

## Chapter 2

# **Southeast Asia: Prospects and challenges**

*This chapter reviews the prospects and challenges facing the agricultural sector in Southeast Asia over the next decade. In line with the focus of policy makers, agriculture and fisheries issues are primarily explored with reference to trade and food security. This chapter first considers the historical performance and current state of agriculture and fisheries in Southeast Asia before presenting the market and food security projections for the medium-term (2017-26). It concludes with a discussion of the challenges and uncertainties that may influence the medium-term projections presented. Countries in Southeast Asia have experienced significant improvements in their levels of development along with strong growth in their agriculture and fishery sectors. The outlook for agriculture is broadly positive, but could be further improved by consistent policies and strategic investments, particularly in rural infrastructure.*

## Introduction

Southeast Asia (Figure 2.1) comprises a diverse range of countries at varying levels of development and endowments (Table 2.1). Over recent decades, the region as a whole has undergone significant development. Structural changes in many of its economies have led to significant gains, and the rise of “Factory Asia” has placed Southeast Asia central to a varied mix of manufacturing global value chains (GVCs). With this, the region has experienced strong growth in Gross Domestic Product (GDP); for most countries, real GDP growth has averaged close to 5% per year over the period 2000-16. Meanwhile, the regional population has continued to grow at close to 1.3% per year over the same period.

Figure 2.1. **The Southeast Asian region**



Southeast Asia has also made remarkable progress in terms of improving food security. In the early 1990s, undernourishment rates were the world’s highest at around 31%, but these rates had fallen below 10% by 2014-16, below those seen in a number of other regions. Despite this, the varying levels of development among countries in the region means that food security remains a significant issue; in 2014-16, the region, which

has a population of around 630 million (9% of world total), still contained around 60 million (or 8%) of the world's undernourished (FAO, 2017a).

The development of the agricultural and fisheries sectors<sup>1</sup> has contributed to the improvements in food security, and both sectors remain a key part of food security policy for regional policy makers. In this way, agricultural and fisheries policy settings are interlinked with food security objectives. This is particularly the case for policy approaches directed at the region's key staple crop – rice. However, for some countries, the use of market interventions in pursuit of food security objectives has had unintended consequences for both the development of the sectors and for food security itself.

Table 2.1. **Contextual indicators for selected countries in Southeast Asia, 2015**

|             | GDP per capita | Population | Rural population | Total land area    | Agricultural land  | Agricultural land per capita | Freshwater resources      | Freshwater withdrawals agriculture | Freshwater resources per capita |
|-------------|----------------|------------|------------------|--------------------|--------------------|------------------------------|---------------------------|------------------------------------|---------------------------------|
|             |                | (millions) | (%)              | (km <sup>2</sup> ) | (km <sup>2</sup> ) | (ha)                         | (billion m <sup>3</sup> ) | (billion m <sup>3</sup> )          | ('000 m <sup>3</sup> )          |
| Cambodia    | 1 159          | 15.6       | 79.3             | 176 520            | 54 550             | 0.36                         | 120.6                     | 2.1                                | 7.9                             |
| Indonesia   | 3 346          | 257.6      | 46.3             | 1 811 570          | 570 000            | 0.22                         | 2019.0                    | 92.8                               | 7.9                             |
| Lao PDR     | 1 818          | 6.8        | 61.4             | 230 800            | 23 690             | 0.35                         | 190.4                     | 3.2                                | 28.5                            |
| Malaysia    | 9 768          | 30.3       | 25.3             | 328 550            | 78 390             | 0.26                         | 1003.0                    | 2.5                                | 33.5                            |
| Myanmar     | 1 161          | 53.9       | 65.9             | 653 080            | 126 450            | 0.24                         | 580.0                     | 29.6                               | 10.9                            |
| Philippines | 2 904          | 100.7      | 55.6             | 298 170            | 124 400            | 0.13                         | 429.0                     | 67.1                               | 4.8                             |
| Thailand    | 5 815          | 68.0       | 49.6             | 510 890            | 221 100            | 0.33                         | 224.5                     | 51.8                               | 3.3                             |
| Viet Nam    | 2 111          | 91.7       | 66.4             | 310 070            | 108 737            | 0.12                         | 359.4                     | 77.7                               | 4.0                             |

Note: GDP per capita measured in current 2015 USD. Data on freshwater withdrawals and agricultural land are from 2014.

Source: World Bank (2017), World Development Indicators, <http://databank.worldbank.org/data/>.

Agricultural and fisheries sector development in Southeast Asia has also meant that it is increasingly involved in international agro-food trade. For both producers and consumers, international and regional markets are gaining importance as a source of both income and food. As such, developments in international markets, and the policies of other agro-food trading countries, are of key importance.

This chapter first considers the historical performance and current state of agriculture and fisheries in Southeast Asia before presenting the market and food security projections for the medium-term (2017-26). The chapter concludes with a discussion of the challenges and uncertainties that may influence the medium-term projections presented. In line with the focus of policy makers, agriculture and fisheries are primarily explored with reference to trade and food security. Eight Southeast Asian countries are the focus of this chapter (each are individually modelled in the *Outlook*) and include Cambodia, Indonesia, Lao People's Democratic Republic (hereafter Lao PDR), Malaysia, Myanmar, the Philippines, Thailand and Viet Nam.

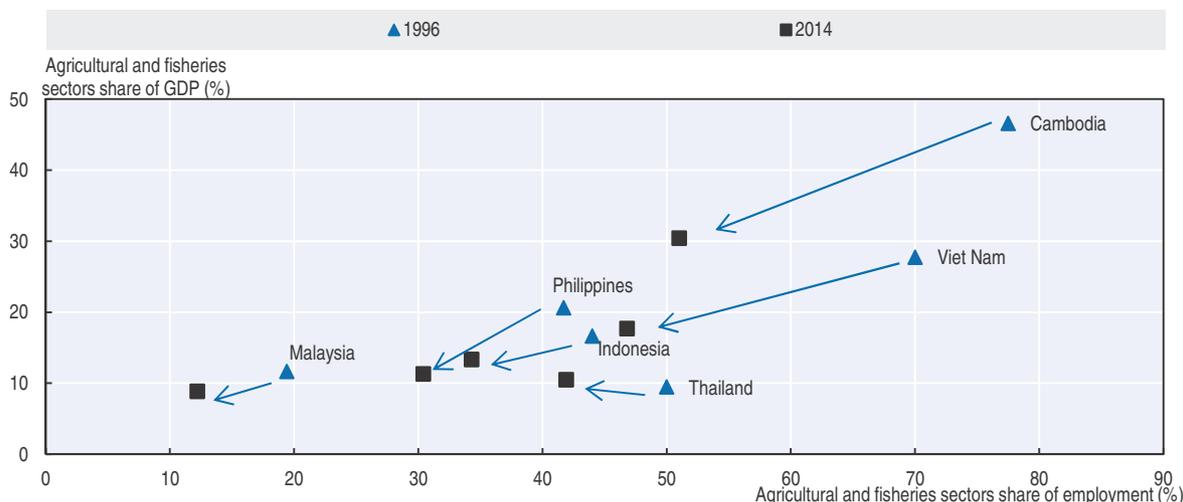
## Developments in agriculture and fisheries in Southeast Asia

### **Extensive structural changes**

Agriculture and fisheries in Southeast Asian countries have undergone significant structural changes over time. The relative importance of the two sectors in GDP and employment declined in most countries between 1996 and 2014 (the earliest and latest

years for which data are available) (Figure 2.2). Productivity improvements and opportunities outside agriculture have led to significant labour-shedding in several countries, but most notably in Cambodia and Viet Nam. Interestingly, the agricultural share of employment fell in Thailand even as its share of GDP rose over the period, representing a shift to relatively higher-value production along with opportunities for labour absorption in other sectors of the economy.

Figure 2.2. **Agricultural and fisheries sectors share of employment and GDP**  
1996 and 2014



Note: Value added estimates include forestry and hunting. Data for Cambodia are for 1998 and 2012, and data for employment share are for 2013 for Thailand and Viet Nam.

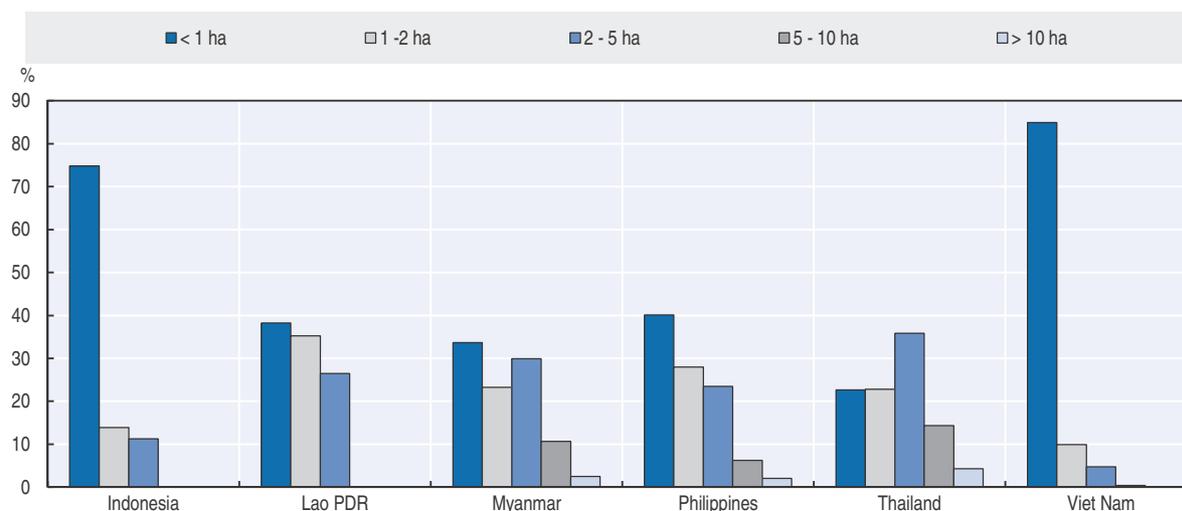
Source: World Bank (2017), World Development Indicators, <http://databank.worldbank.org/data/>.

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### Adjustment within agriculture

While the sector overall appears to have undergone significant structural adjustment, farm sizes in Southeast Asia remain relatively small, and may remain so over the medium term (FAO, 2015). Data on farm size and its distribution are sparse. For those countries for which time series data exist – Indonesia, the Philippines and Thailand – patterns indicate a generally falling average farm size (Lowder et al., 2014). In some of these countries, changes in average land holdings can be traced to policy moves that have redistributed land, for example in the Philippines through its agrarian reform programme (OECD, 2017a). The trend of falling farm size may have broader long-term implications for agricultural productivity growth if it is also leads to a further fragmentation of production activities. In contrast, two countries appear to have exhibited trends of *increasing* farm size – Myanmar and Viet Nam. In the case of Viet Nam, land consolidation has been seen across different production activities and was found to be more visible in livestock production but only in very early stages for crops (OECD, 2015c). In terms of the distribution of farm size, although data are both limited and dated, they indicate that farms of less than 1 ha of land dominate (Lowder et al., 2014) (Figure 2.3). Indonesia and Viet Nam have the largest share of total producers who farm less than 1 ha of land. Thailand and Myanmar also stand out as countries with different patterns of ownership – both have a relatively higher number of producers who farm between 2 and 5 ha, compared with other countries.

**Figure 2.3. Distribution of farm size in Southeast Asia**  
Percentage of farm holdings by size, estimates during the 2000s

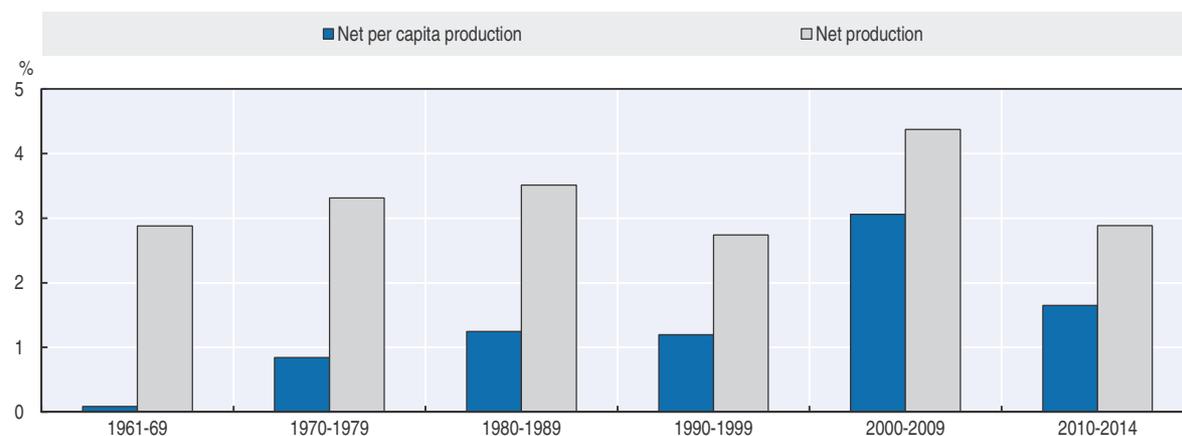


Notes: Estimates for each country relate to data collected during the 2000s. Specifically, Indonesia (2003), Lao PDR (1998-99), Myanmar (2003), the Philippines (2002), Thailand (2003) and Viet Nam (2001). No data is available for Cambodia and Malaysia.  
Source: Lowder et al. (2014).

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Structural adjustment in the sector has contributed to strong production growth over time. Since the 1960s, annual compound production growth in the Southeast Asian region as a whole has been strong (Figure 2.4).<sup>2</sup> However, agricultural production growth relative to population growth has been strong since the 1980s (shown as per capita growth), driven by both slowing population growth rates and increases in agricultural growth rates during the 1980s and 2000s.

**Figure 2.4. Production growth in Southeast Asia**  
Decadal annual compound growth rates (%) 1960 to 2009



Notes: Net production refers to total production less cereal use for livestock feed. The FAO calculates net production in the form of an index; see [http://faostat3.fao.org/download/QI/\\*E](http://faostat3.fao.org/download/QI/*E) for further details.

Source: FAO (2017a), FAOSTAT, <http://faostat.fao.org/>.

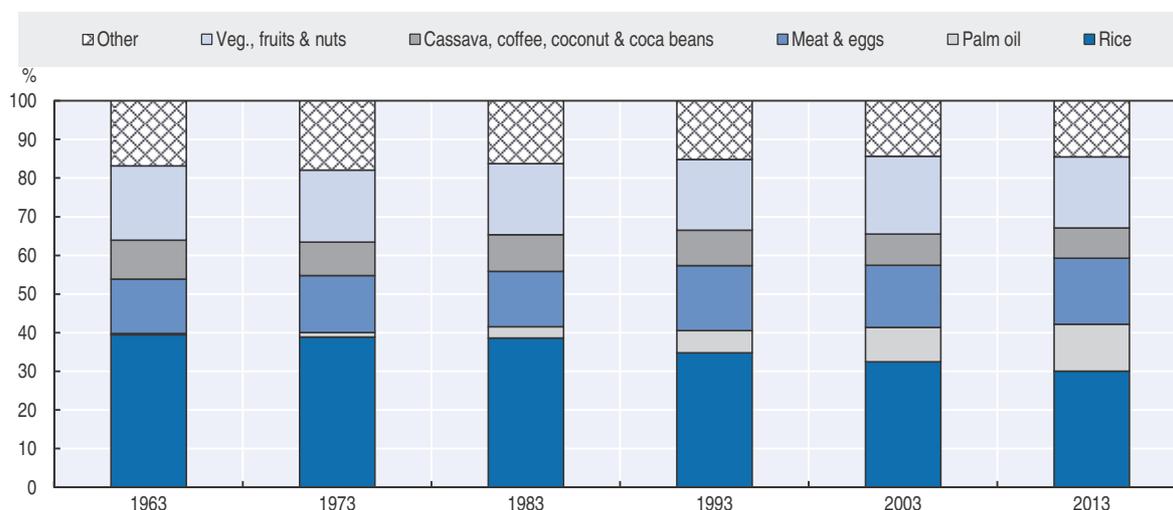
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### A shifting agricultural production mix centred on the key rice crop

Agricultural production in Southeast Asia remains centred around rice. Rice cultivation is the main agricultural production activity, accounting for a greater share of gross production value than any other single commodity. In general, the production shares of various agricultural activities have remained relatively stable over time; however, the contribution of rice to total gross agricultural production value has fallen since the early 1990s – from around 40% to close to 30% in 2013 (Figure 2.5). Much of the change has been driven by the increasing contribution of palm oil to total agricultural production value in the region as it represents a higher value product (combined with relative dietary shifts away from rice in some countries – discussed below). Within commodity categories, there have also been changes such as increasing poultry production within the meat sector.

Figure 2.5. **Agricultural production in Southeast Asia**

Commodity shares of gross production value in constant 2004-06 international dollars, 1963 to 2013



Notes: International prices are used to overcome issues in the aggregation of commodities that cannot be added up according to their physical weights. The FAO uses international prices in determining gross production value so that production trends can be seen without the influence of changes in exchange rates – see [www.fao.org/faostat/en/#data/QV](http://www.fao.org/faostat/en/#data/QV) for further details.

Source: FAO (2017a), FAOSTAT, <http://faostat.fao.org/>

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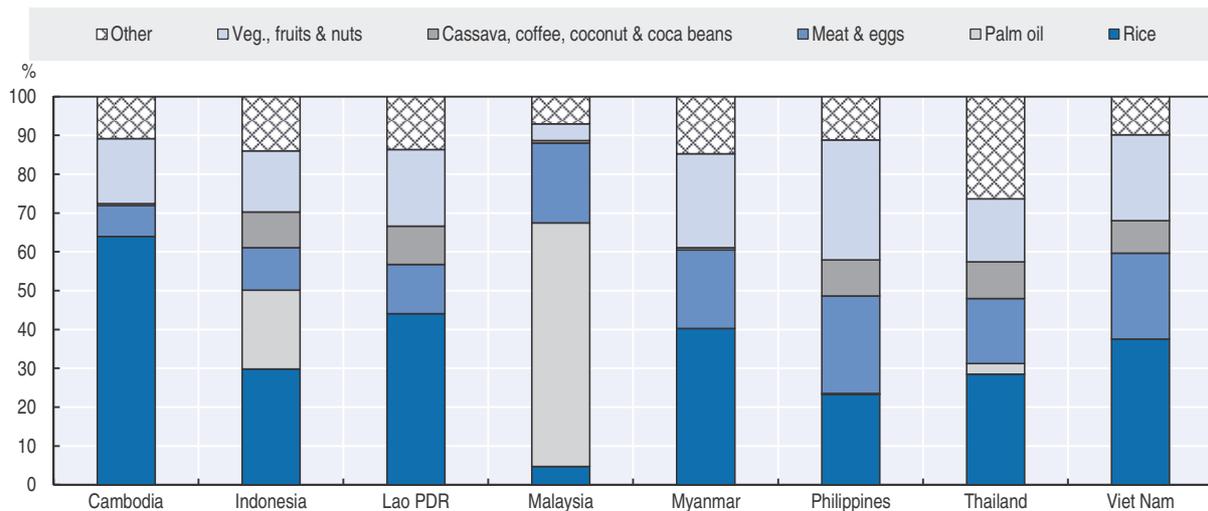
Across individual Southeast Asian countries, changes in the production mix are more apparent (Figure 2.6). In Malaysia, production has significantly shifted towards palm oil, crowding out both rice and other production activities. In Myanmar, there have been increases in both meat and fruit and vegetable production, and its share of production value coming from rice has fallen by around 20 percentage points over the past 50 years. Expressed as shares in constant dollar terms, in 2013, the agricultural sectors of Cambodia and Malaysia were most reliant on one production activity or sector – rice and palm oil respectively. Others are more diversified. Over the period examined, the Philippines is the only country where the share of rice in its total agricultural production value has increased.

### Changes in fisheries production

Fisheries and aquaculture are important contributors to food security and nutrition, along with the livelihoods and household incomes of many living in Southeast Asia. Fish and seafood products represent the main source of animal protein for most of the

Figure 2.6. **Southeast Asia agricultural production shares by country, 2013**

Commodity shares of gross production value in constant 2004-06 international dollars



Notes: International prices are used to overcome issues in the aggregation of commodities that cannot be added up according to their physical weights. The FAO uses international prices in determining gross production value so that production trends can be seen without the influence of changes in exchange rates; see [www.fao.org/faostat/en/#data/QV](http://www.fao.org/faostat/en/#data/QV) for further details.

Source: FAO (2017a), FAOSTAT, <http://faostat.fao.org/>.

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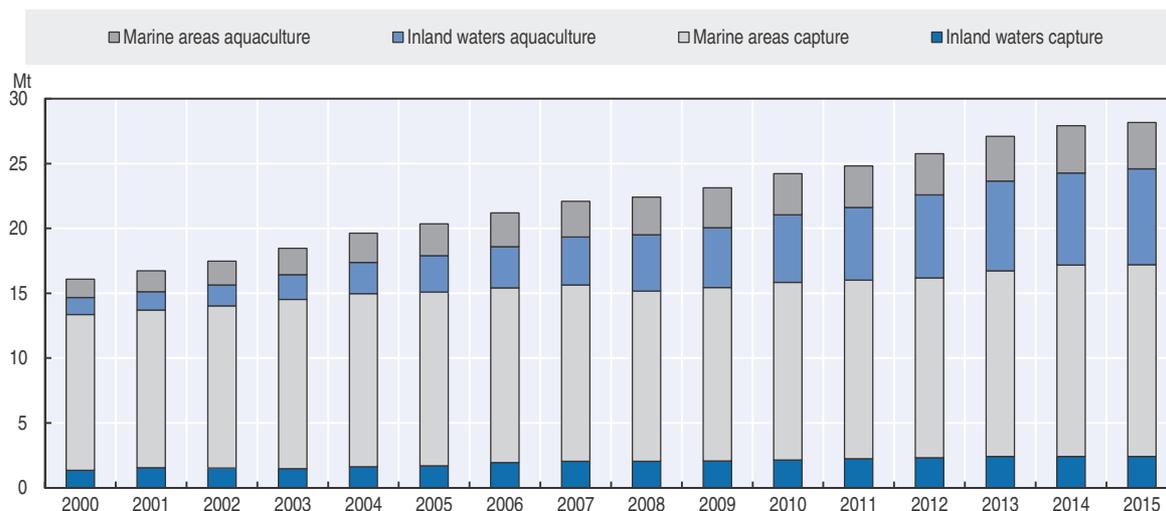
population in the region – per capita fish consumption stands at around 36 kg, around double the world average and accounts for about 42% of total animal protein intake for individuals (FAO, 2017b).

Production from fisheries and aquaculture in the region is significant. In 2015, the region accounted for close to 17% of global fisheries production (14% for aquaculture and 19% for capture fisheries). Overall, fisheries and aquaculture production increased by around 75% over the period 2000-15. The largest increase was seen in production from inland aquaculture, where production grew by over 460% between 2000 and 2015 – growing at an average annual rate of 12.4% over the period (Figure 2.7). Over a longer horizon, the increases in fishery production are even more significant. In 1950, regional production stood at 1 Mt, rising to the 28 Mt seen in 2015. Much of this growth occurred between 1995 and 2015, over which period production doubled. During the last two decades, the fishery sector in Southeast Asia has transformed from a small-scale capture fisheries production mainly sold domestically toward a mixture of smaller-scale and larger-scale export-oriented fisheries.

For both capture fisheries and aquaculture, four of the top ten producing countries in the world are in Southeast Asia, with Indonesia the second largest producer in the world behind China. Across countries, Indonesia dominates total fishery and aquaculture production in the region, accounting for 38% of total production in 2015 (Figure 2.8). The extent of this dominance has increased over time on the back of strong production growth. At the same time, fishery and aquaculture production has also increased significantly in Viet Nam – almost tripling between 2000 and 2015 – with Myanmar reporting a similar level growth in production, moving from the sixth to third largest regional producer.

Aquaculture production is highly diversified in the region, with a large number of species cultured in fresh, brackish and marine environments targeting both domestic and

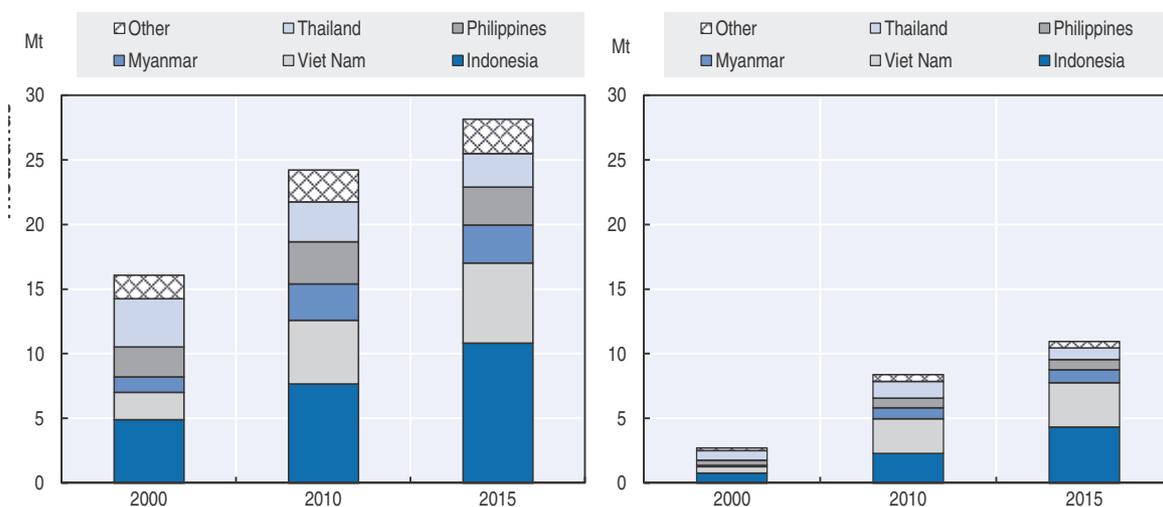
Figure 2.7. **Marine and inland fishery production in Southeast Asia**  
Capture and aquaculture, 2000-15



Source: FAO (2017b), Global Fishery and Aquaculture Production (database), [www.fao.org/fishery/statistics/global-production/en](http://www.fao.org/fishery/statistics/global-production/en).

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Figure 2.8. **Contribution to fishery production by country**  
Total fishery production (left); Aquaculture (right)



Notes: Other includes Cambodia, Lao PDR and Malaysia.

Source: FAO (2017b), Global Production Fisheries (database), [www.fao.org/fishery/statistics/global-production/en](http://www.fao.org/fishery/statistics/global-production/en).

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export markets. For many rural areas in the region, small-scale freshwater aquaculture, often in ponds and on rice fields, plays a crucial role in providing populations with high quality protein, essential fatty acids, vitamins and minerals. Across the region, growth in aquaculture has been unequal among countries reflecting differences in local policy, management objectives and environmental factors (Figure 2.8). Indonesia and Viet Nam are the most important aquaculture producers in the region, accounting for close to 40% and 31% of the quantity produced respectively. Over the period 2000-15 production growth in Viet Nam was consistently high, only slowing towards the end of the period. In contrast, the strong growth in Indonesia took place more recently and is concentrated at the end of

the period. In contrast, production in Thailand declined by 37% between 2009 and 2015 due to disease that affected shrimp production.

While much of the production growth has come from aquaculture, capture fisheries in the region remain the largest source of production – one that is also growing (by over 29% during period 2000-15). For capture fisheries in inland waters, production is reported to have increased by 79% over the period 2000-15. Unfortunately, these data are subject to a great number of uncertainties. While part of this increase has been a result of growing fishing effort to further exploit inland fisheries resources (along with a lack of resource management tools or a lack of enforcement thereof – see below), the true extent of this is unclear as the increases seen in the region might also be generated by improved statistics. Capture fisheries in inland waters play a key role in food security and poverty alleviation, sustaining the livelihoods of many rural communities. Southeast Asian countries contribute 21% of world inland capture fisheries production. Marine capture fisheries in Southeast Asia also reported production growth, but at slower rates to those reported in inland fisheries, by around 23% over the 2000-15 period (Figure 2.7).

In addition to its production of fish and other seafood species, Southeast Asia is also a major producer of seaweeds and aquatic plants, accounting for more than 43% of world production. This output is dominated by farmed tropical seaweed species from Indonesia, where farmed seaweed output increased by 5391% over the period 2000-15 (from 205 000 tonnes in 2000 to 11.3 Mt in 2015 (wet weight)). At the global level, Indonesia is currently the second largest producer and the leading exporter of seaweeds, and national policy aims to maintain recently observed rates growth with a focus on export markets.

## **Drivers of production growth in Southeast Asia**

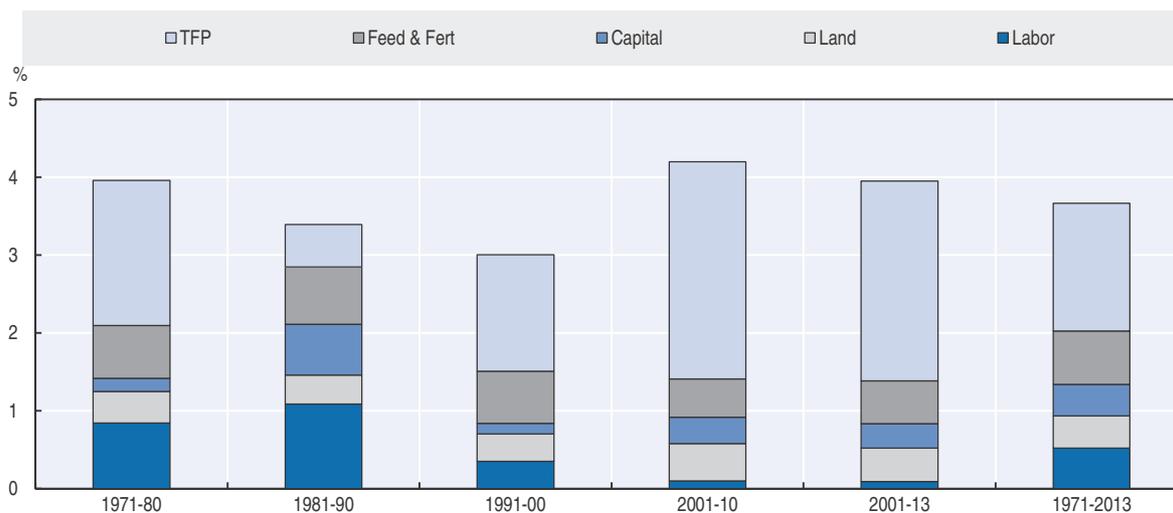
### **Agriculture**

Improvements in agricultural productivity have played a key role in driving agricultural output growth in the region. Although estimates are subject to measurement errors, total factor productivity (TFP)<sup>3</sup> for the region as a whole has increased at an average annual rate of 2.2% a year since 1991 (1.4% a year on average for the period 1961 to 2013), based on USDA (2016) data. Agricultural productivity growth has accounted for an increasing share of output growth over time (Figure 2.9). Between 2001 and 2013, productivity growth accounted for over 60% of output growth, compared with 13% in the 1980s, when increasing input use of 2.8% a year drove agricultural output growth.

Productivity growth rates in Southeast Asia also compare favourably with those observed in other regions. For the period 2001 to 2013, agricultural productivity growth in Southeast Asia exceeded growth realised in all other regions except the rest of Asia.<sup>4</sup> Moreover, for the same period, productivity growth accounted for a similar share of agricultural output growth (63%) to the world average.

Notwithstanding the contribution of TFP, agricultural output growth has been significantly influenced by increased input use (including land, labour capital – animals and machinery, fertiliser and feed use), which has in turn been driven by a combination of increased intensification of activities and area expansion (Figure 2.10). While data are sparse, anecdotal evidence and partial data from some countries in the region suggests

Figure 2.9. **Composition of agricultural output growth in Southeast Asia, by period (%)**



Notes: Weighted average (by output) for Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Thailand and Viet Nam. Capital represents both machinery and livestock related capital. The USDA Economic Research Service methodology for measuring international agricultural TFP growth is available at [www.ers.usda.gov/data-products/international-agricultural-productivity/documentation-and-methods/](http://www.ers.usda.gov/data-products/international-agricultural-productivity/documentation-and-methods/).

Source: USDA (2016), International Agricultural Productivity, [www.ers.usda.gov/data-products/international-agricultural-productivity.aspx](http://www.ers.usda.gov/data-products/international-agricultural-productivity.aspx).

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that mechanisation is occurring even on small-scale farms (FAO, 2015). USDA (2016) estimates based on FAO data suggest that while increases in labour usage dominated earlier periods, land and capital increases become more important from the 1990s onwards. Further, data on fertiliser use indicates that between 1961 and 2013, average annual growth has been around 7% for the eight countries examined since 1961, with the highest rates seen in Cambodia and Lao PDR of 13% per year on average (USDA, 2016).

A key driver of input growth has been an increase in land use. Across Southeast Asia, agricultural land has increased by close to 40% between 1980 and 2014 (FAO, 2017a). In terms of absolute expansion of agricultural land, the most significant increase has been in Indonesia, which is also the largest country in terms of total land size. In relative terms, Cambodia, Indonesia, Myanmar and Viet Nam have all seen agricultural land use expand by in excess of 50% over the period 1980-2014; the largest increase relates to Cambodia, where agricultural land has increased by over 100% (FAO, 2017a).<sup>5</sup> Lao PDR has also seen an increase by close to 48% over this same period.

In Indonesia and Malaysia, much of the expansion of agricultural land has been due to the conversion of forested areas to land used for palm oil production. While these changes have contributed to increasing incomes for those employed in agriculture, with positive effects on poverty and food security, this expansion has not been without significant cost or controversy. Pirker et al. (2016) cite evidence that 17% of new palm oil plantations in Malaysia and 63% of those in Indonesia came at the expense of lost biodiversity-rich tropical forest over the period 1990-2010 (Gunarso et al., 2013; Koh et al., 2011), and in addition contributed to increased carbon emissions from the sector (Carlson et al., 2012; Miettinen et al., 2012; Omar et al., 2010). These costs are not only one-off, but will have a lasting impact on the future productive capacity of the region and thus on long term

income and food security. Reconciling these costs and benefits will be a key challenge for regional policy makers going forward, including demonstrating to increasingly aware consumers that palm oil production is sustainable – a challenge not viewed as insurmountable by some (Sayer et al., 2012).

Looking ahead, future area expansion is likely to be limited. Instead, increases in production of any given agricultural product will need to be driven by increases in intensification or productivity, or come at the expense of production of other products. With climate change expected to place downward pressure on yield growth of many crops (OECD, 2017b), the role of agricultural R&D and innovation systems will become increasingly important in future agricultural development over the next decade and beyond.

As part of a wider enabling environment, FAO (2015) emphasises that the public provision of education and health services will be crucial for farmers to be able to operate in an increasingly complex and knowledge-intensive industry. However, to make these investments happen, policy choices will need to change, and funding for various agricultural programmes should be reformed.

Recent analysis suggests that for countries within Southeast Asia, compared with other countries at a similar level of development, there is significant scope to increase investments in R&D and innovation systems to help safeguard future levels of productivity growth and mitigate some of the expected negative effects of climate change (Box 2.1).

#### **Box 2.1. Improvement of regional agricultural innovation systems is key to future productivity growth**

Public investment in agricultural R&D is essential for sustainable agricultural productivity growth. By ensuring that farmers have access to innovations that meet their diverse and complex needs, public spending on agricultural R&D is proven to be more effective at raising sustainable agricultural productivity than other public expenditures in agriculture, such as irrigation and fertiliser subsidies. Recent findings suggest that countries in Southeast Asia have scope to improve R&D and innovation systems more broadly to enhance productivity growth and to better manage future production and food security risks (OECD, 2017b). The Agricultural Growth Enabling Index (AGEI) compares the performance of selected countries – Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Thailand and Viet Nam, together with a wider set of countries at a similar level of development – across the various components of the enabling environment (Figure 2.10). As such, it provides an overview of government measures and activities that potentially aid or hinder agricultural growth.

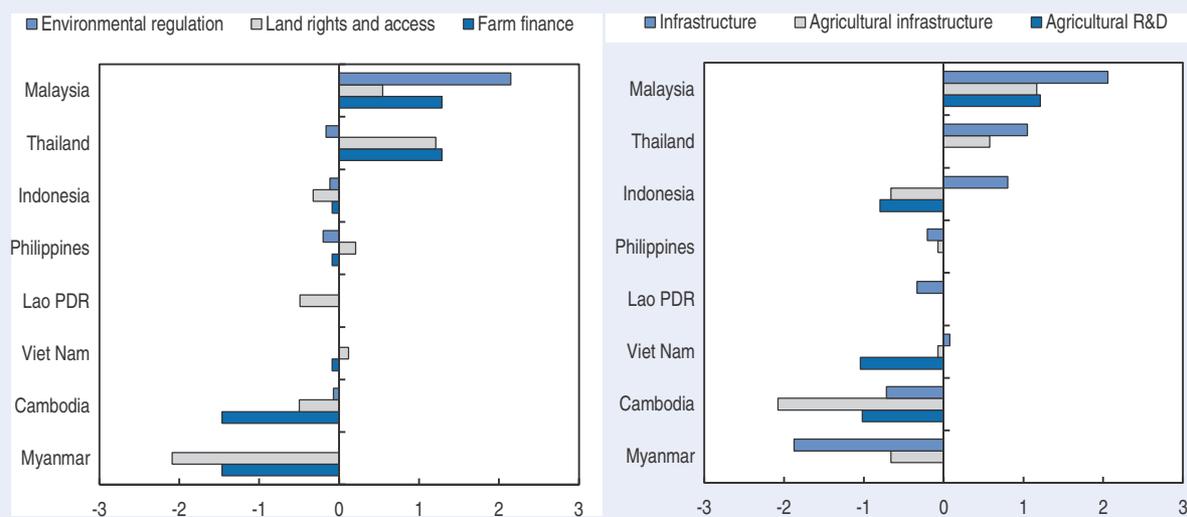
Although the performance of the ASEAN countries analysed varies significantly across the AGEI, the results reveal some common relative strengths and weaknesses. Relative strengths of the region as a whole include aspects of economy-wide policy settings – such as the broader macroeconomic environment and its structure (related to governance macro fiscal and monetary policy settings), labour market functioning and levels of human capital – and relatively abundant water resources (not shown in Figure 2.10), while common areas of relative weakness include agricultural and sustainability aspects of the enabling environment. With the exception of Malaysia, Southeast Asian countries tend to score relatively poorly with regard to public investments in agricultural R&D, land rights and access, farmer access to finance, the existence and quality of agricultural infrastructure – although Thailand also scores above average in this respect – and for the stringency and enforcement of environmental regulations (Figure 2.10). Indeed, the results suggest that, compared with other sectors, agriculture in Southeast Asian countries may actually be underprovided with public goods and other economic services.

### Box 2.1. Improvement of regional agricultural innovation systems is key to future productivity growth (cont.)

Recent analysis by the OECD has recommended that Southeast Asian governments direct policy efforts towards additional investments and reforms in the enabling environment to enhance future sustainable productivity growth to help address food security and manage future risks facing the sector. These include the improvement of environmental governance; regulations on land, water and biodiversity resources; and investments in infrastructure and agricultural R&D. Governments should also persevere with reforms to improve regulatory and institutional frameworks that govern rural land market rights and access, and should consider opportunities to increase farmer access to credit, including for small-scale farmers.

Figure 2.10. **There is scope to improve a number of areas of the enabling environment**

AGEI normalised scores for each country relative to sample average



Notes: Normalised values are calculated by subtracting the average for the 32 countries covered from each country value, and then dividing the resulting country value by the standard deviation for the series. This creates a series with zero mean and unit standard error.

Source: OECD (2017b).

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For some countries, additional policy reforms and investments could significantly alter future production. For Myanmar in particular, the potential for agricultural production and trade growth is potentially significant and could help drive the future development of the country (Box 2.2). This, however, will require a number of policy reforms and investments that allow producers to fulfil the opportunities they have in terms of access to regional and international markets. If Myanmar is able to make headway in this regard there are potentially significant gains in terms of poverty reduction and economic transformation.

### Fisheries

In the fisheries sector, the drivers of growth relate to both productivity improvements and changes to production mix. The rapid growth of aquaculture production over the last two decades has mainly been a direct result of the sector diversifying its practices and species mix (towards exportable species) coupled with increased levels of intensification. This is particularly the case for Indonesia, Viet Nam and Thailand, the most important producers in the region. The increasing levels of intensification have created issues in

### Box 2.2. **The potential role of agriculture in the future development of Myanmar**

Myanmar's economy needs to transform from an agrarian economy to one based more on a mix of activities, including manufacturing and services. Agricultural modernisation has the potential to be the catalyst for transforming the wider economy and reducing poverty wholesale.

Raising incomes in rural areas will require not only raising agricultural productivity and diversifying to high-value crops, but also expansion of agriculture's linkages to non-agricultural activities to stimulate employment in non-farm sectors. Expanding agricultural exports in a value-chain framework which can drive these linkages could be key to this transformation. This path for development is particularly relevant for Myanmar because of its natural resource endowments, its strategic location and a favourable external environment.

The OECD's *Multi-dimensional Review of Myanmar*, working through stakeholder consultations in the country, revealed a number of constraints on exports that need to be addressed:

- Poor quality infrastructure is a particular constraint in rural areas. Producers and traders often substitute the lack of public infrastructure with private, higher-cost solutions (such as fuel-based generators in place of national electricity supplies) which lowers profits and dampens incentives for investment.
- The rural sector's lack of an adequate financial system has constrained productivity. Although this is due in part to the underdevelopment of the financial system in general, the problem is particularly acute in the rural sector. Reforming the Myanmar Agricultural Development Bank (which has essentially been the only credit provider to date), providing incentives for commercial banks to operate in the sector, and expanding the variety of financial institutions and the range of services they offer will be important.
- Ambiguity in land tenure and production rights dampens production incentives. Stakeholders saw the need for an overarching law on land to overcome contradictory laws and overlapping responsibility for the laws by different ministries.
- Low levels of agronomic knowledge and skills of producers contribute to poor product quality and low productivity. Expanding agricultural extension services and farmer education, informed by solid agronomic R&D, can help spread modern farming practices using better quality inputs.
- Insufficient government support to access new markets and ensure quality and safety standards has constrained exports. The lack of government support to explore new market opportunities limits market entry potential in relation to competitors, while the lack of food safety inspection services increases production risks and limits market access. Important measures will include devoting resources to increase ISO-certified laboratories with appropriately qualified technical staff, and building the Myanmar brand through an effective export promotion agency.

Lifting these constraints will enable Myanmar to reap the opportunities offered by international markets for food products and help kick-start the country's structural transformation.

Source: OECD (2015b).

disease management and in terms of environmental impacts. For the export-oriented countries, continued growth will depend on their ability to sell aquaculture products to international buyers. This will require further adaptation to production practices that meet an increasing focus on traceability and to concerns relating to human health and potential environmental impact. Such concerns have impacted demand for selected species exports from Southeast Asia recently.

Land is also an important input for aquaculture production. The intensity of land use depends on the species; however, in general, increased production has generally depended on increasing access to land. Increasing land use will place greater pressure on an already constrained regional resource. The constraints vary across countries, but in some regions, competition exists between agricultural crops, such as rice, and aquaculture. In Viet Nam's Mekong Delta district of Tran Van Thoi, for example, from only a few ponds in 1973, by 2011 aquaculture covered around 20% of the land surface. The land occupied progressively moved from mangrove to rice paddy and then to aquaculture, with most of the latter change taking place as of 1995 to capitalise on the production of higher value shrimp (Tran et al., 2015). In contrast, Indonesia's extensive coastline and relatively undeveloped industry has meant that it has been less constrained than other countries (Phillips et al., 2015).

For marine fisheries, production growth has a number of different drivers. Growth has been fuelled by increases in fishing effort (including that displaced from more depleted coastal fisheries), and improvements in fishing technology and capacity that has allowed fishers to expand the range of their fishing activities to better access offshore stocks (Funge-Smith et al., 2012). Production growth has also been supported by fishing-induced changes to the ecosystem. For example, high rates of fishing pressure on predator species have had flow on effects on biomass levels, creating growth in biomass of prey species as falls in predation levels have allowed for catch increases in these species – fishing down the food chain effect (Funge-Smith et al., 2012). However, there are serious concerns over the sustainability of marine capture fisheries. A considerable number of fish stocks in the region are considered to be overfished – that is, fished beyond their biologically-sustainable harvest levels – and sustainable management instruments to control the level of fishing activity are often lacking (Funge-Smith et al., 2012). In Viet Nam, where coastal fishing effort is effectively unconstrained and resources are overfished, the expansion of offshore fishing operations over the last decade – targeting pelagic species such as tuna – has helped support capture fisheries growth, but there are concerns that without adequate management this development will be unsustainable. In particular, the growth in the offshore industry has predominantly come about as a consequence of government support, in the form of fuel tax credits, and is not believed to have alleviated pressure on inshore fisheries in the process (UNEP, VIFEP and WWF, 2009). Assessments, however, are limited significantly by a lack of data on a number of key regional species and true fishing pressure is often unknown due to illegal, unreported and unregulated (IUU) fishing. Given the limitations to capture fishery growth, aquaculture is expected to be the driver of production increases in the future.

Further to high levels of fishing pressure, inland, coastal and offshore waters of the region face challenges from habitat degradation, growing competition for scarce freshwater resources, reengineering of habitats by dams and other infrastructure, biodiversity loss, and industrial and urban pollution and diseases. With the region home to a large number of mostly small scale (around 90%) fishers and fish farmers – an estimated 14.5 million, of which 5.4 million are fish farmers (FAO, 2017c) – maintaining sustainable production from fishery resources will be important for the region.

### **Growing regional participation in world food markets**

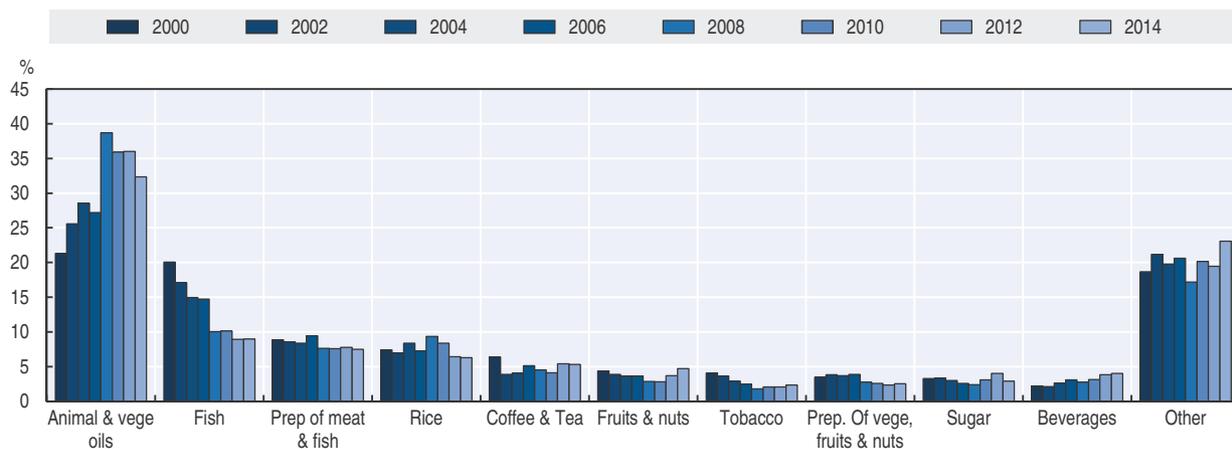
Southeast Asia is playing an increasingly important role in world agro-food trade. The region as a whole has increasingly become a net agro-food exporter, with around USD 139 billion in exports in 2014, compared with USD 90 billion worth of agro-food imports (WITS, 2017). Intra-regional agro-food trade is also an important component of food supply. The share of agro-food imports sourced from within the ASEAN group has trended upwards over time, rising from close to 21% in 2000 to 29% in 2011, but has since fallen, accounting for close to 24% of the region's total imports in 2014 (WITS, 2017). However, despite increased involvement in world markets, agro-food tariffs generally remain high and weighted average applied tariffs averaged 7.2% between 2010 to 2014.

Of the products traded, vegetable and animal fats and oils – in this case, palm oil – are the most important agro-food export, accounting for the largest share of agro-food export value – a share that has grown over time but fallen in recent years (Figure 2.11). Fisheries are also important, with exports of fish and seafood products (fish in Figure 2.11) the second-largest export earner and representing 15% of world fish exports. Since 2014, Viet Nam and Thailand have, respectively, been the third and fourth major exporters of fish and fishery products in the world. For the region, the export mix is also concentrated, with the top ten products accounting for over 75% of total export value. On the import side, there is more diversity. The top ten imported products account for just over 55% of total imports. Flours, brans and other food industry preparations and residues, dairy products, fish and seafood, and wheat are all major import products (Figure 2.11).

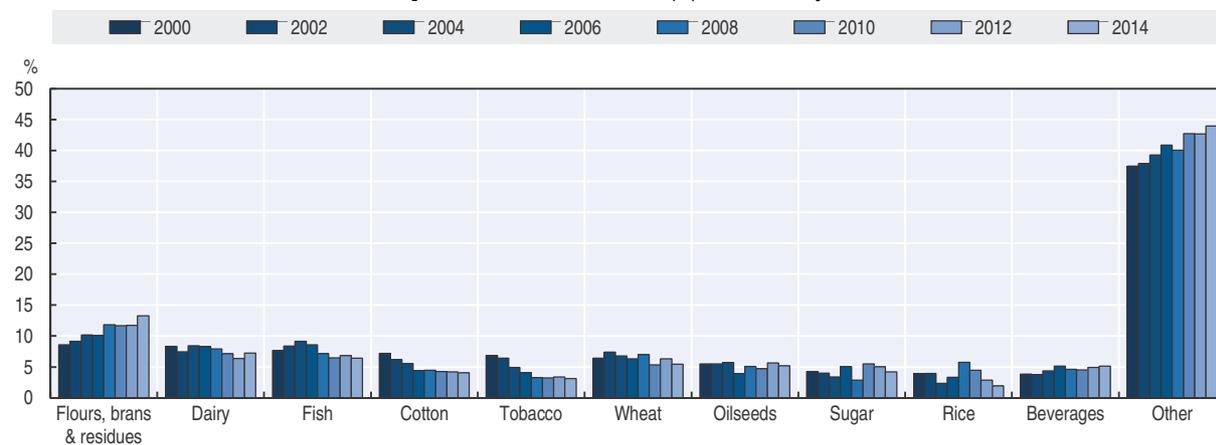
Rice is also a significant export and import crop. Overall, the region is a significant net exporter, with export values in 2014 that were five times greater than import values.<sup>6</sup> The strong net export position is primarily due to large export volumes from Thailand and Viet Nam (Figure 2.12). Recently, Cambodia also became a net exporter and Myanmar reported net exports in 2010 (but has limited reported trade data). The other countries in Southeast Asia are net importers (no data exist for Lao PDR).

With growing agro-food exports and imports, the region's producers and consumers are both more exposed to international markets and more reliant on these as a source of income and food. For Southeast Asian countries, this shift means that it is not only domestic agricultural policies that will influence outcomes for producers and consumers, but also those of other countries. The greater interactions in world markets now mean that Southeast Asian economies have more to gain from removing distortions in world agricultural markets, both those related to trade barriers and to those that distort domestic support. Recent analysis has found that multilateral reforms that reduce distortions in world agricultural markets, including those in Southeast Asian economies, can enhance the region's agricultural trade, incomes and overall welfare (OECD, 2016a). The effects are particularly strong for net exports from Indonesia, Malaysia and Thailand, primarily from higher exports of food products (processed products – for Indonesia and Malaysia in the form of palm oil, and for Thailand, in the form of sugar and processed rice). Such reforms should provide greater opportunities within the region for their agricultural sectors, ultimately helping to increase incomes in rural communities connected with agriculture and improve food security. The results indicate that it is in the region's interests that continued reforms to improve agricultural markets are made at the multilateral level. Indeed, FAO (2012) point out that with respect to food security, the gains from multilateral reforms are likely to be even greater than those from bilateral and regional agreements.

**Figure 2.11. Main agro-food export and import products**  
Exports, share of total value (%) in selected years

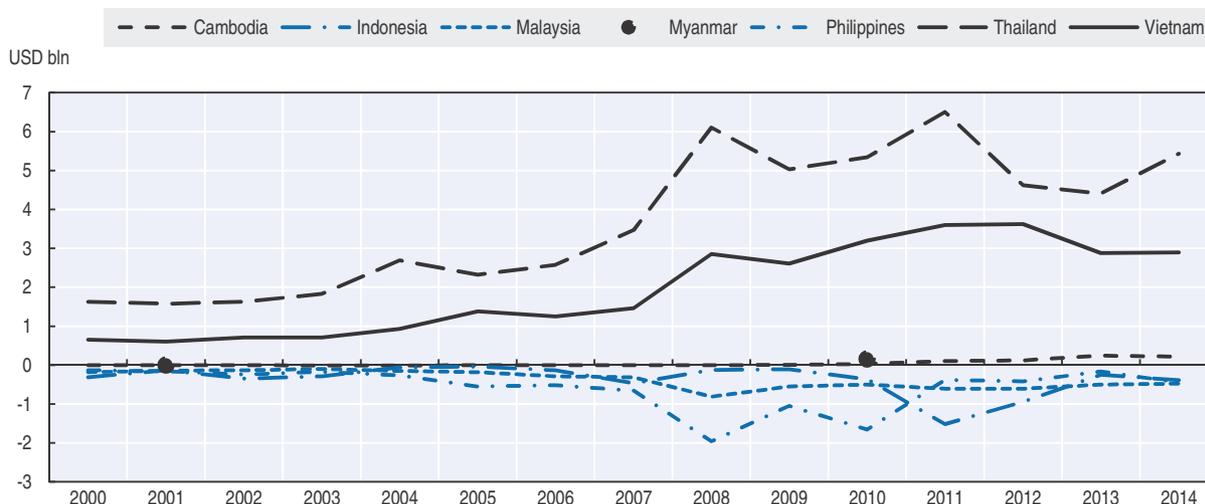


Imports, share of total value (%) in selected years



Source: WITS (2017), World Integrated Trade Solution, <https://wits.worldbank.org/WITS/WITS/Restricted/Login.aspx>.

**Figure 2.12. Net exports of rice**  
USD billions, 2000 to 2014



Notes: Data for Myanmar available for 2001 and 2010 only.

Source: WITS (2017), World Integrated Trade Solution, <https://wits.worldbank.org/WITS/WITS/Restricted/Login.aspx>.

However, for both, reform undertaken in the context of agreements needs to be accompanied by appropriate domestic policies that target labour markets, social safety nets and equity of opportunity to address the adjustment costs that will be created.

From a domestic viewpoint, the removal of trade restrictions is important for the agricultural sector to remain competitive and generate income for producers. As noted by FAO (2015), there are several dangers in excessive impediments to open trade. Distorting one commodity – usually rice in the case of Southeast Asia – affects resource allocation in general and will encourage producers to remain dedicated to rice production, reducing incentives to shift into the production of higher-value (return) crops. Beyond incomes, the influence of higher staple product prices on household budgets can impede better nutrition as access to the variety of foods needed for better nutrition is hampered. Such policies can also increase current food insecurity and the vulnerability of households to temporary food insecurity risks, as discussed below.

The rising presence in international agro-food markets is not simply a matter of exporting one commodity and importing another. Agricultural production, like that of other areas of the economy, has changed with the development of global value chains (GVCs). GVCs have arisen as both technology and changes in demand have allowed for a distribution of production so that the production of a good from raw material to final product now seldom takes place in the same location (Baldwin, 2012).

Recent data on agro-food trade in value added, as opposed to gross trade value, allows for GVC development in agricultural and food production systems to be observed (see Greenville, Kawasaki and Beaujeu, 2017). Instead of tracing individual product types across borders, the contribution of production in sectors in specific countries is observed, allowing for the value of any given trade flow to be broken up into the various contributions from sectors across the world, including in the countries in Southeast Asia.

For Southeast Asia, data on trade in value added reveals that the region is heavily integrated into world agro-food GVCs (Box 2.3). The region has strong agro-food GVC linkages to countries in other parts of Asia and to Europe. However, there appears to be significant gaps in regional inter-linkages (little trade flow of value added between countries), with the exception of some specific country links, such as Indonesia-Malaysia, and Cambodia and Lao PDR to Viet Nam.

For a number of sectors, including the large export sectors, foreign inputs form an important component of the export value. Such inputs, drawn from a diverse array of industries, help to improve competitiveness and can improve productivity within the industries that use them (Lopez-Gonzalez, 2016). For fisheries, fishery product exports from Thailand and Viet Nam rely on foreign supplied raw materials (often from within the region); these countries have higher backward integration into value chains than the ASEAN or world average (Greenville, Kawasaki and Beaujeu, 2017). These sectors also supply significant amounts of intermediate products that are used in other country exports. The important processing industries in these two countries significantly contribute to their economy through job creation and trade (FAO, 2016). The significant linkages between Southeast Asia and other countries worldwide mean that the competitiveness of agro-food exports is significantly influenced by policies that raise the cost of imported goods. Import barriers placed on agro-food products can effectively act as a tax on exports, limiting the domestic returns available from participation in agro-food GVCs (Greenville, Kawasaki and Beaujeu, 2017).

### Box 2.3. Southeast Asia a major player in agro-food GVCs

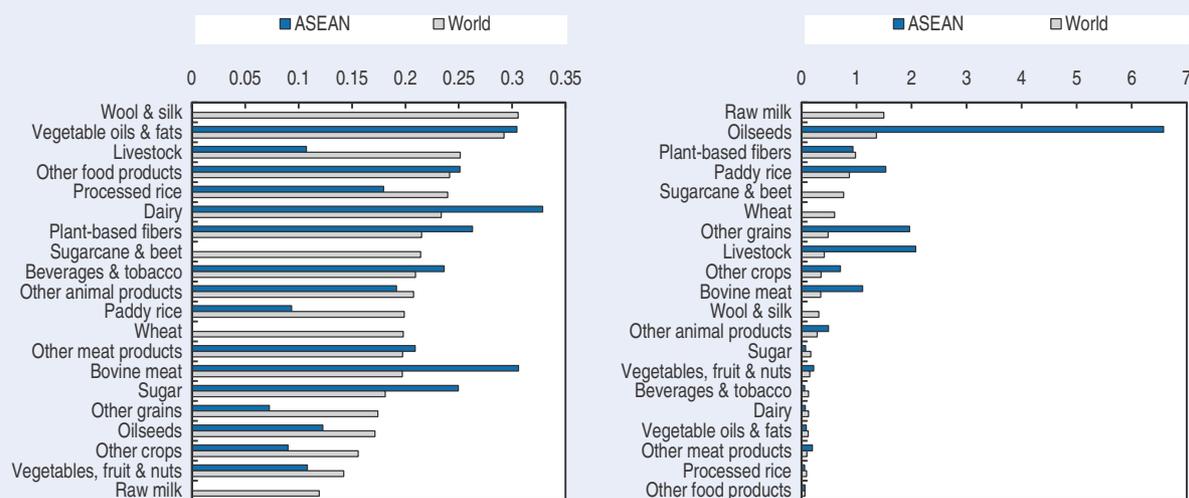
A recent study by Greenville, Kawasaki and Beaujeu (2017) explored trade in value added data for 2011 for 20 different agro-food sectors. Examining trade in value added allows for the international trade of goods, including agricultural products, to be broken down into the various contributions from different sectors worldwide. Doing so reveals the GVC for different products.

GVCs can be characterised in a number of ways, but a common approach is to explore them from the sector-country perspective through measures of vertical specialisation – forward and backward participation. The forward indicator captures the extent to which a sector's exports form part of a production process in another country, contributing to that other country's exports (selling into GVCs), while the backward indicator indicates the extent to which imports from other countries are used in the production of a country's exports (buying from GVCs).

Southeast Asian participation in GVCs varies compared with world averages across the 20 agro-food sectors (Figure 2.13). For the oilseeds sector, there are strong linkages to ongoing GVCs largely through the vegetable oils & fats processing sector (processed palm oil). However, the vegetable oils and fats sector also has significant backward linkages, indicating that it uses a number of foreign inputs into its production processes to underpin its competitiveness – these range from imported raw palm fruit to chemical products and a significant use of imported trade and business services. Across the broader range of sectors, a large part of the differences in engagement is driven by structural factors (that is to say production possibilities due to climate and land availability, for example in the case of wheat), but not all. Globally, Greenville, Kawasaki and Beaujeu (2017) show that policy factors, such as trade policy settings, the agricultural enabling environment and policies in services are all important in explaining differences in GVC participation and domestic value added creation. In particular, they show that tariffs and other trade barriers, along with distorting forms of domestic support to the agricultural sector, act as an effective tax on value created through participation in agro-food GVCs.

Figure 2.13. **ASEAN and world GVC participation**

Backward and forward linkages, 2011  
Backward (left); Forward (right)



Source: Greenville, Kawasaki and Beaujeu (2017).

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### ***Agricultural policies in Southeast Asia: A focus on rice and self-sufficiency***

Agricultural policy in Southeast Asia is interlinked with food security policy in a number of countries. In general, for much of the region, agricultural and food security policy can be characterised as “rice-centric”, with governments employing a complex range of measures in an attempt to balance often competing objectives (Alavi et al., 2012; Dawe et al., 2014; OECD, 2017b). For both large and small rice producers, an emphasis is placed on rice production such that it is sufficient to meet domestic demand –indeed, policies oriented towards self-sufficiency are used throughout the region (Box 2.4). The policies chosen to pursue these objectives tend to vary. In general, for importing countries, they are related to attempts to spur domestic production through the use of price support, trade barriers and input subsidies. For exporting countries, governments use interventions in export markets (taxes, bans, licencing arrangements) along with attempts to “lock-in” a certain quantity of rice production (OECD, 2017b). This does not mean that other substantial investments to support agriculture have not been made. In particular, some countries have made substantial investments in the enabling environment, focusing on irrigation and other agricultural infrastructure (much of it though directed towards rice). However, the relative size of this type of expenditure suggests that these are not the main focus of policy in many countries.<sup>7</sup>

On the consumer side, some countries have public distribution and public stocking regimes aimed at provide subsidised rice and in some instance also at stabilising market prices. These are most notable in countries such as Indonesia, Malaysia and the Philippines (OECD, 2017b). While such regimes have stabilised prices compared to other Southeast Asian countries, as they are used in conjunction with trade barriers they have stabilised prices at much higher levels, bringing into question the net impact on food security. For example, in Indonesia domestic prices in 2012-14 were 70% above comparable world prices (OECD, 2016b) and trade and investment restrictions are reported to have placed added pressure on consumer prices for fish products (OECD, 2017b). It is worth noting, however, that much of the rice acquired for the market operations and public distribution is imported, indicating that these countries maintain an interest in having well-functioning international markets.

Stockholding policies are also seen on the exporter side, with Thailand at various points over time using government purchasing and stockholding policies as a means to influence producer incomes and influencing world prices (Permani and Vanzetti, 2014). Most notably, in 2011, the Thai Government built large stocks after it pledged to pay domestic rice producers 50% more than the market price. The Thai Government subsequently abandoned the scheme as its cost grew and world prices did not increase. Past reviews of the set of agriculture-related food security policies used in the region have pointed to shortcomings with current policy approaches, with some suggesting that opportunities exist to pursue alternative policies that can better address food security concerns in the longer term (Dawe et al., 2014; OECD, 2017b). Studies suggest that many of the interventions have created inefficiencies in resource allocation within the economies, discouraged private investment by creating greater uncertainties, and imposed significant budgetary costs on governments, and for which there are significant opportunity costs in terms of other policy priorities (OECD, 2017b). Further, large leakages and difficulties in effective targeting have characterised a number of food distribution programmes used in the region (Deuss, 2015).

#### Box 2.4. Self-sufficiency policies common in Southeast Asia

Almost all Southeast Asian countries have some form of self-sufficiency policy. The use of policies directed at achieving some level of self-sufficiency has increased since the 2007/08 food price crisis. The push towards self-sufficiency has often been framed around a desire to no longer be vulnerable to world price movements similar to those that were seen during this period – especially for rice – despite the fact that it was largely policy factors, and not global imbalances in supply and demand, that explained the food price spike (Alavi et al., 2012; OECD, 2008; Piesse and Thirtle, 2009; Naylor and Falcon, 2010; Headey, 2011).

Self-sufficiency policies are often supported by production targets for a particular commodity or set of commodities. Across Southeast Asia, almost all countries have some form of self-sufficiency related target (Table 2.2). Within this, Indonesia has the most ambitious set of targets, aiming for self-sufficiency across all main staple products. The Philippines is the only country which has coupled a drive for self-sufficiency in its two main staple crops (rice and maize) with attempts to diversify individual diets by encouraging consumption of a wider set of food products (Philippines Government, 2011).

These targets are further underpinned by a wide variety of output, input and trade-related interventions. Beyond the supply side, some countries have also sought to intervene in markets with the expressed aim of stabilising prices for the benefit of both producers and consumers. This intervention has taken the form of public stockholding policies, most notably in Indonesia, Malaysia and the Philippines.

Table 2.2. Self-sufficiency targets of ASEAN members

| Country           | Self-sufficiency target   |
|-------------------|---|
| Brunei Darussalam | Rice self-sufficiency of 20% by 2015 and 60% over the longer term (2035)  |
| Cambodia          | <b>No specific self-sufficiency targets</b>   |
| Indonesia         | Complete self-sufficiency (100% of domestic production) targets for rice, maize and soybeans by 2017 and beef and sugar by 2019                                 |
| Lao PDR           | Production targets for rice ~ 4.2 Mt by 2015 and rate of increase targets for other products. Absolute quantity targets of food production for some commodities |
| Malaysia          | Self-sufficiency targets for rice of 90% of domestic consumption plus other production targets  |
| Myanmar           | <b>No specific self-sufficiency targets</b>   |
| Philippines       | Self-sufficiency in rice previously set for 2013, but later abandoned set year target. Self-sufficiency in maize production by 2013                             |
| Singapore         | Increase self-sufficiency levels to 30% for eggs, 15% for fish and 10% for leafy vegetables   |
| Thailand          | <b>No specific self-sufficiency targets</b>   |
| Viet Nam          | Maintain a 2.5% rice yield increase per year until 2020, and the set aside of 3.8 m ha of land specifically for rice production                                 |

Source: Adapted from OECD (2017b).

In some instances, to spur production, policies have increased domestic prices with a view to increasing the availability of domestically-produced food. However, such policies are unlikely to be effective in helping to address food security for vulnerable consumer households. Moreover, the ineffective nature of this type of support in addressing the low farm incomes of the poorest – and in a number of cases the incidence of price support accruing to otherwise food secure households – suggests that even for poor rural producers, the long-run impacts on food security are questionable.

Beyond domestic policies, ASEAN has established a sound regional architecture to address many of the key food security challenges facing the region. ASEAN regional frameworks are developed by member states through the co-ordination of the ASEAN Secretariat, which is responsible for the organisation of the various working groups and meetings along with implementation of various ASEAN projects and activities. For agriculture and food security, the ASEAN Integrated Food Security Framework and the Strategic Plan for ASEAN Cooperation in Food, Agriculture and Forestry provide a solid platform on which ASEAN member states are

pursuing policies to address long-term food security. These regional policy frameworks are underpinned by core policy areas and a number of “Strategic Thrusts”, which set out actions for ASEAN member states to address food security. This regional framework is also supported by the ASEAN Plus Three Emergency Rice Reserve (APTERR) that seeks to provide food coverage across the region in times of severe short-term need and sits under the overall ASEAN Economic Community Blueprint. The general objective of these regional frameworks is to help address food security through greater regional integration. Beyond ASEAN, other regional structures exist, such as the Mekong River Commission, which are tasked to improve resource use and planning across a range of Southeast Asian countries.

Recent OECD analysis (OECD, 2017b) has indicated there are significant benefits on offer from additional efforts and policy choices that are consistent with the core policy areas identified in the regional frameworks. For example, further integration of regional rice markets, in line with the ASEAN Economic Community Blueprint, will help the region better manage food insecurity risks and, through the price effects created by integration, help to reduce regional undernourishment (Box 2.5). Rice market integration allows domestic production risk (and so price) risks to be hedged across the region, allowing individual countries scope to better manage domestic production risks that occur more frequently than international market risks. Overall, ASEAN rice market integration would reduce the undernourished population by 5% in the five countries examined (Indonesia, Myanmar, the Philippines, Thailand and Viet Nam).

However, the impact of regional integration will not be evenly felt. Both Indonesia and the Philippines would be expected to witness the largest improvements in food security, but at the same time, agricultural adjustment would take place as domestic rice production would be replaced in part by imports. For these countries, the provision of assistance specifically targeted at vulnerable households, and investments to allow producers who formerly benefited from higher prices to shift away from rice production would be required (Box 2.5). That said, even with full regional integration, for both Indonesia and the

#### **Box 2.5. Regional integration of rice markets good for regional food security**

The development of the ASEAN Economic Community AEC extends well beyond agriculture and aims to allow for the free flow of goods, services, investment and skilled labour across the region, along with the freer flow of capital. As such, it has the potential to significantly impact growth opportunities in the region, agricultural competitiveness (within countries and for the region globally), along with important policy focuses such as food security.

Full economic integration will take time to occur. Nevertheless, in moving down this path, and through exploiting the potential benefits of developing a single market and production base, food security could be enhanced. Bello (2005) argues that free trade in rice and maize, enhanced by improved trade facilitation measures and the harmonisation of food regulations, could improve food security for each of the ten ASEAN members. Such measures would exploit the natural diversity in agricultural production systems across the region to the benefit of all members. Others have explored further integration specifically in the area of rice. Rice has remained a product which has only seen little steps taken to regional integration. Hoang and Meyers (2015) found that for the importing countries of Indonesia, Malaysia and the Philippines, integration of rice markets could lead to falls of around 30-40% in prices, whereas price rises on world markets were around 30%. It is noted, however, moves to integration are best realised through shared actions over time. In this way, the disruptions to world markets are minimised and time is allowed for adjustments in both exporting and importing countries, avoiding pressures on world markets.

**Box 2.5. Regional integration of rice markets good for regional food security (cont.)**

Recent OECD analysis supports findings on the potential positive links between regional rice market integration and food security. The analysis explored both tariff reductions but more importantly further reforms that see full integration and the convergence of producer prices across the region. The analysis shows that there is much to be gained – in terms of managing risk and improving food security – from moving towards regionally integrated rice markets. For the economies involved, the analysis suggests that regional integration of rice markets could increase total welfare by around 2.8 billion USD annually (once full integration is achieved in 2025). Of this, USD 1 billion accrues to the Philippines with the remaining gains spread more evenly across countries. Where integration occurs, fall of between 25 and 45% in prices are seen in importing markets (Indonesia, Malaysia and the Philippines), with prices rising in the other regional markets by between 9 and 17%. Underlying these estimates, however, are a range of winners and losers from the reforms and it is important to deal with the adjustment this entails, in particular, it is important to provide new opportunities for displaced rice farmers and safety nets for households put at risk in both importing and exporting countries.

At the household level, the impact of ASEAN rice market integration was explored using individual household level data; it was found that integration would reduce undernourished populations by 5% in the five countries examined (Indonesia, Myanmar, the Philippines, Thailand and Viet Nam). The 5% fall in undernourishment accounts for both the benefits from price falls in some countries and costs from price rises in others. Of these five countries, undernourishment in two rice-importing countries – Indonesia and the Philippines – would fall the most due to the resulting decreases in domestic prices (in Indonesia, Malaysia and the Philippines prices are projected to fall by 39%, 26% and 45% respectively). The integration of regional rice markets also helps to mitigate the otherwise large impact of weather risks in the region. In particular, increased consumer access in both Indonesia and the Philippines could offset the food insecurity impact of a regional *El Niño* or of domestic crop failure, which are identified as the largest risks to food security for these two countries. While the regional *El Niño* scenario increases the undernourished population in five ASEAN member states by 49% under the current rice trade regime, integrating the regional rice market could mitigate the impact to a 11% increase. However, integration will have negative impacts on producers in importing countries and poor consumers in exporting countries due to the price effects. While safety nets can help to mitigate the potential negative effects of these, it is also likely that the gradual integration of the regional rice market would actually prevent a sharp increase in consumer rice prices in exporting countries.

Regional integration will also have an impact on world markets as there would be some diversion of trade. In total, integration would see an increase in regional trade by 10 Mt, about half of which would come from a diversion of exports that would have gone to the rest of the world (with the difference attributable to higher production growth and lower consumption growth in exporting countries). Reduced supply to the world market would cause international prices to rise by approximately 8%, thus impacting on food security in countries outside the region.

In addition, greater involvement of the private sector in regional rice trade could help to facilitate the necessary market integration, as well as providing benefits in terms of greater efficiency, reduced distortions and greater potential for growth. Viet Nam could, for example, allow its private exporters to play a greater role in the export market, while in the Philippines, Malaysia and Indonesia; the role of state agencies in imports could be restricted to the neutral management of emergency stocks to enable the greater involvement of private traders.

Source: OECD (2017b); Furuhashi and Gay (2017, forthcoming).

Philippines, despite a shift to larger import volumes, 89% and 73% of their respective domestic consumption would continue to be provided by local production (compared with current levels of 99% to 86% respectively). This highlights that in both countries, regional integration and a vibrant and internationally competitive rice sector can indeed co-exist.

Regional integration will also have impacts outside Southeast Asia. Rice trade is concentrated to a few large exporters globally, and as such, the shift in supplies to other Southeast Asian countries will influence world prices and supplies in other regions. In particular, the out-of-region effects would see world prices rise by 8%.

### ***Fisheries policies in Southeast Asia: The sustainability and food security challenge***

Like agriculture, the fishery sector in Southeast Asia is dominated by small-scale producers. Coupled with difficulties in managing often open access resources, this presents a number of challenges for regional policy makers as they seek to ensure that production is sustainable. In conjunction with this, like for agriculture, fishery policies are often interlinked with food security objectives. Less information is available on a consistent basis across the region on fisheries management policies, however; in general all countries recognise the sustainability challenges facing their fisheries sectors, but have taken differing steps to address them.

In Indonesia, for example, the main objective underpinning fisheries sector policy relates to increasing domestic production in order to increase the availability of seafood in the country, as well as supporting the livelihoods of artisanal fishers and aquaculture producers (OECD, 2017b). An ambitious programme to achieve this objective has been put in place that combines attempts to address illegal industrial fishing; promoting the development of the artisanal fleet through modernisation; encouraging the expansion of artisanal aquaculture production by supporting the creation of artisanal cooperatives; restricting imports to protect domestic producers and fishers from competition; and improving value creation by investing in infrastructure and attracting foreign investment to the processing sector. Fisheries policies in the Philippines also feature food security objectives linked to production, employment and poverty reduction (FAO, 2017d).

Malaysia, the Philippines and Thailand, along with Indonesia, all have policies targeting illegal, unreported and unregulated (IUU) fishing but to varying degrees (FAO, 2017d). These policies ultimately seek to reduce fishing pressure and better allocate the returns from fishery resources to domestic fishers. Malaysia also has in place a series of spatial management tools implemented through marine protected areas. Such measures have been argued to help improve fishery management outcomes in instances where more direct and efficient policy measures cannot be implemented (Greenville and MacAulay, 2007) – in this case due to the small scale nature of producers.

Policies in both Cambodia and Viet Nam are heavily focused on the development of the aquaculture sector (FAO, 2017d). For Viet Nam, there has been a focus on developing new varieties to expand access to international markets while at the same time attempting to better comply with a number of market requirements related to product safety and production techniques. Increasing the competitiveness of Vietnamese producers, by improving domestic transport links within the country and facilitating the movement of product from production sites to export hubs, is also a priority. For Cambodia, policy efforts are seeking to exploit production synergies with rice cultivation, and so have a small-scale production focus.

## Medium-term outlook

The previous two decades have witnessed substantial changes within the agriculture, fishery and food sectors of the Southeast Asia region. The ongoing policy environment and changes in international markets, coupled with the continued evolution in the region's economies and societies and growing environmental issues, all form important driving influences over the next decade. The key questions facing the Outlook include not only how food security in the different countries of the region will evolve, but also whether and how the region's trade profile may change in a way that may affect international markets.

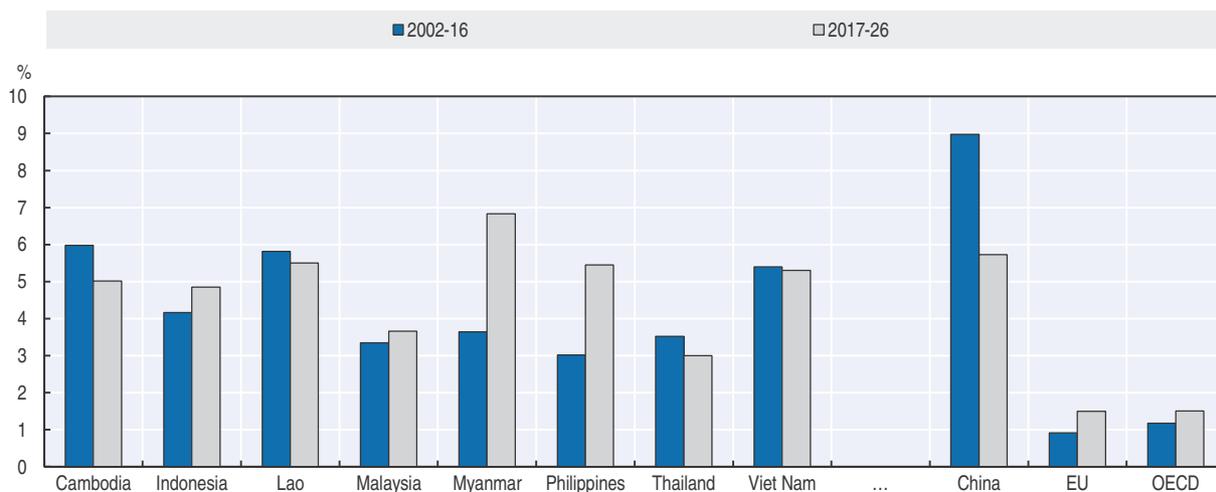
### Key economic and social factors underlying the agricultural outlook for the region

The region has developed considerably over the past 15 years, a trend that is expected to continue. Going forward, key influences on the medium-term outlook will include continued relatively high levels of economic growth, consumption changes (both regionally and globally) and population growth.

Economic growth for Southeast Asia the outlook is relatively optimistic (Figure 2.14). For four of the countries examined in the region, per capita GDP growth is projected to be higher than that experienced over the past 15 years (2002-16). Furthermore, growth rates are expected to exceed those seen in developed countries – exceeding OECD and EU averages – but for all but Myanmar, per capita growth is expected to be below that of the People's Republic of China (hereafter “China”).

Figure 2.14. **Past and projected GDP per capita growth in Southeast Asia**

Average annual per capita growth rates (%), selected periods



Source: IMF (2016); OECD-FAO (2017), “OECD-FAO Agricultural Outlook”, OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-data-en>.

1 2 <http://dx.doi.org/10.1787/888933521807>

The expected high levels of growth in the Southeast Asian region will have effects on agro-food markets. First, higher growth should reduce poverty levels, which will in turn contribute to increases in demand and the reduction of undernourishment. Second, higher incomes will also change the *nature* of demand. As incomes grow, there will be a substitution away from some staple crops, such as rice, to other products, particularly animal products. Third, the changes in economic growth are occurring alongside

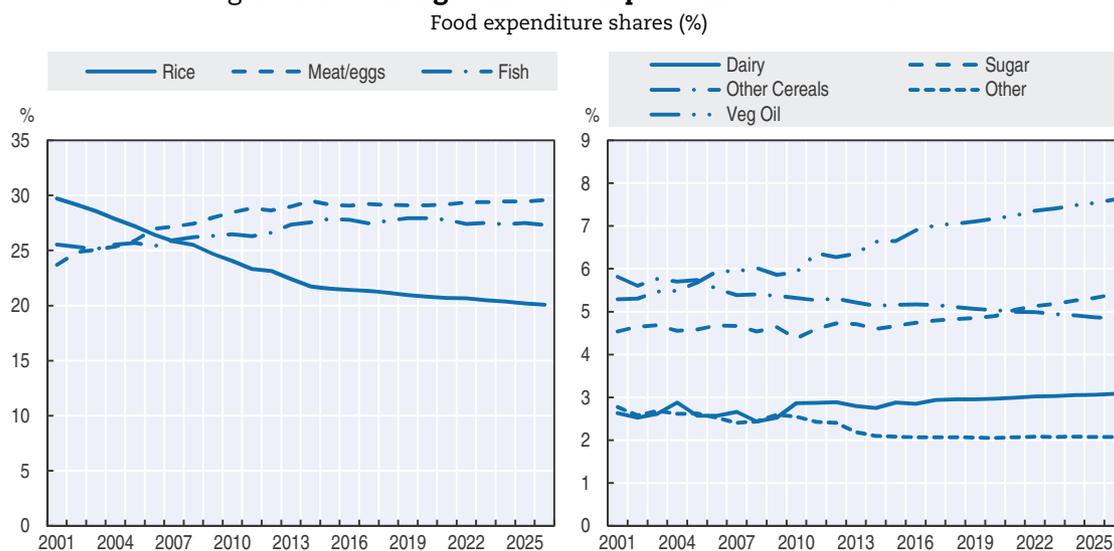
population growth. Higher population levels will lift demand across the board for agro-food products, augmenting the abovementioned income effects for some products.

### Continued shifts in consumption away from cereals

As the region develops, income levels rise; and as people move to urban settings, consumer buying patterns will also change. With rising incomes, the general transition from staple cereal consumption to protein based diets is expected to occur over the medium term in Southeast Asia. For this region, the key changes will revolve around shifts in demand for rice. Since the early 1960s, countries in Southeast Asia have seen drops in the relative importance of rice in meeting total caloric consumption. The rates of change have been most significant for both Thailand and Malaysia (which have the highest per capita income), indicating that diets have diversified most in these countries compared with the 1960s. In contrast, the importance of rice in the average diet has increased in the Philippines due to rising incomes of the poorest (Lantican, Sombilla and Quillooy, 2013), and in Brunei Darussalam more recently, albeit to a lesser extent and from a much smaller base. Nevertheless, data on household consumption in five Southeast Asian countries (Indonesia, Myanmar, the Philippines, Thailand and Viet Nam) reveals the income effect; in other words, wealthy households consume less rice than poorer households (OECD, 2017b). Similar effects are likely to be seen at the global level, with demand for rice expected to fall relative to that of other products (Sharma, 2014). Despite this, income and population growth will see total demand for rice and other products increase over the medium term.

In terms of expenditure shares, the most notable change in consumption (expressed as shares of total expenditure) relates to the continued fall in rice's share of total consumption – from nearly 30% in 2001 to 21% in 2016, falling further to 20% in 2026 (Figure 2.15). For the other major consumption items – those of meat and eggs and fish, shares are expected to remain stable over the projection period.

Figure 2.15. **Changes in consumption in Southeast Asia**



Note: Apparent food consumption of modelled products valued at estimated retail prices in USD in 2010.

Source: OECD-FAO (2017), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-data-en>.

1 <http://dx.doi.org/10.1787/888933521826>

Of the other commodities, both sugar and vegetable oils are products which experience more significant changes in demand. For both of these, the projected changes in income are associated with an increase in consumption expenditure share of close to 1% per year between 2016 and 2026.

### ***Slowing population growth***

Population is expected to continue growing but at slower rates than observed in the past. Over the projection period, total population growth in Southeast Asian countries (excluding Myanmar) is projected to fall from the 1.3% annual growth experienced in the period 2001-16 to 0.9%. This overall growth masks large differences across countries – Lao PDR is projected to experience annual growth of around 1.5% compared to close to zero growth in Thailand. Population projections also indicate that, over the next 10 years, the rural population within the region will start to decline. Continued strong growth in the urban population will mean that urban populations will exceed rural populations by 2020.

With continued strong GDP growth and falling population growth rates, per capita incomes are likely to rise faster than in the past. Such changes will accelerate shifts in demand as highlighted above. However, for food security and poverty alleviation, it is important that the projected growth is *inclusive* and that Southeast Asian countries are able to avoid the widening of income inequalities.

## ***The outlook for production and prices in Southeast Asia***

### ***Production***

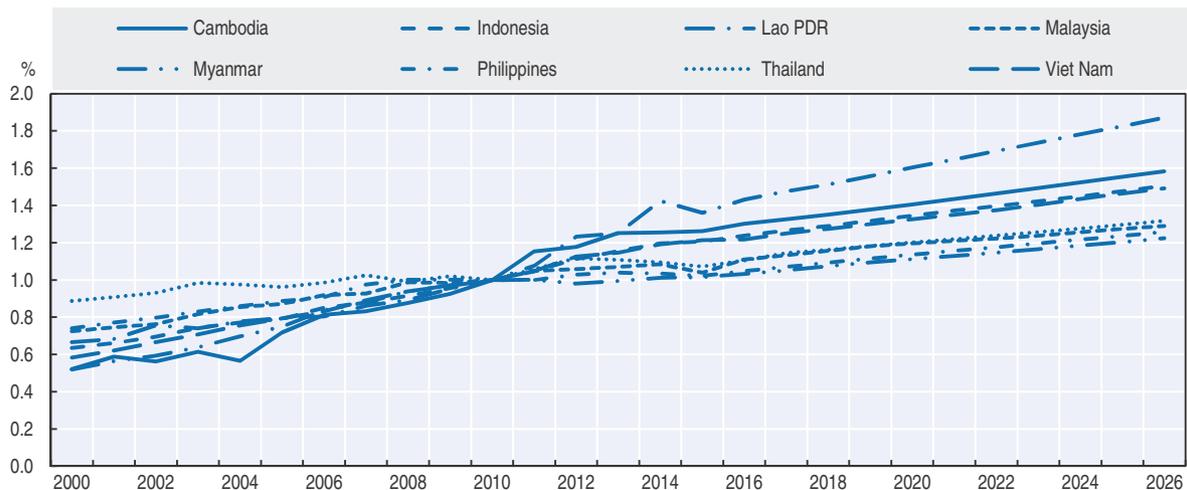
The changes in production within Southeast Asia projected over the medium term are a combination of both domestic supply and demand effects along with feedback from international markets. The relative influence of domestic and international impacts will depend on the relative exposure to international markets by different sectors. For example, production of vegetable oils in the region will be more influenced by international markets under current policy settings than many other sectors as 70% of production is exported (in 2016).

For individual countries, projected growth rates vary (Figure 2.16). Highest growth rates are projected for the least developed countries – Lao PDR, Myanmar and Cambodia. However, strong growth rates are also observed for Viet Nam and Thailand, two of the region's biggest agricultural exporters.

For the region as a whole, while agriculture and fishery production is expected to grow, slowing growth rates in a number of countries will mean that the growth of regional production will slow relative to world production growth. This means the region's share in total world production is expected to remain relatively stable over the medium term. Rising land and environmental factors will play a role in these changes. Net agriculture and fish production is projected to grow at the rate of 1.8% per year over the next decade, down from a robust rate of 2.7% per year experienced over the previous ten years (Figure 2.17).

The slow-down in production in the region is mostly due to reduced growth in fishery production which is projected to fall to a growth rate of 1.2% per year, down from annual growth of over 3.6% seen over the past 15 years (Figure 2.18). With the high share of fishery production in total production, the effect of this slow-down is significant. Most of the slow-down in production is derived from the slowing of growth in aquaculture as past expansion in activities are projected to be limited by land availability, environmental constraints and

Figure 2.16. **Net agriculture and fish production across Southeast Asia**  
Index values



Source: OECD-FAO (2017), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-data-en>.  
1 2 <http://dx.doi.org/10.1787/888933521845>

Figure 2.17. **Southeast Asian versus world agriculture and fish production**  
Average annual growth rates and share of world trade (%)

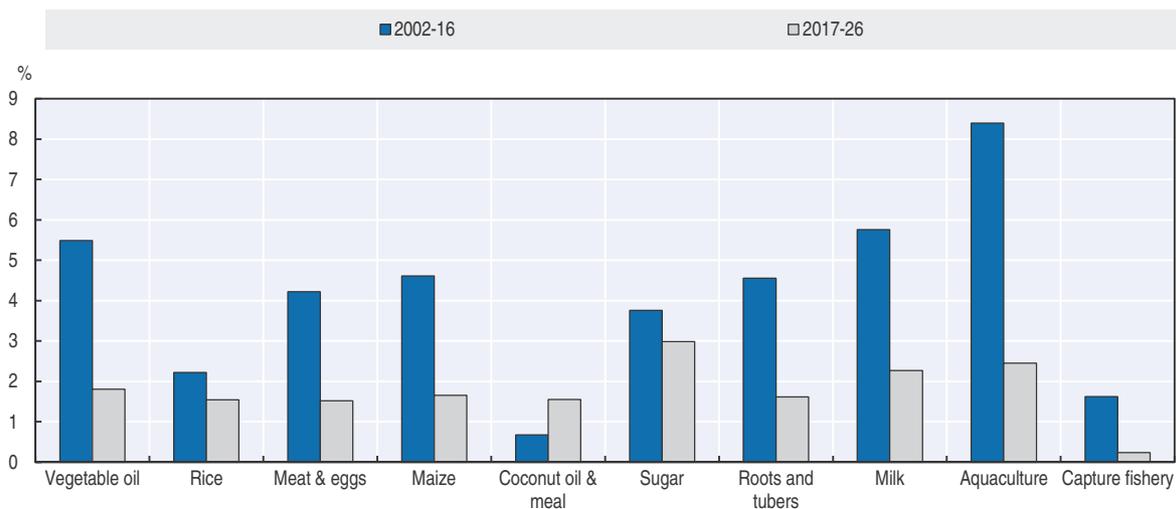


Source: OECD-FAO (2017), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-data-en>.  
1 2 <http://dx.doi.org/10.1787/888933521864>

market opportunities. Similarly, the past expansions in capture fishery production, driven through inland capture fisheries, are not projected to continue as pressure on already exploited stocks is expected to cap production at current levels. Indeed, there is a risk that production could fall if management practices are not improved.

The region's other major crop, palm oil (captured through vegetable oils), is also projected to slow in growth (Figure 2.18). Past expansion in production has been driven by both yield improvements but importantly by area expansion. Production is projected to fall from a growth rate of close to 6.5% over the past 15 years to around 2% over the next ten years. For rice, the third largest production activity in value terms, the region is projected to grow at a rate of around 1.6% per year, slightly higher than that seen in the past decade but lower than the growth rate observed over the past 15 years. At the regional level, commodities anticipated to

Figure 2.18. **Changes in major production activities in Southeast Asia**  
Average annual growth rates (%)



Source: OECD-FAO (2017), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-data-en>.  
1 <http://dx.doi.org/10.1787/888933521883>

grow most strongly include are sugar (3.0%/yr) and milk (2.3%/yr), albeit at slower rates than in the past. For meat and eggs, production growth is similarly projected to slow and there are projected compositional changes. Poultry is projected to have the strongest growth (1.8%/yr) and strengthening its lead over pig meat as the largest meat sector in the region.

One sector where production is expected to accelerate compared with past growth is that of coconut (Box 2.6). This increase is projected to occur on the back of replanting of aged palms and rehabilitation of growing areas, particularly in the Philippines.

### Box 2.6. The coconut economy

Coconuts are cultivated across the tropics, but commercial production is highly concentrated in Southeast Asia. The Philippines accounts for 44% of global copra production and Indonesia follows at 28%. The industry makes significant contributions to the agri-food sectors of these countries and is also a socio-economic pillar in rural areas, where smallholders account for 80-90% of primary coconut production. In the Philippines alone, an estimated 25 million people depend on the coconut industry.

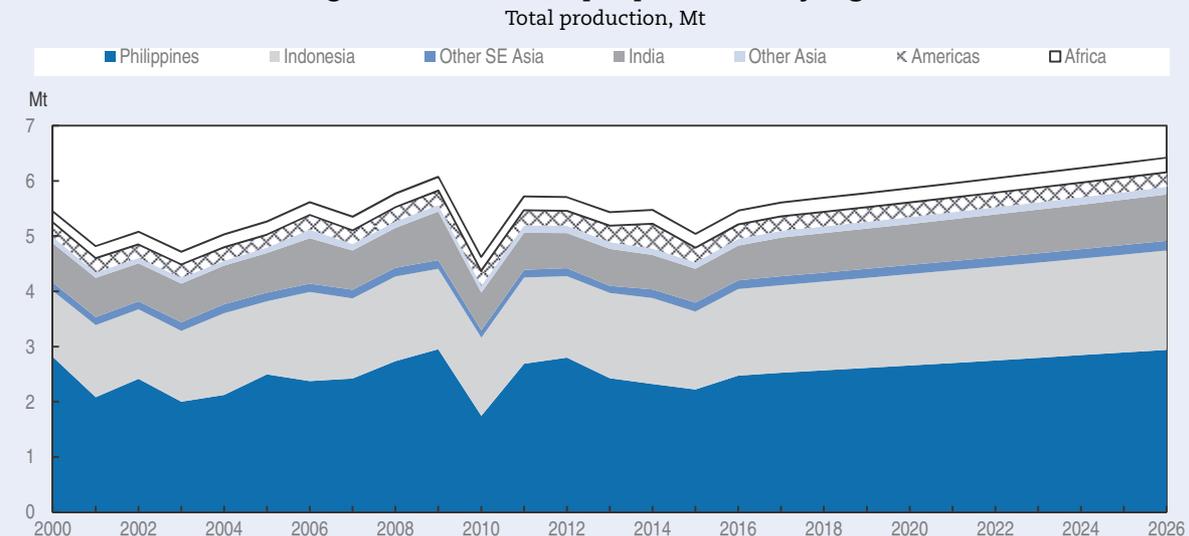
Despite 1 Mha of new coconut plantings during the last decade, global coconut production stagnated as a result of declining productivity. This downward trend was due to aged palms, insufficient access to inputs, underdeveloped institutional capacity and numerous pests and diseases. The situation has also been intensified by the devastation of large coconut-producing regions by increasingly frequent severe weather events, such as typhoon Yolanda in 2014.

Palm kernel oil and coconut oil are the main raw materials of the vegetal oleo chemical industry. The small-scale structure of the coconut plantations and processing plants, combined with the rapid expansion of the highly concentrated and industrialised palm oil industry, have caused many processors to shift to more competitive palm kernel oil. Despite challenges, the global demand for certain coconut products has increased substantially in recent years – notably for high-value added products such as coconut water, coconut sugar and virgin coconut oil. Further investments into productivity and competitiveness of the sector are needed, allowing farmers to take full advantage of these opportunities to improve and stabilise their incomes.

### Box 2.6. The coconut economy (cont.)

In the Philippines (and India), government efforts are now underway to improve coconut production and productivity. Ongoing replanting and rehabilitation programmes are expected to increase the productivity of the aged palms going forward, supporting the projected recovery in production over the next ten years (Figure 2.19). About 70% of the 1.1 Mt production increase in copra by 2026, will originate from improved yields. While planted area has remained largely fixed in the recent past, the outlook foresees additional planting of coconut palms in Indonesia, the Philippines and Viet Nam over the next decade.

Figure 2.19. **Global copra production by region**



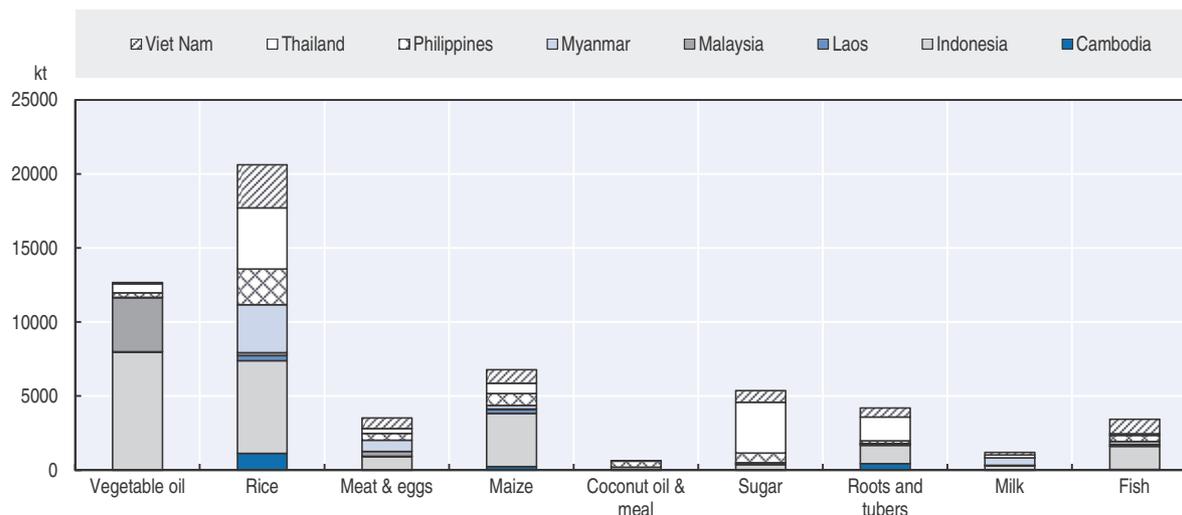
Source: OECD-FAO (2017), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-data-en>.

1 2 <http://dx.doi.org/10.1787/888933521902>

For individual countries within the region the changes in production vary along existing lines of relative production levels and comparative advantages (Figure 2.20). For example, the growth of vegetable oil is concentrated in Indonesia and Malaysia, with sugar production growth concentrated in Thailand. Similarly, fishery production growth mainly flows from increased production in Indonesia and Viet Nam. The story for rice is more mixed. All countries are seen to increase production with large volume changes seen in both the large exporting countries of Thailand and Viet Nam, along with significant increases in the more populous countries such as Indonesia. However, uncertainties exist over the rice production increases in these countries, and in particular in Viet Nam due to concerns over water salinization (Box 2.7).

Improvements in productivity of agricultural production systems, through both the closing of yield gaps and the intensification of production processes, are projected to be the most significant drivers of production growth (Figure 2.21). The region as a whole has only limited scope for increases in production to be created through increases in land use, as both existing lands are already exploited and due to rising land competition for other uses (such as for urban or industrial purposes). Across major crop production activities in the region, total area harvested is projected to increase by only 4% over the next decade compared with a 16% increase in area seen in the ten years prior to the 2014-16 base period. Increased area allocated for sugar cane, palm and coconut production account for

Figure 2.20. **Changes in major production activities in Southeast Asia**  
Increase in production across major production activities, 2017-26



Source: OECD-FAO (2017), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-data-en>.  
1 2 <http://dx.doi.org/10.1787/888933521921>

### Box 2.7. The impact of water salinization on Viet Nam's rice sector

Viet Nam's agricultural sector plays an important role in the country's economy. Following the introduction of the overall policy package of *doi moi* in the late 1980s, rice output rose rapidly to a level that remains substantially above domestic needs. This success story, however, is now in jeopardy, above all due to climate change and the growing problem of soil salinization.

#### Problems of soil salinization

Salinity can cause problems for rice production in both irrigated and rain-fed areas. Rice is highly sensitive to salt stress in its early growth stage. Transplanted seedlings can die and establishing a sufficient crop stand becomes very difficult. Salinity in coastal areas evolves during the season: it is high in both the soil and water during the dry season, but decreases after the monsoon rains begin. However, the salt concentration increases once again during the dry season when most fields are left barren. Salinity problems are also encountered in some inland areas due to improper irrigation.

During the 2015/16 cropping season, severe and prolonged dry weather associated with *El Niño* caused the worst salinity problems in almost a century. In 2016, the high concentration of salt in the soil resulted in severe crop damage, reducing the harvest by 4%, nearly 2 Mt below the 2015 level.

#### How many areas of croplands are vulnerable to salinity problems?

Soil and water salinization in the dry season is a major problem in the coastal Mekong Delta (Tuong et al., 2003; Carew-Reid, 2007), with around 1.8 Mha subject to dry season salinity annually (Carew-Reid, 2007; MRC, 2010). During the low flow months of March and April, saline water intrudes 40-50 km inland from estuaries via the main river systems (White, 2002; Sam, 2006). Salinity can damage both high-yielding rice (in double or triple rice cropping systems) and traditional rice (in rice-shrimp rotational farming system) paddies. According to a report by the Vietnamese Ministry of Agriculture and Rural Development (MARD, 2011), 100 000 ha of the 650 000 ha of high-yielding paddies in the Mekong delta are at a high risk of dry-season saltwater intrusion.

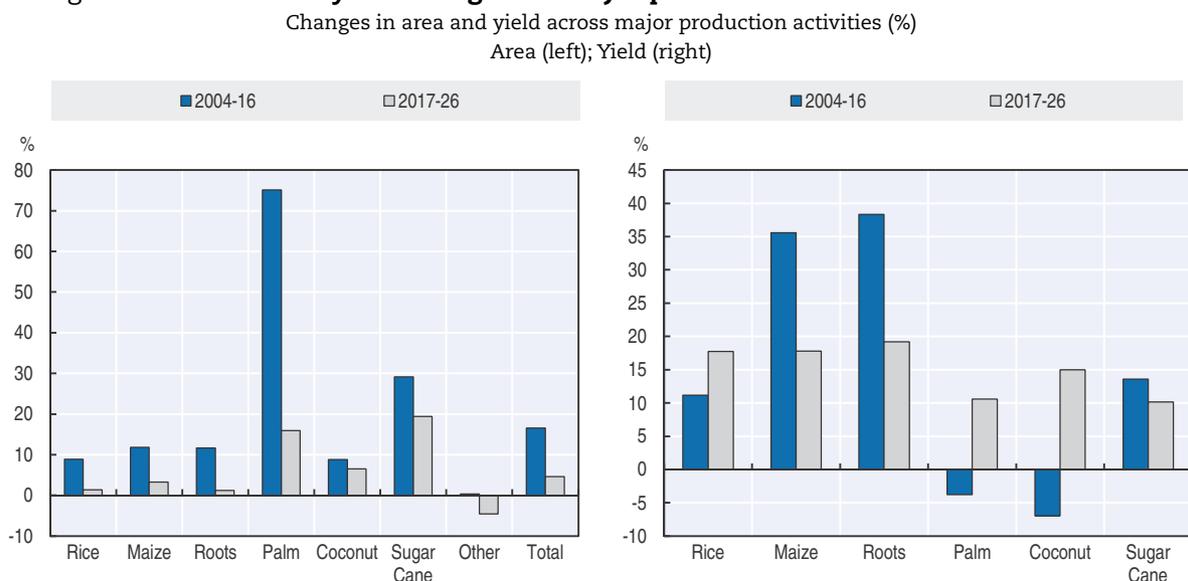
### Box 2.7. The impact of water salinization on Viet Nam's rice sector (cont.)

#### Impact on the rice production projection and food security

The medium-term outlook suggests that Viet Nam will continue to expand its rice production, securing its position as a leading rice exporter. Production is expected to shift towards a superior rice, allowing the country to compete with Thailand, the world's premier rice exporter. These baseline projections, however, assume that Viet Nam will be able to confront the challenges that are arising from climate change and the growing salinization of its paddy fields. Failing this, there is evidence that salinization will result in a serious drop in production, thus jeopardising the country's export position, as well as compromising the income and food security of its smallholder farmers. Some authors even suggest that Viet Nam could become a net importer if the problem of salinization is not adequately addressed (Dijk et al., 2014; Chen, 2012), which in turn would affect the overall food supply situation in Southeast Asia. To address these challenges, the Vietnamese government has developed a national strategic plan for 2008-20 (MONRE, 2008).

most of the growth in area. Rice area is projected to increase by less than 1% by 2026 compared to the 2014-16 base period. However, strong yield growth is projected for all commodities, particularly for palm and coconut, where yields fell in the last decade due to new investments in area expansion.

Figure 2.21. Area and yield changes for major production activities in Southeast Asia



Source: OECD-FAO (2017), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-data-en>.  
1 2 <http://dx.doi.org/10.1787/888933521940>

Production within the region will also become increasingly affected by changes in climatic conditions brought about from climate change. While over the medium term such impacts are difficult to project, the region has been identified as one of the most affected regions worldwide. In the last few decades, sea levels in the region have been reported to have risen by between 1 and 3 mm per year (ADB, 2009). The number of floods, cyclones and periods of drought has also increased, leading to a decline in water, soil and land resources, with further increases expected in the future (Cruz et al., 2007). These changes

have implications for both terrestrial and marine-based production systems and due to the pressures created are likely to lead to further conflicts between environmental outcomes and food production (Box 2.8).

#### Box 2.8. **Mangroves and land use change: The case of Southeast Asia**

Mangroves are immensely important ecosystems, harbouring rich aquatic and terrestrial biodiversity. They offer multiple ecosystem services including providing fish habitat, supporting nutrient cycling, carbon storage, and salinity regulation. Currently, mangrove forests cover around 14 Mha, of which around one-third are in Southeast Asia (FAO, 2007). Losses of between 30 to 50% are estimated to have occurred over the last five decades due to land-use change for aquaculture, agriculture and infrastructure development (Donato, 2011). The degree of mangrove loss has varied by region, with hotspots in Myanmar, particularly in Rakhine state, in Indonesian Sumatra and Borneo, and in Malaysia. By comparison, the rate of mangrove deforestation was considerably lower in Thailand, Viet Nam, and the Philippines.

Policies to promote food security and local development, coupled with limited protection of open access mangrove resources, were the main forces behind mangrove land-use change in coastal mangrove areas from 2000 to 2012 (Richards and Friess, 2016). Conversion of forest area into aquaculture (30% of total mangrove area loss), was particularly dominant in Indonesia, Cambodia, and the Philippines. Over the coming decade, Indonesia's aquaculture production is expected to expand by about 37%, the Philippines by 25%, and Cambodia by 47%. At least some of this is expected to take place in the coastal margins, therefore, pressure on the mangrove areas will continue. However, policies encouraging intensification rather than expansion have now been implemented. These, along with tighter environmental regulations for new aquaculture development, mean the impact on mangroves is expected to decline.

Conversion to rice agriculture from 2000 to 2012, was important at the regional scale (22% of total area) with the main concentration in Myanmar, where rice production expansion accounted for much of the mangrove deforestation. The Outlook projects no further expansion in the country's rice area in the coming decade, with increases in production achieved through yield improvements.

Palm oil plantations also accounted for a significant part of mangrove conversion (16% of total area) during the same period, particularly in Malaysia and Indonesia. This Outlook projects only minor area expansion of oil palm in these two countries up to 2026, reducing the impact of this sector on coastal forests.

Considering the high biodiversity value of mangroves for carbon storage (Alongi, 2014) and climate mitigation, as well as the other ecosystem services they provide, much stronger environmental safeguards are required. One option to ensure that their utilisation is carried out sustainably, would be the introduction of payments for environmental services (carbon storage) targeted at local communities that derive their livelihoods from mangroves and its multiple services.

Increases in agricultural production are also likely to place further pressure on the environment. Palm oil is one production activity where environmental trade-offs have been identified. The effects of increases in production of palm oil on the environment in the region, however, will be heavily influenced by both of the environmental policies directed at the sector but also the policies that directly influence production – such as

biofuels policies and other domestic support measures. Indonesia, Malaysia and Thailand all have biofuels policies targeting the use of palm oil. In Thailand, the government has set up targets for ethanol and biodiesel use of 4.1 Bln L and 5.1 Bln L by 2036. Indonesia similarly has targets, currently set at 10% (biodiesel mandate) but targeted to reach 30% by 2020 (however, at present, current usage is around 6%). For the region, biofuels production is projected to increase by around 4% year, helping to stimulate demand for palm oil production.

### **Prices**

Across Southeast Asia's major production crops, world prices are expected to decline slightly over the medium term (see Chapter 1). For example, real prices for rice and vegetable oils, the region's largest export items, are projected to fall. A similar picture is seen for the region's main import products. These shifts at the global level are driven by the projected changes in productivity and input use counterbalanced against growth in demand. For most commodities, output growth is expected to exceed demand growth placing downward pressure on real prices over the medium term.

The extent to which regional prices will vary in line with world prices will depend on the trade exposure of each of the individual countries within the region. For rice, Indonesia, Malaysia and the Philippines have in place border controls (tariffs and licensing arrangements) along with domestic support policies that limit price transmission. Indeed, in these countries rice prices are considerably higher (more than would be expected to arise from transport costs) and less variable (OECD, 2017b). However, even for these countries, the underlying drivers of price falls; that of rising productivity levels, are expected to hold and would place downward pressure on domestic prices if current policy settings are maintained. For others, such as the larger exporters of Thailand and Viet Nam, trends in world rice prices are expected to follow similar patterns.

### ***The outlook for trade in the region***

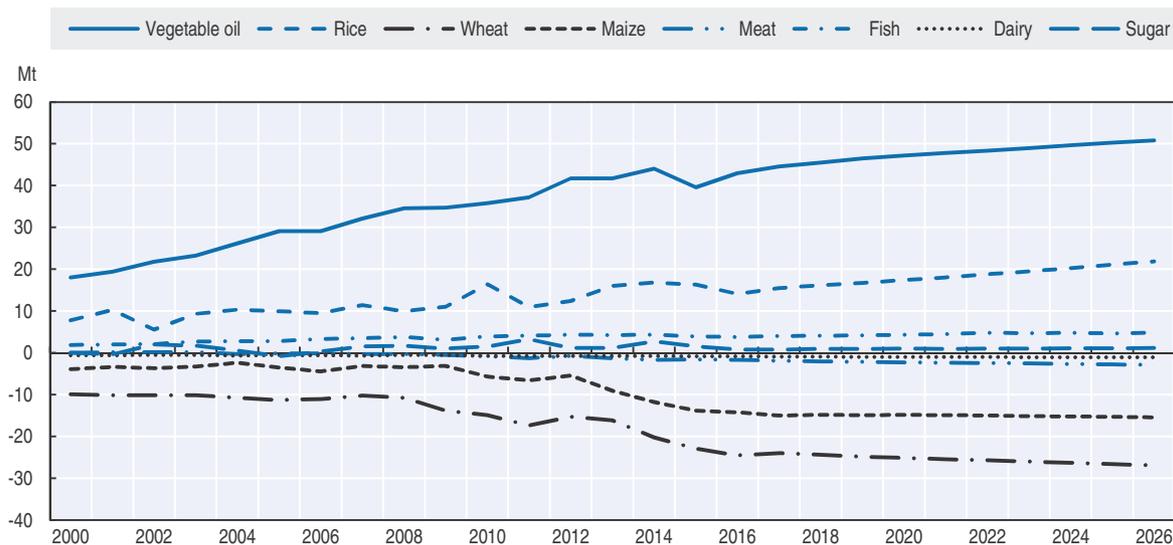
Over the medium term, the increase of production along lines of already established comparative advantages, coupled with rising incomes and demands for a wider variety of food products leads to a deepening of existing trade across commodity groups. In other words, the region is projected to increase the volume of products it currently exports while also increasing the volume of the products it currently imports (Figure 2.22). The largest changes in this deepening of trade balances are seen for vegetable oil and rice, where the trade surplus is increasing, and wheat and maize where the trade deficit is increasing. The trade deficit for dairy powders grows to some 1.1 Mt, which is a significant in size relative to world markets, at over 17% of global imports

Across these individual products, the contribution to the changes in the net trade balances flow along the pre-existing trading patterns (Figure 2.23). For vegetable oils, rising net exports are driven by increased exports from Malaysia and Indonesia, while for rice increased net exports are driven by rising exports from Viet Nam and Thailand. For sugar, the region shows differing patterns with Thailand increasing exports while a number of other countries in the region increasing their net imports.

### ***Implications of market developments for food security***

The projected changes in production, trade, incomes and prices over the medium term across Southeast Asia will have a significant impact on food security. These changes will

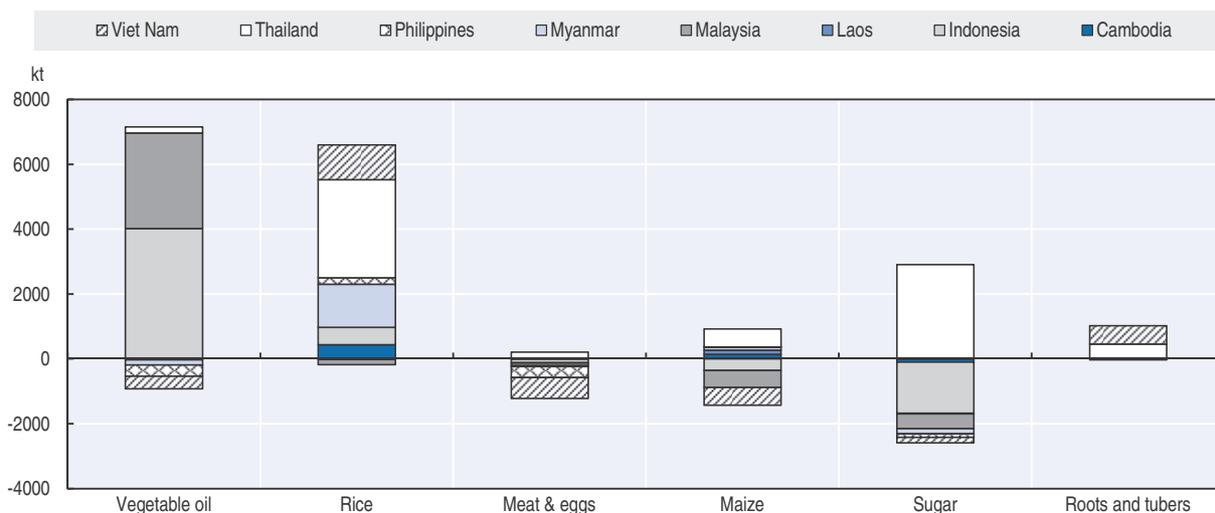
Figure 2.22. **Changes in the trade balance of major commodities in Southeast Asia**  
Net trade balance (exports less imports)



Source: OECD-FAO (2017), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-data-en>.  
1 <http://dx.doi.org/10.1787/888933521959>

Figure 2.23. **Contributions to changes in the trade balance of major commodities in Southeast Asia**

Changes in net trade balance (exports less imports), 2017-26



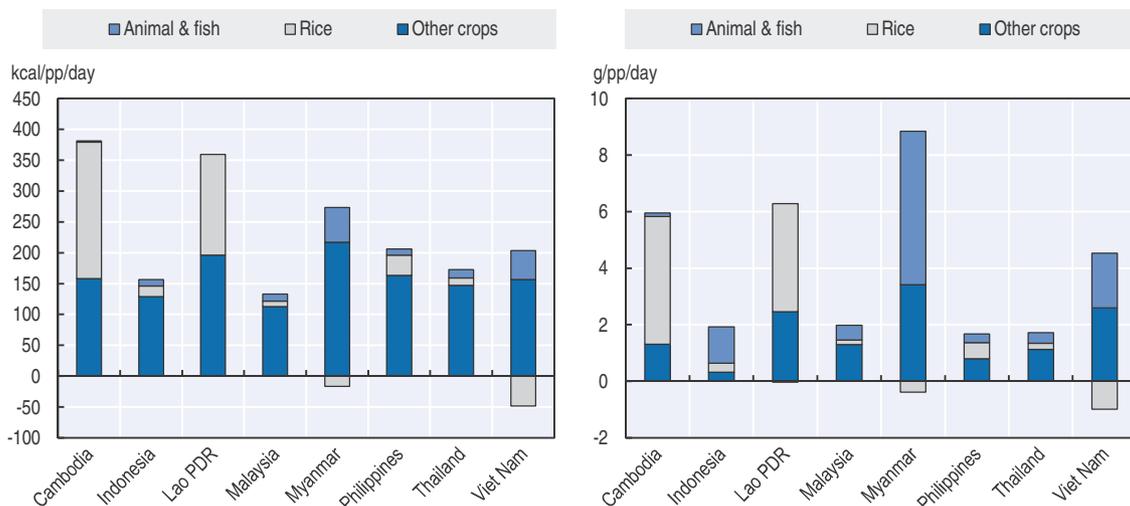
Source: OECD-FAO (2017), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-data-en>.  
1 <http://dx.doi.org/10.1787/888933521978>

have an impact not only availability and accessibility of food but also are likely to influence its utilisation and stability. While impacts of the two former elements are difficult to project in the context of the Outlook, by examining the changes in undernourishment based on the observed aggregates of food supply and income growth over the projection period an insight can be gained into the possible changes in in food security over the medium term.

For Southeast Asia, while the projections suggest that overall the region will see continued falls in the number of undernourished individuals, the improvements witnessed will not be sufficient to overcome food insecurity. All countries individually make progress in reducing undernourishment over time, with Indonesia, Thailand and Viet Nam all on target to achieve Sustainable Development Goal (SDG) number 2 by 2030 (less than 5% of the population being undernourished). However, for the remaining countries, and for the region in aggregate, the projected changes over the medium term will not be sufficient to overcome food insecurity. With current high levels of food insecurity, Cambodia, Lao PDR and Myanmar are projected to be furthest away from meeting the SDG2 target, and for the Philippines, the current stagnation in undernourishment improvements is projected to continue.

The changes over the medium term will not only influence aggregate calorie consumption but also its composition. Most of the increase in calorie intake over the medium term is due to crops other than rice, particularly vegetable oil and sugar (Figure 2.24). However, increased rice consumption is still a contributor to higher calorie intake in all countries but Viet Nam and Myanmar. Meat, dairy and fish consumption is responsible for higher protein intake in all countries, particularly Myanmar, Indonesia and Viet Nam.

Figure 2.24. **Sources of changes in calorie and protein intake in Southeast Asia**  
Calorie (left); Protein (right)



Source: OECD-FAO (2017), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-data-en>.  
1 2 <http://dx.doi.org/10.1787/888933521997>

The medium term results on undernourishment indicate that further policy effort will be required in the region to overcome food insecurity. Policy makers have a number of policy levers that they could employ to help address these, but in the context of having markets deliver better food security outcomes, a key factor will be removing distortions to agricultural and food markets. As discussed earlier, realisation of the AEC Economic Blueprint with respect to rice market integration has the potential to yield significant improvements in reducing the rates of undernourishment in the region. Furthermore, actions taken to improve access of poorer households to food, through measures such as social safety net payments, have been found to be able to significantly reduce projected

rates of undernourishment over the medium term (OECD, 2017b). These results indicate that, for the region, it is not a lack of available food that is the fundamental problem behind food insecurity, but rather effective access to that food.

### **Challenges and uncertainties in the medium-term outlook**

The medium term outlook for Southeast Asia points to a number of strengths of the agricultural and fisheries sectors yet challenges and uncertainties exists. These relate to the region's ability to meet the projected productivity improvements, particularly in the face of climate change risks and challenges. Further, the region has placed significant pressure on its natural resource base – its natural capital – during its past development, and so finding ways to sustainably produce will important. Lastly, with the continued interactions in international markets, continued global uncertainty over actions to reduce market interventions and to prevent new ones from arising will impact the region. Each of these is discussed briefly here.

The baseline presented in this chapter requires a continued push to realise the projected productivity gains. Embodied in the projections are assumptions around continued policy reform and investments that will drive future growth. Within the region, as globally, investments in R&D are low and in some cases already declining. R&D plays a role through both past investments in R&D (the stock) and the rate of new investments (the flow) (Sheng, Mullen and Gray, 2011; Smeets Kristkova, Van Dijk and Van Meijl, 2016). In any given year, productivity performance is influenced by both these factors. However, this means that current investments will have a cumulate effect on the future, and so falling R&D spending will have lasting impacts that will be hard to correct if they persist. Smeets Kristkova, Van Dijk and Van Meijl (2016) demonstrate that if this relationship between R&D investments and productivity growth continues to hold, current declines in R&D investments will mean that the assumption of yield growth that underpins many models, ranging from long term climate projections to the medium term models such as the one presented here, are likely to be overly optimistic. For Southeast Asia, where R&D spend is already low in comparison to other countries at a similar levels of development (OECD, 2017b), improving the agricultural innovation systems represent a key challenge. Furthermore, beyond R&D, fragmentation in farm size, if it continues, may also create risks for future productivity growth, suggesting issues in land markets will become a key challenge facing the region.

A key uncertainty facing the region's productive capacity relates to climate change. As noted, climate change is expected to have a significant impact of the region. This will require the sector to adapt and adjust to changes over the medium and longer term. Even with R&D to help in adaptation actions (OECD, 2017b; Ignaciuk and Mason-D'Croz, 2014), current policies may put at risk adaptation responses and could potentially compound the impact of climate change. In the Philippines, for example, support policies oriented to rice work against incentives for adaptation and can increase producers exposure climate risks (OECD, 2017a). Similarly, for the region as a whole, current trade distortions have the potential to amplify the global price effects from climate change (OECD, 2017b). Furthermore, the agriculture sector, as a large greenhouse gas emitter, will also need to be involved in efforts to mitigate the effects of climate change. While there are likely to be synergies for some sectors in terms of efficiency gains and practice change that reduces greenhouse emissions – including efforts related to soil carbon sequestration such as the “4 in 1000” initiative – there will be instance where these do not exist. Much of the ultimate

impact will once again depend on the discovery of new and innovative solutions, putting the innovation system at the forefront of required policy focus.

Allied to the pressure that will be created by climate change is the need to better manage the region's natural resources and make agricultural and fisheries production more sustainable. The region has experienced significant environmental costs from area expansion already, and while limits to further expansion exist, the management of this land along with fresh water and marine resources will be a key challenge for regional policy makers. Having in place systems that better inform producers about more sustainable practices and having regulations that ensure externalities are controlled will be critical. For aquaculture, a further consideration is the need to avoid undue administrative burdens on the industry whilst ensuring that environmental requirements are met (OECD 2016c). In capture fisheries, sector reducing or redirecting policy support such as fuel tax exemptions, which contribute to overcapitalisation and the overexploitation of resources, towards more effective management will be an important component of achieving sustainability (OECD 2017c).

For Southeast Asia, achieving continued economic growth in a time of global uncertainty with respect to international markets will also be a key challenge. This extends beyond the agriculture and fisheries sectors. The region has been one of the major beneficiaries of globalisation and the development of GVCs. For the region, global value chain participation across all industries has been associated with productivity growth and higher incomes (measured as domestic value added creation) (Lopez-Gonzalez, 2016). Further, the development of GVCs has meant that domestic trade restrictions effectively act as a tax on exports (Greenville, Kawasaki and Beaujeu, 2017; Lopez-Gonzalez, 2016; OECD, 2015d), harming the development of several sectors (Jouanjean, Gourdon and Korinek, 2017 forthcoming). A more distorted international market place will work against the region's future growth, for agricultural and non-agricultural sectors alike. For regional policy makers, taking steps to ensure market distortions are reduced, both regionally and multilaterally, will be important if future growth projections are to be realised.

## **Conclusions**

Countries in Southeast Asia have experienced significant improvements in their levels of development along with strong growth in their agriculture and fishery sectors. Production growth in agriculture and fisheries has been brought about by productivity growth along with significant increases in the use of both intermediate and natural inputs. However, the medium term projections point to a slowing of this growth, suggesting that for continued development of agriculture and fishery sectors, policy makers must look to a new wave of reforms to ensure strong and sustainable productivity growth.

While the scope for change inevitably varies across the region given its diversity, key next steps will be to create an environment where agricultural and fishery innovation can take place and which is conducive to sustainable productivity growth. This will entail addressing a number of the environmental challenges facing the agriculture and fishery production. It will also entail better integration in regional and global markets, which will require steps to address and improve the efficiency of the service markets that support the agriculture sector – a policy sphere that often lies outside the remit of agriculture and fishery ministries.

Policies need to focus on creating a more robust enabling environment for the region's producers and avoid distorting incentives along the food chain. This will allow adjustment to take place and allow the region to realise efficiency gains in its production systems. Taking these steps should also better equip the region to combat food insecurity and malnutrition in all its forms to achieve SDG2.

### Notes

1. For this chapter, the fisheries sector is taken to mean both capture and aquaculture production.
2. The Southeast Asian region includes the ten ASEAN members and Timor-Leste.
3. Total factor productivity (TFP) is an indicator for measuring agricultural productivity. It takes into account all of the market inputs used in agricultural production (labour, land, livestock, machinery and intermediate inputs) and compares these with the total market outputs produced (crop and livestock commodities).
4. Excluding West Asia.
5. Agricultural land refers to the FAO's category of agricultural area, which includes is the sum of areas under "Arable land", "Permanent crops" and "Permanent pastures".
6. Net exports of rice are calculated as total exports to all partners less total imports from all partners.
7. See OECD (2017) for a more detailed description of current agricultural policies in the region.

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