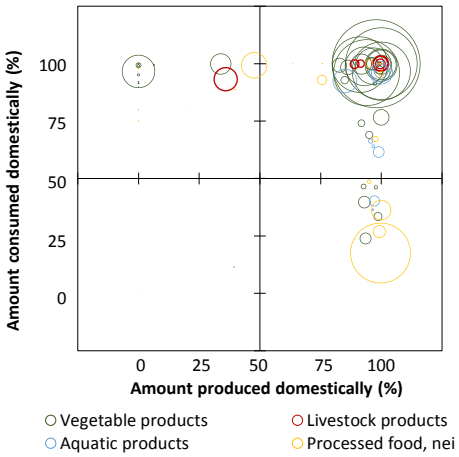
3. Supply–Demand Balance of Agri-food Products

Supply–Demand Structure

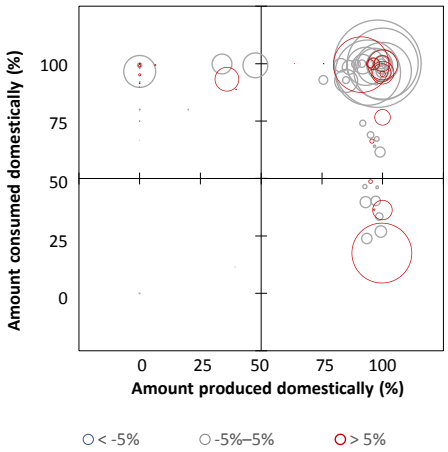
Figure 4.15 shows the structure of domestic commerce and foreign trade in 2004–2013. There are two graphs, each of which is divided into four quadrants defined by two criteria: whether agri-food goods were *produced* domestically or in foreign markets and whether they were *consumed* domestically or in foreign markets. In 4.15 A and 4.15 B, the circles are scattered across three of the four quadrants. The circles vary in size according to the volumes produced of the goods they represent. The pattern of circles is the same in both graphs, but the circles in Figure 4.15 A are colour-coded to indicate the agri-food sector, whilst those in Figure 4.15 B are colour-coded to reflect growth rates.

Figure 4.15. Classification of Agri-food Products, by Supply–Demand Balance, 2004–2013

A. By IC1 Group, Annual Averages



B. By Average Annual Growth Rate



IC1 = item category level 1, nei = not elsewhere included.
Notes: Each circle represents a Food Balance Sheet (FBS) item as designated by FAOSTAT. The sizes of the circles express the quantity of total supply, with the proportions estimated based on quantitative data. 'IC1' comprises the author's classifications of broad agri-food product categories (see Appendix 2.2). In these graphs, the percentage of goods not produced/consumed domestically are produced/consumed in foreign markets. Data classification: FBS items.
Sources: FAO (2019); Appendix 3.4.

The top side of each graph represents goods that were mostly or completely consumed domestically, and the right side represents goods that were mostly or completely produced domestically. Most of the agri-food products are concentrated in the first quadrant, on the upper right, representing goods that ere both produced and consumed in the domestic market (i.e. domestic-oriented goods). There are also large and medium circles in the second quadrant (upper-left), representing goods produced in foreign markets but consumed domestically (i.e. import-oriented goods), and in the fourth quadrant (lower right), representing goods produced domestically but consumed in foreign markets (i.e. export-oriented goods). There is one arely observable circle in the third quadrant (lower left), representing imported livestock products that are destined for re-exportation (i.e. trade-oriented goods). Unlike the corresponding figures

for Malaysia (Figure 2.15) and Thailand (Figure 3.15), Figure 4.15 has large circles concentrated mostly in the first quadrant. In addition, there are more products in the second and fourth quadrants than are seen in the same quadrants of the corresponding figures for Lao PDR (Figure 7.15), Cambodia (Figure 8.15), and Myanmar (Figure 9.15). The supply–demand structure of Indonesia's agri-food sector is similar to that in the Philippines, but with more products falling into the fourth (export-oriented) quadrant than seen in the corresponding graph for the Philippines (Figure 5.15).

Table 4.4 shows that, during 2004–2013, most agri-food products, in particular, cereals (11), oil and sugar crops (12), and vegetables (13), were produced and consumed mainly in the domestic market. A comparatively large amount of cereals was imported, followed by vegetables, sugar (41), and milk (22). Exports of fat and oils (42), mainly consisting of palm oil, were relatively large. The second largest exports were stimulants and spices (15), and the third, vegetables. One of the characteristics of Indonesia was the large production and domestic supply of cereals and marine fishes (32), exceeding those of all the other ASEAN countries featured in this report.

Annual change data indicates a rapid expansion in the production and importation of cereals and a corresponding growth in domestic supply. A similar structure is observed for oil and sugar crops and vegetables. Aquatic plants (36) are conspicuous for their steep increase in production and domestic supply. Fat and oils accounted for the large part of the increase in exports of agri-food products. The surging export demand for fat and oils seems to have spurred the sharp increase in agri-food production.

Table 4.4. Supply–Demand Balance of Agri-food Products, 2004–2013

(1,000 metric tons)

IC1	IC2	2004–2013 average				Average annual change, 2004–2013			
		Production	Domestic supply	Import	Export	Production	Domestic supply	Import	Export
1 Vegetable products	11 Cereals	56,805	63,568	8,324	289	2,376	2,629	624	5
	12 Oil and sugar crops	52,634	53,758	1,797	738	809	855	110	45
	13 Vegetables	34,889	36,177	2,288	1,077	996	1,335	276	-105
	14 Fruits and nuts	16,527	16,473	664	718	275	316	46	5
	15 Stimulants and spices	2,024	918	159	1,259	12	13	16	37
2 Livestock products	21 Meat	3,068	3,163	102	9	137	139	2	0
	22 Milk	1,132	2,938	2,020	214	73	191	100	-17
	23 Eggs	1,296	1,301	5	0	39	40	0	0
3 Aquatic products	31 Freshwater fishes	1,880	1,811	7	75	206	208	0	-2
	32 Marine fishes	4,274	4,125	487	636	107	131	48	24
	33 Crustaceans	684	425	7	266	26	19	0	7
	34 Molluscs	188	128	8	68	10	1	1	9
	35 Aquatic animals, nei	25	9	1	16	5	3	0	1
	36 Aquatic plants	2,881	2,769	2	113	606	594	0	12
4 Processed food, nei	41 Sugar	2,344	4,064	2,266	64	3	84	179	6
	42 Fat and oils	22,925	5,019	130	18,060	1,974	414	12	1,580
	43 Food, nei	0	5	8	2	0	0	1	0
	44 Alcoholic beverages	235	228	3	10	16	17	0	-1

IC1 = item category level 1, IC2 = item category level 2, nei = not elsewhere included.

Note: 'IC1' and 'IC2' comprise the author's classifications of broader product categories and more specific groups, respectively (Appendix 2.2). This table is based on an aggregation of all the data available from FAOSTAT's Food Balance Sheet (FBS). Data classification: FBS items.

Sources: FAO (2019); Appendix 3.4.

Table 4.5 shows FBS items (as designated by FAOSTAT) listed in descending order of total supply quantity within each category in 2004–2013, corresponding to the quadrants in Figure 4.15. The products existing in large quantities—such as rice, sugar cane, and cassava—are concentrated in the column for domestic-oriented products. Most products are in the cells representing stable or expanding markets for domestic-, export-, or import-oriented products.

Maize and products, used for animal feed, are identifiable as domestic-oriented products by their large quantities of supply undergoing rapid growth. Palm kernels, aquatic products (such as aquatic plants and freshwater fishes), and poultry meat are also remarkable by the accelerated growth of their supplies. Palm oil and palm kernel oil are major export-oriented items, with rapid increases in supply. By contrast, milk is an example of an import-oriented product. Although their markets were comparatively stable, wheat and products, sugar, and soybeans (all import-oriented items) are conspicuous for their large quantities of supply.

Table 4.5. Total Quantities of Supply for Product Categories, in Descending Order, 2004–2013
(1,000 metric tons)

Category		Domestic-oriented			Export-oriented			Import-oriented			Trade-oriented		
Provided by		Domestic market			Domestic market			Foreign market					
Consumed in		Domestic market			Foreign market			Domestic market			Foreign market		
Change	Rank	IC2	FBS items	Quantity	IC2	FBS items	Quantity	IC2	FBS items	Quantity	IC2	FBS items	Quantity
Annual change rate, 2004–2013 (%) r > 5 Expanding	1	11	Maize and products	16,638	42	Palm oil	19,319	22	Milk - excluding butter	3,152			
	2	12	Palm kernels	4,864	42	Palmkernel oil	2,156	14	Grapes and products (excl wine)	44			
	3	36	Aquatic plants	2,882	42	Fats, animals, raw	104	11	Barley and products	43			
	4	31	Freshwater fish	1,886	35	Aquatic animals, others	26	13	Pulses, other and products	17			
	5	21	Poultry meat	1,472	12	Cottonseed	2	14	Dates	17			
-5 < r < 5 Stable	1	11	Rice (milled equivalent)	41,332	42	Coconut oil	868	11	Wheat and products	5,813	21	Meat, other	5
	2	12	Sugar cane	27,545	15	Cocoa beans and products	814	41	Sugar (raw equivalent)	3,594	44	Wine	0.2
	3	13	Cassava and products	23,329	15	Coffee and products	722	12	Soyabeans	2,363			
	4	12	Coconuts - incl copra	18,233	32	Marine fish, other	614	14	Apples and products	167			
	5	13	Vegetables, other	8,167	14	Nuts and products	401	42	Butter, ghee	14			
r < -5 Shrinking	1	44	Beverages, fermented	2				11	Cereals, other	13			
	2												
	3												
	4												
	5												

FBS = Food Balance Sheet (FAOSTAT), IC2 = item category level 2, r = average annual change rate.
Notes: The values in this table represent the averages for 2004–2013. Data classification: FBS items.
Sources: FAO (2019); Appendix 3.4.

Trade Prices and Volumes

The export prices of several categories of goods, such as aquatic products, particularly raw and processed crustaceans (33), and processed meat (21), were remarkably high during 2014–2016 (Table 4.6). Export values, as well as export prices, were relatively high for raw crustaceans. We can conclude that the raw crustaceans exported in large amounts had high enough values during this period to induce active trade.

The import prices of aquatic products, including raw freshwater fishes (31), raw marine fishes (32), raw and processed crustaceans (33), and raw aquatic plants (36), exceeded those of many other products. The high prices of raw eggs (23) and alcoholic beverages (44) were also conspicuous. The import values of most of these high-priced products were quite small. Overall, the export and import prices of processed products tended to be higher than those of primary products, except for some items such as eggs, sugar, and several aquatic products.

Table 4.6. Prices and Values of Exported/Imported Agri-food Products, 2014–2016

IC1	IC2	Price ($/kg)				Value ($ million)			
		Export		Import		Export		Import	
		Primary products	Processed products	Primary products	Processed products	Primary products	Processed products	Primary products	Processed products
1 Vegetable products	11 Cereals	0.4	2.0	0.3	0.6	2	550	2,358	723
	12 Oil and sugar crops	0.4	1.8	0.6	1.6	240	27	1,341	48
	13 Vegetables	0.5	1.2	0.8	1.4	107	23	601	113
	14 Fruits and nuts	1.1	1.2	1.5	1.5	437	225	742	72
	15 Stimulants and spices	2.8	2.8	2.2	4.7	2,176	770	353	240
2 Livestock products	21 Meat	—	4.1	—	4.0	0.0	30	0.0	407
	22 Milk	1.1	2.4	2.9	2.8	27	59	29	990
	23 Eggs	—	—	10.0	5.4	0.0	0.0	1	8
3 Aquatic products	31 Freshwater fishes	1.8	3.4	8.5	4.7	49	127	10	9
	32 Marine fishes	5.1	3.0	9.2	1.1	73	644	1	116
	33 Crustaceans	9.8	11.0	8.8	6.4	1,531	617	63	3
	34 Molluscs	2.3	3.5	1.6	2.1	224	15	7	0.2
	35 Aquatic animals, nei	1.8	3.5	—	2.5	18	106	0.2	44
	36 Aquatic plants	0.9	—	10.7	—	106	0.0	2	0.0
	38 Fishes, nei	2.2	1.8	5.8	1.5	108	455	0.5	28
4 Processed food, nei	41 Sugar	0.3	0.4	3.6	0.5	9	309	8	1,948
	42 Fat and oils	—	0.7	—	2.1	0.0	19,798	0.0	264
	43 Food, nei	—	2.6	—	3.7	0.0	673	0.0	559
	44 Alcoholic beverages	—	1.8	—	6.4	0.0	21	0.0	14

IC1 = item category level 1, IC2 = item category level 2, kg = kilogram, nei = not elsewhere included.
Notes: This table shows the averages for 2014–2016. The values indicated for exports are based on 'free on board' (FOB) prices, and those for imports are based on 'cost, insurance, and freight' (CIF) prices. Data category: IC2 groups based on the Broad Economic Categories (BEC) classifications of primary products (11) and processed products (12).
Sources: UNSD (2017); Appendix 3.6.

4. The Competitiveness of Each Product in the ASEAN Region

Commodities Imported by ASEAN Countries

Tables 4.7 and 4.8 provide information about the agri-food products imported by ASEAN countries from Indonesia in 2014–2016. ASEAN countries imported many of these products from Indonesia more cheaply than they did from other ASEAN+6 countries (Table 4.7). Roughly 60%–80% of items in the IC2 groups were imported as low-price products. Indonesia exported notably more goods to Malaysia than to the other ASEAN countries; its next-largest exports went to countries with similar values, other than Brunei and the CLM states (Table 4.8).

As shown in Table 4.7, Indonesian products that were imported by other ASEAN countries in significantly larger quantities than had been estimated (based on approximate lines) were concentrated in the low-price range. Examples of such products included crustaceans (33), stimulants and spices (15), and fishes, nei (38). Meanwhile, major products that were imported in lesser quantities than estimated (based on their prices) included cereals (11) in the low- and mid-price ranges; and food nei (43), fat and oils (43), and fruits and nuts (14) in the low-price range.

Table 4.7. Prices and Values of Products Imported by ASEAN Countries, by IC2 Group, 2014–2016

IC1	IC2	Price ($/kg)	Value ($ million)	Number of imported products by price ranges (%)			Number of products deviated from approx. lines (%)						Obs.
							Imported larger			Imported smaller			
				Price ranges			Price ranges			Price ranges			
				Low	Mid	High	Low	Mid	High	Low	Mid	High	
1 Vegetable products	11 Cereals	2.0	269	73	14	14	0	1	0	4	3	0	74
	12 Oil and sugar crops	1.9	135	63	20	16	2	0	0	2	0	0	49
	13 Vegetables	1.4	44	74	11	15	0	0	0	2	0	0	137
	14 Fruits and nuts	1.5	237	80	8	12	1	0	0	3	1	0	142
	15 Stimulants and spices	3.4	1,075	85	11	4	4	0	0	1	0	0	117
2 Livestock products	21 Meat	4.8	0.4	60	30	10	0	0	0	0	0	0	20
	22 Milk	2.1	36	65	20	15	2	0	0	0	0	0	46
	23 Eggs	1.4	0.1	67	0	33	0	0	0	0	0	0	3
3 Aquatic products	31 Freshwater fishes	6.0	3	62	12	27	0	0	0	0	0	0	26
	32 Marine fishes	3.9	153	76	14	10	2	0	0	2	0	0	58
	33 Crustaceans	7.7	85	76	15	10	5	2	0	0	0	0	41
	34 Molluscs	3.5	41	75	11	14	0	0	0	0	0	0	36
	35 Aquatic animals, nei	6.4	25	57	21	21	0	0	0	0	0	0	14
	36 Aquatic plants	2.7	9	80	20	0	0	0	0	0	0	0	5
	38 Fishes, nei	4.3	220	77	6	16	3	0	0	0	0	0	31
4 Processed food, nei	41 Sugar	1.4	128	74	12	14	0	0	0	2	0	0	50
	42 Fat and oils	1.2	1,791	83	8	9	0	0	0	5	0	0	65
	43 Food, nei	3.6	412	80	20	0	0	0	0	7	0	0	15
	44 Alcoholic beverages	3.1	2	60	20	20	0	0	0	0	0	0	10

ASEAN = Association of Southeast Asian Nations, IC1 = item category level 1, IC2 = item category level 2, kg = kilogram, nei = not elsewhere included.

Notes: The prices and values represent the averages for 2014–2016. 'Price' refers to the import price, including cost, insurance, and freight (CIF) added to the tariff established by the ASEAN *Trade* in Goods Agreement (ATIGA). 'Value' refers to the imported value (CIF) without the tariff. See Appendix 3.6 for price ranges and approximate lines. The products for which the externally studentized residual was significantly large or small at the 10% level were counted. 'Obs.' refers to the number of detailed commodities classified according to the Broad Economic Categories (BEC) three-digit category numbers and used for applying approximation lines. Data category: FAOSTAT Commodity List (FCL) and adjusted groups under the International Standard Statistical Classification of Aquatic Animals and Plants (ISSCAAP), classified under BEC 111, 112, 121, and 122.

Sources: UNSD (2017); Appendix 3.6.

Table 4.8. Prices and Values of Products Imported into the ASEAN Region, by Country, 2014–2016

Importer	Price ($/kg)	Value ($ million)	Number of imported products by price ranges (%)			Number of products deviated from approx. lines (%)						Obs.
						Imported larger			Imported smaller			
			Price ranges			Price ranges			Price ranges			
			Low	Mid	High	Low	Mid	High	Low	Mid	High	
Singapore	2.5	836	84	8	8	1	0	0	0	4	0	205
Brunei	3.0	19	63	20	16	0	0	0	0	1	0	93
Malaysia	1.7	1,868	86	6	8	2	0	0	0	0	0	216
Thailand	4.0	536	75	14	12	1	0	0	0	3	0	153
Indonesia	2.6	13	78	15	7	2	2	0	0	4	0	46
Philippines	1.7	506	68	13	20	2	1	0	0	0	0	87
Viet Nam	2.7	511	67	24	10	0	0	0	0	2	2	42
Lao PDR	3.7	0.0	33	33	33	0	0	0	0	0	0	3
Cambodia	2.1	8	58	17	25	0	0	0	0	0	0	36
Myanmar	1.9	0.0	52	21	28	0	0	0	0	0	0	58

ASEAN = Association of Southeast Asian Nations, kg = kilogram, nei = not elsewhere included.

Notes: The prices and values represent the averages for 2014–2016. 'Price' refers to the import price, including cost, insurance, and freight (CIF) added to the tariff established by the ASEAN *Trade* in Goods Agreement (ATIGA). 'Value' refers to the imported value (CIF) without the tariff. See Appendix 3.6 for price ranges and approximate lines. The products for which the externally studentized residual was significantly large or small at the 10% level were counted. 'Obs.' refers to the number of detailed commodities classified according to the Broad Economic Categories (BEC) three-digit category numbers and used for applying approximation lines. Data category: FAOSTAT Commodity List (FCL) and adjusted groups under the International Standard Statistical Classification of Aquatic Animals and Plants (ISSCAAP), classified under BEC 111, 112, 121, and 122.

Sources: UNSD (2017); Appendix 3.6.

Goods Imported in Smaller/Larger Quantities than Estimated Based on Prices: Non-price Competitiveness in the ASEAN Region

Indonesian vegetable products in the low- and mid-price ranges—especially stimulants and spices (15) such as cinnamon, cocoa powder/cake, and pepper—tended to be imported in great quantities by other ASEAN countries in 2014–2016, considering their prices (Table 4.9). Among the aquatic products, crustaceans (33) such as crabs, nei, and lobsters, and marine fishes (32) including sharks/rays/chimeras were imported in substantial quantities. Malaysia imported a great amount of processed food from Indonesia, particularly fat and oils (42) in the low-price range for industrial use. It might be beneficial to seek opportunities to develop further export markets for these products. Moreover, research on the causes of such active import demand, including production and sales methods, would help identify pathways toward increasing the sales of other items.

Research on the characteristics of the goods actively exported by other countries to Indonesia might also trigger a reconsideration of production and marketing strategies for domestic products that could compete with goods produced by other states in the ASEAN region, for instance: stone fruits from Thailand, green coffee from Viet Nam, and dried beans from Myanmar.[2]

There were also many products for which the import quantities were significantly smaller during 2014–2016, considering their prices, such as vegetable products in all the price ranges; aquatic products in the low- and high-price ranges; and processed food, nei, in the low-price range. Although these products were certainly exported to other ASEAN countries, they might not have been as competitive as the same products from other ASEAN and +6 countries. If these items are to be promoted as export goods destined for other ASEAN countries, active and intensive product differentiation will be necessary.

[2] For reference, see tables 2.9 to 9.9. See also Table A4.2 on major exports from the +6 countries.

Table 4.9. Goods Imported by ASEAN Countries in Smaller/Larger Quantities than Estimated Based on Prices, in Ascending Order of P-values, 2014–2016

A. Larger Quantities of Imports than Estimated Based on Prices

IC1	Rank	Price ranges																					
		Low							Mid							High							
		Importer	IC2	BEC	Detailed commodity name	Price ($/kg)	Value ($ million)	p-value	Importer	IC2	BEC	Detailed commodity name	Price ($/kg)	Value ($ million)	p-value	Importer	IC2	BEC	Detailed commodity name	Price ($/kg)	Value ($ million)	p-value
1 Vegetable products	1	SGP	14	112	Areca nuts	1.4	18	0.03	PHL	11	122	Cereals, breakfast	2.5	35	0.03								
	2	THA	15	112	Cinnamon (canella)	2.4	4	0.05	MYS	15	112	Pepper (piper spp.)	10.6	12	0.16								
	3	IDN	15	112	Nutmeg, mace and cardamoms	10.7	0.6	0.05	SGP	15	112	Pepper (piper spp.)	11.3	69	0.19								
	4	MYS	15	121	Cocoa, powder and cake	2.2	88	0.06															
	5	THA	12	111	Coconuts	0.3	30	0.07															
2 Livestock products	1	PHL	22	122	Ice cream and edible ice	3.6	2	0.10															
	2																						
	3																						
	4																						
	5																						
3 Aquatic products	1	MYS	33	112	Crabs, nei	3.0	10	0.06	IDN	33	122	Shrimps, prawns	7.7	0.4	0.07	IDN	38	122	Fish and fish products, nei	4.3	0.8	0.12
	2	MYS	32	112	Sharks, rays, chimaeras	10.6	0.3	0.06	VNM	32	122	Tunas, bonitos, billfishes	6.5	12	0.14								
	3	SGP	33	112	Lobsters, spiny-rock lobsters	7.9	0.9	0.09															
	4	MYS	38	112	Fish and fish products, nei	2.8	82	0.10															
	5	MYS	32	122	Sharks, rays, chimaeras	1.7	0.5	0.11															
4 Processed food, nei	1	MYS	42	121	Oil, palm	0.6	432	0.13															
	2	MYS	42	121	Oil, coconut (copra)	1.2	160	0.14															
	3	MYS	42	121	Cocoa, butter	1.2	45	0.15															
	4	MYS	42	121	Fat, nes, prepared	0.7	152	0.15															
	5	MYS	42	121	Oil, palm kernel	1.0	211	0.18															

B. Smaller Quantities of Imports than Estimated Based on Prices

IC1	Rank	Price ranges: Low — Importer	IC2	BEC	Detailed commodity name	Price ($/kg)	Value ($ million)	p-value	Mid — Importer	IC2	BEC	Detailed commodity name	Price ($/kg)	Value ($ million)	p-value	High — Importer	IC2	BEC	Detailed commodity name	Price ($/kg)	Value ($ million)	p-value
1 Vegetable products	1	THA	11	122	Rice, milled/husked	0.7	0.000	0.00	SGP	11	121	Flour, maize	1.9	0.000	0.04	BRN	13	112	Mushrooms and truffles	12.2	0.000	0.12
	2	IDN	11	121	Flour, wheat	0.6	0.097	0.03	MYS	14	122	Fruit, cooked, homogenized preparations	3.2	0.002	0.05	MMR	13	112	Sweet corn frozen	1.3	0.004	0.13
	3	VNM	15	122	Coffee, roasted	5.4	0.000	0.04	VNM	11	122	Mixes and doughs	2.7	0.001	0.06	MYS	13	112	Potatoes, frozen	1.7	0.000	0.15
	4	BRN	14	112	Mangoes, mangosteens, guavas	3.3	0.000	0.06	VNM	12	122	Soya sauce	2.0	0.006	0.13	MMR	14	122	Juice, apple, concentrated	2.0	0.003	0.17
	5	THA	14	122	Juice, fruit nes	0.5	0.001	0.07														
2 Livestock products	1	PHL	22	122	Milk, whole evaporated	0.6	0.009	0.11														
	2																					
	3																					
	4																					
	5																					
3 Aquatic products	1	SGP	32	122	Cods, hakes, haddocks	4.0	0.000	0.01								THA	34	122	Clams, cockles, arkshells	7.0	0.000	0.16
	2	THA	32	112	Flounders, halibuts, soles	1.1	0.000	0.12								PHL	38	122	Fish and fish products, nei	6.7	0.000	0.16
	3	MYS	34	112	Oysters	2.1	0.002	0.18														
	4																					
	5																					
4 Processed food, nei	1	THA	42	121	Oil, sesame	3.0	0.000	0.01														
	2	IDN	42	121	Fat, nes, prepared	1.5	0.002	0.03														
	3	SGP	42	121	Oil, sesame	2.0	0.000	0.04														
	4	THA	43	122	Infant food	6.5	0.000	0.05														
	5	SGP	41	121	Fructose and syrup, other	1.0	0.000	0.07														

BEC = Broad Economic Categories, United Nations Statistics Division (UNSD), BRN = Brunei, IC1 = item category level 1, IC2 = item category level 2, IDN = Indonesia, kg = kilogram, MMR = Myanmar, MYS = Malaysia, nei = not elsewhere included, PHL = Philippines, SGP = Singapore, THA = Thailand, VNM = Viet Nam.

Notes: The values listed in this table represent the averages for 2014–2016. The top five agri-food products within each IC1 grouping are listed in ascending order of p-value < 0.2, under the BEC as follows: primary products mainly for industry (111), primary products mainly for household consumption (112), processed products mainly for industry (121), and processed products mainly for household consumption (122). 'Price' refers to the CIF (cost, insurance, and freight) import price added to the tariff set by the ASEAN *Trade* in Goods Agreement (ATIGA). 'Value' refers to the imported value (CIF) without the tariff. The expression 'p-value' refers to the p-value of the t-stat against the externally studentized residual. See Appendix 3.6. Data category: FAOSTAT Commodity List and the adjusted groups under the International Standard Statistical Classification of Aquatic Animals and Plants (ISSCAAP) classified under BEC 111, 112, 121, and 122.

Sources: UNSD (2017); Appendix 3.6.

Inter-commodity and Inter-country Comparisons of Land/Feed Productivity

The median land productivity of fruits and nuts (14) was the highest, followed by that of vegetables (13), in 2011–2015 (Table 4.10). The ratio of the yield is an indicator of comparative advantage within the ASEAN region, and this value for fruits and nuts exceeded that of every other IC2 group in the category of the vegetable products.

Table 4.10. Median Levels of Productivity and Resource Allocation in Each IC2 Group

IC1	IC2	Land productivity (Rp million/ha)	Chg (%)	Ratio of the yield Index (Yi/Yi')	Chg (%)	Area harvested (1,000 ha)	Chg (%)	Obs.
1 Vegetable products	11 Cereals	32	11	1.3	1	8,767	1	2
	12 Oil and sugar crops	13	-2	0.9	-1	485	1	8
	13 Vegetables	66	4	1.0	0	60	1	22
	14 Fruits and nuts	93	1	1.8	-1	102	1	13
	15 Stimulants and spices	10	-2	1.0	-2	143	2	9
	Total	50	2	1.1	0	104	1	54
IC1	**IC2**	**Feed productivity (Rp million/100 PU)**	**Chg (%)**	**Ratio of the yield Index (Yi/Yi')**	**Chg (%)**	**Producing animals (million PU)**	**Chg (%)**	**Obs.**
2 Livestock products	21 Meat	26	—	0.8	—	11	2	8
	22 Milk	10	—	1.5	—	12	4	3
	23 Eggs	60	—	0.9	—	65	2	2
	Total	29	—	1.0	—	12	3	13

Rp = rupiah (Indonesian currency).
ha = hectare, IC1 = item category level 1, IC2 = item category level 2, PU = unit of pig feed requirements, Yi = yield in Indonesia, Yi' = average yield in other ASEAN countries.
Notes: Land/feed productivity, ratio of the yield, and area harvested/producing animals represent the average values for 2011–2015. 'Chg' refers to the average annual rates of change during 2006–2015 (%). 'Obs.' refers to the number of items in the FAOSTAT Commodity List (FCL). The data on land productivity was deflated to constant 2015 rupiah prices. The figures are estimates based on all the FAOSTAT data under the 'Production' rubric. Data category: FCL.
Sources: FAO (2019); Appendix 3.7.

Within the category of fruits and nuts, tropical fruits (such as pineapples, bananas, papayas, and oranges) had comparatively high land productivity and ratios of the yield during the same period (Table 4.11). Pineapple's productivity and ratio of the yield sharply increased over this period. Furthermore, large quantities of pineapple juice (considering the high price) were imported by Singapore, indicating that it may have had high non-price competitiveness. Among the vegetable products, the productivity and the ratio of the yield of several vegetables (such as mushrooms and pumpkins/squash/gourds) and spices (15) (especially spices, nes) outstripped those values for the other products. Similarly, buffalo and cattle meat had high feed productivity and ratio of the yield, compared with those of other livestock products. Although the extent of harvested areas or number of animals involved in the production of the goods noted above were small, (except for those related to bananas and cattle), and were not necessarily increasing, the potential of these products as exports to other ASEAN countries could be high if they became competitive with the same products from those other countries by means of greater physical productivity.

As shown in the second column from the right in Table 4.11, which lists examples of products imported by other ASEAN countries from Indonesia during 2014–2016 in greater quantities than expected given their prices, many of these products apparently had non-price competitiveness or were differentiated from the same items produced in other ASEAN countries. Among these products were processed foods such as palm oil, pineapple juice, and ice cream, but most were primary products such as pepper, cinnamon, and green coffee under the IC2 group of stimulants and spices (15). The comparative advantage in terms of the physical productivity of those products, including major items such as

pepper and green coffee, was low in the ASEAN region. Maintaining or increasing non-price competitiveness is critically important for the international competitiveness of those products. As some products already have non-price competitiveness, that of other products should be actively improved in the interest of developing the FVC in Indonesia.

Table 4.11. Levels of Productivity and Resource Allocation for Individual Items

No.	IC2	FCL name	Land or feed productivity (Rp million/ha or Rp million/100 PU)	Chg (%)	Ratio of the yield Index (Yi/Yi')	Chg (%)	Area or producing animals (1,000 ha or million PU)	Chg (%)	Intpn. A	Intpn. B	Items imported larger or smaller compared with the price (p<0.2) Imported larger	in	Imported smaller	in
1	11	Rice, paddy	46	15	1.3	0	13,680	2	iii	ii				
2		Maize	19	7	1.3	2	3,854	1	iii	iii				
3	12	Sugar cane	28	-2	0.9	-3	455	1	iv	ii				
4		Oil, palm fruit	25	-1	0.9	-1	7,336	8	iv	i	Oil, palm	MYS		
5		Groundnuts, with shell	19	-2	0.9	-7	514	-4	iv	i				
6		Soybeans	13	4	1.1	4	594	1	iii	i				
7		Coconuts	11	-5	1.3	-1	3,011	1	iii	iii	Coconuts	THA	Oil, coconut (copra)	IDN
8		Castor oil seed	1	8	0.4	8	5	-6	iv	iv				
9		Seed cotton	1	-10	0.1	-17	7	-7	iv	iv				
10		Kapok fruit	—	—	0.4	0	165	2	—	—				
11	13	Mushrooms and truffles	303	-1	3.9	-6	1	4	i	i			Mushrooms, canned	SGP
12		Pumpkins, squash and gourds	224	10	2.7	7	10	-2	i	i				
13		Chillies and peppers, green	218	13	1.4	3	250	2	i	i				
14		Potatoes	138	4	1.1	-2	68	2	i	i				
15		Onions, dry	123	0	1.1	0	107	3	ii	i				
16		Carrots and turnips	118	5	1.2	-1	31	4	i	i				
17		Tomatoes	117	9	0.9	-1	57	1	ii	ii				
18		Garlic	109	2	1.1	1	2	-1	i	i				
19		Cabbages and other brassicas	106	4	1.0	-5	65	1	ii	ii				
20		Beans, green	77	14	3.8	3	123	-3	i	i				
21		Leeks, other alliaceous vegetables	66	1	1.5	2	57	1	i	i			Leeks, other alliaceous vegetables	SGP
22		Vegetables, fresh nes	56	4	0.9	-2	63	1	ii	iv				
23		Cassava	54	13	1.1	3	1,067	-3	i	iii				
24		Sweet potatoes	51	13	1.7	2	164	-2	i	iii				
25		Eggplants (aubergines)	48	10	1.0	2	50	0	iv	iv				
26		Cucumbers and gherkins	41	4	0.9	0	49	-3	iv	iv				
27		Spinach	17	5	0.3	-4	45	0	iv	iv				
28		Maize, green	15	4	0.5	2	96	1	iv	iv			Sweet corn frozen	MMR
29		Roots and tubers, nes	7	0	0.5	0	68	2	iv	iv				
30		Beans, dry	4	1	0.8	-3	232	-5	iv	iv				
31		Pulses, nes	2	1	0.6	0	2	1	iv	iv				
32		Cauliflowers and broccoli	—	—	0.7	-3	11	3	—	—				
33	14	Pineapples	421	6	4.2	4	15	-2	i	i	Juice, pineapple, concentrated	SGP		
34		Bananas	316	2	3.4	0	125	5	i	i				
35		Papayas	311	1	3.5	-4	11	3	i	i				
36		Oranges	241	-2	2.7	-3	51	-4	i	i			Juice, orange, concentrated	THA
37		Melons, other (inc.cantaloupes)	103	5	1.4	2	10	2	i	ii				
38		Fruit, fresh nes	93	1	2.0	3	102	0	i	i				
39		Avocados	93	1	3.4	2	23	5	i	i				
40		Mangoes, mangosteens, guavas	86	0	1.6	0	213	1	i	iv			Mangoes, mangosteens, guavas	BRN
41		Fruit, tropical fresh nes	83	0	1.8	-1	203	-2	i	iii			Fruit, tropical fresh nes	SGP
42		Watermelons	72	8	0.8	-1	34	2	ii	iv				
43		Areca nuts	5	0	0.5	-4	142	1	iv	iv	Areca nuts	SGP		
44		Nuts, nes	2	-1	0.3	-2	211	0	iv	iv	Nuts, nes	SGP		
45		Cashew nuts, with shell	2	10	0.1	-3	552	-1	iv	iv				
46	15	Spices, nes	285	1	11.5	1	5	-2	i	i				
47		Ginger	98	-2	1.3	-3	11	5	i	i				
48		Pepper (piper spp.)	34	5	0.2	4	172	-2	iv	ii	Pepper (piper spp.)	VNM		
49		Cinnamon (canella)	25	-4	2.4	-3	106	2	iii	i	Cinnamon (canella)	THA		
50		Coffee, green	10	1	0.3	-2	1,246	-1	iv	ii	Coffee, green	SGP		
51		Cocoa, beans	9	-6	1.3	9	1,753	7	iii	iii	Cocoa, powder and cake	MYS		
52		Nutmeg, mace and cardamoms	8	10	0.5	-5	143	10	iv	iv	Nutmeg, mace and cardamoms	IDN		
53		Tea	8	-5	0.7	-3	120	0	iv	iv				
54		Cloves	1	-3	1.0	1	473	8	iv	iii	Cloves	SGP		
55	21	Meat, pig	97	—	0.4	—	12	3	ii	ii				
56		Meat, buffalo	93	—	1.0	—	4	-1	i	i				
57		Meat, cattle	89	—	1.0	—	48	6	i	i				
58		Meat, sheep	29	—	0.8	—	10	-4	ii	i				
59		Meat, goat	24	—	0.4	—	20	1	iv	iv				
60		Meat, duck	20	—	0.7	—	7	2	iv	iv				
61		Meat, chicken	18	—	0.8	—	449	5	iv	iv				
62		Meat, horse	17	—	1.6	—	0	3	iii	iii				
63	22	Milk, whole fresh cow	47	—	1.0	—	12	4	i	ii	Ice cream and edible ice	PHL		
64		Milk, whole fresh goat	10	—	2.4	—	23	3	iii	i				
65		Milk, whole fresh sheep	8	—	1.5	—	11	5	iii	iii				
66	23	Eggs, other bird, in shell	63	—	1.0	—	16	3	i	i				
67		Eggs, hen, in shell	58	—	0.7	—	114	2	ii	iv				

Rp = rupiah (Indonesian currency).

BRN = Brunei, FCL = FAOSTAT Commodity List, ha = hectare, IC2 = item category level 2, IDN = Indonesia, Intpn. = interpretation, MMR = Myanmar, MYS = Malaysia, nes = not elsewhere specified, p = p-value, PHL = Philippines, PU = unit of pig feed requirements, SGP = Singapore, THA = Thailand, VNM = Viet Nam, Yi = yield in Indonesia, Yi' = average yield in other ASEAN countries.

Notes: 'Area' refers to the total harvested area, and 'producing animals' refers to the number of producing animals. Land/feed productivity, ratio of the yield, and area harvested/producing animals represent the average values for 2011–2015. 'Chg' refers to the average annual rates of change during 2006–2015 (%). The data on land productivity was deflated to constant 2015 rupiah prices. The figures are estimates based on all the FAOSTAT data provided under the 'Production' rubric. In the 'Intpn' column, the codes are as follows: i = both productivity and ratio of the yield are high; ii = productivity is high, but the ratio of the yield is low; iii =

productivity is low, but the ratio of the yield is high; and iv = both productivity and ratio of the yield are low. The codes under 'A' reflect the median of the broader product categories in IC1 (item category level 1), and those under 'B' reflect the median of the specific products in IC2 included here. Regarding the items imported in larger or smaller quantities compared with their prices ($p<0.2$), the names of the FCL items (classified according to the Broad Economic Categories) listed in the table are those with the smallest p-value < 0.2 estimated based on data during 2014–2016. Data category: FCL.
Source: Appendix 3.7.

Table 4.12 shows a positive correlation between the land productivity and ratios of the yield of vegetables (13) and fruits and nuts (14) during 2011–2015. In other words, the profitability per unit area of those FCL items tended to be high when they had a comparative advantage in terms of physical productivity within the ASEAN region. However, this was not true for products belonging to other IC2 groups.

Negative or non-existent correlations are observed between land/feed productivity or ratios of the yield and the extent of harvested areas or number of producing animals for all IC2 product groups other than oil and sugar crops (12). Such results show that most of the harvested land and producing animals in Indonesia were simply not allocated to products characterized by high productivity or competitiveness.

Table 4.12. Correlation Matrix of Comparative Advantage, Productivity, and Resource Allocation, 2011–2015

	Land or feed productivity						Ratio of the yield					
IC2	11 Cereals	12 Oil and sugar crops	13 Vegetables	14 Fruits and nuts	15 Stimulants and spices	21 Meat	11 Cereals	12 Oil and sugar crops	13 Vegetables	14 Fruits and nuts	15 Stimulants and spices	21 Meat
Ratio of the yield	—	0.32	**0.74**	**0.90**	0.32	-0.29	—	—	—	—	—	—
Area or producing animals	—	0.46	-0.14	**-0.71**	-0.57	0.10	—	**0.86**	-0.02	-0.61	-0.48	-0.36
Obs.	2	7	21	13	9	8	2	7	21	13	9	8

IC2 = item category level 2.
Notes: 'Area' refers to the total harvested area, and 'producing animals' refers to the number of producing animals. This table uses Spearman's rank correlation coefficient of average values during 2011–2015. The values were estimated based on the data for items on the FAOSTAT Commodities List (FCL) relating to land/feed productivity, the ratio of the yield, and the number of producing animals and the land area they used. FCL items with correlation coefficients less than 4 were omitted. 'Obs.' refers to the number of FCL items. Data category: FCL.
Source: Author's calculations, see Appendix 3.7.

5. Summary

Social and Economic Conditions

- The overwhelmingly large population of Indonesia and its strong prospect of population and economic growth suggest that the country has high potential as a consumption market for agri-food products.
- The VA of the agricultural, food-and-beverage, and wholesale/retail trade industries has been a major component of Indonesia's GDP; for instance, the VA of each accounted for about 10% of GDP in 2015. While the proportion of GDP due to the VA of most FVC-related industries shrank, that due to the VA of the food and beverage industries gradually expanded.
- Interindustry transactions involving product flows from agriculture and fishing to the food and beverage industries increased. Transactions from fishing to the hotel and restaurant industries gradually increased, as did transactions from the food and beverage industries to the hotel and restaurant industries. The growth of intra-industry transactions within agriculture and the food and beverage industries was observable, as well.

Linkages amongst FVC-Related Industries

- The increase in the final demand in downstream sectors of the FVC, particularly the food and beverage industries, had a positive impact on the VA of upstream sectors. This result suggests that interventions in the food and beverages industries do contribute to the development of agriculture.
- The effects of downstream industries on the VA of fishing was limited, compared with the effects on the VA of agriculture. It is also suggested that services from the wholesale and retail trade sectors were apparently necessary, but alone not sufficient, to automatically drive the development of the FVC-related industries.
- Production growth can accompany a rise in per capita employee compensation in many FVC-related industries, particularly in the agricultural sector.
- The food and beverages industries, which had remarkably high per capita compensation, seemed to be amongst the more attractive sectors with regard to labour absorption, although the number of employees in these industries was still very limited, and was increasing only slowly.

Supply–Demand Balance of Agri-food Products

- Most agri-food products—particularly cereals, oil and sugar crops, and vegetables—were produced and consumed mainly in the domestic market. A comparatively large amount of cereals was imported, followed by vegetables, sugar, and milk. The exportation of fat and oils, mainly consisting of palm oil, was remarkably large. The second-largest category of exports was stimulants and spices, and the third largest was vegetables. Even though cereals and vegetables are mainly produced/consumed at home, the little that's produced in foreign markets are in large enough volumes to rank high compared with other exports and imports. One of the characteristics of Indonesia was the large production and domestic supply of cereals and marine fishes, exceeding those of all the other ASEAN countries covered in this report.

- The export prices of several products—such as aquatic products, particularly raw and processed crustaceans, and processed meat—were remarkably high. We can conclude that raw crustaceans, which were exported in large amounts in spite of their high prices, must have had a high enough value to generate active trade.

The Competitiveness of Each Product in the ASEAN Region

- Indonesian vegetable products in the low- and mid-price ranges—especially stimulants and spices such as cinnamon, cocoa powder/cake, and pepper—tended to be imported in great amounts within the ASEAN region, considering their prices. Among aquatic products, crustaceans such as crabs, nei, and lobsters, and marine fishes, including sharks/rays/chimeras, were largely imported. Malaysia imported large quantities of processed food, particularly fat and oils in the low-price range for industry use.
- Research on the characteristics of the goods actively exported by other ASEAN countries to Indonesia might trigger a reconsideration of production and marketing strategies for domestic products that could compete with goods produced by other states in the ASEAN region, for instance: stone fruits from Thailand, green coffee from Viet Nam, and dried beans from Myanmar.
- In the category of fruits and nuts, tropical fruits such as pineapples, bananas, papayas, and oranges had comparatively high land productivity and ratios of the yield. Among the vegetable products, the productivity and ratios of the yield of several vegetables, such as mushrooms, pumpkins/squash/gourds, and spices (especially spices, nes, and minor spices), outstripped those values for the other products. Similarly, buffalo and cattle meats had high feed productivity and ratios of the yield compared with other livestock products. The potential of these products as exports to other ASEAN countries could be high if they became competitive with the same products from those other countries by means of greater physical productivity.