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What Asia wants

Long-term food consumption trends in Asia

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Foreword

Asia has recorded unprecedented economic growth over the past two decades, particularly in China and India, and is expected to continue to grow rapidly in coming decades. Strong income growth has been driven by reform toward more market oriented economies and increased openness to foreign investment and trade.

Asia's economic growth, population growth and urbanisation have contributed to fundamental changes in global food demand. Food consumption has increased in Asia over the past two decades and consumption patterns have shifted away from staples toward higher value and higher protein foods. This has resulted in Asia becoming a net importer of a number of food-based products of interest to Australia.

In this study, Asia's consumption, production and trade of a range of food-based commodities are examined and factors likely to influence the future pattern of Asian food consumption and trade and longer-term prospects for consumption are discussed, with a view to better understanding Asia's potential as a market.

This report is the first in the *What Asia wants* series. This series will assess trends in Asian food demand and identify opportunities for the Australian agriculture and food industries in expanding Asian markets over the medium to long term.

Kim Ritman

Acting Executive Director

October 2013

Overview

Key findings

- Food consumption in Asia has increased over the past two decades. Consumption patterns have shifted from traditional diets oriented around starchy staples to more varied diets with greater quantities of higher value and higher protein foods, particularly meat and dairy products.

- In this report, a preliminary assessment is provided of the trends in food consumption and production in major Asian countries. The factors that are likely to influence the future pattern of Asian food consumption and trade are also discussed and long-term prospects for consumption and trade of a range of food based commodities are provided.

- This report builds on existing ABARES analysis of global food consumption and production to 2050, and focuses on China, India, Japan, the Republic of Korea and the ASEAN member states.

- The ability of Asian countries to satisfy the increased demand for food out to 2050 will depend on Asia's productive capacity and trade. ABARES' preliminary projections indicate that food production in Asia will not be sufficient to meet the growth in Asian food consumption for many commodities. As a result, Asian demand for food imports is likely to increase.

- In China, sustained income growth is projected to lead to significantly higher demand for many food commodities. Compared with 2007, the real value of consumption in 2050 is projected to rise by 18 per cent for coarse grains (in 2007 US dollars hereafter), 61 per cent for vegetable oil, nearly double for sugar and beef, 75 per cent for sheep and goat meat and more than double for dairy products. Higher domestic consumption is expected to lead to increased import demand for these commodities.

- In contrast, Chinese consumption of rice, wheat, vegetables, fruit, pig meat and poultry meat has been mainly met by domestic production, with trade playing a relatively minor role. Toward 2050, the situation for these commodities is not expected to change significantly.

- India is one of the largest consumers and producers of grain in Asia and has a self-sufficiency policy. By 2050, India is projected to remain a net exporter of rice and coarse grains, and to be a relatively small net importer of wheat (US$1.5 billion). India does not have a culture of drinking wine and is expected to remain a significant exporter of beef (primarily buffalo meat) to 2050.

- The value of imports and exports of horticultural products in India both increased by an annual average of around 6 per cent between 1990 and 2010. By 2050, India is projected to become a significant net importer of vegetables and fruit (US$14 billion). Protein requirements are often supplemented with dairy products in India as a large proportion of the population follows a vegetarian diet. The projected growth in demand for dairy products is expected to result in India becoming a significant net importer of dairy products (US$13 billion) by 2050.

- For Japan and the Republic of Korea, growth in food consumption is projected to be limited through to 2050. This is the result of the already high incomes and food consumption per person in these countries combined with projected declining populations and modest future income growth.

- For the ASEAN member states as a whole, imports of wheat are projected to rise by 40 per cent between 2007 and 2050, as no significant amount of wheat is produced in the region. The real value of vegetable and fruit consumption in the ASEAN region is projected to nearly double by 2050, with net imports increasing to US$8 billion.

- The ASEAN member states only consume small quantities of wine and future imports are likely to depend more on growth in tourist numbers than on growth in domestic consumption. For sugar, the ASEAN member states, collectively, are projected to be a small net importer out to 2050.

- By 2050 the real value of beef consumption in the ASEAN member states is projected to be 120 per cent higher than in 2007, while net imports of beef for the region are projected to expand by US$3 billion over this period. The ASEAN member states are significant importers of dairy products. The real value of dairy consumption for ASEAN member states is projected to more than double by 2050. This consumption growth will be largely met by imports, which are projected to be US$6 billion higher in 2050 than 2007.

- In order to meet this new and changing demand, it will be important to reduce import barriers in these Asian countries to ensure that imports are able to complement domestic production.

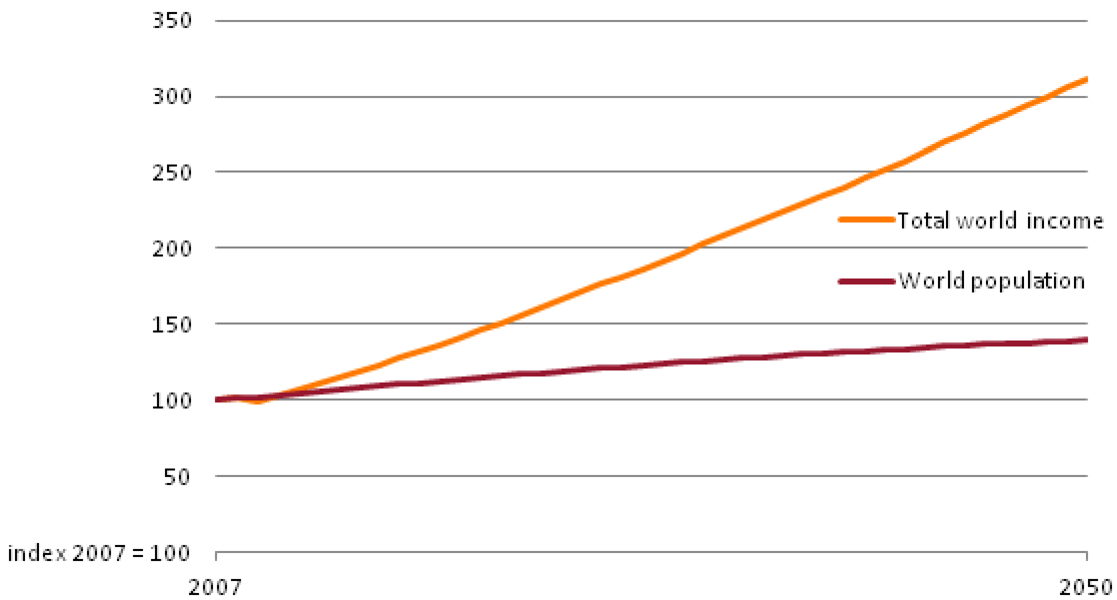
- Apart from the role governments will play in reducing market barriers, the contribution from the private sector will also be important. Supermarkets and hypermarkets will have a role in facilitating trade and patterns of trade given their rising prominence in the Asian food retail sector and their well developed system of international supply networks.

Background

World demand for agrifood products is expected to increase significantly through to 2050 because of a larger global population, growth in per person incomes and increasing urbanisation, especially in developing countries (Figure 1). This report provides a preliminary assessment of the trends in food consumption and production in major Asian countries, the factors that are likely to influence the future pattern of Asian food consumption and trade and longer-term prospects for consumption and trade of a range of food-based commodities. This report builds on existing ABARES analysis of global food consumption and production, and focuses on China, India, Japan, the Republic of Korea and the ASEAN member states.

The preliminary projections presented in this report were developed using an updated version of the ABARES agrifood model—an economic simulation model of global agricultural supply, demand and trade. ABARES used the model to prepare projections that consistently accounted for the main economic forces linking demand and supply for various food commodities within a region and between regions over time. All projections are expressed in 2007 US dollars.

Figure 1 World population and income



Source: ABARES model assumption; United Nations (2011)

Economic drivers and production potential in Asia

Demand for food products in Asian countries has increased over the past two decades, reflecting income growth, population growth and urbanisation. Incomes in China, India, the Republic of Korea and many ASEAN member states have increased rapidly over the past 20 years. For example, in China real gross domestic product rose by an average of 10 per cent a year between 1990 and 2010. Similarly, Indian gross domestic product grew by an average of 6 per cent a year in the same period. In contrast, income growth in Japan was moderate over those two decades.

Toward 2050 income growth in China, India and many ASEAN member states is expected to continue, albeit at slower rates than recently achieved as countries become more developed. For Japan and the Republic of Korea, economic growth is expected to remain at levels similar to those achieved in recent years.

The population of most Asian countries is expected to grow toward 2050, although at a declining rate. In particular, India's population is projected to increase from 1.2 billion in 2010 to 1.7 billion by 2050, while the population of the ASEAN member states in total is projected to increase from 592 million in 2010 to 756 million in 2050. China's population is projected to peak at 1.4 billion in 2026, before declining to 1.3 billion by 2050.

Asian countries have urbanised considerably over the past two decades. For China, India and many ASEAN member states, this has in part been driven by the difference between urban and rural incomes. With higher incomes, urban consumers spend more on food than rural consumers and have a more diverse, higher value diet. In addition, they have increased their expenditure on convenience foods, fast food and restaurant food. The share of food purchased at supermarkets and hypermarkets has also increased. A greater proportion of the Asian population is expected to live in urban areas by 2050. As a result, changes in consumption patterns toward the diversification of diets are expected to continue.

The ability of Asian countries to satisfy the increased demand for food out to 2050 will depend on Asia's productive capacity as well as on trade. While total Asian food consumption is projected to increase through to 2050, for many food commodities much of the increased consumption is likely to be met through increased production in the Asian countries themselves. Asia has accounted for over 50 per cent of global agricultural production growth in recent decades. Improvements in total factor productivity have driven this growth. However, resource constraints and other challenges may slow Asia's future growth rates in agricultural production.

Out to 2050, Asia's agricultural productivity growth is anticipated to slow from the high rates achieved since the 1980s but to remain high relative to expected productivity growth in developed countries. Strong productivity growth is projected for meat products, particularly pigs and poultry. This projection assumes that Asian producers will adopt advanced production technologies and that this will lead to a significant increase in intensive livestock production. With ongoing productivity growth, food production in Asia is projected to grow.

Developments in Asian food markets

Food consumption in Asia has increased over the past two decades and consumption patterns have shifted from traditional diets of starchy staples to more varied diets with greater quantities of higher value and higher protein foods, particularly meat and dairy products. While food consumption patterns across Asia have been changing, changes have varied between countries. Production, trade and policy settings have also varied, both between countries and between commodities. The major developments for agricultural commodities in China, India, Japan, the Republic of Korea and ASEAN member states are summarised below.

China

Grains

Total consumption of wheat increased from 103 million tonnes in 1990–91 to 120 million tonnes in 2011–12. Between 2005–06 and 2011–12 feed uses of wheat increased by over 20 million tonnes, reaching 24 million tonnes. Toward 2050 wheat consumption growth is projected to be modest, with the real value of consumption increasing to US$23 billion, 4 per cent higher than in 2007.

Total rice consumption increased from 120 million tonnes in 1990 to 131 million tonnes in 2009. However, the rate of increase did not keep up with population growth. Reflecting the move in dietary patterns away from starchy staples, China's per person consumption of rice declined from 85 kilograms in 1990 to 78 kilograms in 2009 (milled equivalent). The real value of rice consumption is projected to decline to US$31 billion by 2050, 9 per cent lower than in 2007.

Wheat production peaked at 123 million tonnes in 1997–98, before declining to 87 million tonnes in 2003–04 and increasing to 118 million tonnes in 2011–12. Rice production has followed a similar pattern. The decline in production of both grains in the late 1990s and early 2000s reflected relatively unfavourable grain prices and reduced government support, which led to farmers growing more profitable crops such as vegetables. In contrast, the increase in production after 2003 reflects Chinese Government policies on grains production implemented in 2004 and 2006. These policies included the introduction of direct payments to producers based on the area planted, seed subsidies and the re-introduction of minimum support prices.

Domestic wheat and rice production has mainly met consumption needs, with trade playing a relatively minor role in most years. China has switched between being a small net importer and a small net exporter of wheat, depending on the level of domestic production in each year. China has generally been a small net exporter of rice. With mild growth projected for both production and consumption of wheat, the real value of China's net exports of wheat in 2050 is projected to be similar to that in 2007—around US$300 million.

Total consumption of coarse grains increased from 96 million tonnes in 1990–91 to 197 million tonnes in 2011–12, largely because of the increase in feed demand. Maize accounts for around 95 per cent of total coarse grains consumption. By 2050, the real value of China's coarse grain consumption is projected to be US$31 billion, 18 per cent higher than 2007. Feed use is projected to represent over 70 per cent of the total.

Total coarse grain production increased from 113 million tonnes in 1990–91 to 200 million tonnes in 2011–12. The share of maize in total coarse grains production increased from 86 per cent in 1990–91 to 97 per cent in 2011–12. Maize producers receive direct support from the Chinese Government in input subsidies and direct payments. A minimum purchase price for maize operates in the north-eastern provinces to encourage production.

China exported large volumes of coarse grains (almost all maize) from 1990–91 to 1993–94 and again from 1996-97 to 2006–07. More recently, China imported large volumes of maize, with imports rising from 1.3 million tonnes in 2009–10 to 5.2 million tonnes in 2011–12. The real net value of China's coarse grain imports is projected to increase to around US$2 billion by 2050.

The significant increase in Chinese consumption of vegetable oils is due to the rapid increase in household incomes and changing consumer preferences toward a more western diet. Consumption of vegetable oils rose from almost 7 million tonnes in 1990–91 to a record 29 million tonnes in 2011–12. Soybean oil is the most consumed vegetable oil in China. The real value of China's vegetable oil consumption in 2050 is projected to be US$36 billion, 61 per cent higher than in 2007.

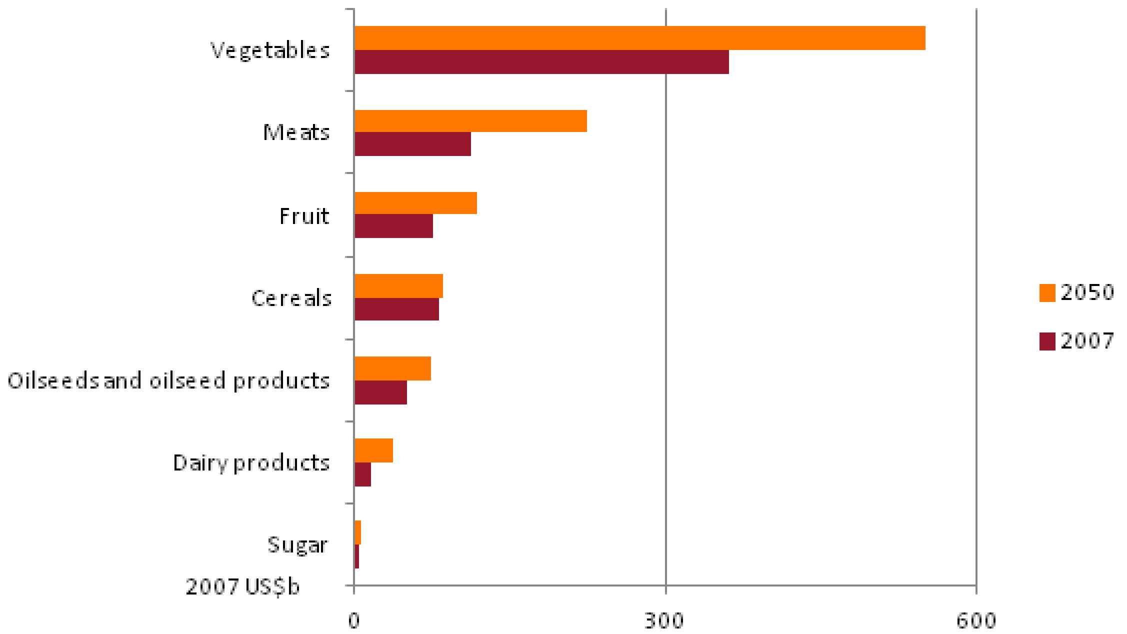
Consumption of protein meals (mainly soybean meal) grew from just under 9 million tonnes in 1990–91 to a record 68 million tonnes in 2011–12. The feed requirements of the expanding livestock sector largely explain this increase. The real value of consumption of protein meals in China is projected to be US$17 billion in 2050, 22 per cent higher than in 2007.

Over the past two decades, oilseeds production in China increased by 77 per cent, reaching a record 59 million tonnes in 2011–12. Use of oilseeds since the mid–1990s has outpaced domestic production, resulting in a significant increase in imports—reaching a record 62 million tonnes in 2011–12. The real net value of China's imports of oilseeds and oilseed products in 2050 is projected to be US$28 billion, nearly double the value in 2007.

Horticulture

Consumption of horticultural products in China grew at a little more than 5 per cent a year between 1990 and 2009. Consumption of vegetables, except starchy roots, grew at 7 per cent a year during this period and accounted for most of the increase. Consumption of fruit grew at nearly 9 per cent a year. In 2050, the real value of fruit and vegetable consumption is projected to be US$118 billion and US$551 billion, respectively, over 50 per cent higher than in 2007 (Figure 2).

Figure 2 China's agrifood consumption



Source: ABARES model output

Trade volumes of horticultural products are small compared to consumption. China is a net exporter (in value terms) of horticultural produce. In 2010, Chinese exports of horticultural products totalled US$15.9 billion, while imports totalled US$5.2 billion. China is projected to remain a net exporter of vegetable products in 2050, with the real net value of its exports being around US$6 billion. In 2007 China was a net exporter of fruit, but by 2050 China is projected to be a small net importer. The real net value of China's fruit imports in 2050 is projected to be just over US$1 billion.

Sugar

Sugar consumption in China doubled from 7 million tonnes in 1990 to 14.8 million tonnes in 2011. Despite this growth, consumption per person was only 11 kilograms in 2011, compared with the world average of 23 kilograms. China is projected to remain the second largest consumer of sugar in Asia (after India) by 2050, with the real value of consumption at around US$7 billion—nearly double that of 2007.

China is a net importer of sugar, as its domestic sugar production is variable. In recent years, domestic sugar production was unable to keep pace with the growth in domestic consumption and China used its large stocks and imports to fill the gap. China has a tariff quota for its sugar imports, which was around 3 million tonnes in 2011. Up to 70 per cent of the tariff quota volume can be assigned to state trading enterprises. China is projected to be a net importer of sugar in 2050, with the real net value of imports being around US$2 billion—compared to US$300 million in 2007.

Wine

Total consumption of grape-based wine increased steadily between 1990 and 2009, from 260 million litres to 1.76 billion litres. However, per person consumption remained low, at 0.7 litres a year. Wine production also grew steadily, from 254 million litres in 1990 to 1.66 billion litres in 2011—when China ranked fifth in the world for production. The volume of imported wine increased from about 157 thousand litres in 1992 to 366 million litres in 2011 but accounted for less than a quarter of total Chinese wine consumption. China's most favoured nation applied tariffs on imported wines are 14 per cent for sparkling wine and bottled still wine and 20 per cent for bulk still wine.

Meat

China's pig meat industry is its largest meat industry, accounting for around two-thirds of total meat production in 2012. The poultry meat and beef industries accounted for 19 per cent and 8 per cent of production, respectively.

China accounts for just under half of world pig meat consumption and production. China is projected to remain a significant consumer of pig meat, with the real value of consumption projected to reach US$128 billion in 2050—US$65 billion higher than in 2007.

Prior to 2008 China's imports of pig meat were relatively low. While variable, imports increased from 370 000 tonnes in 2008 to 522 000 tonnes in 2012. China's pig meat exports peaked at almost 300 000 tonnes in 2004 but then declined. It is projected that China will be a net importer of pig meat products in 2050, with the real value of its pig meat imports being US$9 billion.

Poultry meat has become an increasingly important protein source in Chinese diets over the past two decades. Consumption per person has also risen significantly, reaching 12.6 kilograms in 2009 compared with 3.3 kilograms in 1990. The real value of consumption is projected to be US$42 billion in 2050, nearly double that of 2007.

China is the world's second largest poultry meat producer. Poultry meat production grew by over 350 per cent over the two decades to 2011, from 3.7 million tonnes in 1990 to 17.4 million tonnes. China has been a net importer of poultry meat since 1999. With increasing consumption, the real net value of China's poultry meat imports in 2050 is projected to be US$3 billion higher than in 2007.

Beef consumption in China grew significantly between 1990 and 2008, from 1.1 million tonnes to 6 million tonnes, before falling to 5.5 million tonnes in 2012. China is expected to remain the largest consumer of beef in Asia in 2050, with the real value of consumption projected to be US$45 billion—almost double that of 2007.

Beef production in China increased from 1.3 million tonnes in 1990 to 5.5 million tonnes in 2012. However, between 2008 and 2012, beef production in China has fallen—particularly among smaller producers, who make up the majority of the industry—as a result of rising input costs and poor prices.

The volume of beef imported by China is low relative to its beef production. From 1990 to 2008 imports averaged less than 5000 tonnes a year. In 2012 imports of beef increased to a record 61 000 tonnes, reflecting declining domestic production. Increasing consumption is projected to lead to an increase in the real net value of beef imports to US$10 billion in 2050. China's tariffs on beef imports range from 12 per cent to 25 per cent.

Between 1990 and 2009 sheep and goat meat consumption increased by an average of around 7 per cent a year, with per person consumption rising from just under 1 kilogram to 3 kilograms. China is projected to remain the principal consumer of sheep and goat meat in Asia in 2050, with the real value of consumption projected to be around US$9 billion—75 per cent higher than in 2007.

China is largely self-sufficient in sheep and goat meat. However, Chinese imports of sheep meat have grown by an average of 23 per cent a year since 1995, reaching 140 000 tonnes (carcass weight equivalent) in 2012. The real net value of China's sheep and goat meat imports in 2050 is projected to be US$700 million, an increase from US$100 million in 2007.

Dairy

Consumption of milk and dairy products in China has risen significantly in response to higher household incomes, increased urbanisation and changes in diets to include more animal products. Per person consumption of milk and dairy products (except butter) rose from 9.5 kilograms in 2000 to 29.8 kilograms in 2009.

China's milk production expanded rapidly during the 2000s, reaching 35 million tonnes in 2007 before declining sharply in 2008 and 2009. Milk production increased in the two years to 2012, reaching 32.5 million tonnes.

China has emerged as a large global importer of milk powders. In the three years to 2011 China's imports of whole milk powder increased more than sixfold to 325 000 tonnes, imports of skim milk powder more than doubled to 130 000 tonnes and imports of whey products increased by 60 per cent to 344 000 tonnes. China applies tariffs on imports of most dairy products on an ad valorem basis. These can be up to 20 per cent, depending on the product. The real net value of China's dairy imports in 2050 is projected to be around US$7 billion.

Fisheries

China's share of global fisheries product consumption increased from 17 per cent in 1990 to 34 per cent in 2009. Per person consumption of fisheries products in 2010 in urban households was 15.2 kilograms and in rural households 5.2 kilograms.

China is the world's largest producer of fisheries products. Production grew from 12.7 million tonnes in 1990 to 56 million tonnes in 2011. China's wild catch has remained relatively constant since 1998, at around 15 million tonnes. In contrast, China's aquaculture production increased from 19 million tonnes in 1998 to around 40 million tonnes in 2011 China targets the wild capture sector in domestic policies to ensure sustainable fishing. In the 1990s China renewed long-term land leases of 30–50 years, which removed a disincentive to long-term investments in aquaculture ponds. Combined with rising demand, this fuelled expansion in the aquaculture sector.

In value terms, China is the world's largest exporter of fisheries products and the third largest importer. In 2011 the value of China's net exports of fisheries products was about US$10 billion, while the value of imports was US$7.6 billion. Imports of fisheries products are subject to applied tariffs of between 10 and 16 per cent.

India

Grains

India is one of the largest consumers of grain in the Asian region due to its population size, low per person incomes and a largely vegetarian Hindu diet. Wheat and rice are the most commonly consumed grains, although maize and millet are also important to the Indian diet. Between 1990 and 2009 rice consumption increased from 74 million tonnes to 89 million tonnes and wheat consumption increased from 48 million tonnes to 81 million tonnes.

In 2050 rice will remain the principal grain consumed, with the real value of consumption projected to reach US$28 billion (a rise of 15 per cent compared with 2007). The real value of consumption of wheat is projected to rise by 30 per cent on 2007 levels to US$20 billion and coarse grains by 55 per cent to US$10 billion.

India is also a significant grains producer, with wheat, rice and maize accounting for the majority of production. Between 1990 and 2011 yield improvements in the grains sector resulted in rice production increasing by 39 per cent to 104 million tonnes and wheat production increasing by 74 per cent to 87 million tonnes. In 2011–12 production of coarse grains was 42 million tonnes—with maize and millet production at 21 and 13 million tonnes, respectively.

The Indian Government's policy of self-sufficiency resulted in limited grain exports during much of the early 1990s. More recently, the pattern of trade has been contingent on world prices and domestic stock holdings. In 2011, India was a significant exporter of rice (5 million tonnes) and coarse grains (4 million tonnes) and exported around 1 million tonnes of wheat. By 2050 India is projected to remain a net exporter of rice (US$2 billion) and coarse grains (US$1 billion) and to be a net importer of wheat (US$1.5 billion).

India's grains industry is subject to domestic policies of minimum support prices and input subsidies for producers. The government subsidises a food distribution program to provide consumers, depending on their income level, with low cost grain.

The Indian Government applies tariff and non-tariff trade policy measures, including export bans, to manage grain stocks and domestic prices. Applied tariffs for most grains have been relatively low in recent years.

India is the world's third largest consumer of vegetable oil. Between 1990–91 and 2011–12, consumption of vegetable oils grew by 240 per cent to 16.9 million tonnes. However, per person consumption was below the world average, at 13.6 kilograms. By 2050 the real value of India's oilseeds and oilseed product consumption is projected to be US$30 billion (a rise of 64 per cent compared with 2007), with vegetable oils accounting for US$17 billion (an increase of 60 per cent from 2007).

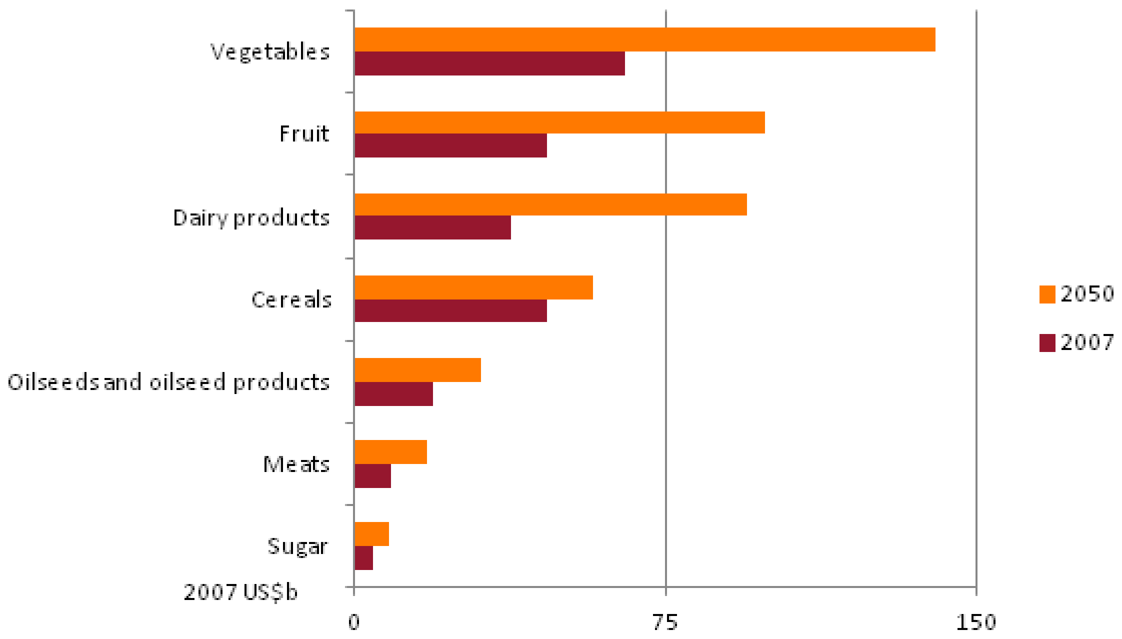
The principal oilseeds produced in India are cottonseed, soybeans, rapeseed and peanuts. The Indian Government supports oilseeds producers through minimum support prices and input support programs. Between 1990–91 and 2011–12 oilseeds production increased by 76 per cent to 36 million tonnes. Over the same period oilseed crush rose by 70 per cent to 29 million tonnes, largely reflecting the growth in demand for edible vegetable oils.

Exports of protein meal grew significantly between 1990–91 and 2011–12, reaching more than 5 million tonnes. Imports of vegetable oil reached a record 10 million tonnes in 2011–12, with palm oil accounting for around 75 per cent. The government applies a 7.5 per cent tariff on most imports of edible vegetable oils. India is projected to remain a significant net importer of vegetable oils (US$8 billion) in 2050.

Horticulture

Consumption of horticultural products grew by an average of 3.6 per cent a year between 1990 and 2009, with potatoes, bananas, tomatoes, onions and cassava being the major items. The real value of India's vegetable and fruit consumption is projected to reach US$140 billion and US$99 billion, respectively, in 2050—more than double the 2007 level (Figure 3).

Figure 3 India's agrifood consumption



Source: ABARES model output

India is the second largest producer of fruit and vegetables in Asia. Horticultural production grew by an average of 4 per cent a year between 1990 and 2011, with fruit the fastest growing category. Potatoes, bananas, tomatoes, onions, mangoes and eggplants were produced in greatest volume.

The value of India's horticultural product imports and exports each increased by an average of 6 per cent a year between 1990 and 2010, although trade remained very small compared to total consumption and production. By 2050 India is projected to become a significant net importer, with net imports of vegetables around US$8 billion (compared to net exports of US$1.3 billion in 2007) and net imports of fruits around US$6 billion (compared to net exports of US$100 million in 2007).

India applies a most favoured nation tariff of 30 per cent to many fruit and vegetable imports but tariffs are as high as 100 per cent on some items. Generally, no quantitative restrictions apply to imports of horticultural products provided they fulfil import permit, phytosanitary, fumigation and inspection requirements.

Sugar

In 2011 India was the second largest consumer and largest producer of sugar in Asia. Since 2001 consumption grew by 3 per cent a year, reaching 23 million tonnes in 2011. By 2050 India is projected to be the largest consumer of sugar in Asia, with the real value of consumption projected to reach US$9 billion—85 per cent higher than in 2007.

Trade flows of sugar in India depend on domestic production, which can vary highly with the monsoon season. In 2011 India exported 3 million tonnes of sugar, accounting for 18 per cent of Asia's sugar exports. India is projected to remain a net exporter of sugar in 2050, with the real net value of exports to be around US$600 million.

The Indian Government supports sugar producers through input subsidies and minimum support prices and consumers through its Targeted Public Distribution System, which discounts the price of sugar for the poor. The government uses its buffer stocks to stabilise the market in periods of price volatility and export restrictions and import tariffs to manage the domestic supply of sugar.

Wine

India does not have a culture of wine drinking, as the constitution and state imposed excise duties discourage alcohol consumption and production. Per person consumption is among the lowest in the world, with a significant proportion of consumption attributed to tourists and expatriates. The size of the Indian wine industry is also small, with production in 2012 just 11.5 million litres.

India meets about a third of its wine requirements with imports, which increased from less than 1 million litres in 2004 to 4.4 million litres in 2012. The Indian Government imposes a tariff of 150 per cent on all wine imports but hotels and other tourist operators can be exempted.

Meat

India is a relatively small consumer of meat, as a large proportion of its population is Hindu and follows a vegetarian diet. In 2009 India consumed 2 million tonnes of poultry meat and 2 million tonnes of beef (primarily buffalo meat). Poultry and beef were the two most widely consumed meats, followed by sheep and goat meat (800 000 tonnes) and pig meat (351 000 tonnes). Per person consumption is also low, at less than 2 kilograms a year of each meat. Cultural and religious factors are expected to constrain per person consumption growth of meat products in India. Consumption in 2050 of beef (US$13 billion), sheep and goat meat (US$2 billion), poultry (US$2 billion) and pig meat (US$1.4 billion) is projected to remain relatively low.

Beef and poultry meat production account for the majority of meat produced in India. Sheep and goat meat production was relatively low, at 890 000 tonnes, in 2011. Pig meat production decreased between 2003 and 2011, to 329 000 tonnes. Cattle's cultural and religious significance precludes their slaughter in the majority of Indian states.

India is the largest beef exporter in Asia, with exports of 1.65 million tonnes in 2012. Buffalo meat accounts for most of India's exports, predominantly to markets in the Middle East and

South-East Asia. India is largely self-sufficient in poultry, pig, sheep and goat meat products. In 2050 India is projected to remain a net exporter of beef (US$2 billion).

The Indian Government's domestic policies across the meat sectors aim to improve productivity, stimulate capital growth and enhance supply chain systems. The government subsidises capital, interest and transportation. Its applied tariff rate on imports of meat products is around 30 per cent.

Dairy

India often supplements its protein requirements with dairy products, for which it has relatively high per person consumption at 72 kilograms. Dairy consumption increased by 58 per cent between 1990 and 2009 to 87 million tonnes, making India the largest consumer of dairy products in Asia. Much of this growth was driven by a rise in per person consumption of manufactured dairy products, which more than doubled between 1990 and 2009 to 29 kilograms. In 2050 India is projected to remain the largest consumer of dairy products in Asia, with the real value of consumption at US$95 billion—more than double compared with 2007. The expected growth of the Indian middle class is likely to drive the demand for manufactured dairy products.

India is the largest dairy producer in Asia. Dairy production increased by around 4 per cent a year between 2000 and 2012 to 123 million tonnes. Buffalo milk accounted for 57 per cent of milk production in 2012. Despite the growth in production, yields remain lower than those of other developed economies because of less developed feed systems and smaller scale, more informal production processes.

India's imports (US$180 million in 2011) and exports (US$77 million in 2011) of dairy products are relatively small. Dairy product exports have consisted mainly of skim milk powder and butter. The projected growth in India's demand for dairy products will result in it becoming a significant net importer of dairy (US$13 billion) in 2050.

India operates a tariff quota for milk powders, while most other dairy products are subject to tariff-only protection. The applied tariff rate for fresh milk, cream, butter, yoghurts and cheese is 30 per cent. The Indian Government has also used non-tariff measures such as export bans to manage the domestic dairy market, particularly during periods of high prices.

Fisheries

Most Indian fisheries production is consumed domestically, and consumption is highest in coastal states. Per person consumption of fisheries products in 2009–10 was similar in rural and urban areas, at 3.2 kilograms and 2.9 kilograms per person.

India's fisheries production in 2009 was split between wild catch production (marine and freshwater, at 4 million tonnes) and aquaculture production (3.8 million tonnes). Between 1991–92 and 2011–12 the quantity of fisheries products derived from inland water areas grew by 5.9 per cent a year. This was much faster than marine production, which grew by only 1.5 per cent a year.

India exported around 430 000 tonnes of fisheries products between 1996–97 and 2008–09. However, in the three years to 2011–12, exports grew to 889 000 tonnes. Shrimps and prawns were the major fisheries products exported. India imports very small quantities of fisheries products (27 502 tonnes in 2011–12) and imposes average tariffs of 30 per cent.

Japan and the Republic of Korea

Growth in food consumption in Japan and the Republic of Korea is projected to be limited through to 2050 (Figure 4). This is the result of the already high incomes and food consumption per person in these countries combined with expectations of declining populations and modest future income growth.

Figure 4 Japan and the Republic of Korea's agrifood consumption

Source: ABARES model output

Grains

Over the past two decades wheat consumption in Japan and the Republic of Korea has varied as the feed use of wheat fluctuated. Japan and the Republic of Korea rely on imports to meet demand. In 2011–12 wheat imports in Japan and the Republic of Korea totalled 11.5 million tonnes. Wheat imports are projected to total US$1.8 billion in 2050 for both Japan and the Republic of Korea, 6 per cent higher than in 2007.

Japan and the Republic of Korea consumed around 12 million tonnes of rice in 2009 (milled equivalent), more than 90 per cent of which was consumed as food. Over the past 20 years, rice production in the region has declined by an annual average of 1 per cent. Imports of rice have risen in recent years, albeit from a low base. Import demand for rice by Japan and the Republic of Korea is projected to be relatively subdued out to 2050, with the real net value of rice imports at around US$150 million—a decrease of 25 per cent compared with 2007. Both Japan and the Republic of Korea have policies to discourage overproduction of rice.

In both Japan and the Republic of Korea, coarse grains are mostly consumed as livestock feed and maize is the predominant feed grain. Japan and the Republic of Korea are almost entirely reliant on imports to meet domestic demand. Japan is the world's largest importer of coarse grains, while the Republic of Korea is the third largest importer. Growth in coarse grain consumption for Japan and the Republic of Korea is projected to be relatively small, with the real value of consumption projected to be US$5 billion in 2050, 10 per cent higher than in 2007.

While consumption of oilseeds in Japan and the Republic of Korea declined between 1990–91 and 2011–12, consumption of vegetable oils rose strongly, with per person consumption rising from 15 kilograms and 11 kilograms to 17 kilograms and 20 kilograms, respectively. Imports of oilseeds trended downward between 2002–03 and 2011–12, to a combined 6.7 million tonnes, while imports of vegetable oil rose. The collective real net value of Japan and the Republic of Korea's oilseeds and oilseed product imports in 2050 is projected to be US$5 billion, a rise of 9 per cent compared with 2007.

Japan and the Republic of Korea support grains production with domestic policies such as direct payments, price supports, purchase programs and government stockholding. Japan applies tariffs on coarse grains and oilseeds and tariff quotas on imports of wheat and rice. The Republic of Korea applies tariffs or tariff quotas on imports of grains.

Horticulture

Consumption of horticultural products in Japan and the Republic of Korea has grown little in the past two decades. Between 1990 and 2009 horticultural products consumed for food increased by an average of 1.4 per cent a year in the Republic of Korea and fell by 0.3 per cent a year in Japan. Consumption growth for Japan and the Republic of Korea is expected to be relatively flat to 2050, with the real value of consumption projected to be US$9 billion—3 per cent lower than in 2007.

Sugar

Sugar consumption in Japan declined from 2.8 million tonnes in 1990 to 2.3 million tonnes in 2011. Domestic sugar production accounted for only 36 per cent of sugar consumption over the 10 years to 2011, with the balance imported as raw sugar for processing by the large sugar refining industry. Sugar producers in Japan receive price support. Total sugar consumption in the Republic of Korea increased to 1.2 million tonnes in 2011, 48 per cent more than in 1990.

The Republic of Korea imports and refines raw sugar, and applies a 3 per cent import tariff. Japan and the Republic of Korea's sugar consumption is projected to remain relatively constant, with the total real net value of sugar imports projected to be US$600 million in 2050—marginally higher than in 2007.

Wine

Wine consumption in Japan increased between 1990 and 2009, from 144 million litres to 253 million litres. Despite growing demand for wine in the Republic of Korea, consumption remained relatively low and generally aligned with import volumes. Between 1990 and 2009 total consumption of grape-based wine in the Republic of Korea increased from 1.9 million litres to 23 million litres. Imports increased significantly from the late 1990s to meet the growing demand. Both Japan and the Republic of Korea apply tariffs to wine imports and have labelling regulations.

Meat

Pig meat consumption growth in Japan was slow between 1990 and 2009, rising by an average of 1 per cent a year from 1.9 million tonnes to 2.5 million tonnes. In the Republic of Korea it grew at around 5 per cent a year, from 551 000 tonnes in 1990 to 1.4 million tonnes. Pig meat production in Japan declined from 1.6 million tonnes in 1990 to 1.3 million tonnes in 2011, while it rose in the Republic of Korea from 550 000 tonnes in 1990 to 1.1 million tonnes in 2010.

Japan and the Republic of Korea are net importers of pig meat. Imports almost quadrupled between 1990 and 2011, from 346 000 tonnes to 1.3 million tonnes. In Japan and the Republic of

Korea production and consumption are projected to remain around recent historical levels to 2050. Combined real value of net imports is projected to be around US$3 billion, an increase of 6 per cent from 2007.

Poultry meat consumption rose in both Japan and the Republic of Korea between 1990 and 2009 from 1.7 million tonnes to 2.8 million tonnes. In 1990 Japan imported around 301 000 tonnes of poultry meat and the Republic of Korea imported around 6000 tonnes. By 2011 Japanese imports had increased to more than 477 000 tonnes and the Republic of Korea's to almost 110 000 tonnes. Poultry meat consumption growth for Japan and the Republic of Korea is projected to be relatively small, with the real value of consumption projected to be around US$4 billion in 2050—4 per cent higher than in 2007. Domestic production is expected to meet most of the projected rise in demand out to 2050.

Imports are important in the supply of beef in Japan and the Republic of Korea. The real net value of beef imports for Japan and the Republic of Korea is projected to remain constant, at around US$3 billion in 2050. Japan and the Republic of Korea administer subsidy programs for cattle producers. The Japanese Government imposes a most favoured nation applied tariff of 35.8 per cent on imports of beef, while the Republic of Korea's bound and applied tariff rate is 40 per cent.

Dairy

Consumption of dairy products in Japan is relatively high compared with that in the developing countries of Asia, with per person consumption of milk at 73.9 kilograms in 2009. In the Republic of Korea it was 21.9 kilograms. Dairy consumption growth for Japan and the Republic of Korea is projected to be relatively modest, increasing to a total of US$6 billion in 2050—30 per cent higher than in 2007. Dairy imports for Japan and the Republic of Korea are projected to be about US$2 billion by 2050, US$1 billion higher than in 2007. This increase is due to projected consumption growth, particularly from the Republic of Korea, and stable production.

Fisheries

Japan is a large consumer of fisheries products. Its consumption accounted for about 5 per cent of global consumption in 2009, with per person fish consumption of 54.5 kilograms. While around three quarters of Japan's production supplies its domestic market, imports account for around half of its domestic consumption.

In the Republic of Korea per person consumption of fisheries products was 60.6 kilograms in 2009. The Republic of Korea produced 3.1 million tonnes of fisheries products in 2010, 2 per cent of global production. The Republic of Korea recently became a strong net importer of fisheries products.

ASEAN

Grains

Rice accounts for more than 80 per cent of total cereal consumption for food in many of the ASEAN member states. The real value of rice consumption is projected to increase by 21 per cent (on 2007 levels) to reach US$34 billion in 2050.

Over the 20 years to 2011, rice production in ASEAN member states increased by an average of 2.9 per cent a year. Most ASEAN governments support the production of rice through input subsidies, trade restrictions, minimum prices and intervention stocks.

ASEAN member states are significant exporters of rice, with aggregate net exports amounting to around 12 million tonnes (milled equivalent) in 2010. With production projected to increase over the longer term, the real value of net rice exports is projected to increase by 25 per cent to reach US$3 billion in 2050.

Consumption of wheat among ASEAN member states has risen, but per person consumption remains relatively low—averaging 28.5 kilograms in 2011–12. Consumption is projected to remain low in 2050. The real value of wheat consumption is projected to be around US$4 billion, with Indonesia accounting for around half the region's consumption.

Wheat is not produced in significant amounts in the region, so ASEAN member states depend almost entirely on imports to meet growing demand. ASEAN member states generally apply tariffs of less than 5 per cent on wheat imports but specify bound rates of up to 30 per cent. Between 1990–91 and 2011–12 imports grew by 5.5 per cent a year, to reach 17.9 million tonnes. ASEAN member states sourced the bulk of these imports from Australia. Wheat imports are projected to grow—increasing on 2007 levels by 40 per cent in real terms—to reach nearly US$4 billion by 2050.

Maize dominates coarse grain consumption and production in ASEAN member states. Consumption of maize increased from 15.2 million tonnes in 1990–91 to 35.1 million tonnes in 2011–12. In 2011–12 three-quarters of maize consumption was used for feed, particularly as pig and poultry feed. Production of coarse grains averaged 27.3 million tonnes a year in the five years to 2011–12. By 2050 the real value of coarse grain consumption is projected to reach US$8 billion, 41 per cent higher than in 2007. Imports are projected to meet around 25 per cent of this consumption.

Net imports of coarse grains rose from 0.5 million tonnes 1990–91 to 5.6 million tonnes in 2011–12, sourced principally from Argentina, India, Brazil and the United States. ASEAN member states generally impose low or zero tariffs on coarse grains imports. However, Thailand and the Philippines, which both have relatively sizeable domestic maize industries, impose higher tariffs.

Use of oilseeds in ASEAN member states increased by 145 per cent over the two decades to 2011–12, reaching 28 million tonnes. Indonesia is the largest consumer of soybeans for food of the ASEAN member states. Consumption of vegetable oils quadrupled to 18.5 million tonnes between 1990–91 and 2011–12, reflecting the increased use of vegetable oils by industry. By 2050 the real value of consumption of oilseeds and oilseed products is projected to be 44 per cent higher than in 2007, at US$25 billion, with vegetable oil accounting for 60 per cent of the total consumption.

The ASEAN region is the largest producer of vegetable oils in the world, partly because government programs in Indonesia and Malaysia encourage palm oil production. Production of vegetable oil, primarily palm oil, increased from 12.6 million tonnes in 1990–91 to 55 million tonnes in 2011–12. Exports of palm oil expanded from 8 million tonnes to 35 million tonnes.

Between 1990–91 and 2011–12 oilseeds imports, particularly soybean imports, increased from 1.2 million tonnes to 5.7 million tonnes to meet increasing requirements for both food and feed.

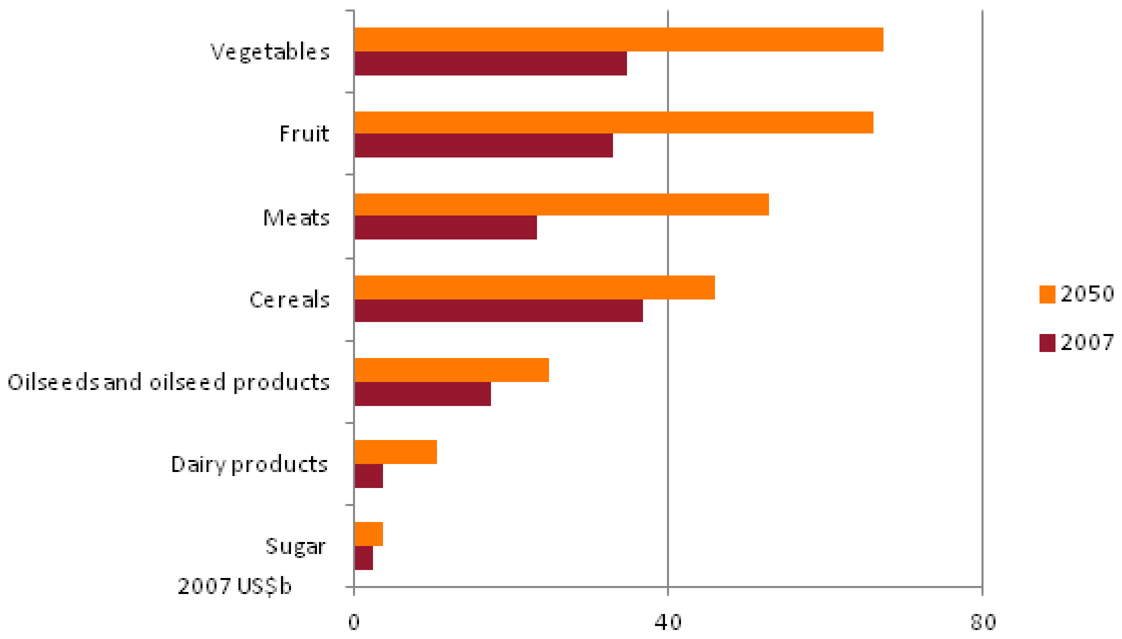
Out to 2050 net exports of vegetable oils, primarily palm oil, are projected to increase by 40 per cent to US$31 billion, while net imports of other oilseeds and oilseed products, dominated by protein meals, are projected to increase by 53 per cent to around US$5 billion.

Horticulture

Total food consumption of horticultural products grew by 3 per cent a year on average between 1990 and 2009. Horticultural production in ASEAN member states grew by an average of 2.8 per cent a year between 1990 and 2011. ASEAN member states, in total, are net exporters of horticultural products but imports have been increasing.

The real value of fruit and vegetable consumption is projected to reach US$133 billion in 2050, nearly double that of 2007 (Figure 5). Most is expected to be produced within the ASEAN member states, with net imports increasing to only US$8 billion.

Figure 5 ASEAN agrifood consumption



Source: ABARES model output

Sugar

ASEAN member states have accounted for around 21 per cent of Asian sugar consumption since 2000. Between 2002 and 2011 consumption grew at 4 per cent a year average to 13.4 million tonnes. This was driven by rising consumer incomes and populations. The bulk of ASEAN sugar consumption growth took place in the four main sugar producing countries: Thailand, the Philippines, Indonesia and Vietnam. By 2050 the real value of sugar consumption in ASEAN member states is projected to be around US$4 billion, 56 per cent higher than in 2007.

Sugar production in ASEAN member states increased from 11.7 million tonnes in 2002 to 17.7 million tonnes in 2011. A number of ASEAN member states support the production of sugar through minimum prices, subsidising infrastructure and imposing tariffs on imports.

Between 2002 and 2011 sugar exports increased by 7 per cent to 8.1 million tonnes, while imports rose by 4 per cent to 5.2 million tonnes. By 2050 the ASEAN member states, collectively, are expected to be a small net importer despite projected production growth in the major sugar producing countries. The value of net imports is expected to be less than US$100 million.

Wine

ASEAN member states consume only small quantities of wine. Some impose tariffs of up to 150 per cent, and some governments impose restrictions on alcohol consumption because of Muslim religious beliefs. Tourists and expatriates account for a significant proportion of wine consumed in the ASEAN member states, and future imports are likely to depend more on growth in tourist numbers than on changes in domestic consumption patterns.

Meat

In the past two decades consumption of pig meat has increased rapidly. Consumption of pig meat in 2009 was 45 per cent of total meat consumption, with poultry meat accounting for 40 per cent, bovine meat 13 per cent, and sheep, goat and other meat 2 per cent. The real value of pig meat consumption is projected to increase on 2007 levels by US$12 billion to US$22 billion in 2050. Imports will increasingly meet this growth in consumption. They are projected to increase from 2007 levels by US$8 billion in 2050, despite some ASEAN member states imposing tariffs as high as 50 per cent.

Since 1990, pig meat has been the dominant meat produced by ASEAN member states. Production rose significantly between 1990 and 2011, increasing by around 166 per cent to 7.3 million tonnes (carcass weight equivalent) in 2011. However, its relative importance has declined as demand for poultry meat has grown and the poultry industry has expanded.

Consumption of poultry meat increased from 2.1 million tonnes in 1990 to 6.4 million tonnes in 2009. The real value of poultry meat consumption is projected to more than double between 2007 and 2050, to reach US$16 billion.

Poultry meat production grew from 2.2 million tonnes in 1990 to 7.1 million tonnes in 2011. Net imports amounted to only 192 000 tonnes. The real net value of poultry meat imports of ASEAN member states in 2050 is projected to be US$5 billion higher than in 2007. Many ASEAN member states apply tariffs of 30 to 50 per cent on imports from non-ASEAN sources.

Beef consumption in ASEAN member states increased to 2 million tonnes in the two decades to 2011. The 65 per cent increase in beef production over the same period to 1.8 million tonnes (carcass weight equivalent) was not sufficient to meet demand, resulting in a rise in imports.

Some ASEAN member states impose tariffs of up to 50 per cent, but others impose none. Some with predominantly Muslim populations impose certification standards on imported beef.

The real value of beef consumption in 2050 is projected to be US$15 billion, 120 per cent higher than in 2007. Net imports of beef are projected to expand by US$3 billion to US$4 billion.

Sheep and goat meat consumption in ASEAN member states exceeds production. In 2011 ASEAN member states imported 42 000 tonnes (carcass weight equivalent) of mainly sheep meat. By 2050 the real value of sheep and goat meat consumption is projected to increase by around US$400 million, while sheep and goat meat imports are projected to remain relatively constant at around US$20 million.

Dairy

ASEAN member states' consumption of milk and dairy products (excluding butter) is relatively low compared with that of major OECD countries, at around 15.3 kilograms per person, and is constrained by limited domestic supply, lower incomes and dietary habits. Production of milk and dairy products in ASEAN member states is largely undeveloped, but some countries have increased production.

ASEAN member states are significant importers of dairy products, particularly milk powders but also butter, cheese and whey. Around 840 000 tonnes of milk powders were imported in 2011. Applied tariffs for dairy products were generally low.

The real value of dairy consumption in ASEAN member states in 2050 is projected to be more than double that of 2007 and to reach US$11 billion. Imports valued at US$9 billion—US$6 billion higher than in 2007—are projected to largely meet consumption.

Fisheries

Consumption of fisheries products increased from 8.6 million tonnes in 1990 to 19.2 million tonnes in 2009, leaving an expanded surplus for export. Production of fisheries products in the ASEAN region more than doubled to 33.8 million tonnes between 1990 and 2011. Aquaculture accounted for the bulk of this increase. Most ASEAN member states apply zero tariffs for fisheries products.

Conclusion

Food production in Asia is expected to increase, but ABARES projections indicate that it will not be sufficient to meet the growth in food consumption for commodities other than rice. Asian demand for imported food is likely to increase.

In order to meet this new and changing demand, there will be a need for Asia to significantly increase food imports to complement domestic production. Apart from the role Governments will play in reducing market barriers to moving food, the contribution from the private sector will also be important. Supermarkets and hypermarkets will have a role in facilitating trade and patterns of trade, given their rising prominence in the Asian food retail sector and their well-developed system of international supply networks.

This is the first *What Asia wants* report. ABARES continues to develop its agrifood model and to further research projections for Asian food demand. It will assess developments in export capacity of Australia’s competitors and identify implications and opportunities for Australian agriculture and food industries in the Asian century.

Introduction

World demand for agrifood products is expected to increase significantly through to 2050. This will be driven by growth in global population and in per person incomes and by increasing urbanisation, especially in developing countries. ABARES projects that the real value of food consumption in Asia will double between 2007 and 2050, accounting for around three-quarters of the projected global increase in food consumption. China accounts for almost half of the global increase in agrifood consumption and India a further 13 per cent.

The food products most sought after by 2050 are likely to be the vegetables and fruit, meat, dairy products, cereals and fish commodity groups. According to ABARES projections, China accounts for much of the projected increase in world import demand for these products, while the growth in demand from India is projected to be strongest for dairy products. These results are consistent with the expected change in diets toward high value products as consumer incomes rise.

This report, the first in the *What Asia wants* series, assesses trends in food consumption and production in major Asian countries, including China, India, Japan, the Republic of Korea and ASEAN member states. The report examines factors likely to influence the future pattern of Asian food consumption and trade and longer term prospects for consumption and trade of a range of food-based commodities. It will also identify opportunities for the Australian agriculture and food industries in expanding Asian markets over the medium to long term. *What Asia wants* builds on existing ABARES analysis of global food consumption and production.

Chapter 2 of this report examines the factors driving Asian food demand, including population and income growth, urbanisation and the growing importance of supermarkets in Asia. Chapter 3 provides an overview of the production potential for food in Asia and outlines the key issues that have the potential to influence the productive capacity of agriculture in Asia and therefore affect Asia's capacity to meet its increasing food needs.

Commodity based chapters discuss developments in production, consumption, trade and policy issues in Asia. These chapters, with the exception of those on wine and fisheries, draw on ABARES preliminary model results to examine long-term prospects for Asian consumption and imports to 2025 and 2050.

The long-term projections presented in the commodity chapters were developed using the ABARES agrifood model, an economic simulation model of global agricultural supply, demand and trade. The model includes a set of supply-side assumptions relating to, for example, productivity growth, availability of arable land and expectations about growth in global fisheries. These assumptions are sourced from the Food and Agriculture Organization of the United Nations and the Agricultural Modelling Intercomparison and Improvement Project. The projections toward 2050 are conditional on these underlying assumptions.

As part of the *What Asia wants* series, further work is underway which will examine prospects for Asian food demand and supply in more detail; potential developments in the export capacity of Australia's key competitors; and implications and opportunities for Australian agriculture and food industries in the Asian century.

1 Drivers of Asian food demand

Patrick Hamshere, Jenny Eather and Brian Moir

Demand for food products in many Asian countries changed substantially over the past two decades, reflecting population growth, urbanisation and income growth. Food consumption increased, as a whole and on a per person basis, and consumption patterns shifted from traditional diets oriented around starchy staples, to more varied diets with greater quantities of higher value and higher protein foods, particularly meat and dairy products.

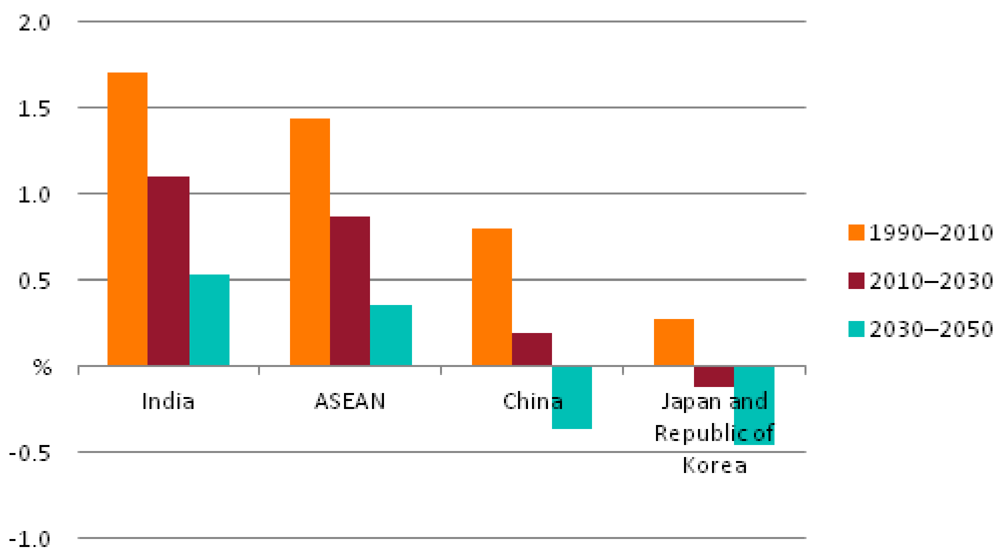
Population growth

Between 1990 and 2010 the combined population of China, India, Japan, the Republic of Korea and ASEAN member states increased by an average of 1.2 per cent a year, with growth rates varying considerably among countries. In Malaysia, for example, the population grew by an average of 2.2 per cent a year. This compares with growth rates in Japan and the Republic of Korea of 0.2 per cent and 0.6 per cent, respectively (United Nations Population Division 2011).

The population of most Asian countries is expected to grow toward 2050, although at a declining rate (Figure 6). For ASEAN member states as a whole, population growth is projected to decline from an annual average rate of 1.4 per cent between 1990 and 2010 to 0.9 per cent between 2010 and 2030 and 0.4 per cent between 2030 and 2050. In India, population growth is projected to slow from an annual average rate of 1.7 per cent between 1990 and 2010 to 1.1 per cent between 2010 and 2030 and 0.5 per cent between 2030 and 2050. India is projected to have a population of 1.7 billion by 2050 (United Nations Population Division 2011).

By contrast, populations in some Asian countries are projected to decline toward 2050. For example, the United Nations Population Division (2011) projects that China's population will peak at 1.4 billion in 2026, before declining gradually to 1.3 billion by 2050. Japan's population is projected to decline from 127 million in 2010 to 120 million in 2030 and 109 million in 2050.

Figure 6 Population growth prospects, selected Asian countries



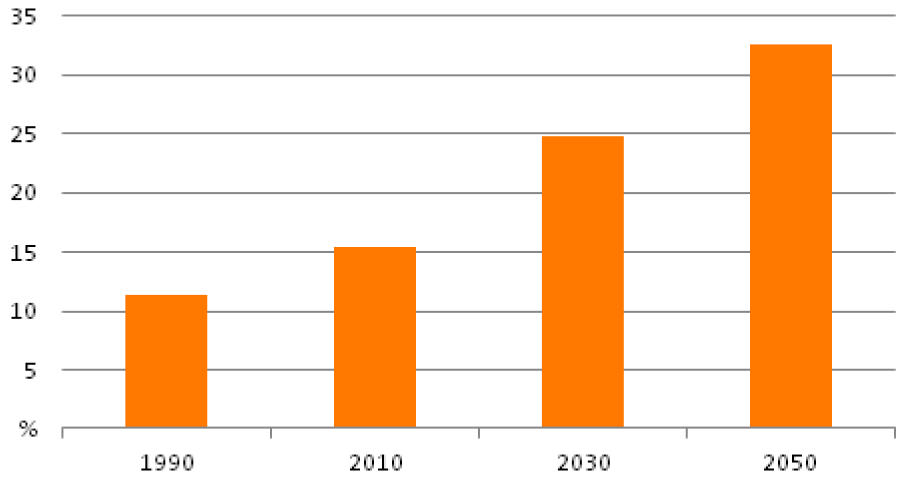
Note: *Medium-fertility variant*

Source: United Nations Population Division 2011

Ageing populations will be a challenge to sustaining rapid economic growth in Asia. According to the United Nations Population Division (2011), for the study countries as a whole, the proportion of people aged 55 years or over is expected to increase from 15 per cent in 2010 to 25 per cent in 2030 and 33 per cent in 2050 (Figure 7). Similarly, the share of the labour force in these populations is expected to decline gradually. For example, the share of Japan's working age population (aged 15 to 64 years) in the total population is projected to decline from 64 per cent in 2010 to 57 per cent in 2030 and 51 per cent in 2050.

Food consumption in populations with a larger proportion of elderly people is less likely to increase significantly (*The Economist* 2006) and elderly people will probably prefer more healthy and easy-to-cook processed or semi-processed food. Consequently, demand for particular types of foods, such as convenience and health foods, could grow in Asian countries with an ageing population (Roberts et al. 2006).

Figure 7 Share of population aged 55 years or over, all study countries

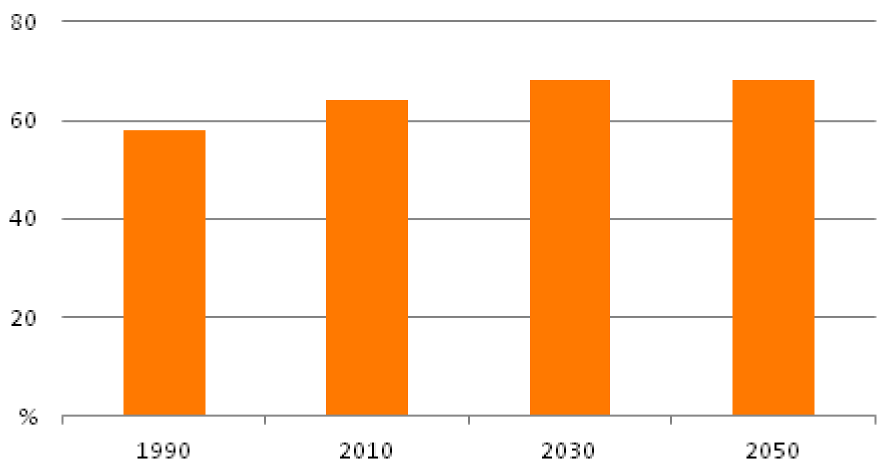


Note: *Study countries are China, India, ASEAN member states, Japan and the Republic of Korea.*

Source: United Nations Population Division 2011

An exception to this is India, where the proportion of people aged 55 years or over is not expected to increase as significantly as the other Asian countries in this study by 2030 or 2050. Additionally, in India the share of the labour force in the total population is projected to grow over the longer term. The United Nations Population Division (2011) projects the proportion of people aged 55 years or over will increase from 11 per cent in 2010 to 17 per cent in 2030 and 25 per cent in 2050. As a share of total population, the working age population is projected to increase from around 64 per cent in 2010 to around 68 per cent 2030 and 2050 (Figure 8). India's increasing labour force underlines the potential for an extended period of rapid economic growth toward 2050.

Figure 8 Working age population as a share of total population, India

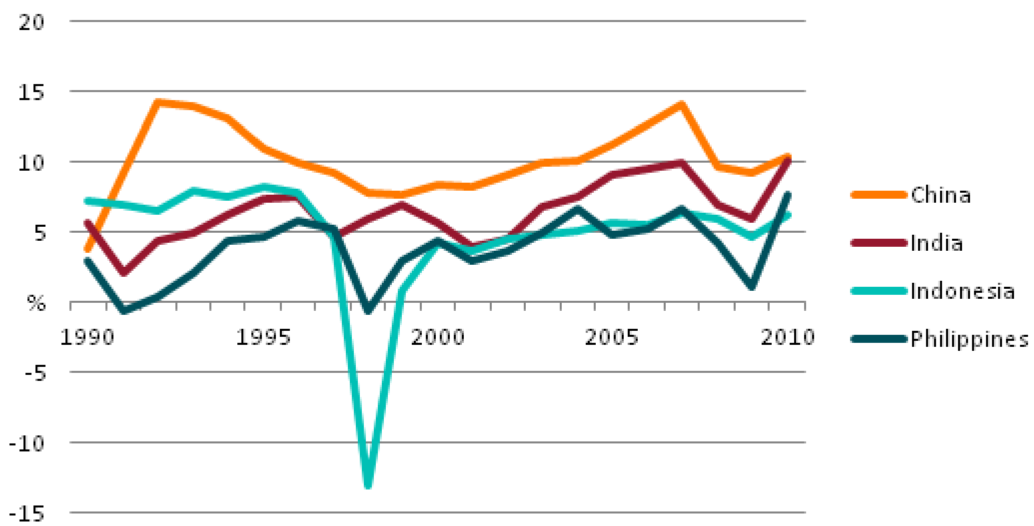


Source: United Nations Population Division 2011

Income and consumption growth

For China, India, the Republic of Korea and many ASEAN member states, incomes have increased rapidly over the past 20 years (Figure 9). Income growth was driven by reform toward more market oriented economies and increased openness to foreign investment and trade. For example, in China real gross domestic product (GDP) rose by an average of 10 per cent a year between 1990 and 2010. Similarly, Indian GDP grew by an average of 6 per cent a year in the same period (IMF 2012).

Figure 9 GDP growth, selected Asian economies



Source: IMF 2012

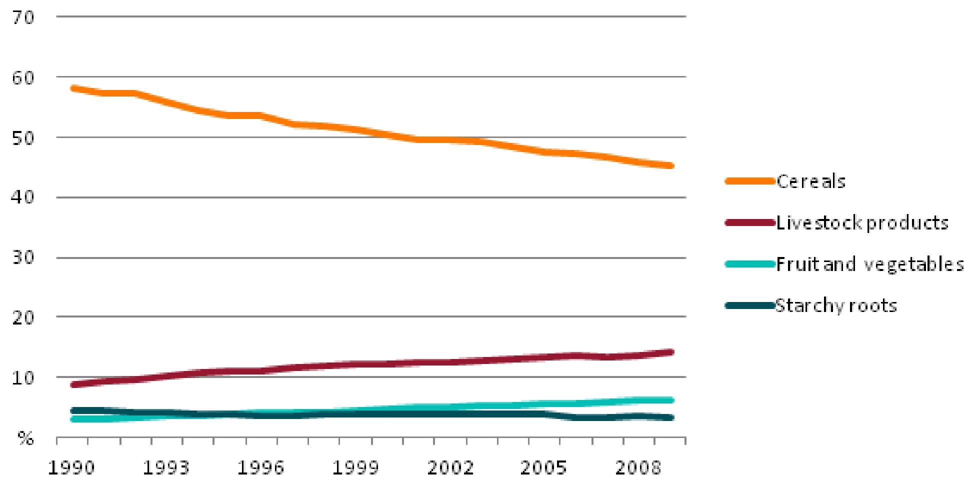
In Japan, income growth has been moderate over the past two decades, which in part reflects its advanced stage of economic development. Economic activity in Japan expanded at an average of 1 per cent a year between 1990 and 2010 (IMF 2012).

Consumption per person

Within Asia rising per person incomes have led to an increase in total food consumption per person and a change in food consumption patterns. Total annual food consumption per person in the countries studied increased from 400 kilograms in 1990 to 585 kilograms in 2009. Expressed in calories, consumption per person increased from 2583 calories a day in 1990 to 3067 calories a day in 2009, representing growth of 0.8 per cent a year. Food consumption, expressed as calories per person, grew by as much as 2.1 per cent a year in Vietnam. In China it averaged 1.3 per cent a year, but was much slower in India (0.4 per cent a year; FAO 2013).

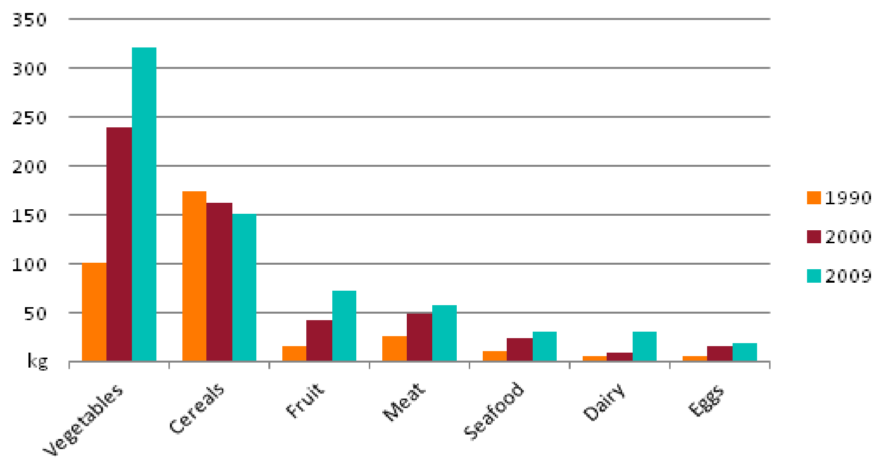
Over the past two decades Asian consumption has shifted away from traditional to more varied diets, with greater quantities of wheat-based products, meat, dairy, seafood, fruit and vegetables. For China, India and ASEAN member states, cereals contributed 64 per cent of daily calorie intake in 1990 but only 53 per cent in 2009 (Figure 10). The contribution of livestock products increased over the same period, from 10 per cent to 16 per cent. In China, as real incomes increased by 520 per cent between 1990 and 2010 (World Bank 2013), per person consumption of grains declined by 13 per cent, while that of dairy and meat increased by 398 per cent and 126 per cent, respectively (Figure 11).

Figure 10 Share of daily calorie intake, China, India and ASEAN



Source: FAO 2013

Figure 11 Per person consumption of selected food categories, China



Source: FAO 2013

The situation in Japan and the Republic of Korea is different. Income per person in Japan and the Republic of Korea is high relative to other Asian countries. For example, in Japan GDP per person (on a purchasing power parity basis) in 2010 was $34 241, compared with $46 811 in the United States and $3403 in India (IMF 2012). With high incomes, food consumption patterns in these countries are similar to those in many developed countries (Table 1).

Table 1 International comparison of food consumption, 2009

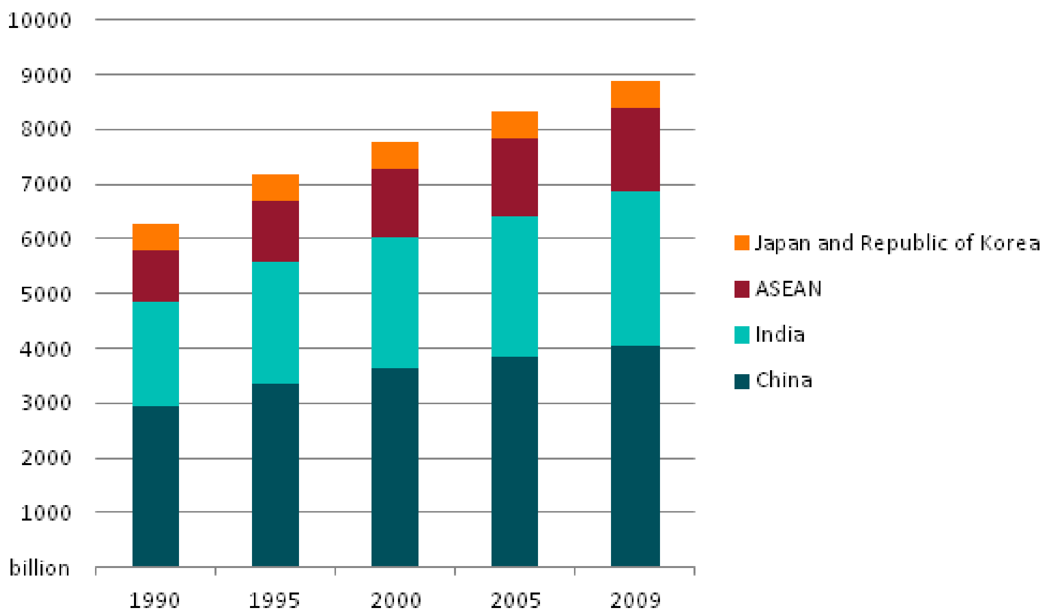
Food consumption	Republic of Korea	Japan	Australia	United States
Daily calorie intake per person	cal.	cal.	cal.	cal.
Vegetable products	2 697	2 158	2 275	2 675
Animal products	504	566	985	1 013
Total	3 200	2 723	3 261	3 688
Consumption per person	kg	kg	kg	kg
Cereals	146.0	114.7	96.9	108.2
Starchy roots	16.7	31.9	55.3	56.9
Fruit	73.8	52.7	104.2	110.6
Vegetables	218.7	101.6	97.6	122.9
Meat	54.1	45.9	111.5	120.2
Dairy	23.3	74.5	211.6	257.6
Eggs	10.8	19.1	5.8	14.1
Fish, seafood	56.1	56.6	24.9	24.1

Source: FAO 2013

Total food consumption

For many Asian countries, rising total food consumption at the national level is the result of both increased per person consumption and population growth. For the study countries as a whole, total consumption of food increased by 42 per cent over the period 1990 to 2009, representing average annual growth of around 2 per cent a year (Figure 12). In China, food consumption grew at 2 per cent a year over this period, while in Japan it contracted slightly (FAO 2013).

Figure 12 Food consumption in calories per day, all study countries



Note: Study countries are China, India, ASEAN member states, Japan and the Republic of Korea.

Source:FAO 2013

Future challenges

The Organisation for Economic Co-operation and Development (OECD 2012) and the Centre for Prospective Studies and International Information (Fouré et al. 2012) project economic growth in China, India and many ASEAN member states to slow gradually toward 2050, reflecting difficulties in maintaining rapid economic growth as countries become more developed. For Japan and the Republic of Korea, economic growth is projected to remain around levels similar to those achieved in recent years (Fouré et al. 2012; OECD 2012).

A number of challenges face Asian economies in sustaining economic growth. First, economies heavily reliant on exports, particularly China and a number of ASEAN member states, will find it difficult to maintain rapid export growth in the longer term. If their economic growth is to be maintained, these countries will need to develop greater reliance on domestic demand (ADB 2013).

Second, there is limited availability of modern infrastructure in a number of Asian countries. In India, for example, reliability of the power network is relatively poor, with frequent electricity supply disruptions (*The Economist* 2012). Unless substantial improvements in infrastructure support can be achieved, bottlenecks and production constraints will become major impediments to economic growth.

For some Asian countries, particularly India, the ability to provide adequate infrastructure is made more difficult by large fiscal deficits and public sector debt as a share of GDP. This could constrain their ability to finance major projects to improve not only infrastructure, but also education and basic services, which are critical to raising the potential for economic growth.

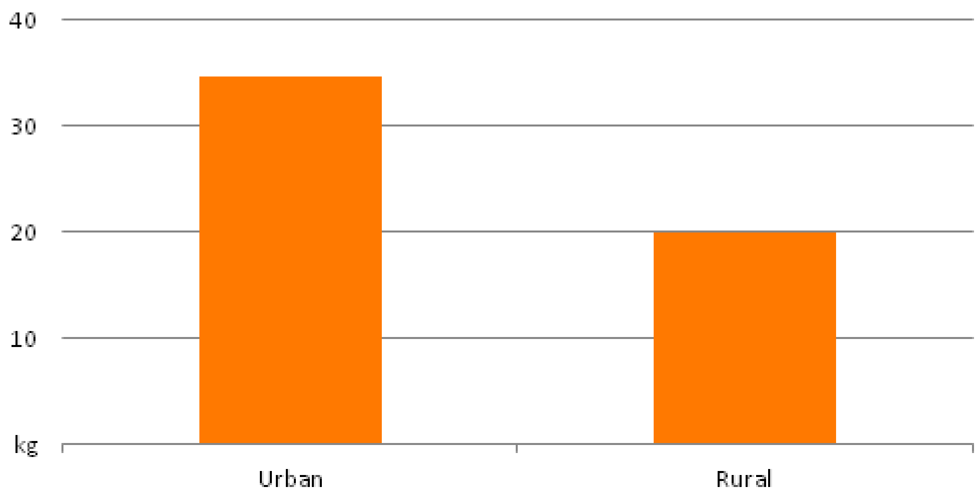
Urbanisation

Considerable urbanisation in Asian countries has occurred over the past two decades, as measured by the proportion of the population living in urban areas (FAO 2009). For the study countries as a whole, the proportion of the population living in urban areas increased from 30 per cent in 1990 to 44 per cent in 2010 (United Nations Population Division 2012). The proportion of people living in urban areas increased most in China, almost doubling between 1990 and 2010.

In general, this urbanisation was driven largely by migration from rural to urban areas, while natural population growth within urbanised populations also contributed, particularly in Japan and the Republic of Korea. For China, India and many ASEAN member states, a key driver of urbanisation was the differential between urban and rural incomes. For example, in China urban incomes were around twice as high as rural incomes in 1990 and around three times higher in 2010 (Zhou et al. 2012). This disparity continued despite the proportion of the population living in urban areas increasing from 26 per cent in 1990 to 49 per cent in 2010 (United Nations Population Division 2012).

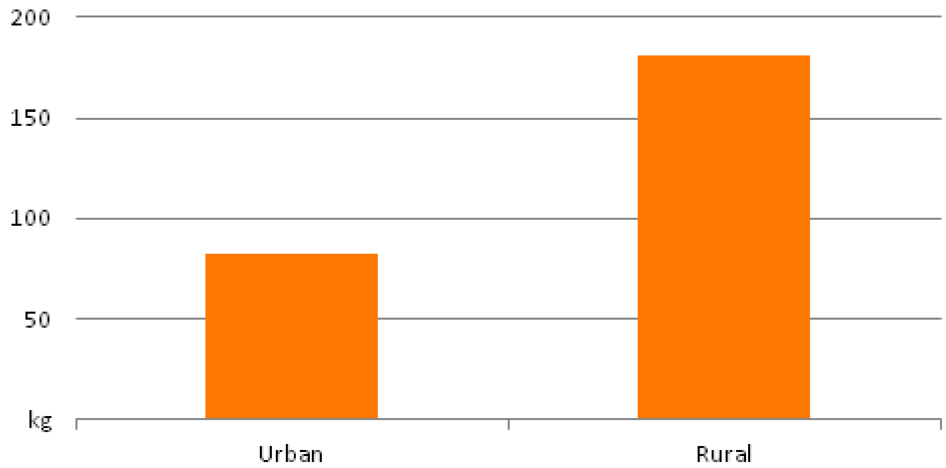
With higher incomes, urban consumers in these countries spend more on food than do rural consumers and have a more diverse, higher value diet. For example, in China per person expenditure on food in urban areas was 4800 yuan in 2010, compared with 1800 yuan in rural areas. Per person consumption of meat and dairy products in urban areas was 74 per cent and 410 per cent higher than in rural areas in 2010 (Figure 13). By contrast, per person consumption of grains was 55 per cent lower (Figure 14) (Zhou et al. 2012).

Figure 13 Meat consumption per person in 2009, China



Source: Zhou et al. 2012

Figure 14 Grain consumption per person in 2009, China

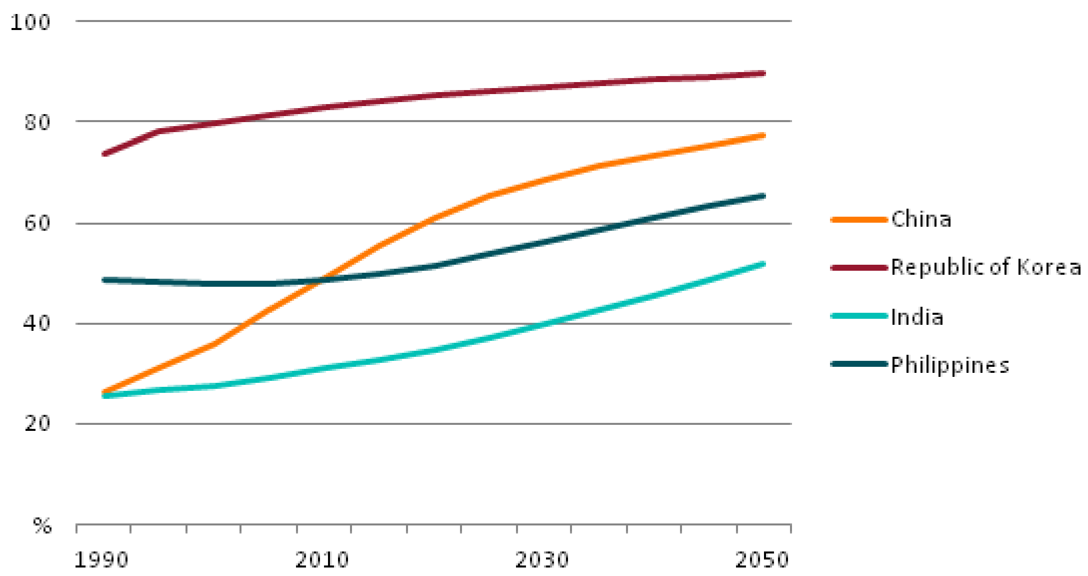


Source:Zhou et al. 2012

Urban consumers in China, India and many ASEAN member states have increased their expenditure on convenience foods, fast food and restaurant food, reflecting busy lifestyles combined with income growth. In China, the proportion of food expenditure on food-away-from-home in urban areas increased from 10 per cent in 1995 to 15 per cent in 2000 and 22 per cent in 2009 (Zhou et al. 2012). For the study countries as a whole, rising incomes and urbanisation over the past two decades have also contributed to an increase in the share of food purchased at supermarkets and hypermarkets, as discussed in Box 1(Reardon 2011).

A greater proportion of Asian populations is expected to live in urban areas by 2030 and 2050, with the factors underpinning current urbanisation trends likely to continue. For the study countries as a whole, the United Nations Population Division (2012) projects the proportion of the population living in urban areas to increase from 44 per cent in 2010 to 56 per cent in 2030 and 65 per cent in 2050(Figure 15). As a result, changes in consumption patterns toward diversification of diets are expected to continue.

Figure 15 Urbanisation prospects, selected Asian countries



Source: United Nations Population Division 2012

Box 1 Supermarkets and hypermarkets

In much of Western Europe and North America, supermarkets and hypermarkets account for well over two-thirds of all food retailing (Shepherd 2005). Supermarkets in developing countries generally have a somewhat smaller share. However, supermarkets' share of food sales in Asia is increasing rapidly and this will have implications for producers and exporters supplying food to those countries.

Between 2003 and 2010 sales by modern retail chains selling food in China grew by 24 per cent a year (National Bureau of Statistics of China 2011, 2004). Much of this development has taken place with foreign capital, with more than half of the top 50 global retailers active in China (White 2011). In 2006 modern retailers in China were estimated to have a retail market share of 37 per cent in fruit, 22 per cent in vegetables and 79 per cent in processed goods (Reardon 2011). With a considerable number of domestic and foreign supermarkets in China, no single company has any degree of market dominance.

In India, the sales of the leading 20 private chains that sold food accounted for around 5 per cent to 6 per cent of urban food retail in 2010, an increase from less than 1 per cent six years earlier. The average yearly growth of sales in the modern retail sector between 2001 and 2010 in India was 49 per cent, five times faster than the gross domestic product and among the fastest in the world (Reardon & Minten 2011). However, traditional markets remain important particularly in rural areas.

In Indonesia, supermarkets also occupied only a tiny niche of the retail food market until the mid-1990s. Following the liberalisation of foreign investment, and coupled with income growth and urbanisation, it was estimated in 2007 that supermarkets had around 30 per cent of food retailing, gaining 2 per cent of the market each year (World Bank 2007). In that year, supermarkets had been less successful in expanding into fruit and vegetable retailing, with only 10 per cent to 15 per cent, but had a growing share of this market.

The development of supermarkets is typically associated with closer vertical coordination along value chains as the supermarkets develop close relationships with their suppliers. In the case of fruit and vegetable production, this often involves contractual arrangements with farmers. In developing countries, supermarkets often provide farmers with inputs, credit, training and technical advice while insisting on a supply of produce that meets their standards. They typically also invest in transport and cold-storage infrastructure.

The development of close relationships between retailers and their suppliers occurs not only within countries but between countries as well. For example, strong links have been developed between supermarkets in the United Kingdom and farmers in Kenya and other African countries. The supermarkets help determine what types of producers and processors in Africa are able to gain access to the fresh vegetables chain and the activities they must carry out if they are to participate in these value chains.

Supermarkets typically set their own private standards for the products they handle, which are imposed in addition to public standards on, for example, food safety, quality and packaging (Reardon 2006). As supermarkets come to dominate the retail market, producers who cannot meet their standards are effectively excluded from the market. And as supermarkets expand to account for a dominant share of produce imported into a country, producers in exporting countries who cannot meet their standards are effectively excluded from trading with that country. This is the case in the United Kingdom, where large supermarkets have captured most of the market for imported fresh vegetables (Dolan, Humphrey & Harris-Pascal 1999).

While supermarkets in Asian countries have yet to develop the dominance they have in the United Kingdom and other developed countries, their rapid development has brought changes for food exporters. For example, Asian supermarket chains have developed direct relationships with suppliers of fresh horticultural and dairy produce in the United States, New Zealand and Australia (Glover 2011). Exporters of fresh food to Asia will increasingly need to enter relationships with supermarkets and meet their requirements if they are to succeed in supplying those markets.

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2 Production potential in Asia

Verity Linehan and Kasia Mazur

Asia has been driving global agricultural production growth in recent decades. In the 1980s about half the total growth in global agriculture came from East, South-East and South Asia, a contribution that reached 70 per cent in the 1990s and 60 per cent in the 2000s (IFPRI 2012). Improvements in total factor productivity (TFP) are driving this growth. However, challenges such as resource constraints have emerged that may affect Asia's future production potential, in particular, land availability, land degradation, water availability, water quality and climate change.

According to assessments in recent international literature, Asia's agricultural productivity growth is anticipated to slow from the high rates achieved since the 1980s, but remain high relative to those in developed countries. In particular, strong productivity growth is projected for meat products, particularly pigs and poultry, under the assumption that Asian producers will adopt advanced production technologies, leading to a significant increase in intensive livestock production in the region.

In this chapter long-run projections from a number of sources are presented. Like any forecasting exercise, there is uncertainty around these numbers as they are conditional on a set of assumptions. Any changes to the assumptions could result in changes to the projections.

Historical productivity growth

In 2010 East, South–East and South Asia accounted for 44 per cent of global agricultural output. North–East Asia (dominated by China) has sustained average agricultural production growth of more than 4 per cent a year since 1971. South–East Asia—which includes all ASEAN countries except Singapore—has also achieved rapid growth in agricultural output, at around 3 per cent a year, and South Asia has recorded growth in agricultural output of more than 2 per cent a year (IFPRI 2012).

Fuglie (2012) provides agricultural output and TFP growth rates for Asian countries for each of the five decades from 1961 to 2009 (Table 2 and Table 3). China has sustained strong growth in agricultural output over this period, with average annual growth of more than 3 per cent in each decade. TFP growth was particularly strong in China between 1991 and 2000, when annual TFP growth averaged 4.16 per cent, well above that recorded for all developed countries (2.23 per cent) and all developing countries (2.22 per cent) (Fuglie 2012).

In the four decades since 1971 India has maintained average agricultural output growth above 2.5 per cent a year, and recorded TFP growth greater than or equal to 1 per cent (Table 2 and Table 3). Between 2001 and 2009 India recorded a strong rise in its productivity growth rate (2.08 per cent) and strong agricultural output growth (3.27 per cent) (Fuglie 2012).

ASEAN member states (excluding Singapore) have experienced strong agricultural output growth in recent decades. Between 2001 and 2009, in particular, average growth in agricultural output was 4.45 per cent a year (Table 2 and Table 3). This high growth occurred at the same time as a significant improvement in TFP growth in the region, which nearly doubled between 1991–2000 and 2001–09 (Fuglie 2012).

For both the Republic of Korea and Japan, average agricultural output growth has slowed in recent decades while strong TFP growth has been maintained, albeit at varying rates (Table 2 and Table 3) (Fuglie 2012).

Table 2 Historical agricultural output, average annual growth -Agricultural output (%)

Region	1961–70	1971–80	1981–90	1991–2000	2001–09
China	4.87	3.20	4.53	5.28	3.41
India	1.68	2.75	3.35	2.52	3.27
Japan	2.99	1.40	0.51	–1.06	–0.36
Republic of Korea	4.48	5.81	2.91	2.47	0.64
ASEAN **a**	2.63	3.92	3.31	2.89	4.45

a *Excluding Singapore*

Source: Fuglie 2012

Table 3 Historical total factor productivity, average annual growth – Agricultural TFP (%)

Region	1961–70	1971–80	1981–90	1991–2000	2001–09
China	0.93	0.60	1.69	4.16	2.83
India	0.49	1.00	1.33	1.11	2.08
Japan	2.42	2.17	1.11	1.51	2.43
Republic of Korea	1.83	4.28	2.81	4.04	2.86
ASEAN **a**	0.57	2.10	0.54	1.69	3.29

a *Excluding Singapore*

Source: Fuglie 2012

Resource constraints

Land availability

Many Asian countries are experiencing land constraints that have the potential to limit growth in agricultural production. In particular, competition exists with land uses for urbanisation, industrial, environmental and recreational purposes (OECD–FAO 2012). Alexandratos and Bruinsma (2012) estimate that between 1961–63 and 2005–07 arable land use in South and East Asia increased by 19.8 per cent, from 369 million hectares to 442 million hectares. However, for the period 2005–07 to 2050 it is projected to rise by only 7 million hectares, or 1.6 per cent. For the countries in this study (China, India, Japan, the Republic of Korea and ASEAN members states) total arable land use is projected to increase by 5.5 million hectares (1.4 per cent) between 2005–07 and 2050 (Alexandratos & Bruinsma 2012) (Table 4).

It is estimated that China has already reached its limit for arable land in use, with a fall of 4.8 per cent expected between 2005–07 and 2050 (Table 4) (Alexandratos & Bruinsma 2012). Meanwhile, some opportunity exists for expansion of arable land in India where a potential rise of 3.6 per cent has been estimated over the projection period (Alexandratos & Bruinsma 2012).

Arable land use in both Japan and the Republic of Korea is projected to decline between 2005–07 and 2050, by 12.9 per cent and 14.5 per cent, respectively (Alexandratos & Bruinsma 2012). However, among ASEAN member states arable land use is expected to expand over the same period, but at the country level this varies significantly. Myanmar, Laos, Vietnam and Cambodia are projected to significantly increase arable land use, but it is projected to decline in Thailand and Malaysia (Table 4).

Table 4 Total arable land in use, historical and forecast

Region	Arable land in use (million hectares)			% change	
	2005–07	2030	2050	2005–07 to 2030	2030–2050
China	130.3	128.6	124.1	–1.3	–4.8
India	169.5	173.3	175.7	2.2	3.7
Japan	4.7	4.4	4.1	–6.4	–12.8
Republic of Korea	1.8	1.7	1.5	–5.6	–16.7
ASEAN	101.1	107.9	107.5	6.7	6.3
– Cambodia	11.3	13.2	14.7	16.8	30.1
– Indonesia	9.4	10.4	11.3	10.6	20.2
– Laos	1.2	1.4	1.5	16.7	25.0
– Malaysia	7.6	7.4	7.3	–2.6	–3.9
– Myanmar	11.3	11.5	11.5	1.8	1.8
– Philippines	37.5	40.3	40.3	7.5	7.5
– Thailand	18.9	18.1	15.5	–4.2	–18.0
– Vietnam	3.9	5.5	5.4	41.0	38.5
Sum of above regions	407.4	415.9	412.9	2.1	1.4

Source: Alexandratos & Bruinsma 2012

Land degradation

Land degradation is the long-term decline in ecosystem function and is an issue that affects soils, biomass, water, biodiversity and socio-economic services derived from ecosystems (Bai et al. 2008; Nachtergaele et al. 2011). The OECD–FAO (2012) estimate that about 25 per cent of the world's agricultural land area is highly degraded. Case studies on land degradation in Asia are reported in Table 5.

Table 5 Major land and water systems at risk, Asia

Global production systems	Cases or locations where systems are at risk	Risks
Rain-fed cropping; semi-arid tropics	Smallholder farming in Southern India, agro-pastoral systems in Western India	Desertification, reduction of production potential, increased crop failures due to climate variability and temperatures, increased conflicts, high prevalence of poverty and food insecurity, out-migration.
Rain-fed cropping; temperate	Intensive farming in Eastern China and parts of India	Pollution of soils and aquifers, loss of biodiversity, degradation of freshwater ecosystems, increased crop failure due to increased climate variability in places.
Irrigated rice-based systems	South–East and East Asia	Land abandonment, loss of buffer role of paddy land, increasing cost of land conservation, health hazards due to pollution, loss of cultural values of land.
Irrigated other crops	River Basins: Large contiguous irrigation systems from rivers in dry areas, including Krishna, Indo-Gangetic plains and Northern China.	Increased water scarcity, loss of biodiversity and environmental services, desertification, expected reduction in water availability and shift in seasonal flows due to climate change in several places.
Irrigated other crops	Aquifers: Groundwater-dependent irrigation systems in interior arid plains in India and China.	Loss of buffer role of aquifers, loss of agriculture land, desertification, reduced recharge due to climate change in places.
Rangelands	Pastoral and grazing lands, including on fragile soils in parts of Asia.	Desertification, out-migration, land abandonment, food insecurity, extreme poverty, intensification of conflicts.
Other locally important subsystems	Deltas and Coastal areas: Red River delta, Ganges/ Brahmaputra, Mekong, etc. and coastal alluvial plains including Eastern China.	Loss of agricultural land and groundwater, health-related problems, sea-level rise, higher frequency of cyclones (Eastern and South–East Asia), increased incidence of floods and low flows.

Source: FAO 2011

Water availability

The ability to expand land use in agriculture and increase production is closely related to water availability. Agriculture consumes a significant amount of water, accounting for 70 per cent of water use globally (OECD–FAO 2012). In South Asia agricultural water withdrawal accounts for 91 per cent of total water use, 64 per cent in East Asia and 84 per cent in South–East Asia (FAO 2011).

At the global level, water resources are abundant. However, at the regional and country level severe water shortages are already apparent. For example, China is facing water shortages in the north while the south has abundant water resources.

Irrigation has been an important contributor to yield growth that underpinned much of the production increases over the past decades. Yields of irrigated crops are well above those of rain-fed ones (Alexandratos & Bruinsma 2012). The FAO (2011) projects that in developing countries growth in crop production is likely to come mostly from more intensive land use, with irrigation playing an increasing role through improved water services, water-use efficiency improvements, yield growth and higher cropping intensities.

About 70 per cent of the world area equipped for irrigation is in Asia. South and East Asia account for more than half of the world's area equipped for irrigation, and India and China alone (each with about 62 million hectares) account for 40 per cent. Considerable scope remains to improve land and water productivity in irrigated farming systems, as many are performing below their potential (FAO 2011).

Alexandratos and Bruinsma (2012) project the area of irrigated land to expand between 2005–07 and 2050. They expect it to occur through conversion of rain-fed land and be strongest in the most land-scarce regions, such as East Asia and South Asia, where an additional 8 million hectares and 3 million hectares of irrigated land, respectively, are expected to be developed by 2050.

Water quality

Water quality is not only important for human health, but also for agriculture and fisheries production. Industrialisation, urbanisation and agricultural practices can all affect water quality. For example, agriculture and coastal development can lead to accumulation of excess nutrients in surface and coastal waters, causing eutrophication, hypoxia and algal blooms. Intensive agriculture and overuse of fertiliser and pesticides has, in many instances, resulted in surface and groundwater pollution. In countries, especially where fertiliser is heavily subsidised, such as China, its overuse has detrimentally affected groundwater quality (FAO 2011).

It is estimated that coastal development will contribute more than 80 per cent to marine pollution by 2050, affecting the quality and quantity of marine produce harvested and potentially accelerating the spread of marine 'dead zones' (Diaz & Rosenberg 2008; Nellemann et al. 2009).

Climate change

Climate change is projected to have regionally varying degrees of effect on agricultural production, with the likely global net annual cost increasing as global temperatures rise (Parry et al. 2007).

Climate change is predicted to have a range of effects on agricultural production, including reducing the availability and quality of water, increasing the incidence and range of heat stress on crops and livestock, increasing the range and distribution of pathogens and pests, and increasing the incidence and possible severity of extreme weather events (such as storms, floods and fire).

Oceans will be affected, with sea level rise and acidification likely to have a significant negative effect on global fisheries (Parry et al. 2007). While the exact impact and magnitude of climate change are uncertain, it is possible there could be significant changes in water availability and possible shifts in production zones over the long term.

As a result of climate change, freshwater availability is projected to decrease in Central, South, East and South–East Asia by the 2050s.

Future productivity growth in Asia

Productivity growth, in particular yield improvements, has been the driver of production growth in recent decades. In future, productivity growth will be more important as most production is expected to come through more intensive use of land rather than land expansion. Future productivity gains and reduction of yield gaps in Asia will depend on investments in research and development, technological innovation and infrastructure, as well as diffusion of existing and new technology.

Public research and development expenditure on agricultural productivity in developing countries is generally low. Over the past two decades, public and private investment in basic agricultural infrastructure and institutions has declined (FAO 2011). Nevertheless, significant infrastructure projects are either underway or planned; India is planning a US$1 trillion investment in infrastructure between 2012 and 2017 and ASEAN member states have committed $8 trillion in infrastructure projects over the next 10 years (Austrade 2013).

Significant yield gaps exist in the Asian region. Fischer and colleagues (2011) estimated yield gaps—measured as the difference between actual yields and potential yields attainable with advanced farming—for 2005 for a number of rain-fed crops in aggregate. These crops included cereals, roots and tubers, pulses, sugar crops, oil crops and vegetables. They found yield gaps of 11 per cent for East Asia, 32 per cent for South–East Asia and 55 per cent for South Asia. Reducing these yield gaps rather than increasing maximum potential yields will provide an opportunity for increasing agricultural production in the Asian region.

Ludena and colleagues (2006) provide historical productivity estimates for the period 1961 to 2000 and project average total factor productivity growth rates for the period 2001 to 2040. TFP growth was also calculated by sector—crops, ruminants (cattle, sheep, goats) and non-ruminants (pigs, poultry) (Table 6).

Table 6 Projected average total factor productivity growth rates, 1961 to 2040 (%)

Region	Period	TFP weighted average	TFP crops	TFP ruminants	TFP non-ruminants
World	1961–2000	0.94	0.72	0.62	2.10
	2001–40	1.38	0.94	0.82	3.60
China	1961–2000	1.67	0.74	2.82	3.33
	2001–40	3.11	1.45	3.01	6.60
East and South–East Asia	1961–2000	0.18	0.02	–0.22	1.25
	2001–40	–0.08	–0.66	–1.24	3.67
South Asia	1961–2000	0.27	0.17	0.35	1.89
	2001–40	1.16	0.96	1.48	3.48

Source: Ludena et al. 2006

Ludena and colleagues (2006) expect China to maintain rapid TFP growth due to an anticipated transition to modern pig and poultry production systems (OECD–FAO 2012). At the same time strong TFP growth in ruminants is expected for China over the projection period, while TFP for crops is projected to be almost double what was recorded in the period 1961 to 2000. In East and South–East Asia, despite strong improvements in projected TFP growth for non-ruminants, this is offset by lower projected TFP growth for crops and ruminants, resulting in overall negative projected TFP growth. In South Asia positive TFP growth is projected between 2001 and 2040, with improvements in crops, ruminants and non-ruminants TFP (Ludena et al. 2006).

ABARES agrifood model productivity projections

In the ABARES agrifood model there are two types of productivity improvements—land productivity and TFP improvements. Improvements in land productivity reflect a reduction in the input of land per unit of output of cropping or livestock product. This is a partial measure of productivity, where a single factor—land—experiences technological advancement. TFP is a measure of the value of total output relative to the value of total inputs.

Crop land productivity growth estimates stem from the AgMIP model comparison exercise (Table 7). Land productivity growth assumptions out to 2050 are driven by technology improvements, including crop management research, conventional plant breeding and other more advanced breeding techniques. Other sources of land productivity growth incorporated in the estimates include private sector agricultural research and development, agricultural extension and education, development of markets, improved infrastructure, availability of irrigation and access to water.

Livestock land productivity estimates used in the model are derived from the ABARES Global Trade and Environment model (GTEM), a multisector, multiregion dynamic global computable general equilibrium model of the world economy (ABARE 2007).

Productivity growth is projected to be higher for livestock-based industries than for cropping and highest for livestock products in India and China.

Table 7 Weighted average land productivity growth rates, by region and commodity group, 2007 to 2050 (%)

	China	India	Japan	Republic of Korea	Rest of South–East Asia	World
Meat	2.35	2.99	0.93	1.25	1.17	1.41
Dairy products	2.35	2.99	1.25	1.25	0.95	1.48
Cereals	1.12	1.17	0.90	1.21	1.15	1.10
Vegetables and fruit	0.54	0.91	0.54	0.43	0.96	0.74
Other food **a**	1.18	1.14	0.61	0.35	0.92	1.19

a *includes sugar, eggs and oilseeds*
Sources: Agricultural Modelling Intercomparison and Improvement Project; ABARES Global Trade and Environment model

The TFP projections used in this study are provided in Table 8. Meat TFP growth is projected to be higher than the other commodities for all regions and highest in India and China where TFP growth projections are above the world average. Dairy products TFP growth is projected to be greatest in China, while all the regions in this study are above the world average. However, TFP growth of cereals is projected to be lower in the regions in the study compared with the world over the projection period. China is projected to have quite strong TFP growth for other food (which includes sugar, eggs and oilseeds).

Table 8 Weighted average total factor productivity growth rates, by region and commodity group, 2007 to 2050 (%)

	China	India	Japan	Republic of Korea	Rest of South-East Asia	World
Meat	1.58	1.68	1.26	1.24	1.25	1.32
Dairy products	1.55	1.17	1.10	1.17	1.10	1.07
Cereals	1.06	0.97	0.89	0.87	0.92	1.12
Vegetables and fruit	0.71	0.73	0.71	0.70	0.76	0.73
Other food **a**	1.54	0.98	1.28	1.24	1.13	1.11
Total	0.97	0.92	0.96	0.87	0.82	0.97

a *includes sugar, eggs and oilseeds*
Source: ABARES Agrifood Model

Marine environment

Most of the growth in global seafood production to 2050 is expected to be sourced from aquaculture as global wild-catch fisheries are fully developed. In the past three decades, global seafood production from aquaculture grew at an average rate of 8.8 per cent each year. In contrast, wild-caught production has remained stable at around 90 million tonnes since 1990, accounting for around 87 per cent of total seafood production in that year but only 59 per cent in 2011.

Asian wild-caught fisheries are currently faced with flat to falling production levels. A number of factors are contributing to this trend. Overfishing, destruction and alteration of habitats and reduction in biodiversity in marine environments have been reported to be contributing factors (FAO 2013a; Pandya & Laipson 2008). These factors are mostly accentuated in the harvesting of immature or undersize fish, use of destructive fishing techniques, operation of unlicensed vessels and land-based pollution runoff into aquatic environments (such as sediment, fertiliser, nutrients) (Pandya & Laipson 2008). A decreasing number of fishery workers and a general ageing of the fisheries workforce is also contributing to the decline of fisheries production in some Asian countries (OECD 2012). Over the longer term, climate change is likely to periodically reduce productivity of fisheries across Asia as more extreme weather conditions reduce fish stock and fishery infrastructure (Pandya & Laipson 2008).

Due to declining capture production and continuous increase of demand for fisheries products in the Asian region a large emphasis is being placed on the aquaculture sector's contribution to fisheries production (FAO 2013a, b). The future growth of the aquaculture industry in Asia is supported by increasing focus on sustainable aquaculture practices, promotion of environmentally friendly offshore aquaculture and development of new markets (OECD 2012; FAO 2013a, b, c).

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3 Wheat

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China

Production

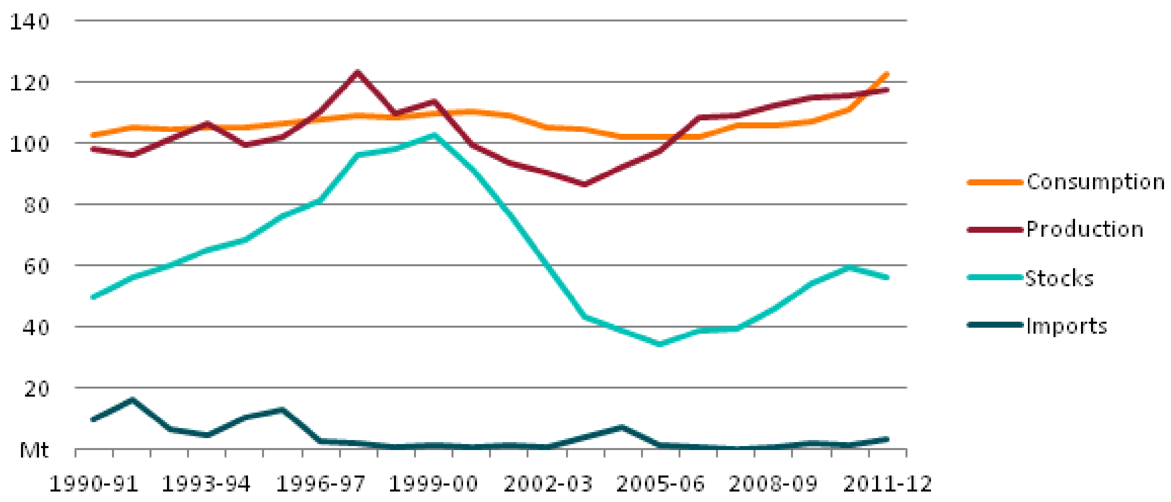
China is the world's second largest producer of wheat behind the European Union. Over the past two decades, wheat production in China was variable (Figure 16). Between 1994–95 and 1997–98 wheat production increased by 24 per cent to 123 million tonnes. This increase was driven by the introduction of a self-sufficiency campaign in 1995 (see Domestic policies) and was achieved through an increase in harvested area and yield improvements.

Following this period of growth wheat production in China declined by 30 per cent to 87 million tonnes in 2003–04 as harvested area fell by 27 per cent. Relatively unfavourable wheat prices and reduced government support led to farmers growing more profitable crops such as vegetables (ABARE 2006).

From 2003–04 Chinese wheat production rose by 36 per cent to 118 million tonnes in 2011–12. New policy measures around grains production introduced by the Chinese Government in 2004 and 2006 were behind this rise (see Domestic policies). Over the period, the area harvested to wheat rose by 10 per cent and better crop management increased yields (USITC 2011).

The current support mechanisms for wheat in China encourage higher production but do not reward wheat quality. As a result, most Chinese producers grow high yielding, low quality varieties (USDA–FAS 2011a).

Figure 16 Wheat supply and use, China



Source: USDA–FAS 2013a

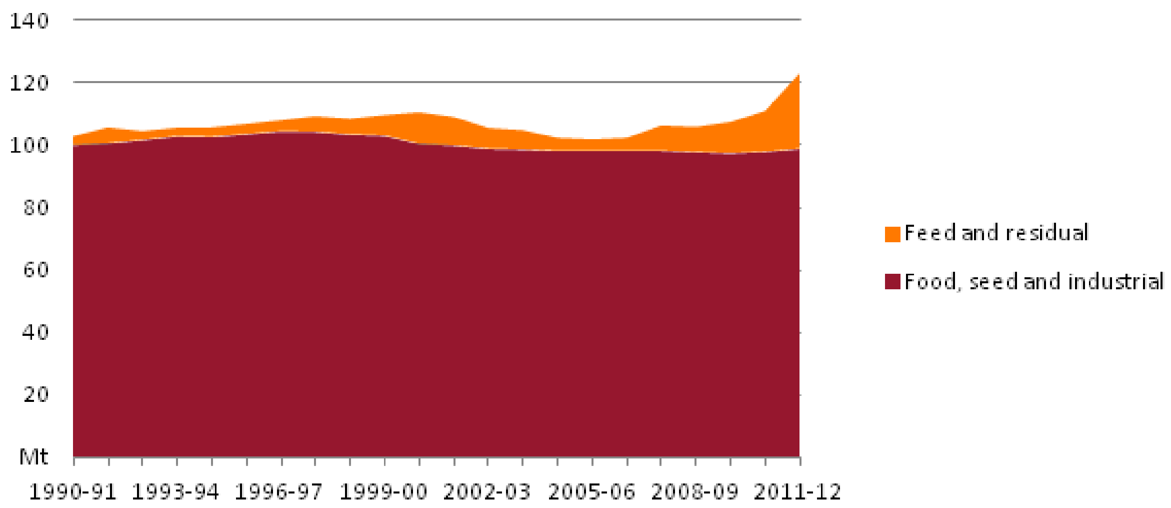
Consumption

China is also the world's second largest consumer of wheat. Between 1990–91 and 2000–01 wheat consumption in China increased by 8 per cent to 110 million tonnes (Figure 17). This was followed by an 8 per cent fall from 2000–01 to 2005–06, reflecting lower use of wheat in livestock feed. Between 2005–06 and 2011–12 wheat consumption increased by 21 per cent, to 123 million tonnes as demand from the livestock sector strengthened.

Food, seed and industrial uses of wheat in China accounted for 80 per cent of total wheat consumption in 2011–12, with the rest mainly for feed. Between 1990–91 and 1996–97 food, seed and industrial uses of wheat increased by 1 per cent a year to a peak of 104.5 million tonnes. However, this growth was much smaller than the 3 per cent a year achieved a decade earlier. From 1996–97 food, seed and industrial uses of wheat declined, reaching 99 million tonnes in 2011–12. This largely reflected the shift away from staples (such as wheat) to a more western diet, with higher consumption of fruit, animal and dairy products (ABARE 2006).

Noodles, dumplings and sweet bread are traditional wheat products consumed in China. These products are generally made with medium gluten wheat. However, as Chinese consumers move toward a more western diet, demand is increasing for other wheat products such as cookies, crackers and cakes made with low gluten wheat, and bread made from high gluten wheat (Lohmar 2004). This trend is creating higher domestic demand for wheat with specific qualities.

Figure 17 Wheat consumption, China



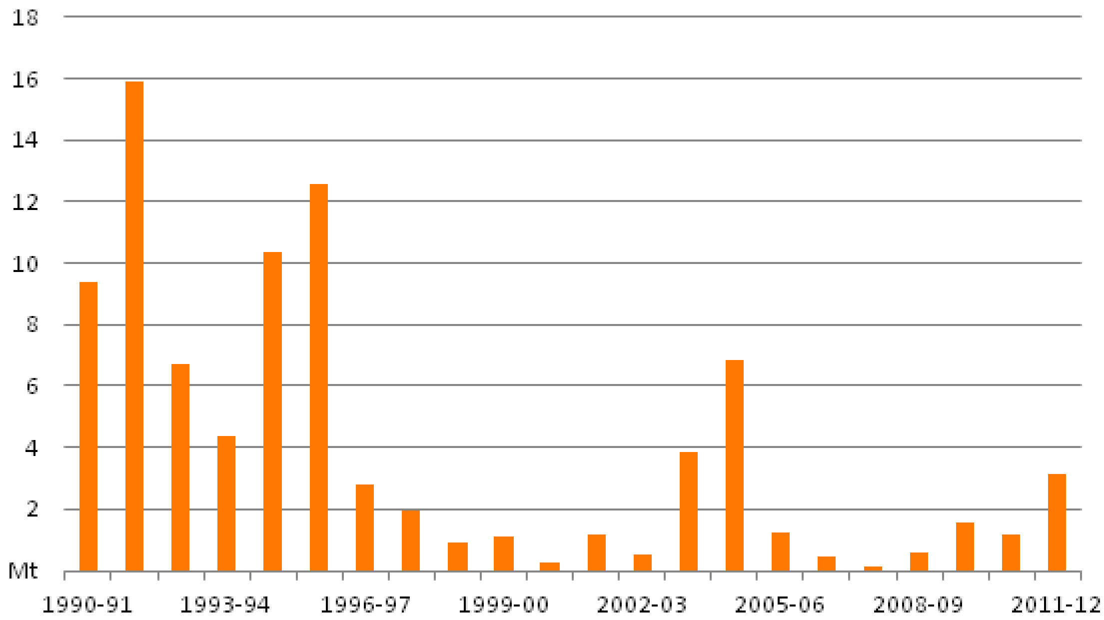
Source: USDA–FAS 2013a

Since 2005–06 feed uses of wheat have increased by over 20 million tonnes, reaching 24 million tonnes in 2011–12. In more recent years, high maize prices resulted in substitution to wheat as a feedstock (USDA–FAS 2012a).

Trade

Chinese wheat imports fell by more than 9 million tonnes in the decade to 2000–01, reaching a low of 276 000 tonnes in that year (Figure 18). This largely reflects increasing domestic supplies of wheat. Since 2000–01 Chinese wheat imports have been variable. In 2011–12 China imported more than 3 million tonnes of wheat. Most of the tariff quota allocated to private traders (see Trade policies) is used to import wheat with specific qualities (USDA–FAS 2012a). This is often blended with domestic wheat to meet the rising demand for specialty wheat products (USDA–FAS 2009). China primarily imports wheat from Australia, Canada and the United States (United Nations Statistics Division 2013).

Figure 18 Wheat imports, China



Source: USDA–FAS 2013a

Policies

Domestic policies

In the early 1990s the Chinese Government implemented a minimum support price policy for grains and established the State Grain Reserve Bureau. The bureau paid farmers the support price for all grain offered, regardless of wheat quality (ABARE 2006).

In 1995 the Chinese Government passed responsibility to provincial governments to achieve self-sufficiency in grains. In order to increase grains production, provincial governments raised grain procurement prices. This led to a significant increase in wheat production. However, in response to increasing supplies of low quality wheat, the Chinese Government reduced or eliminated procurement prices in selected regions between 1999 and 2001 (Hsu et al. 2001).

In 2004 falling domestic supplies led the Chinese Government to introduce direct payments to grain producers—based on planted area—to stimulate domestic production. For wheat, area payments in 2004 were generally paid at the rate of 10 yuan per mu (US$19.95 per hectare). Seed subsidies were also introduced. In 2006 the Chinese Government re-established minimum support prices for wheat, which have increased annually since their introduction (USDA–FAS 2012a; USITC 2011).

Trade policies

Chinese imports of wheat are subject to a tariff quota. The tariff quota volume is 9.6 million tonnes, the in-quota tariff is 1 per cent and the out-of-quota tariff is 65 per cent (WTO 2013a, b). Wheat imports are also subject to a value added tax of 13 per cent.

Ninety per cent of the tariff quota volume for wheat is reserved for state-owned trading enterprises, with the remaining 10 per cent allocated among private traders (USDA–ERS 2012a). By the end of September each year, any unused quota of state-owned trading enterprises may be reallocated to private traders (ABARE 2006).

Wheat imports are also subject to sanitary and phytosanitary measures. In particular, rules around wheat imports affected by *Tilletia controversa kuhn* fungus and weed seeds such as Johnson grass, have restricted trade in the past (US Wheat Associates 2011).

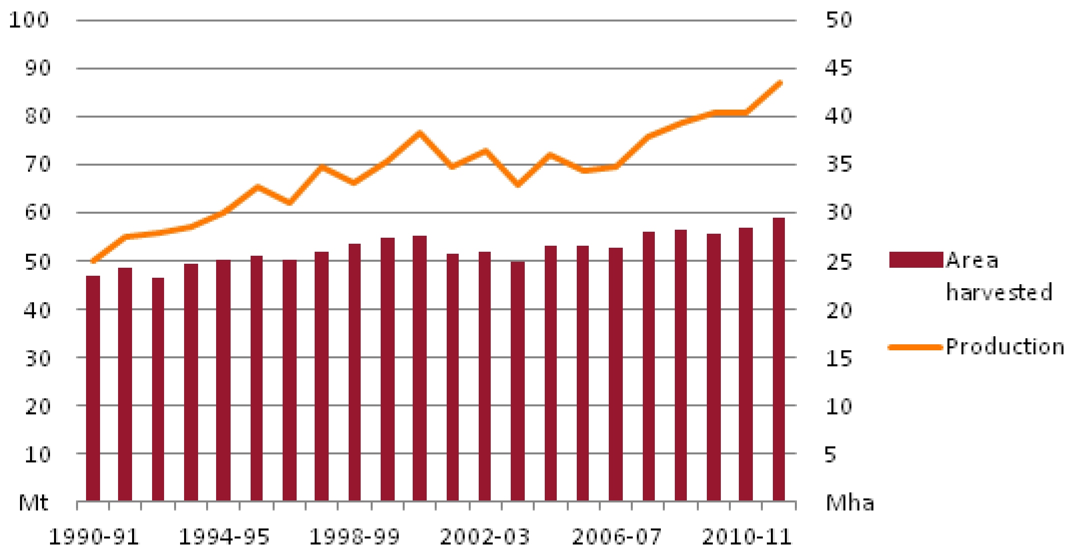
Recent policy developments for Chinese wheat exports aim to secure domestic grains supply and reduce food price inflation. In late 2007 the Chinese Government removed the value added tax rebate on wheat exports. Further, in early 2008 a temporary tax on wheat exports was introduced; this tax was removed by June 2009 (OECD 2011). Chinese wheat exports are also subject to an export quota.

India

Production

India is the world's third largest wheat producing country, accounting for around 12 per cent of world production in the five years to 2011–12. Over the past 20 years, wheat production in India has trended upward, increasing by 2.6 per cent a year between 1990–91 and 2011–12, to 86.9 million tonnes (Figure 19). The major wheat producing regions are the northern states of Uttar Pradesh, Punjab and Haryana, which accounted for around two-thirds of total wheat production in 2011–12 (DES 2013).

Figure 19 Wheat production, India



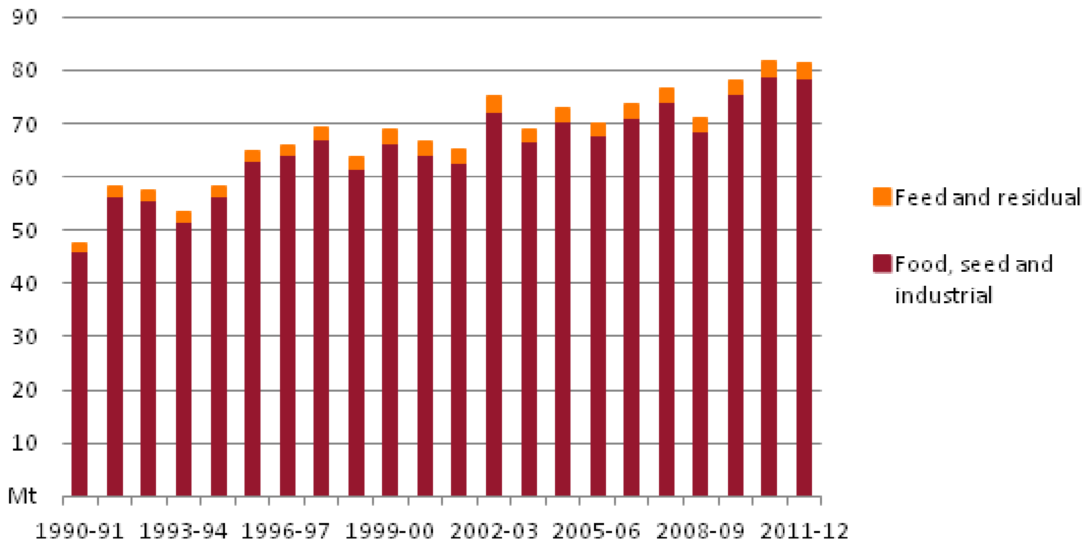
Source: USDA–FAS 2013a

Average Indian wheat yields are slightly below the world average (USDA–FAS 2013a). However, yields vary regionally. Yields in minor producing states, which typically have less irrigation, can be as low as half or one-quarter of the major producing states (Shreedhar et al. 2012). Between 1990–91 and 2009–10 irrigation rates increased by around 11 per cent to reach more than 90 per cent of all wheat areas, during which time yields increased by around 24 per cent (DES 2013).

Consumption

Wheat is a staple food for Indian consumers. Together with rice, it accounts for most per person calorie consumption (USITC 2009). With the growth in the Indian population over the past two decades, wheat consumption increased by an average of 2.5 per cent a year from 1990–91 to reach 81.4 million tonnes by 2011–12 (Figure 20). However, per person wheat consumption has remained relatively stable at around 53 kilograms per year (Agricoop 2013).

Figure 20 Wheat consumption, India



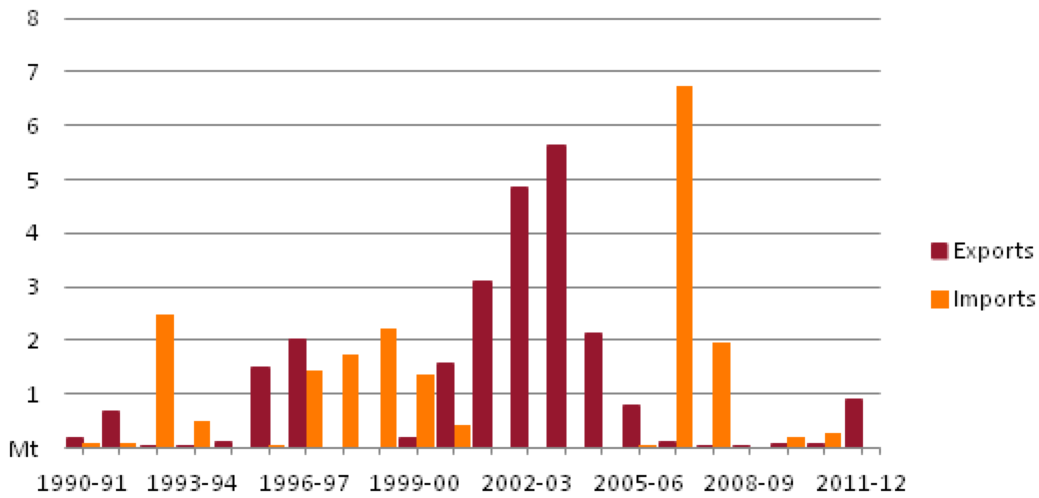
Source: USDA–FAS 2013a

In India, wheat has traditionally been consumed in unleavened flat breads (USDA–FAS 2012b). However, rising incomes and urbanisation have led to stronger demand for a diversified diet, which includes products such as western style bread, biscuits and cake (Pingali & Khwaja 2004). An increase in wheat consumption has also been observed in southern India where rice is traditionally the staple. In recent years consumption under the government's subsidised food program (see Trade policies) has expanded rapidly and accounts for a significant portion of total wheat consumption (FCI 2013a; USDA–FAS 2013b).

Trade

India's trade in wheat was sporadic between 1990–91 and 2011–12 and marked by several changes in government policy (see Policies section). Wheat exports surged in the early 2000s, reaching a peak of 5.7 million tonnes in 2003–04 before falling markedly in 2004–05 (Figure 21).

Figure 21 Wheat trade, India



Source: USDA–FAS 2013a

In response to rising world prices, the Indian Government insulated the domestic market by banning wheat exports from February 2007 to September 2011 (Shreedhar et al. 2012; USDA–FAS 2012b). Following the lifting of the wheat export ban in September 2011, India exported 891 000 tonnes of wheat in the 2011–12 marketing year (April–March).

After five years of low wheat imports (2000–01 to 2005–06), India imported 6.7 million tonnes and 2 million tonnes in 2006–07 and 2007–08, respectively (Figure 21). This was in response to stocks falling to a mere 2 million tonnes in 2005–06 following a production shortfall in that year (Shreedhar et al. 2012). These imports were largely government purchases made through a state trading enterprise (STC 2013). From September 2006 wheat imports were admitted duty free for private traders. Import volumes have been limited because of the high costs of marketing imported wheat in India (USDA–FAS 2012b).

Policies

Domestic policies

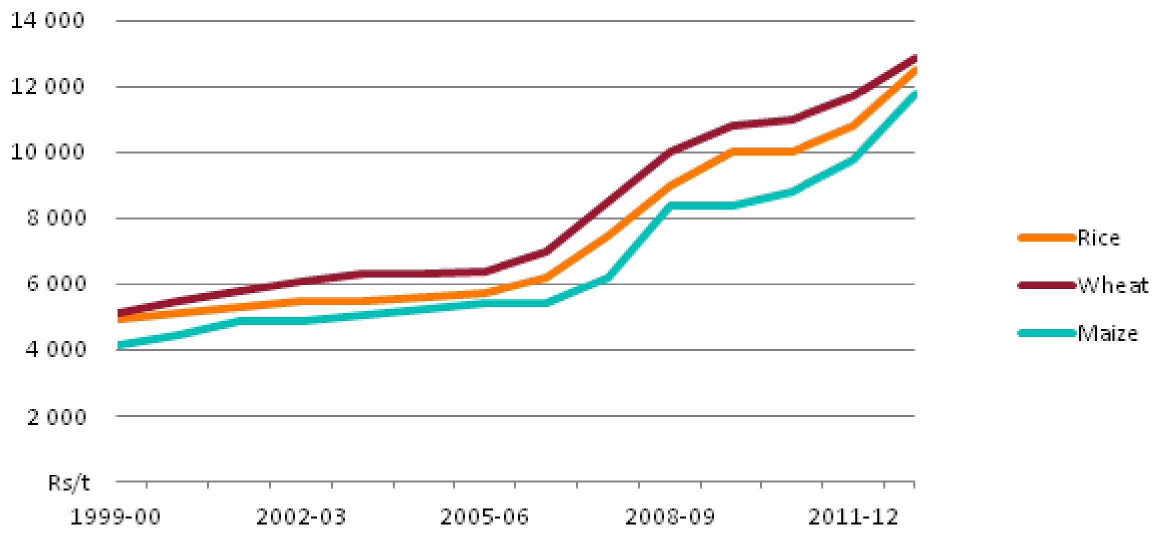
The objectives of the Indian Government's agricultural policy are to support farmers' incomes, food security and food self-sufficiency (USITC 2009). For grains, including wheat, rice and coarse grains, the instruments used by the government to achieve these objectives include input subsidies and minimum support prices to producers and subsidised food prices for consumers (WTO 2011). See Box 2.

Box 2 Indian domestic grains policy

Grain producers are eligible to receive minimum support prices, which are underpinned by procurement by the Food Corporation of India (FCI), state governments and other state agencies. Producers are able to sell as much as they wish to procurement agencies at set prices, subject to meeting quality standards (FCI 2013b). Grains procured by the FCI and state governments are stored in government held stocks.

The minimum support prices (MSP) for wheat, rice and coarse grains (maize, barley, grain sorghum and millet) have generally been raised each year from 1998–99 to 2011–12 (Figure 22). MSPs are set by the Commission for Agricultural Costs and Prices. When determining MSPs the commission takes into account factors including costs of production and conditions of domestic and world markets (CACP 2013).

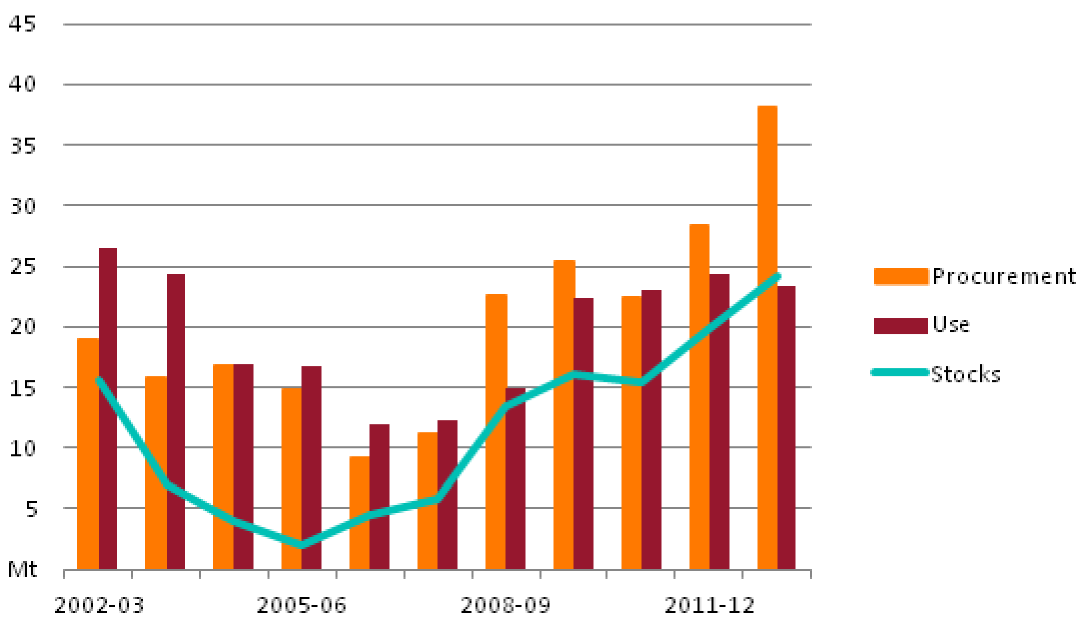
Figure 22 Minimum support prices, India



Note: Several minimum support prices are applied for coarse grains. Maize is taken as a representative price for coarse grains.
Source: FCI 2013c

Wheat and rice procurement has expanded in recent years not only because of the rise in minimum support prices, but also because of increased production of wheat and rice and the Indian Government's open-ended policy on grain purchases (Figure 23). For example, wheat production from 2008–09 through to 2011–12 was well above the longer-term average. As a result, government procurements of wheat rose from a longer-term average of 23 per cent of total wheat production to 33 per cent in 2011–12.

Figure 23 Procurement, use and stocks of wheat, India



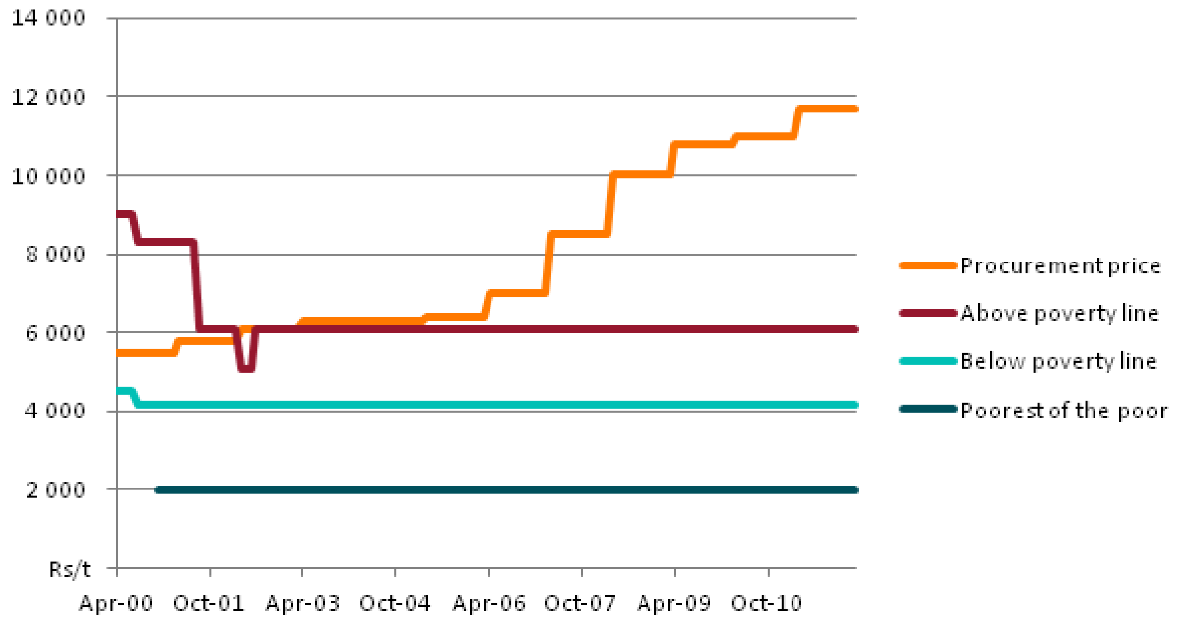
Note: Stocks as at 1 April following each marketing year (April–March).
Source: FCI 2013a, b, d, USDA–FAS 2013a

The Government of India also supports grain producers through numerous input subsidies (USITC 2009). These include subsidised irrigation, electricity, diesel, seeds and fertiliser, which is sold to producers at prices set by the government (USITC 2009). An example of this is the National Food Security Mission, a targeted program aimed at increasing wheat, rice and pulse production. Producers of these commodities receive subsidies for seed, inputs and product specific investments (Hoda & Gulati 2013).

The principal policy instrument targeting food security on the consumption side is the Targeted Public Distribution System (TPDS), a government subsidised food distribution program that provides low cost food grain to Indian consumers. The FCI provides grain to the TPDS from government stocks. Grain is first allocated to state governments and union territories which then distribute grain to some 492 000 fair price shop dealers throughout India (AIFPSDF 2013). At these shops consumers can purchase an allocated amount of grain at set prices that are dependent on their income level (Jha et al. 2007). Three levels of income group are classified under the TPDS: above poverty line, below poverty line and Antyodaya Anna Yojana, or the poorest of the poor (Figure 24).

The price of wheat and rice sold by the Indian Government through the TPDS has been held constant since 2002. In recent years, these prices have been well below the minimum support price offered on procurement (FCI 2013e).

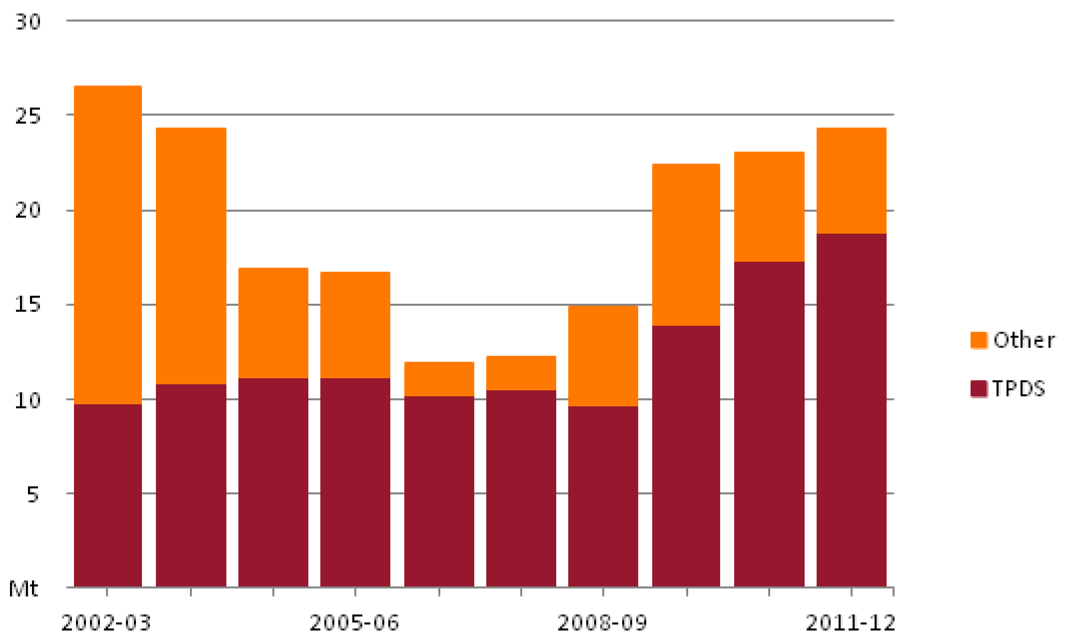
Figure 24 Government procurement and central issue prices of wheat, India



Source: FCI 2013c, e

Use of wheat and rice from government stocks rose markedly in recent years. For example, wheat use under the TPDS almost doubled from 2008–09 to 2011–12 to reach 18.8 million tonnes, equivalent to 24 per cent of food, seed and industrial consumption (Figure 25)(FCI 2013a; USDA–FAS 2013a).

Figure 25 Wheat use from government stocks, India



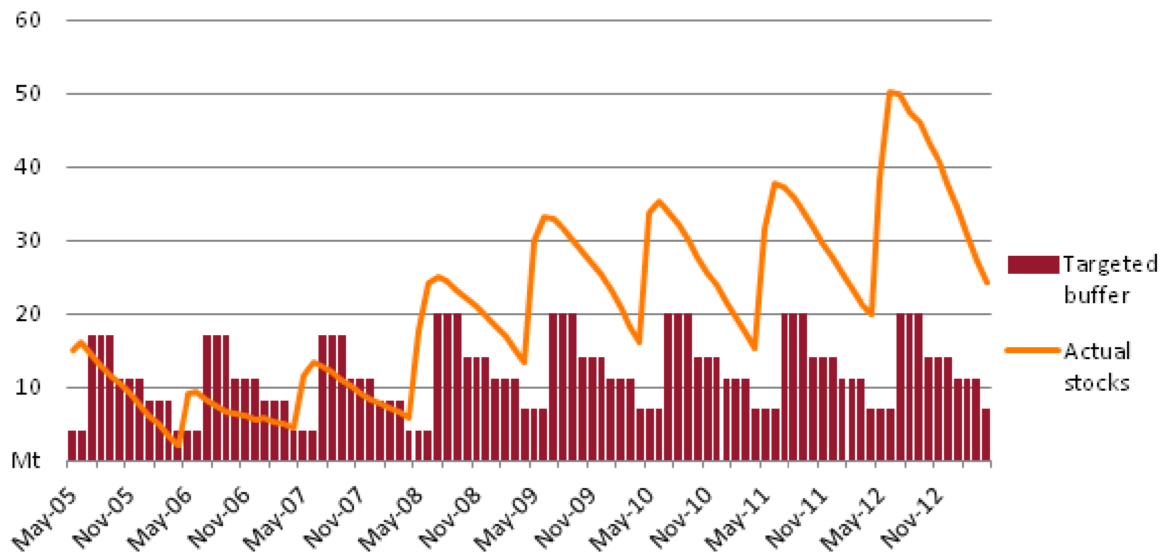
Source: FCI 2013a

The TPDS would be expanded under the National Food Security Bill, which was passed by the Indian Parliament on 2 September 2013 (*Reuters* 2013). After being signed by the President of India, the proposed bill would create a legal right for 75 per cent of rural and 50 per cent of urban households to access 5 kilograms of food grains a month and poorest of the poor households 35 kilograms a month at highly subsidised prices (Fan 2013).

Rising procurement prices and increasing volumes of procurement, combined with the fixed price of grains made available by the Indian Government through the TPDS, resulted in India's food subsidy increasing significantly (USDA–FAS 2013a). The food subsidy more than tripled from 231 billion rupees in 2005–06 to 728 billion rupees in 2011–12.

Growing procurement volumes have also resulted in government wheat reserves rising (Figure 26) (USDA–FAS 2013b). The government of India sets stock targets in order to meet demand from the TPDS and to intervene in the domestic market to stabilise food price rises (FCI 2013f). The varying level of target stocks through the year reflects yearly harvesting patterns. In years of excess stocks, grains may be sold by the Food Corporation of India to the private market or made available for export (DFPD 2013). In April 2013 government stocks of wheat, rice and coarse grains totalled around 60 million tonnes (FCI 2013d).

Figure 26 Targeted wheat stocks and centrally held wheat stocks



Source: FCI 2013d, f

Trade policies

Over the past decade the Indian Government's intervention in wheat trade has been ad hoc and in response to fluctuating market conditions. Government market interventions included tariff and non-tariff measures (WTO 2011).

Wheat is subject to a bound tariff of 100 per cent (WTO 2013a). However, the applied tariff has varied according to the Indian Government's response to changes in the domestic and international wheat markets. Tariffs were raised in 2001 when world wheat prices fell (Shreedhar et al. 2012). In June 2006 the government lowered the applied tariff from 50 per cent to 5 per cent to encourage imports. Since September 2006 wheat imports have been admitted duty free (USDA–FAS 2012b).

In the early 2000s the government offered subsidies to encourage exports (Shreedhar et al. 2012). In response to rising world wheat prices in 2006–07 and a fall in domestic stocks, India prohibited export of wheat between February 2007 and September 2011 (Shreedhar et al. 2012; USDA–FAS 2012b).

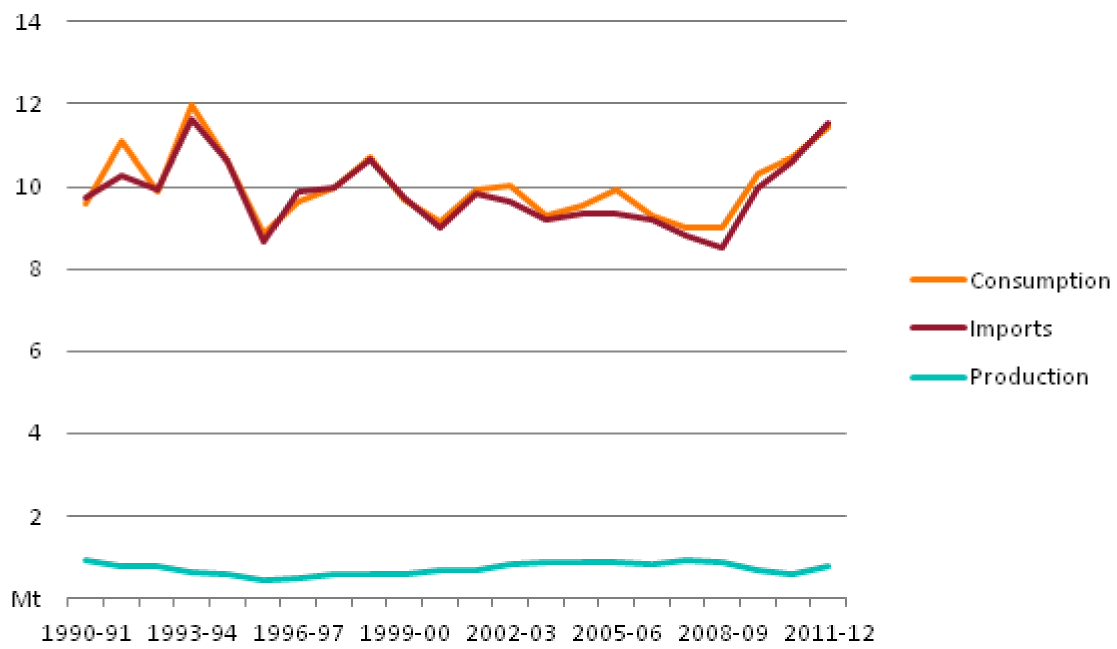
Japan and the Republic of Korea

Production

Wheat production in Japan and the Republic of Korea is small at a combined 786 000 tonnes in 2011–12 (Figure 27). Japan accounted for almost 95 per cent of this production.

Japanese wheat production has been variable over the past two decades. From 1988–89 to 1995–96 wheat production declined by almost 60 per cent to 444 000 tonnes. However, from 1995–96 to 2007–08 it more than doubled to just over 900 000 tonnes. Government subsidies supported this trend as they encouraged producers to increase the area planted to wheat (Fukuda et al. 2004). Since 2007–08 wheat area harvested has remained relatively unchanged at around 210 000 hectares. In 2011–12 Japanese wheat production was almost 750 000 tonnes.

Figure 27 Wheat supply and use, Japan and the Republic of Korea



Source: USDA–FAS 2013a

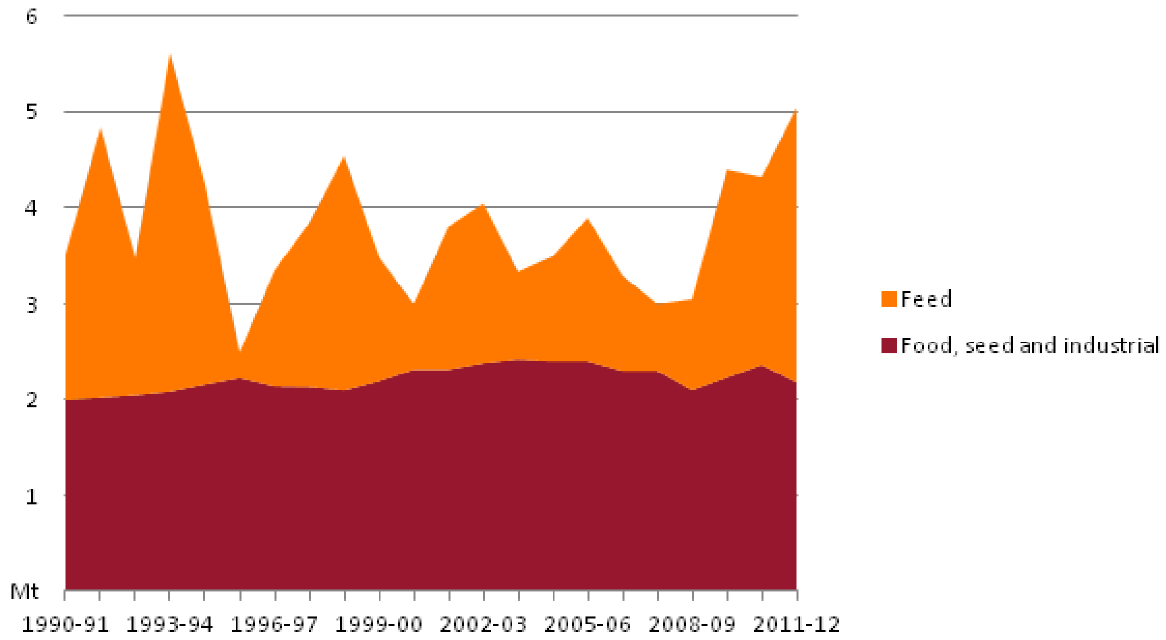
Consumption

Over the past two decades, wheat consumption in Japan and the Republic of Korea has been variable as the feed use of wheat fluctuated (Figure 27). In 2011–12 total consumption was a combined 11.5 million tonnes. Japan accounted for more than 55 per cent of this consumption.

In Japan total wheat consumption was relatively steady between 1990–91 and 2011–12, averaging 6.2 million tonnes a year (USDA–FAS 2013a). Food, seed and industrial consumption is the primary use of wheat in Japan, representing 92 per cent of total consumption in 2011–12. Before the mid 1980s food consumption of wheat in Japan increased significantly as more wheat products, such as bread and pasta, were consumed domestically (USDA–FAS 2010). However, food consumption of wheat has since stagnated at around 32 kilograms per person (USDA–FAS 2013c).

In 2011–12 wheat consumption in the Republic of Korea was 5.1 million tonnes (Figure 28). Livestock feed was the primary use of wheat in that year, accounting for 57 per cent of total wheat consumption. However, feed use has varied significantly over the past two decades. In 2011–12 feed wheat consumption was at its highest level since 1993–94, as relatively high world prices for maize—a substitute for wheat in feed—led to substitution toward feed wheat (USDA–FAS 2012c). By contrast, food, seed and industrial use of wheat was relatively steady from 1990–91 to 2011–12, averaging 2.2 million tonnes a year. In the Republic of Korea wheat flour is used primarily to make noodles and bakery and confectionary products (USDA–FAS 2012c).

Figure 28 Wheat consumption, Republic of Korea

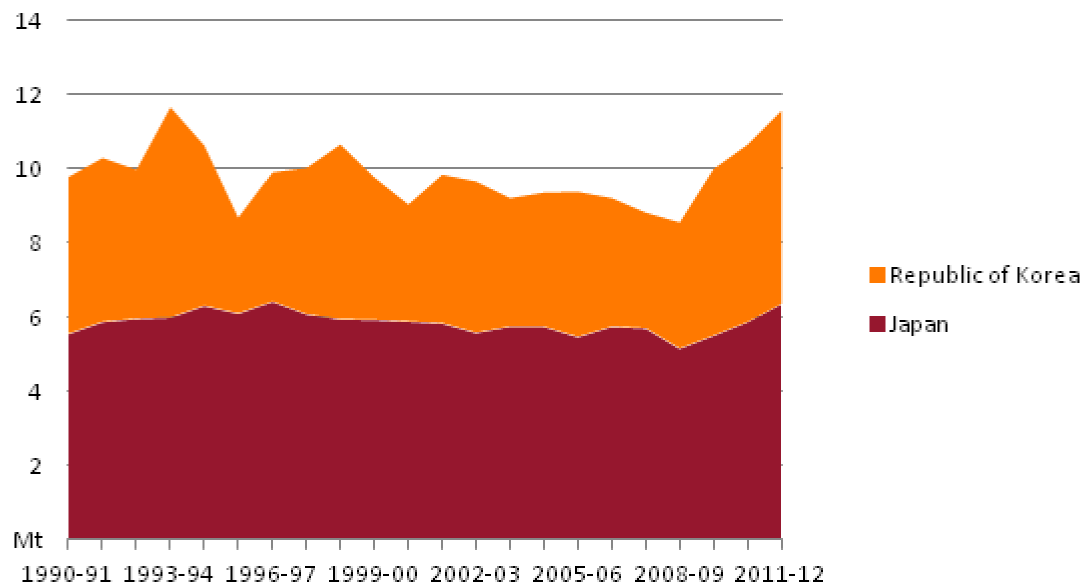


Source: USDA–FAS 2013a

Trade

Because of low domestic production, Japan and the Republic of Korea are reliant on imports to meet demand. Over the past two decades, wheat imports have largely followed consumption trends (Figure 27). In 2011–12 wheat imports in Japan and the Republic of Korea totalled 11.5 million tonnes (Figure 29), of which Japan accounted for more than half. Japan and the Republic of Korea import wheat primarily from the United States, Australia, Canada and Ukraine (United Nations Statistics Division 2013).

Figure 29 Wheat imports, Japan and the Republic of Korea



Source: USDA–FAS 2013a

Policies

Domestic policies

The Japanese Government subsidises wheat production through direct payments as part of a plan to control domestic supply of rice. Producers are eligible for the subsidy when they plant wheat on land traditionally used to produce rice. Payments are based on the historical area planted to wheat, current planted area, crop quality and current and historical price of wheat (USDA–ERS 2012b).

The Republic of Korea has an ambitious target of 57 000 hectares planted to milling wheat by 2015 (USDA–FAS 2011b). This compares with recent harvested area, which rose from around 5000 hectares in 2009 to 13 000 hectares in 2011. The government has encouraged domestic wheat production by providing drying and storage facilities to producers, and by funding a loan program to finance purchases of domestic milling wheat (USDA–FAS 2012c).

Trade policies

Japan has a combined tariff quota of 5.74 million tonnes for wheat, meslin, triticale and their processed products. The in-quota and out-of-quota tariffs for these commodities vary by tariff line. For wheat, the in-quota tariff is zero and the out-of-quota tariff is 55 yen per kilogram (WTO 2013a, b).

Japanese wheat imports are controlled by the Ministry of Agriculture, Forestry and Fisheries (MAFF) through the state trading system. Generally, MAFF purchases wheat on the international market and sells it to domestic flour millers at an inflated price set by MAFF twice a year (April and October). However, MAFF allows domestic flour millers to import wheat independently if they export an equivalent amount of wheat flour (USDA–FAS 2010).

In recent years MAFF has operated part of the tariff quota under a simultaneous buy and sell system for food and feed wheat imports. Under this system, international exporters and domestic importers can make a joint bid to MAFF to import a specific quantity of wheat. MAFF awards the quota to the bid with the largest difference between the buy price and the sell price (USDA–ERS 2012b).

In the Republic of Korea the tariffs applied to wheat and meslin range from zero to 3 per cent. World Trade Organization bound tariffs range from 1.8 per cent to 9 per cent (WTO 2013a). However, in practice the Republic of Korea operates what it terms autonomous tariff quotas for certain wheat imports. The Republic of Korea varies the details of these tariff quotas each year. In 2013 the autonomous tariff quota volume for wheat and meslin for milling is 1 million tonnes, with an applied in-quota tariff of zero and an out-of-quota tariff of 1.8 per cent (USDA–FAS 2013d).

Additionally, under the United States–Korea Free Trade Agreement (implemented in March 2012) the tariff on wheat imported from the United States was eliminated (USDA–FAS 2012c).

ASEAN

Production

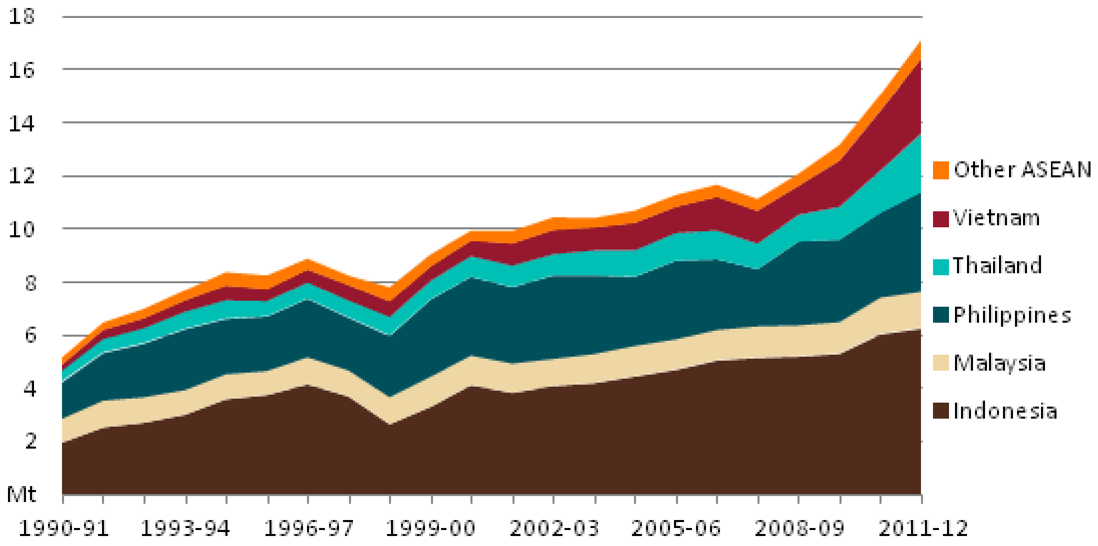
Apart from a modest amount of wheat produced in Myanmar, the ASEAN region does not produce wheat in significant quantities. The small amount of wheat produced in Myanmar is at the subsistence level and yields are generally well below world averages (USDA–FAS 2012d).

Consumption

Wheat consumption has grown rapidly in the ASEAN region over the past 20 years. From 1990–91 to 2006–07 wheat consumption increased by 5 per cent a year to reach 11.7 million tonnes (USDA–FAS 2013a). Consumption accelerated further between 2007–08 and 2011–12, growing by 9 per cent a year to reach 17.1 million tonnes, driven largely by rising feed consumption.

Major consumers in the ASEAN region include Indonesia, the Philippines, Thailand and Vietnam. Indonesia is by far the largest consumer, accounting for around 40 per cent of ASEAN wheat consumption in the five years to 2011–12 (Figure 30).

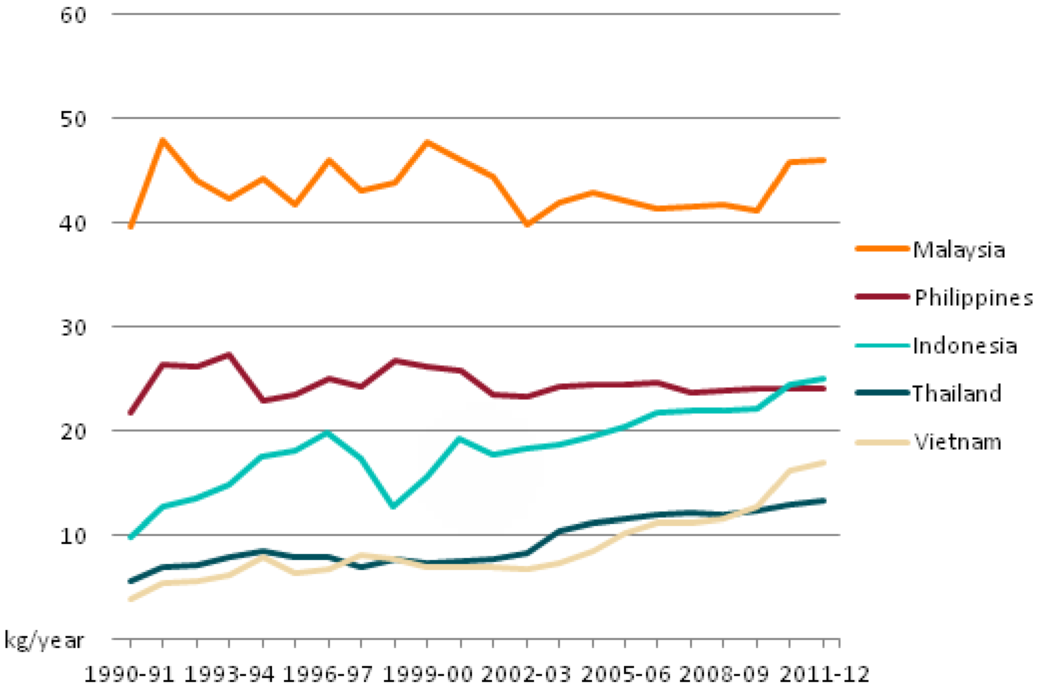
Figure 30 Wheat consumption, ASEAN member states



Source: USDA–FAS 2013a

Per person wheat consumption was relatively stable in the Philippines and Malaysia between 1990–91 and 2011–12, but grew rapidly in Vietnam, Thailand and Indonesia (Figure 31). In Vietnam, per person consumption is estimated to have increased by 7 per cent a year since 1990–91, reaching 17 kilograms in 2011–12. In Indonesia per person wheat consumption more than doubled over the same period to around 25 kilograms in 2011–12 (United Nations Population Division 2011; USDA–FAS 2013a).

Figure 31 Food, seed and industrial consumption per person, ASEAN region

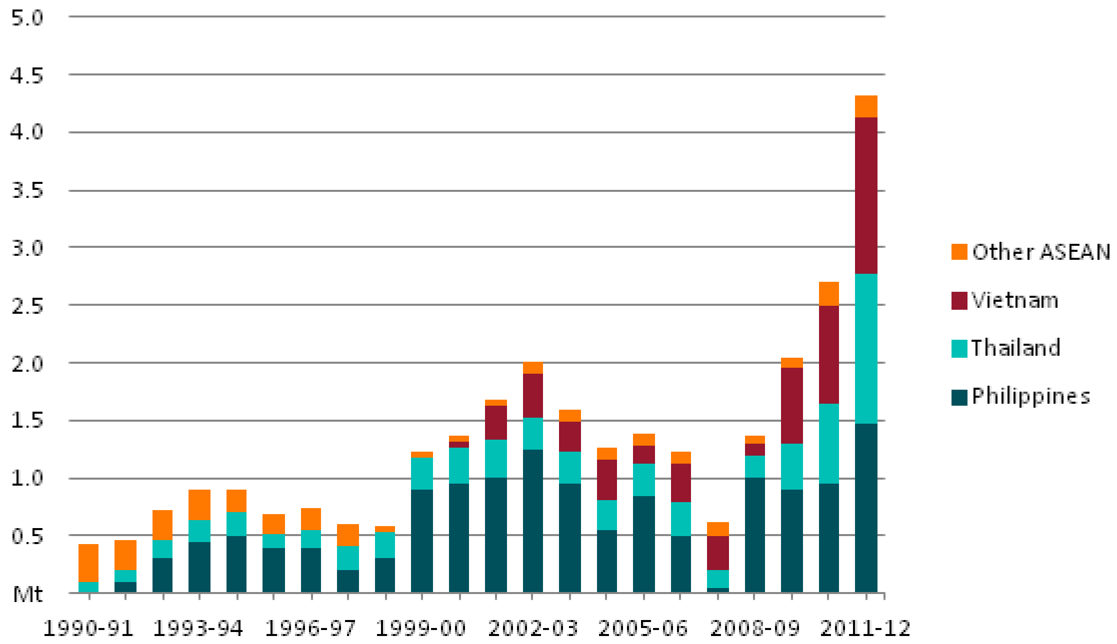


Source: United Nations Population Division 2011; USDA–FAS 2013a

Rising wheat consumption in ASEAN member states reflects the effects of urbanisation and rising incomes on consumer preferences. In countries where rice was traditionally the staple food, consumers have moved toward more wheat-based products. This includes noodles, steamed bread and more western style products such as bread and biscuits (Fabiosa 2006; USDA–FAS 2013e).

Consumption of feed wheat in ASEAN member states is small compared with maize. However, feed wheat consumption rises when world maize prices rise and leads to substitution (USDA–FAS 2013e, f, 2012e). For example, between 2009–10 and 2011–12 wheat became cheaper relative to maize and feed wheat consumption increased markedly (Figure 31).

Figure 32 Feed wheat consumption, ASEAN member states



Source: USDA–FAS 2013e

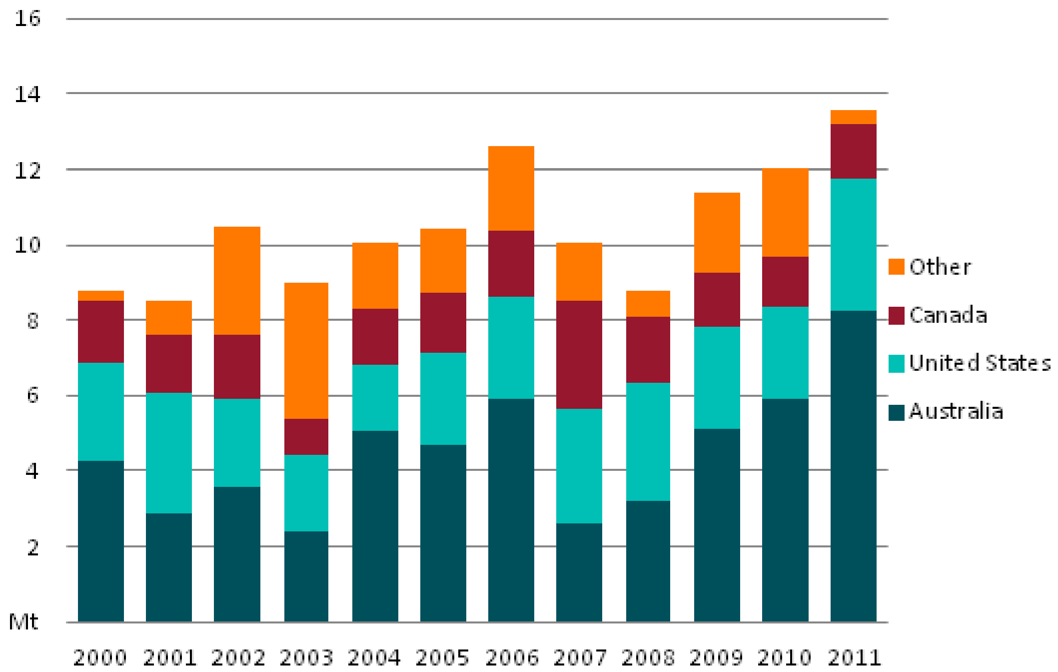
Feed wheat consumption is concentrated in Thailand, the Philippines and Vietnam (Figure 32). Compared with maize, wheat is generally subject to lower tariffs in the Philippines and Thailand, which increases its attractiveness as a feed grain when maize prices rise (WTO 2013b).

Trade

The ASEAN member states depend on imports to meet their growing demand for wheat. From 1990–91 imports grew by 5.5 per cent a year, to reach 17.9 million tonnes in 2011–12 (USDA–FAS 2013a). The major wheat importing countries are Indonesia and the Philippines, accounting for around 63 per cent of total imports in the five years to 2011–12.

Wheat imported by ASEAN member states comes principally from Australia, the United States and Canada (Figure 33). Australia benefits from a freight–cost advantage for shipments to South-East Asia and was the largest supplier of wheat in the decade to 2011, averaging 42 per cent of all wheat imported by the ASEAN member states (Linehan et al. 2012; United Nations Statistics Division 2013).

Figure 33 Wheat import sources, ASEAN region



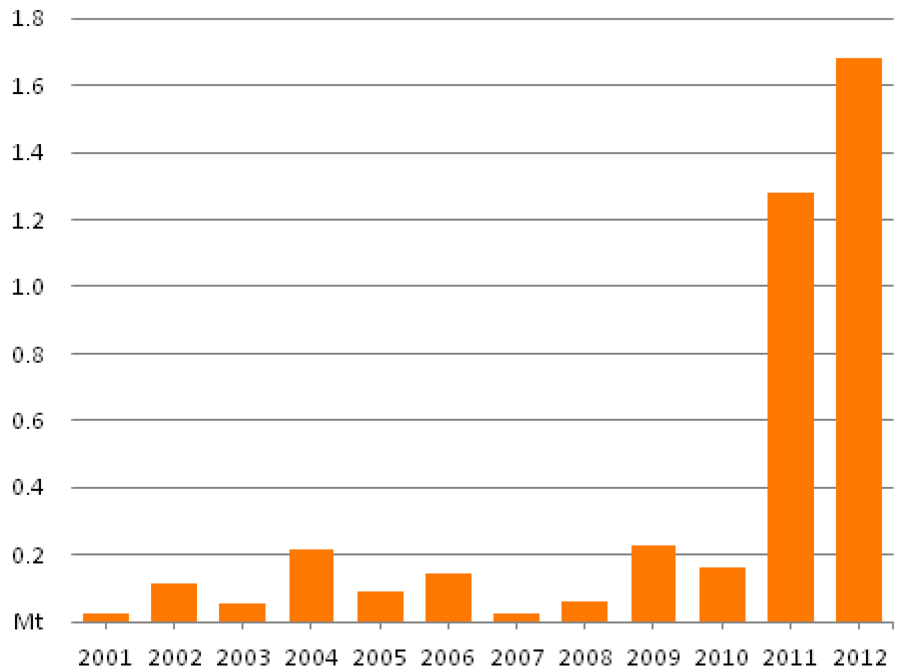
Source: United Nations Statistics Division 2013

The largest wheat importer among ASEAN member states is Indonesia, which sourced around half of its imports from Australia (United Nations Statistics Division 2013). A fall in Australian supplies in drought years has been supplemented by increased imports from Canada and the United States. This pattern is mirrored in some other Asian member states, such as Thailand, Vietnam and Malaysia.

The United States has been the key supplier of wheat to the Philippines for the past decade. However, Philippine imports of Australian wheat surged in 2011 and remained high into 2012 (Figure 34). This led to a rise in Australia's market share of Philippine wheat imports from the five-year average to 2010 of 4 per cent to 33 per cent in 2011.

The increase in Philippine imports of Australian wheat was driven by several factors; these included wheat becoming relatively cheaper than maize from late 2009 onward, elimination of a 7 per cent tariff on Australian feed wheat imports following the Philippine Government's implementation of the ASEAN–Australian–New Zealand Free Trade Agreement (AANZFTA) in 2010 (see Trade policies) and an abundant supply of Australian wheat following the 2010–11 Australian wheat harvest (USDA–FAS 2013d).

Figure 34 Wheat imports from Australia, Philippines



Source: ABS 2013

Policies

Trade policies

The applied tariffs on wheat imported by ASEAN member states are generally between zero and 5 per cent, with half the countries applying a zero tariff (Table 9) (WTO 2013b). However, bound tariffs are high for some member countries, such as the Philippines, Indonesia, Thailand and Brunei Darussalam.

Table 9 Bound and applied tariffs, ASEAN member states

ASEAN member state	Bound tariff (%)	Applied MFN tariff a (%)	Year b
Brunei Darussalam	20	0	2011
Cambodia	10	0	2012
Indonesia	27	2.5	2012
Laos	5	0	2008
Malaysia	0	0	2012
Myanmar	0	0	2012
Philippines	30	3.3	2011
Singapore	10	0	2012
Thailand	27	0	2011
Vietnam	5	5	2012

*Note: **a** Average tariff rates for wheat and meslin (HS1001.90 or HS1001.99). **b** Year to which the applied most favoured nation (MFN) tariff refers.*
Source: WTO 2013b

AANZFTA entered into force for Australia, New Zealand, Burma, the Philippines, Singapore, Thailand and Vietnam in 2010. This was followed by Malaysia and Cambodia in 2011 and Indonesia in 2012 (ACBPS 2013). Under the terms of the agreement wheat imports from Australia are admitted duty free for most ASEAN member states, including Indonesia and the Philippines (DFAT 2013).

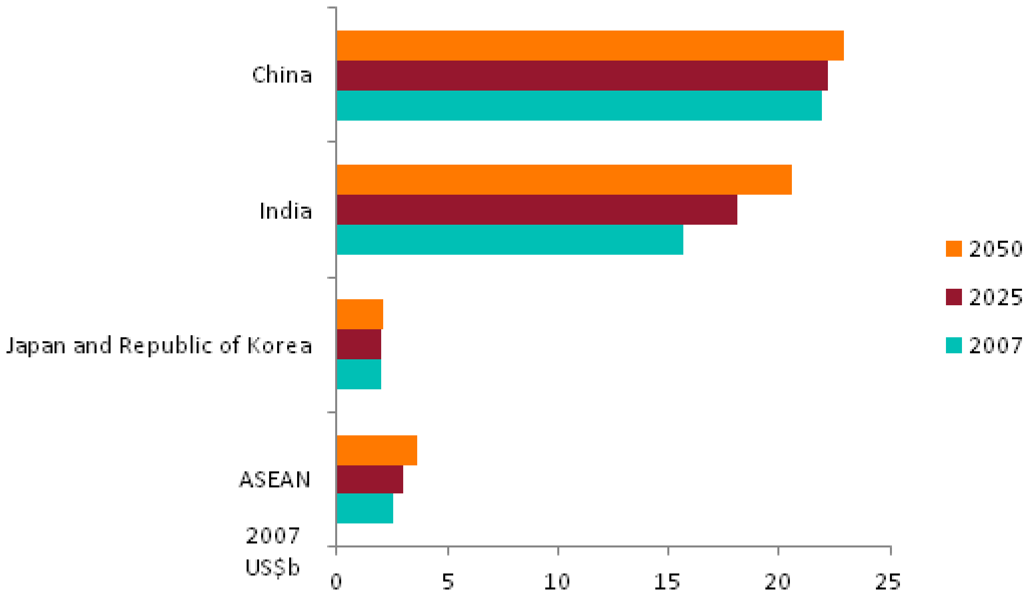
Australia's major competitors for wheat into South-East Asia are Canada and the United States, which do not have free trade agreements with any major wheat importing ASEAN member states (FAITC 2013; USTR 2013).

Long-term prospects

Consumption

Since the early 1990s wheat consumption growth has been modest in China and this is projected to remain the case out to 2050, with the real value of consumption increasing to US$23 billion (2007 dollars), 4 per cent higher than in 2007 (Figure 35). This largely reflects the shift from staples, including wheat, to a more western diet characterised by higher consumption of fruit, meat and dairy products. China is projected to remain the largest consumer of wheat in Asia by 2050. And with 94 per cent of that wheat projected to be consumed as food, per person consumption will be the largest in Asia, at 71 kilograms.

Figure 35 Real value of Asia's wheat consumption



Source: ABARES model output

India's wheat consumption has been increasing at a faster rate than China's since the early 1990s and this is projected to remain the case out to 2050, as the real value of India's wheat consumption increases by 30 per cent. The diverging trends in population growth within the two countries are responsible for this difference. For example, between 2025 and 2050, India's population is projected to increase by 0.6 per cent a year, while China's population is projected to decrease by 0.3 per cent a year (United Nations Population Division 2011). But by 2050 India's per person consumption is going to be below that of China's at 54 kilograms.

The real value of wheat consumption for Japan and the Republic of Korea is projected to remain relatively constant at around US$2 billion. A projected decline in population, particularly in Japan, and modest income growth are largely responsible for the stagnant growth in both countries. Feed consumption growth in the Republic of Korea is projected to partially offset the decline in food consumption in the region.

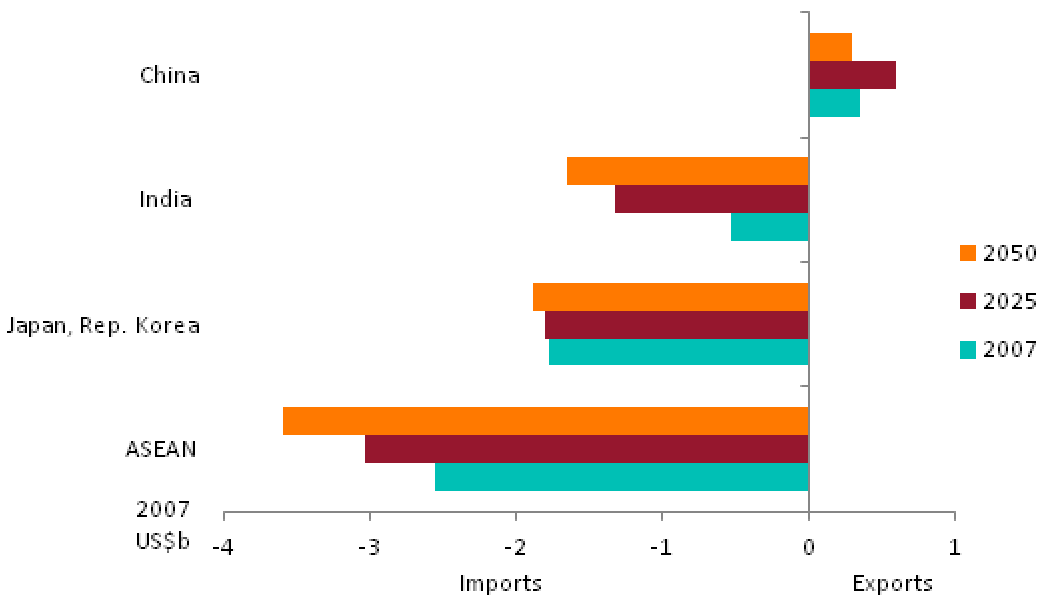
Per person consumption has traditionally been relatively low among ASEAN member states. For example, with the exception of Malaysia (64 kilograms), in 2007 it varied between 15 and 25 kilograms. With per person consumption projected to remain at these relatively low levels, aggregate consumption growth will be relatively subdued out to 2050. At that time, the real value of wheat consumption is projected to be around US$4 billion, with Indonesia accounting for around half the region's consumption.

Trade

Historically, China has switched from being a net importer to a net exporter, and vice versa, depending on the levels of production and consumption in a given year. With the real net value of wheat exports at US$400 million in 2007, it is projected that China will remain a net exporter of wheat by 2050. At that time, the real net value of exports will be around US$300 million (Figure 36). This reflects the mild growth projected for both wheat production and consumption in China out to 2050.

India was a net importer of wheat in 2007. This will continue over the projection period, with the real net value of wheat imports projected to be around US$1.5 billion in 2050. The expansion of consumption relative to production growth will underpin India's import growth out to 2050.

Figure 36 Real value of Asia's net trade for wheat



Source: ABARES model output

Wheat imports are projected to increase marginally for both Japan and the Republic of Korea, with the real value of imports projected to be US$1.8 billion, 6 per cent higher than in 2007. Negligible domestic production means this increase is a direct reflection of consumption growth in both countries.

Wheat import growth in ASEAN member states is projected to be moderate, with the real net value of imports in 2050 projected to be just under US$4 billion, 40 per cent higher than in 2007. ASEAN member states have not historically been significant producers of wheat and given the negligible wheat production projected out to 2050, the change in imports reflects consumption growth.

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4 Rice

Neil Thompson and Andrew Haylen

Rice is the staple of diets across Asia. The share of rice in the daily intake of energy in 2009 ranged from 21 per cent in Japan to 64 per cent in Cambodia (FAO 2013). Japan's relatively low share of rice in energy intake is consistent with its level of economic development and consumer income, which have led to the diversification of Japanese diets to include more meat, fish, dairy products, fruits and vegetables. Similar patterns are observed for China, India and the Republic of Korea, where strong income growth has resulted in declining per person consumption of rice over the past 20 years. By contrast, rice consumption in ASEAN member states, in aggregate, has increased over the same period. This reflects the relatively low incomes across the region despite strong economic development in recent years.

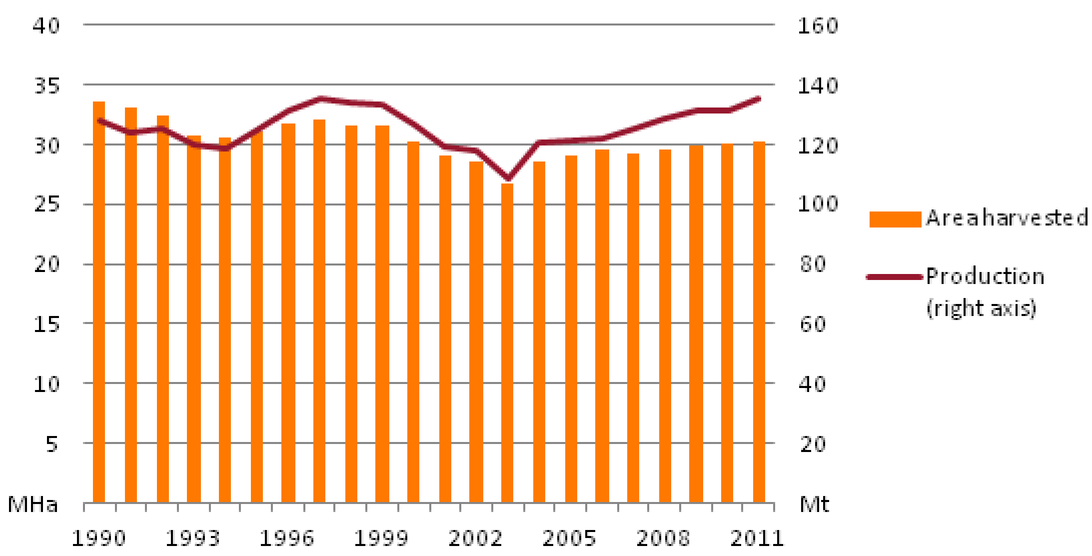
China

Production

China is the world's largest producer of rice, accounting for around 30 per cent of global production. In 2011 Chinese rice production reached almost 135 million tonnes (milled equivalent) (Figure 37).

Following several years of decline from the late 1990s, poor seasonal conditions in 2003 resulted in Chinese rice production falling to a 20-year low. In response to the decline, the Chinese Government introduced a range of input subsidies and removed agricultural taxes in 2004 (Gale et al. 2005). These initiatives have driven the increases in yields and land use in recent years.

Figure 37 Rice production, China

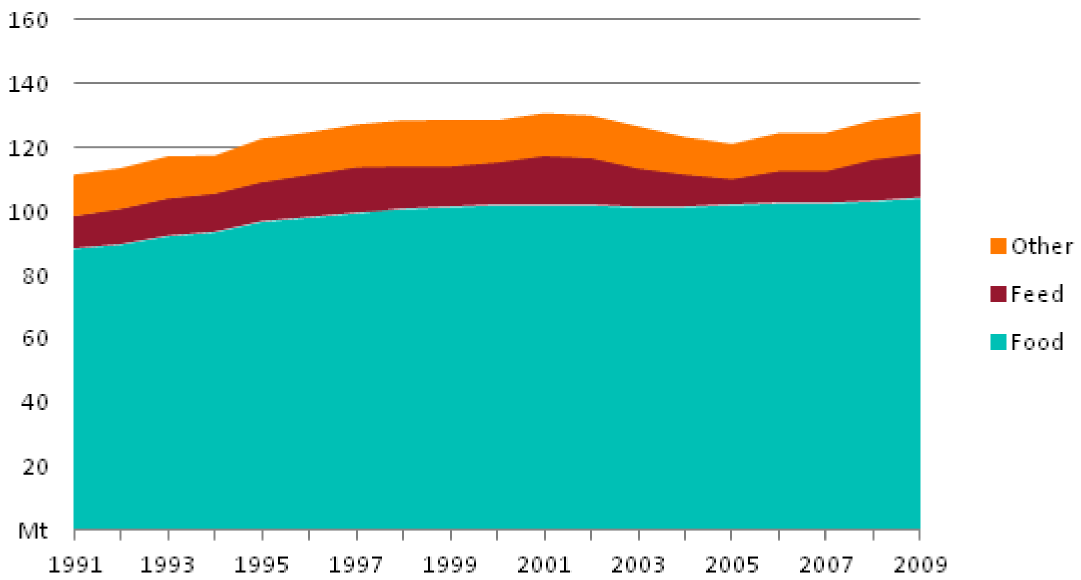


Source: FAO 2013

Consumption

In 2009 consumption of rice in China was around 131 million tonnes (milled equivalent). Of this, around 80 per cent was consumed as food while a further 11 per cent was accounted for by feed use. Seed, waste and other utilisation account for the remainder (Figure 38).

Figure 38 Rice consumption, China



Source: FAO 2013

While total rice consumption grew over the 20 years to 2009, the rate of increase did not kept up with population growth. Consumption of rice for food was estimated at 78 kilograms per person a year in 2009, down from 85 kilograms in 1990 (milled equivalent).

Trade

Despite being the world's largest producer of rice, China's trade in rice is relatively minor. In 2011 Chinese rice exports reached 508 000 tonnes (milled equivalent), around half of which was destined for the Republic of Korea. Over the 20 years to 2011, annual rice exports averaged around 1.4 million tonnes (milled equivalent); however, export volumes have steadily declined since the late 1990s.

Rice imports increased in recent years, reaching 576 000 tonnes (milled equivalent) in 2011. Thailand and Vietnam supply most of China's imported rice. However, rice imports represent less than 0.5 per cent of total domestic consumption (United Nations Statistics Division 2013).

Policies

Domestic policies

China has numerous production support measures for grains, including rice. Since 2004 the Chinese Government has subsidised a range of inputs, including seed, machinery, crop insurance, fuel and fertiliser. In addition, the government provides direct payments to farmers and sets minimum price levels for rice (USDA–FAS 2008; WTO 2012).

The Chinese Government also intervenes directly in market operations. State trading enterprises sell grains from reserves to domestic processors at weekly auctions. Since 2010 participation in these auctions has been restricted to feed and flour millers and livestock and poultry producers, and the volume they can purchase has been regulated (USDA–FAS 2011).

Trade policies

China applies a tariff quota to imports of rice, with a tariff quota volume of 5.32 million tonnes, an in-quota tariff of 1 per cent and an out-of-quota tariff of 65 per cent. The share of in-quota imports allocated to state trading enterprises is limited to a maximum of 50 per cent in China's accession agreement with the World Trade Organization (WTO) (ABARE 2006). In addition to applicable ad valorem duties, all imports of rice are subject to a value added tax of 13 per cent (OECD 2011).

Exports of rice are subject to quotas shared between state trading enterprises and private businesses with export licences. A partial rebate of the value added tax was available to rice exporters until December 2007. The rebate was then removed as a means to curb price rises on domestic markets and has not been reinstated (OECD 2011).

While China has several free trade agreements, of greatest significance to Chinese rice imports is the ASEAN–China Free Trade Area, established in 2002. Under this agreement, the tariff for rice imported from ASEAN member states will be reduced to a maximum of 50 per cent by 2015 (ASEAN 2004).

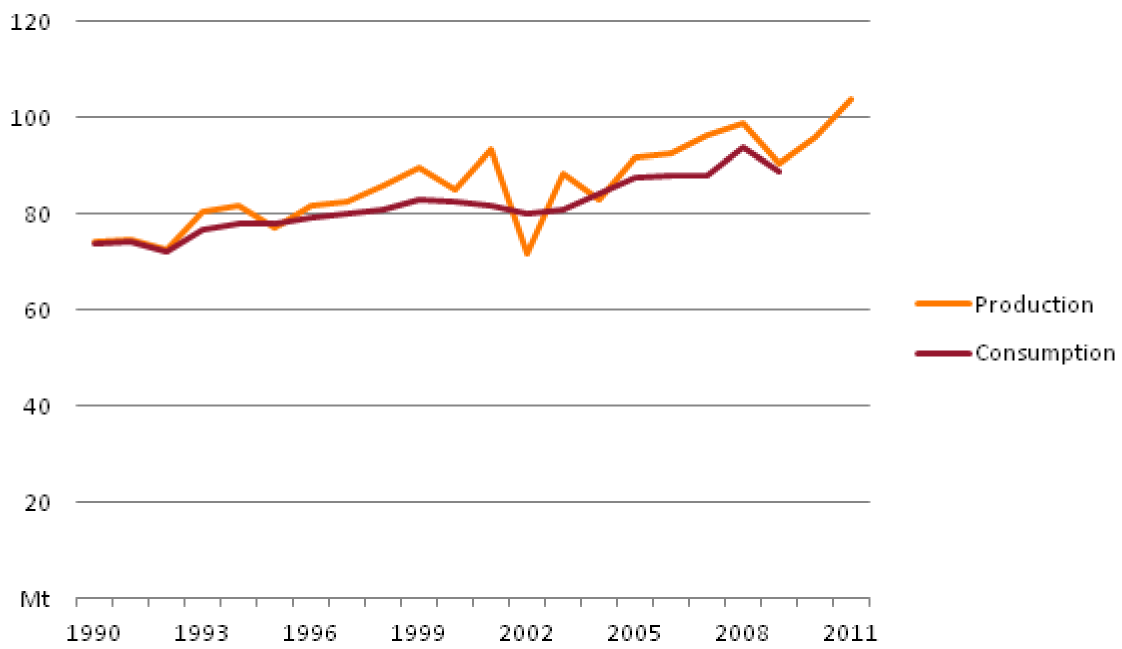
India

Production

In 2011 the volume of Indian rice production reached almost 104 million tonnes (milled equivalent) (Figure 39). While more than 90 per cent of India's rice production is of common varieties (USDA–FAS 2013a), India produces around 70 per cent of the world's basmati rice. Basmati rice attracts premium prices on world markets because of its taste and cooking properties (Anand 2012).

Over the 20 years to 2011, rice production has increased by an average 1.9 per cent a year. This is largely due to a steady increase in yields from 2.6 tonnes a hectare in 1992 to 3.5 tonnes a hectare in 2011 (rough basis) (FAO 2013).

Figure 39 Rice production and consumption, India



Source: FAO 2013

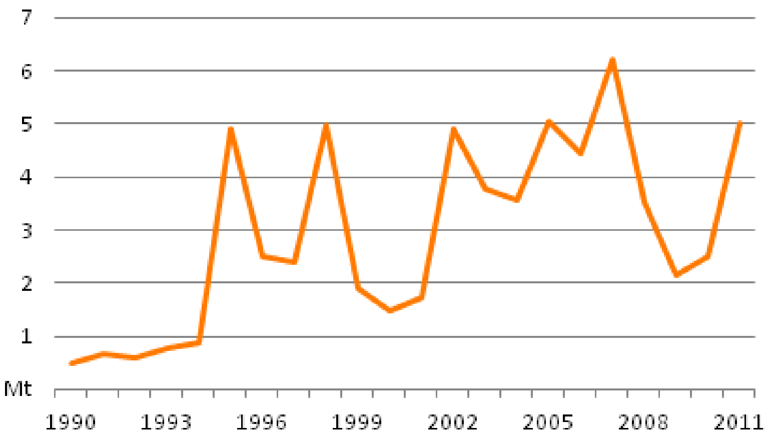
Consumption

More than 90 per cent of India's rice consumption, totalling 89 million tonnes in 2009 (milled equivalent), is consumed as food. Seed and feed use and waste account for the remainder. In the 20 years to 2009, rice consumption for food grew by an average of around 1 per cent a year (FAO 2013). Despite this, India's population has increased at a faster rate, resulting in per person rice consumption for food declining from an estimated 78 kilograms a year in 1990 to 68 kilograms in 2009 (milled equivalent).

Trade

India is an increasingly important supplier of rice to world markets. In 2011 India exported 5 million tonnes of rice (milled equivalent), almost 60 per cent of which was shipped to the Middle East, particularly the United Arab Emirates, Saudi Arabia and Iran. This export volume accounted for only 5 per cent of domestic production in 2011. Export volumes vary significantly from year to year, reflecting the management of reserve stocks by the Indian Government (see Domestic policies) and changes in domestic production and consumption (Figure 40).

Figure 40 Rice exports, India



Source: United Nations Statistics Division 2013

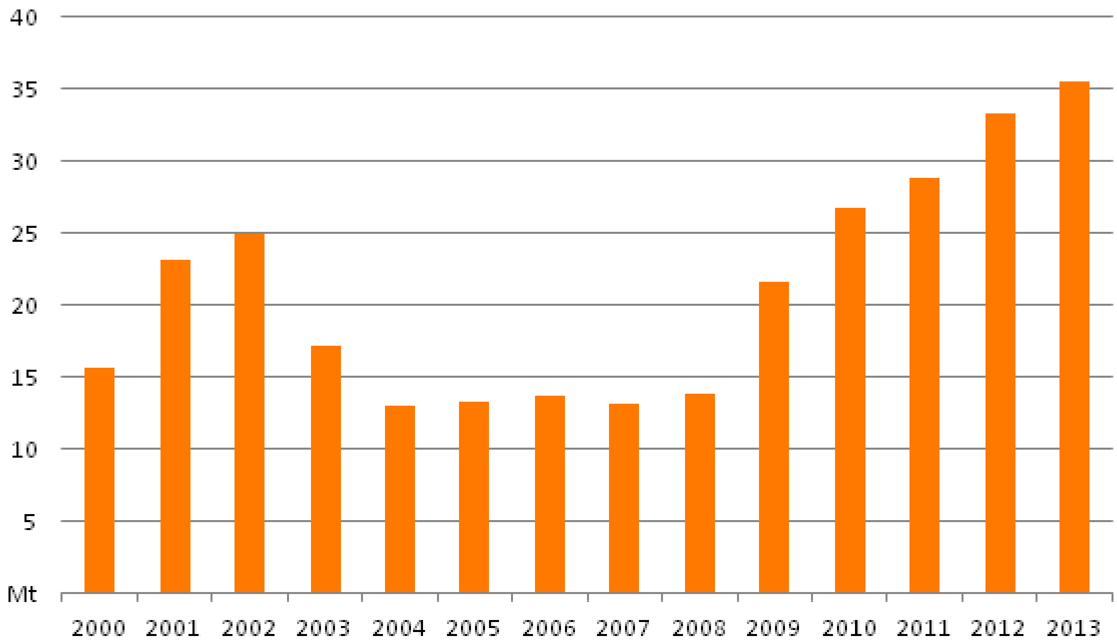
Policies

Domestic policies

The Indian Government has significant involvement in domestic rice production and distribution. On the production side, the Indian Government provides subsidies for machinery, fertiliser, electricity, irrigation and hybrid seeds, and sets a minimum support price for rice producers (Tobias et al. 2012). In terms of distribution, the government's Targeted Public Distribution System (TPDS) provides India's poor with discounted rice on a quota basis determined by the level of household income.

Under the minimum support price scheme, the Indian Government purchases rice directly from producers and rice millers (USDA–FAS 2013a). These purchases support the significant stock holdings of rice that underpin the TPDS program and provide a strategic reserve for emergency response purposes (Figure 41). The target for the government stock holding at 1 April each year is 14.2 million tonnes, 12.2 million tonnes of which are earmarked for the TPDS (FCI n.d.). In 2009 the stock holding target was equivalent to around 16 per cent of total consumption. See Box 2 for details on the minimum support price scheme and the TPDS.

Figure 41 Government rice stocks as at 1 April, India



Source: FCI 2013

Trade policies

India's export policy for rice has changed significantly in recent years, as a result of large increases in domestic production and government stock levels. In the past, the Indian Government kept domestic prices low by restricting rice exports through a combination of export bans, quotas, licensing, and minimum export prices. As recently as 2011 exports of non-basmati rice were banned, with the exception of humanitarian shipments, while basmati rice was subject to a minimum export price of US$900 a tonne (Tobias et al. 2012). In September 2011 the ban on non-basmati rice was lifted and in July 2012 the minimum export price for basmati rice was removed (USDA–FAS 2013a).

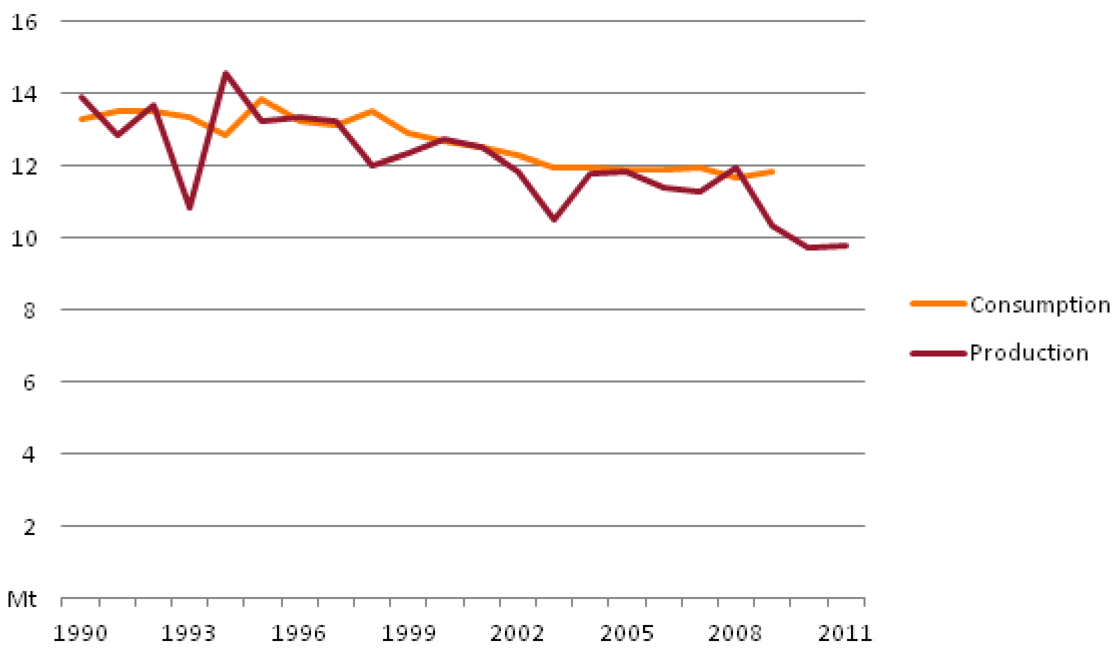
The applied tariff for rice imports has been zero since 2008 (USDA–FAS 2013a). India's bound tariffs are 80 per cent, with the exception of semi-milled or wholly milled rice which has a 70 per cent tariff (WTO 2013a).

Japan and the Republic of Korea

Production

Production of rice in Japan and the Republic of Korea was estimated at around 10 million tonnes in 2011 (milled equivalent), 57 per cent of which was produced by Japan (Figure 42). Over the past 20 years, rice production in the region has declined by an average of 1.7 per cent a year, reflecting an average 1.5 per cent a year fall in the area planted to rice (FAO 2013). The decline in area largely reflects land diversion programs implemented by successive national governments (see Domestic policies), an ageing rural population and urban encroachment.

Figure 42 Domestic production and consumption, Japan and the Republic of Korea



Source: FAO 2013

Consumption

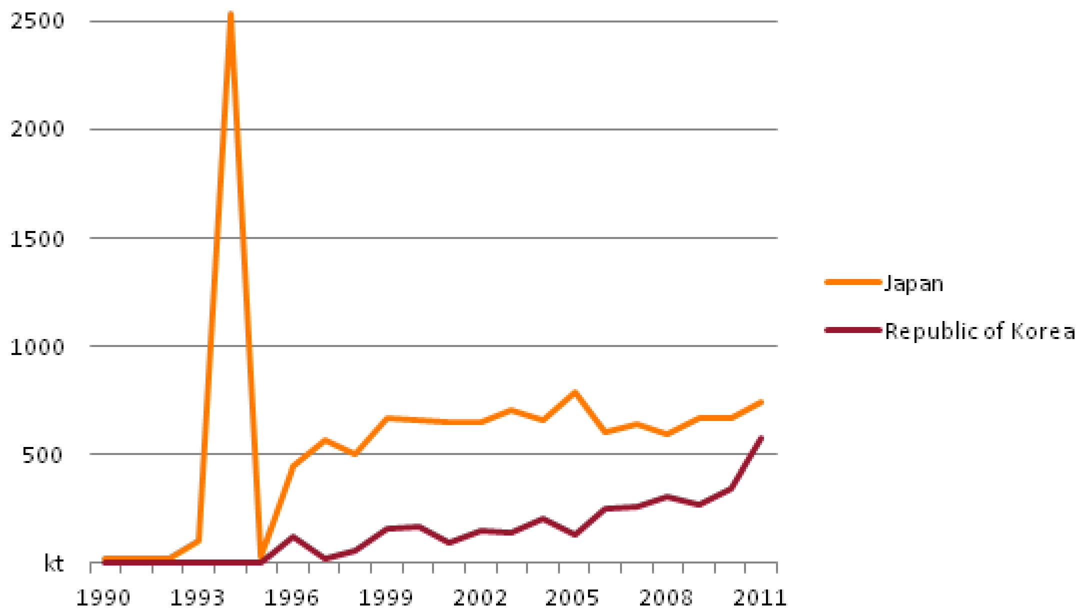
Japan and the Republic of Korea consumed around 12 million tonnes of rice in 2009 (milled equivalent), more than 90 per cent of which was consumed as food. In the Republic of Korea the remaining consumption is largely accounted for by waste and seed, while in Japan it is largely accounted for by processing and waste. Rice consumption in Japan and the Republic of Korea has declined by an average 0.6 per cent a year since the early 1990s (FAO 2013). Over the 20 years to 2009, as diets diversified, per person rice consumption for food in Japan fell by 11 kilograms to an estimated 54 kilograms a year, while in the Republic of Korea it fell by 16 kilograms to an estimated 81 kilograms (milled equivalent).

Trade

Imports of rice by Japan and the Republic of Korea have grown in recent years, albeit from a low base (Figure 43). The increases have been in response to minimum access commitments under WTO rules (see Trade policies). In the past 20 years Japanese rice imports have risen from 18 000 tonnes to 740 000 tonnes in 2011 (milled equivalent). Japanese rice imports are largely sourced from the United States, with additional volumes from Thailand and China (United Nations Statistics Division 2013). The significant spike in rice imports in 1994, to around 2.5 million tonnes, followed poor seasonal conditions in 1993, which reduced domestic rice production by 25 per cent (FAO 2013).

For the Republic of Korea, imports between 1992 and 2011 increased from 1300 tonnes to around 570 000 tonnes (milled equivalent). China supplied around half of these imports with the remainder accounted for by the United States and Thailand (United Nations Statistics Division 2013). Despite these large increases, imports only represented around 9 per cent of Japanese and 6 per cent of the Republic of Korea's total rice consumption in 2009.

Figure 43 Rice imports, Japan and the Republic of Korea



Source: United Nations Statistics Division 2013

Policies

Domestic policies

Japan and the Republic of Korea support domestic rice production through direct payments, price supports and government stock holdings. Japan's direct payments are based on the difference between a three-year average domestic retail price and a seven-year average production cost, while a payment is available when the retail price in the current year falls below the average production cost (OECD 2011). The Republic of Korea has a policy of direct payments on a per hectare basis and a variable deficiency payment, which equates to 85 per cent of the difference between the average domestic retail price and a government set target price, less the area payment (USDA–FAS 2012a).

Stocks in Japan and the Republic of Korea are managed by government agencies. Japan maintains a 1 million tonne emergency stock for domestic food consumption, purchasing 200 000 tonnes of domestic production a year and selling a comparable amount into the domestic feed market (OECD 2011). Japan also maintains a stock of rice imported under WTO minimum access commitments, which is sold into the domestic market for feed and food processing and exported as food aid (Tobias et al. 2012; USDA–FAS 2012b). Rice stocks in the Republic of Korea function as a price stabilisation measure, where the government buys rice during the harvest period and later sells it during the non-harvest period (USDA–FAS 2012a).

While production subsidies have encouraged higher rice output, domestic consumption has fallen, resulting in the governments of Japan and the Republic of Korea implementing policies to discourage over-production. In the case of the Republic of Korea, payments are made to farmers who use land to produce alternative crops to rice (Tobias et al. 2012). In Japan, payments have been made under various diversion programmes since the mid-1980s. Under these programs payments are made to producers who divert land away from rice to the production of other crops (OECD n.d.). The policy to divert rice production to other crops was strengthened in 2010 when the diversion payments were increased (OECD 2010).

Trade policies

Japan operates a tariff quota for rice and rice-based products where the tariff quota volume is 682 200 tonnes. Japan does not have an in-quota import tariff for rice, because these imports are made exclusively by state trading companies. The applied out-of-quota tariff for rice was 49 yen a kilogram in 2012, while the bound out-of-quota tariff for rice was 341 yen a kilogram (WTO 2013a).

Imports by the Republic of Korea are subject to an import quota, with the quota volume scheduled to reach 408 700 tonnes in 2014 (Hong & Cheng 2007). Imports within the quota are subject to a 5 per cent tariff (WTO 2013a).

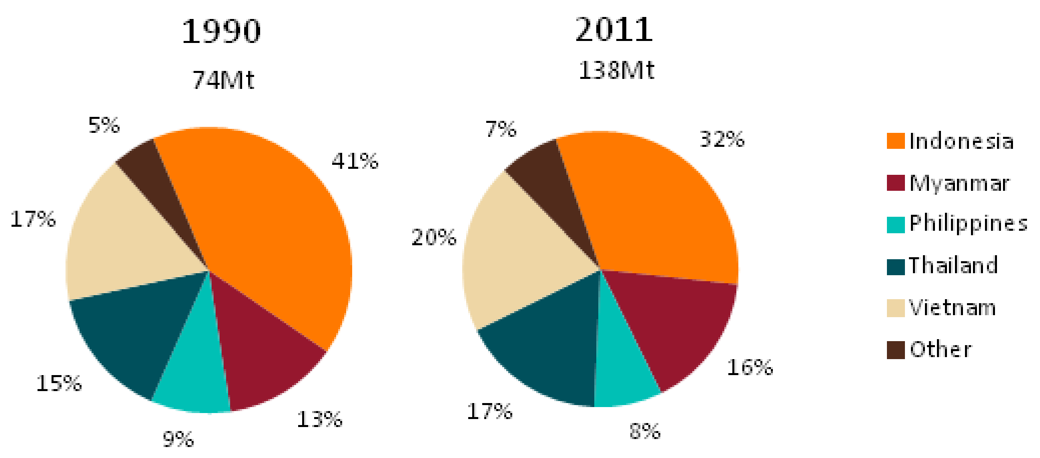
ASEAN

Production

Rice production by ASEAN member states was around 138 million tonnes in 2011 (milled equivalent). In 2011 Indonesia was the largest regional producer, accounting for around 32 per cent of production, followed by Vietnam (20 per cent), Thailand (17 per cent) and Myanmar (16 per cent) (Figure 44).

Over the 20 years to 2011, rice production by ASEAN member states increased by an average of 2.9 per cent a year; however, the drivers of production growth varied across the region. In less developed agriculture sectors, for example in Cambodia, Laos and Myanmar, production gains largely reflect higher planted areas and yields. More developed agriculture sectors, for example in Indonesia, Thailand and Vietnam, largely relied on yield improvements.

Figure 44 Rice production, ASEAN member states

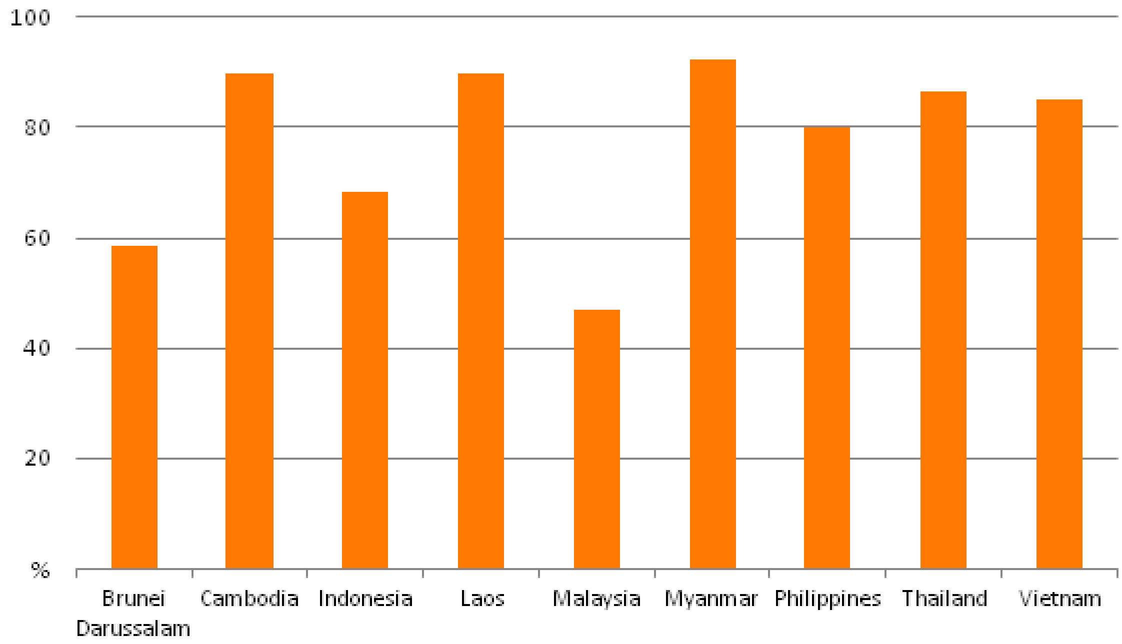


Source: FAO 2013

Consumption

Rice is an essential part of the diet for ASEAN member states, accounting for more than 80 per cent of total cereal consumption for food in Cambodia, Laos, Myanmar, the Philippines, Thailand and Vietnam(Figure 45). In 2009 consumption of rice was around 118 million tonnes (milled equivalent), 64 per cent of which was consumed as food. Other utilisation (17 per cent), waste (9 per cent) and feed (7 per cent) were the other major uses. Indonesia is the single largest consumer of rice for food in the region, accounting for 40 per cent of regional consumption, while Laos consumes the most on a per person basis, at an estimated 166 kilograms a year (milled equivalent) (FAO 2013).

Figure 45 Rice as a proportion of cereal consumption for food, ASEAN member states, 2009



Source: FAO 2013

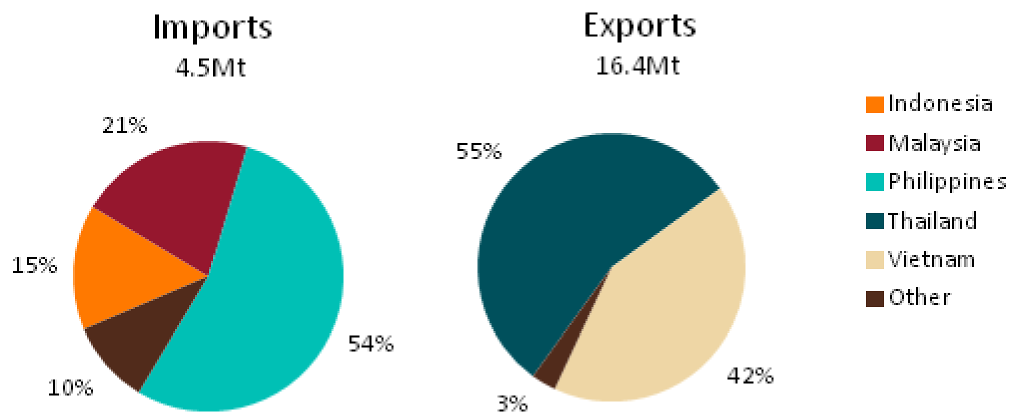
Rice consumption for food by ASEAN member states increased in absolute terms and on a per person basis over the past two decades. Between 1990 and 2009 rice consumption grew at an average 1.7 per cent a year, to reach just over 75 million tonnes.

Trade

In aggregate, ASEAN member states are significant exporters of rice, with shipments of around 16.4 million tonnes in 2010 (milled equivalent). Thailand, the world's largest rice exporter, shipped almost 9 million tonnes in 2010, accounting for around 55 per cent of ASEAN exports, while Vietnam, the world's second largest exporter, shipped almost 7 million tonnes (milled equivalent) (Figure 46). Most rice exports from ASEAN member states are sent to Africa (particularly Nigeria), the Middle East and to other ASEAN member states.

Collectively, ASEAN member states are also significant buyers of rice, importing around 4.5 million tonnes in 2010 (milled equivalent). More than 90 per cent of the region's imports are met through intraregional trade, largely from Thailand and Vietnam. The Philippines is the world's largest importer of rice and accounts for more than half of ASEAN imports, buying almost 2.4 million tonnes in 2010 (milled equivalent). Other major importers in the region include Malaysia (21 per cent) and Indonesia (15 per cent) (United Nations Statistics Division 2013).

Figure 46 Rice trade, ASEAN member states, 2010



Source: United Nations Statistics Division 2013

Policies

Indonesia

The Indonesian Government supports domestic rice production through subsidies for fertiliser and seeds and through trade restrictions. In addition, domestic production is purchased by the state trading enterprise BULOG at a minimum support price, equivalent to 3345 rupiah a kilogram for dry paddy rice in 2011 (USDA–FAS 2012c). These purchases are used by BULOG for market intervention when domestic prices are high and to provide subsidised rice (at a discount of around 80 per cent to the market in 2011) for consumption by poor households (Tobias et al. 2012).

BULOG is the sole importer of rice into Indonesia, using imports to maintain price stability and reserve stock levels. Imports are prohibited from one month before to two months after the main harvest period (USDA–FAS 2012c). In 2012 Indonesia applied an import tariff of 450 rupiah a kilogram for all rice types (WTO 2013a).

Malaysia

The measures used by the Malaysian Government to encourage domestic rice production focus on support payments and prices. In 2011 farmers received 65 ringgit per 100 kilograms of paddy rice produced and a further 25 ringgit per 100 kilograms if the paddy rice was delivered to licensed mill or drying facilities. A minimum support price is also available when rice falls below set quality standards or when there is no market demand. In 2011 the support price was around 75 ringgit per 100 kilograms (or US$249.52 a tonne) (Tobias et al. 2012). Under a 1996 privatisation agreement with the Malaysian Government, the former state trading enterprise BERNAS was made responsible for managing the distribution of these producer support payments. In addition, BERNAS acts as a buyer of last resort for paddy rice farmers and maintains the national rice stockpile (BERNAS n.d.). The government also works with BERNAS on development projects, including the opening of new land to rice farming and consolidating small farms into large-scale operations (USDA-FAS 2013b).

BERNAS is the sole importer of rice into Malaysia, using imports to maintain price stability. In 2012 Malaysia applied an ad valorem tariff of between 15 per cent and 40 per cent for broken rice and 40 per cent for all other rice imports (WTO 2013a). However, under the ASEAN Trade in Goods Agreement, where the majority of Malaysia’s rice imports are sourced, the ad valorem tariff in 2012 was between 15 per cent and 20 per cent for broken rice and 20 per cent for all other rice imports (ASEAN 2009a). Tariffs on imports from ASEAN member states will be further reduced before being completely eliminated by 2015 (Tobias et al. 2012).

The Philippines

The Government of the Philippines provides support to the domestic rice growing sector through subsidised inputs and minimum prices. The National Food Authority purchases rice from farmers at a set price (17 pesos a kilogram in 2012), which is then used to maintain a government held reserve for market intervention (USDA–FAS 2013c). The Philippine Government also supports rice farmers by providing cash-for-work and cash-for-training programs and subsidies for the purchase of machinery and high yielding seeds (Tobias et al. 2012).

Rice imports are controlled by the Philippine Government, with the level of imports determined annually in response to expected domestic production. The National Food Authority imports around 35 per cent of this allocation while the remaining portion is imported by the private sector under license (Tobias et al. 2012). Under the WTO's Agreement on Agriculture the Philippines is subject to a minimum access volume of 350 000 tonnes at a tariff of 40 per cent (WTO 2013b). However, the applied tariff for in-quota imports of paddy rice was zero in 2011 (Tobias et al. 2012). The Philippines also applies an out-of-quota tariff of 50 per cent (De la Peña 2012). In addition, an ad valorem tariff of 40 per cent is applied to out-of-quota imports from ASEAN member states. The maximum rate for in-quota and out-of-quota rice imports from ASEAN member states is set to decline to 35 per cent in 2015 (ASEAN 2009b).

Thailand

The major support to domestic rice production in Thailand is provided by the government's Paddy Pledging Scheme, which purchases rice from farmers through registered mills. Based on quality requirements, farmers could receive up to 15 000 baht a tonne for white rice, reduced to a maximum of 13 500 baht for second crop production from July 2013, and 20 000 baht a tonne for fragrant rice in the 2012–13 season (Bangkok Post 2013; Bhaopichitr et al. 2012). Rice purchased under the pledging scheme is held by the government, with 100 000 tonnes held for emergency purposes and the remainder sold into the domestic or export markets (Tobias et al. 2012; USDA–FAS 2013d). Support is also provided through fertiliser subsidies, either by direct payments or subsidised credit. In 2011 the government restricted rice production to two crops a year (Tobias et al. 2012).

Thai rice exports are subject to minimum price requirements. In 2011 these were US$550–560 a tonne for shipments containing up to 5 per cent broken grains, US$535–545 a tonne for up to 25 per cent broken grains and US$1060 a tonne for fragrant rice (Tobias et al. 2012). For imports, Thailand applied an import tariff of 2.75 baht a kilogram for all rice types in 2011 (WTO 2013a).

Vietnam

Vietnam's support of domestic rice production largely focuses on improving the competitiveness of producers by research into improved varieties and encouraging the merger of small farms into larger scale operations. The Vietnamese Government also intervenes in the market place through decrees and state trading enterprises. To ensure price stability the Vietnamese Food Association, a state trading enterprise, purchased 1 million tonnes of rice from farmers in 2011, at a minimum price of 5000 dong a kilogram. A further 1 million tonnes was purchased by Vietnamese exporters supported by low interest loans (Tobias et al. 2012). More recently, a government decree required that, from September 2012, exporters must hold minimum stocks of rice and maintain a minimum processing capacity (USDA–FAS 2013e).

State trading enterprises account for around 50 per cent of Vietnamese rice exports and the remainder is undertaken by private traders under licence. Rice exports are also subject to minimum prices. In 2011 these were US$465–475 a tonne for shipments containing up to 5 per cent broken grains and US$425–435 a tonne for up to 25 per cent broken grains (Tobias el al 2012).

For rice imports, an ad valorem tariff of 40 per cent is applied, with the exception of imports from Laos and Cambodia that have tariff-free quotas of 70 000 and 300 000 tonnes respectively in 2013 (USDA–FAS 2013e). Imports from China also have preferential treatment, with ad valorem tariffs ranging from zero for paddy rice to 15 per cent for broken rice in 2012 (WTO 2013a). Under the ASEAN Trade in Goods Agreement, Vietnam reduced tariffs for out-of-quota rice imports from member states to 5 per cent in 2013 (ASEAN 2009c).

Other member states

Other ASEAN member states (Brunei Darussalam, Cambodia, Laos and Myanmar) have rice self-sufficiency targets and employ a range of policies, including input subsidies for seeds, electricity and credit; government development of irrigation; and other rural infrastructure and stockholding by the government and private sector (Eliste & Santos 2012; Tobias et al. 2012).

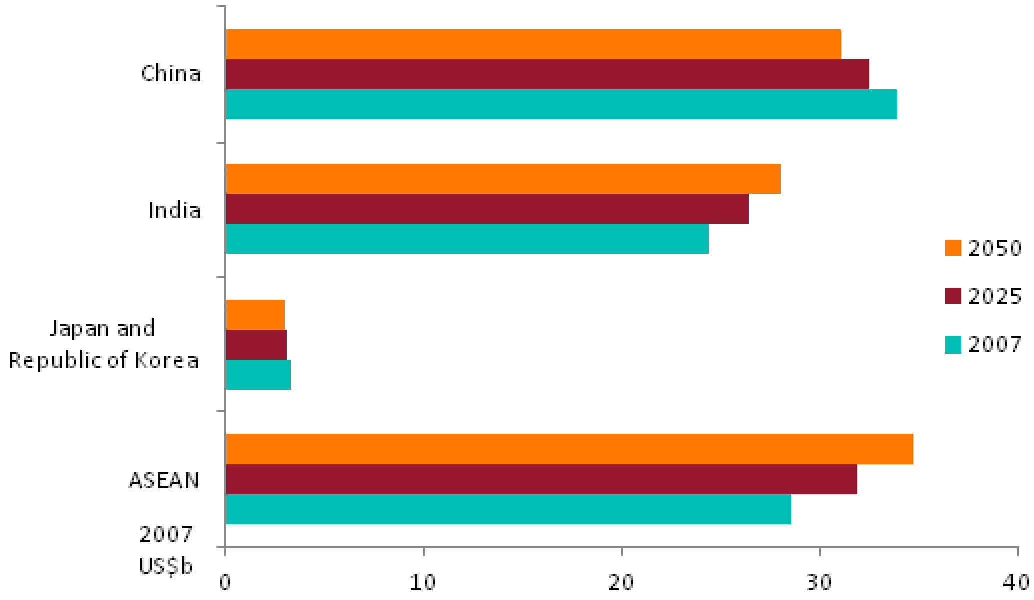
The trade policies implemented by these other ASEAN member states are directed at maintaining domestic price stability. These measures include trading licenses, export taxes, temporary trade bans and restrictions on trade operations to state trading enterprises or directly by government (Tobias et al. 2012). In 2012 ad valorem import tariffs among this group ranged from zero in Brunei Darussalam and Singapore to 7 per cent for some products in Cambodia (WTO 2013a). Under the ASEAN Trade in Goods Agreement, Cambodia reduced the tariff on rice imports from member states to 5 per cent (ASEAN 2009d).

Long-term prospects

Consumption

China is projected to remain the largest individual consumer of rice in Asia by 2050, with the real value of consumption at US$31 billion (2007 dollars), 9 per cent lower than in 2007 (Figure 47). This trend reflects the projected decline in per person consumption of rice, as rising incomes see consumers shift away from traditional diets to protein-based diets. It also reflects the expected contraction in China's population after 2025 (United Nations Population Division 2011).

Figure 47 Real value of Asia's rice consumption



Source: ABARES model output

India is projected to remain the second largest consumer of rice in Asia out to 2050, with the real value of consumption projected to increase to US$28 billion, 15 per cent higher than in 2007. Sustained population growth, increasing by 0.6 per cent a year between 2025 and 2050, will result in further growth in rice consumption during this period. However, per person rice consumption is projected to fall by 15 per cent between 2007 and 2050. The growth in aggregate consumption will be underpinned by population growth rather than a rise in per person incomes. The combined effect of relatively high per person consumption and income increases will allow for a dietary shift away from basic staples, such as rice, to animal-based products such as dairy.

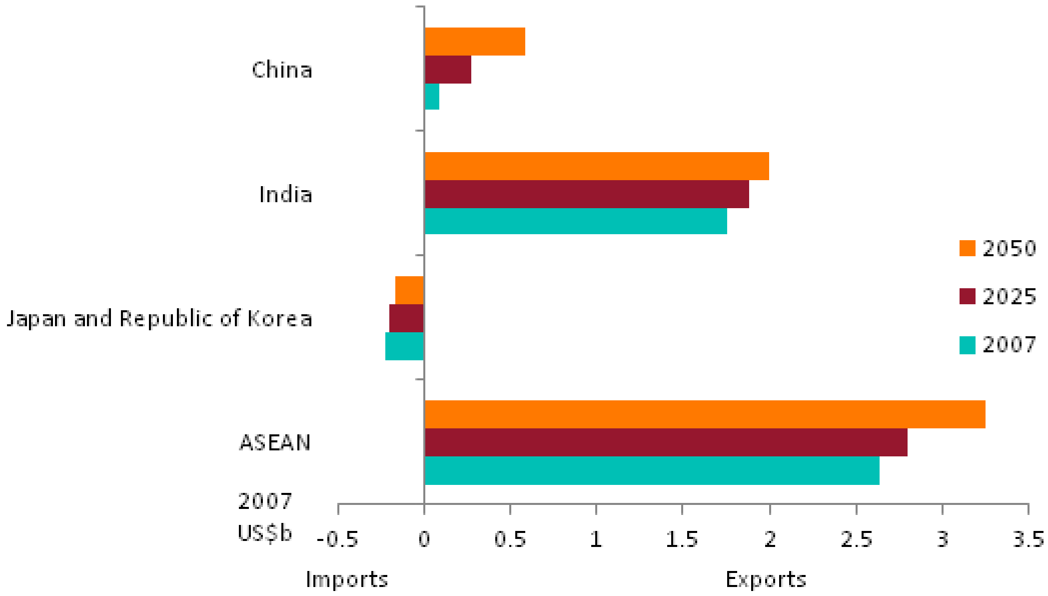
The real value of rice consumption for Japan and the Republic of Korea is collectively projected to be around US$3 billion in 2050, a decrease of 9 per cent compared with 2007. This decline can be attributed to the projected contraction in the populations of both countries out to 2050.

For ASEAN member states, the real value of rice consumption is projected to be US$34 billion, 21 per cent higher than in 2007. This increase will be underpinned by population growth despite lower per person consumption. Indonesia is projected to remain the largest consumer of rice among ASEAN member states, with the real value of consumption at US$12 billion in 2050.

Trade

Historically, China has switched from being a net importer of rice to a net exporter, and vice versa, depending on the levels of production and consumption in a given year. With the real net value of rice exports at around US$100 million in 2007, it is projected that China will remain a net exporter of rice by 2050. At that time, the real net value of rice exports is projected to be around US$600 million (Figure 48). With production projected to remain around historical levels, China's trade position is a reflection of the projected decrease in consumption out to 2050.

Figure 48 Real value of Asia's net trade for rice



Source: ABARES model output

In 2007 India was a net exporter of rice. With domestic production projected to grow by around 15 per cent out to 2050, India is projected to remain a net exporter of rice. At that time, the real net value of rice exports is projected to be around US$2 billion. Historically, the high levels of domestic production in India have been the result of relatively high budget and market price supports for rice producers (Jha et al. 2007). Assuming unchanged domestic policies out to 2050, growth in rice production will be mostly underpinned by yield improvements.

Import demand for rice by Japan and the Republic of Korea is projected to be relatively subdued out to 2050, with the real net value of rice imports at around US$150 million, a decrease of 25 per cent compared with 2007. This trend reflects the decrease in domestic consumption stemming from the expected population decline for both countries.

Collectively, ASEAN member states are projected to remain a net exporter of rice (US$3 billion) in 2050, with the real net value of exports to increase by 25 per cent. This reflects the projected export growth from Myanmar (US$600 million) and Vietnam (US$400 million) and relatively modest import growth from other rice importers such as the Philippines (US$200 million). Thailand and Vietnam are projected to remain significant producers and exporters of rice, while other countries, such as Indonesia, maintain policies of self-sufficiency. Most of the demand for rice within individual ASEAN member states is projected to be met by domestic production, resulting in relatively weak import demand by the ASEAN region as a whole.

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5 Coarse grains

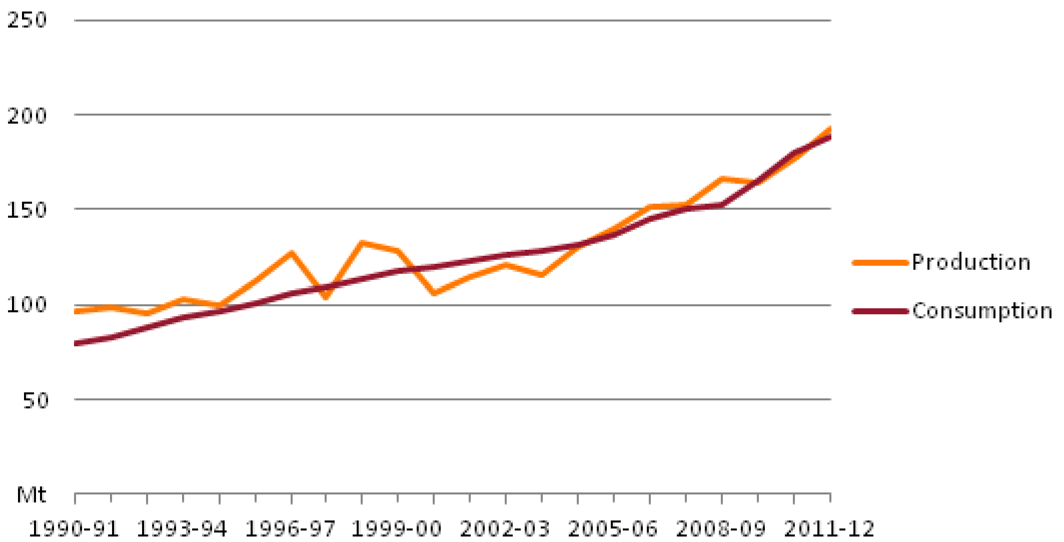
David Mobsby and Andrew Haylen

China

Production

Despite a slight reduction in harvested area to coarse grains, China's production of coarse grains increased by 0.7 per cent annually from 1990–91 to 2003–04 to reach 124 million tonnes (USDA–FAS 2013a). Production rose more strongly in the eight years to 2011–12 at an average of 4.7 per cent a year to around 200 million tonnes reflecting both improved yields and expanded harvested area. This increase was led by rapid expansion of maize production which increased by an average of 5 per cent a year to reach 193 million tonnes (Figure 49). For other coarse grains, such as barley and grain sorghum, the trends were markedly different. Production declined or rose only moderately.

Figure 49 Maize production and consumption, China



Source: USDA–FAS 2013a

The share of maize in total coarse grains production in China has increased over the past 20 years, from 86 per cent in 1990–91 to 97 per cent in 2011–12. This reflected the response to growing feed demand and was achieved through yield improvements and a shift in land use to maize production. The Chinese Government also provided more favourable financial incentives for maize production compared with other coarse grains (USDA–FAS 2012a).

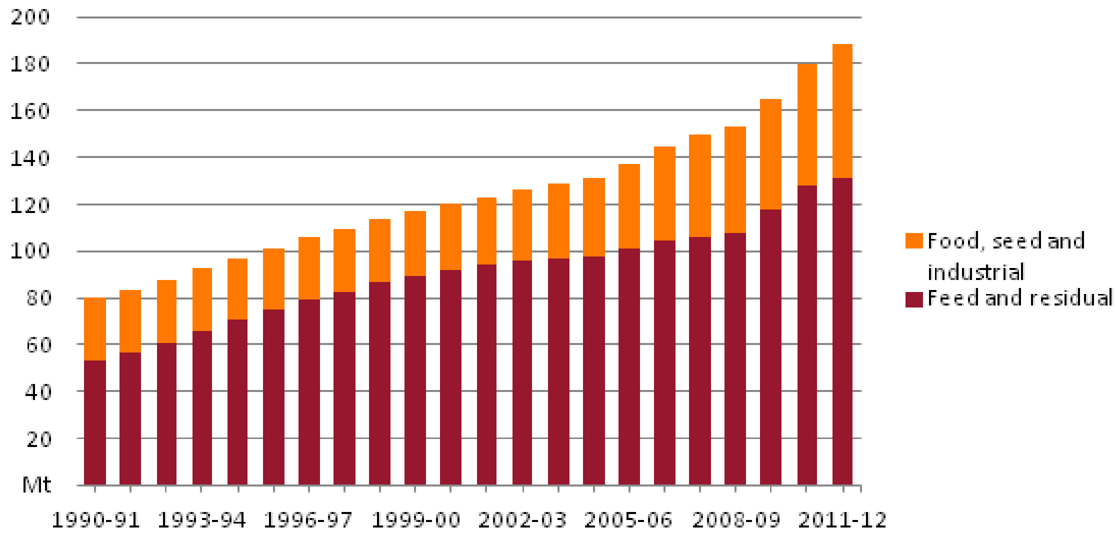
Consumption

Consumption of coarse grains increased by an average of 2.9 per cent a year between 1990–91 and 2003–04, to around 138 million tonnes (USDA–FAS 2013a). From 2004–05 to 2011–12 consumption growth accelerated to 4.3 per cent a year to reach 197 million tonnes. Much of this growth was due to rising feed demand and maize use in industrial processing (Gale et al. 2009).

From 1990-91 to 2011–12, feed consumption of maize grew at 4.2 per cent a year to 131 million tonnes (Figure 50). Driving this growth was an expanding domestic livestock and poultry sector.

In addition to increasing livestock numbers, farm consolidation and commercialisation in the livestock sector created growing demand for maize (USDA–FAS 2012a).

Figure 50 Maize consumption, China



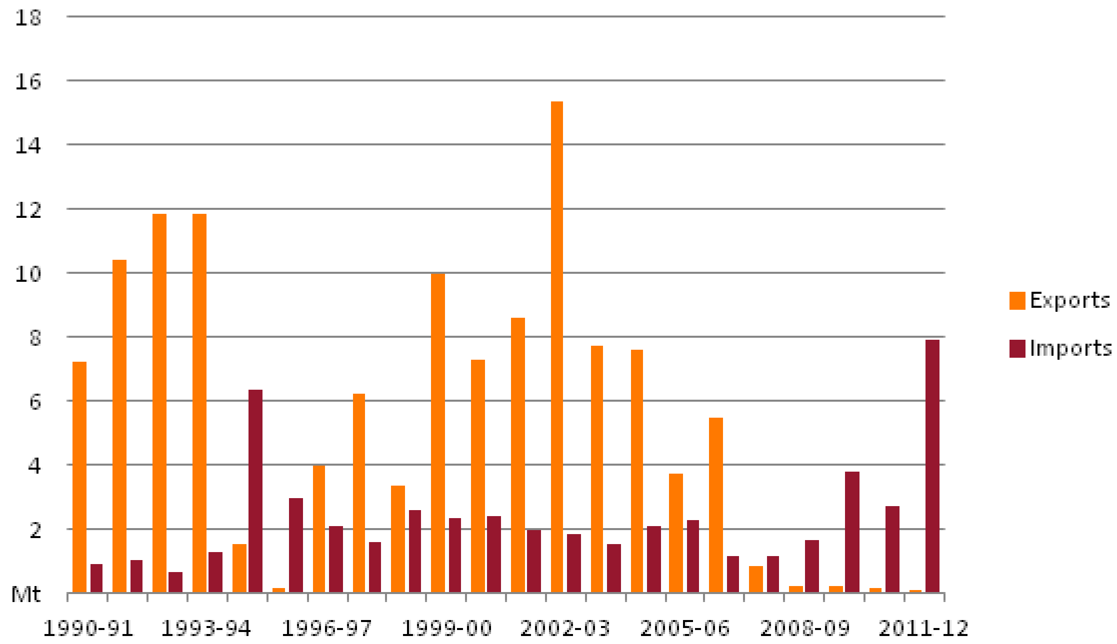
Source: USDA–FAS 2013a

Industrial use of maize accounted for around 75 per cent of food, seed and industrial consumption in 2011–12 (USDA–FAS 2011a). The surge in industrial use of maize, beginning in the mid 2000s, was prompted by strong government support for development of the maize processing industry (Gale et al. 2009). Major industrial products from maize include starch, alcohol and fuel ethanol. However, since 2008 China has reduced support for production of ethanol from food and feed grains and tightened control on the maize processing sector (USDA–FAS 2012b). Food consumption of maize is small and accounts for only about 4 per cent of maize consumption (USDA–FAS 2011a).

Trade

From 1990–91 to 2011–12 China alternated between periods of being a net exporter of coarse grains to being a net importer of coarse grains. During two periods—1990–91 to 1993–94 and 1996–97 to 2006–07—China exported large volumes of coarse grains, virtually all of which was maize (Figure 51) (USDA–FAS 2013a). Major export destinations included the Republic of Korea and Malaysia (United Nations Statistics Division 2013).

Figure 51 Coarse grains trade, China



Source: USDA–FAS 2013a

From 1990–91 to 2008–09 import volumes of total coarse grains were generally steady; barley accounted for most imports. More recently, China has been importing large volumes of maize, with imports rising from 1.3 million tonnes in 2009–10 to 5.2 million tonnes in 2011–12. The main supplier of maize to China has been the United States, accounting for 96 per cent of total coarse grains imports between 2010 and 2012 (United Nations Statistics Division 2013).

Policies

Domestic policies

The Chinese Government has a long-stated goal of maintaining self-sufficiency for grains at 95 per cent, although the goal for maize is 100 per cent (USDA–FAS 2012a). The government also aims to increase grain production capacity to above 540 million tonnes by 2015 (USDA–FAS 2012a). To support these policies, grain producers (including wheat, rice and maize) receive support from the government (USITC 2011). However, the Chinese Government does not provide as much financial and other support for barley, grain sorghum and other coarse grains production as it does for maize production (USDA–FAS 2012a).

Maize producers receive direct support from the government in the form of subsidies and direct payments. Producers receive direct payments based on the area of land planted to maize (USITC 2011). In addition to direct payments, maize producers are eligible to receive input subsidies for seeds, agricultural machinery and fertilisers. The total value of direct payments and subsidies for all grain producers increased sharply from 17.4 billion yuan in 2005 to 138.1 billion yuan in 2011 (USDA–FAS 2012b).

In 2007 the Chinese Government instituted a minimum purchase price for maize in the north-eastern provinces in order to encourage production (OECD 2011). The minimum purchase price for maize increased most years from 1400 yuan per tonne in 2007 to 2120 yuan per tonne in 2012 (USDA–FAS 2013b). Procurement of grain at minimum support prices have been largely carried out through state-owned enterprises (WTO 2012). The Chinese Government also intervenes in the market in an ad hoc way by trading grains from state reserves (WTO 2012).

Trade policies

China has established a tariff quota for maize imports. The tariff quota volume is 7.2 million tonnes while the in-quota tariff is 1 per cent and the out-of-quota tariff is 65 per cent. Chinese imports of maize have been within the tariff quota volume since China's accession to the World Trade Organization in 2001 (USDA–FAS 2013a; WTO 2013a). The tariffs on imports of other coarse grains are small. For example, the applied and bound tariffs on barley are 3 per cent and on grain sorghum 2 per cent.

Non-tariff barriers to trade, such as certification requirements for genetically modified organisms, apply especially to the maize trade (USTR 2012).This includes approval from the exporting country as well as China, where approval certificates must be obtained for each trait as well as each combination of traits. Certificates are only valid for three years, after which the certificate must be renewed (USITC 2011). As of January 2013 only six countries were approved to export maize to China: the United States, Thailand, Peru, Laos, Argentina and Ukraine (USDA–FAS 2013b).

As part of its WTO commitments, China agreed to remove the monopoly of state trading enterprises for the import of maize (USTR 2012). However, 60 per cent of the tariff quota volume remains allocated to state trading enterprises (USDA–ERS 2012).

Recent policy developments have discouraged exports. In 2007 the Chinese Government removed value added tax export rebates on maize and other cereals (OECD 2011). Following this, in 2008 the government imposed export taxes on grains, which were removed by the end of June 2009 (WTO 2012). The Chinese Government continues to impose export quotas on maize and trade is subject to state trading, although some private enterprise exporting may occur (OECD 2011).

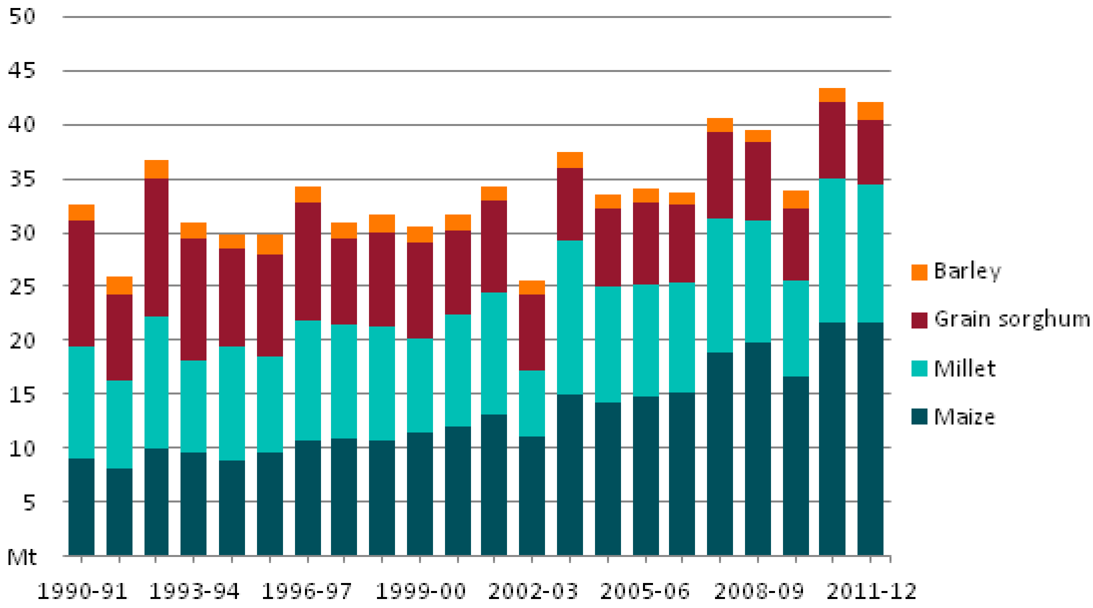
India

Production

Most of India's coarse grains are rain fed and thus production is highly dependent on seasonal monsoon rainfall (Agricoop 2013). From 2000–01 coarse grains production in India grew by 1.2 per cent a year, to reach 42 million tonnes by 2011–12. Given the steady decline in area harvested to coarse grains over this period—from 36 million hectares to 27 million hectares—the rise in production largely reflects improvements in yields, particularly for maize and millet.

The production mix of India's coarse grains has shifted over the past 20 years toward a higher proportion of maize, largely at the expense of grain sorghum. The shares of millet and barley have remained roughly constant (Figure 52). This change in output can be attributed to a supply response to increased demand for feed from growing meat production, particularly chicken meat for which maize is a key feed ingredient (USDA–FAS 2012c). A continued decline in grain sorghum area was, in part, because producers switched to more profitable production alternatives, such as cotton. Also, grain sorghum is less suited for feed use in the poultry sector (USDA–FAS 2012c).

Figure 52 Coarse grains production, India

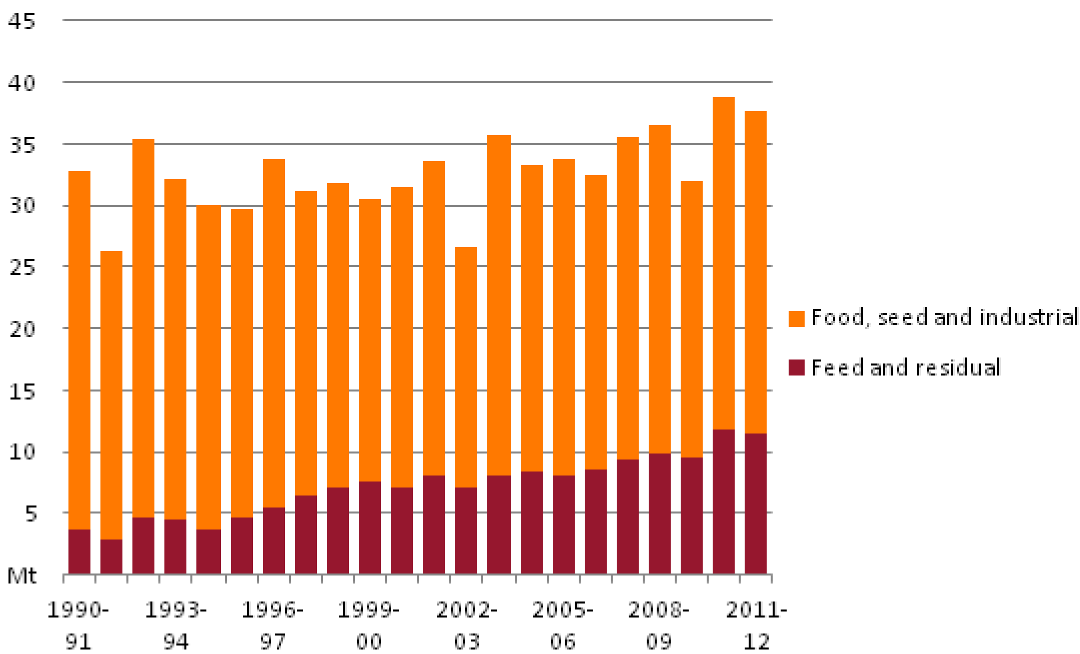


Source: USDA–FAS 2013a

Consumption

Coarse grains consumption growth in India was relatively stable between 1990–91 and 2011–12, increasing at only 0.6 per cent a year to around 38 million tonnes (Figure 53). This moderate growth reflected the increased feed use which offsets declines in food, seed and industrial use.

Figure 53 Coarse grains consumption, India



Source: USDA–FAS 2013a

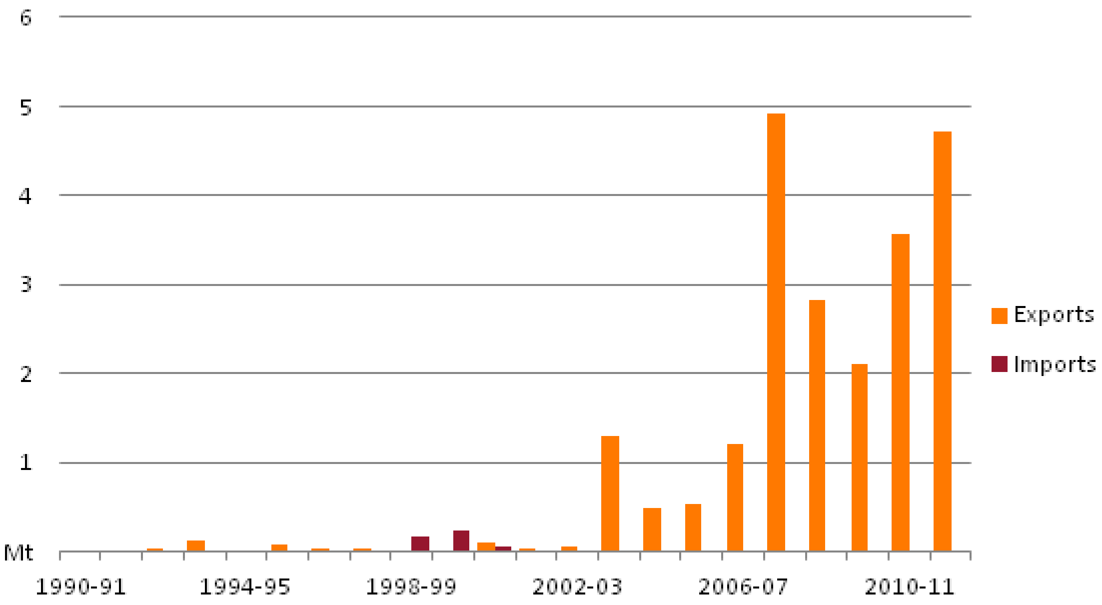
Despite the declines, food use remains the largest component in coarse grains consumption in India since coarse grains are a staple for the rural poor (USDA–FAS 2012c). Millet, maize and grain sorghum are the principal staple coarse grains. From 1993–94 to 2009–10 rural consumption of coarse grains per person fell from 27.9 kilograms a year to 10.3 kilograms a year, whereas wheat consumption stayed relatively constant at around 53 kilograms per person a year (DES 2013).

In contrast, feed consumption of coarse grains grew rapidly, increasing by an average of more than 5 per cent a year between 1990–91 and 2011–12 to 11.5 million tonnes (Figure 53). This increase was driven by a rapid increase in livestock and poultry production. Consumption of maize was the most significant given its dominant role as feed in the poultry sector (USDA–FAS 2012c). Around two-thirds of maize is consumed as livestock feed and one-quarter as food (USITC 2009).

Trade

From 1990–91 until 2002–03 India traded less than 1 per cent of its total production of coarse grains. However, it has exported a more significant volume of coarse grains since 2003–04 (Figure 54). Export activity was most notable in 2007–08, 2010–11 and 2011–12 when world prices rose higher than domestic prices, thus making the export market more attractive. Major export destinations for Indian maize include Bangladesh and the ASEAN member states. India has been nearly 100 per cent self-sufficient in coarse grains and imports have been negligible from 1990–91 to 2011–12.

Figure 54 Coarse grains trade, India



Source: USDA–FAS 2013a

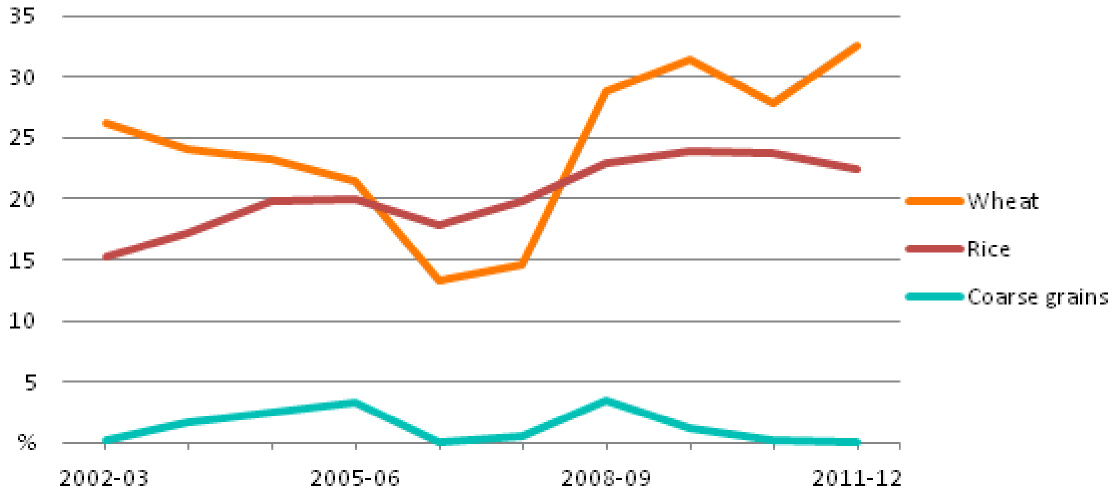
Policies

Domestic policies

The Government of India intervenes in the coarse grains market by offering input subsidies and support prices to producers and by subsidising consumption. For further details on Indian domestic grain policies see Box 2.

However, unlike wheat and rice, government procurement of coarse grains is a fraction of overall production (Figure 55). This was largely because Indian market prices for coarse grains generally trade above minimum support prices (USITC 2009).

Figure 55 Government procurement of grains as proportion of production, India



Note: Coarse grains includes maize, millet, grain sorghum and barley

Source: DES 2013; USDA–FAS 2013a

Trade policies

India has established a tariff quota for maize with a tariff quota volume of 500 000 tonnes, an in-tariff quota of 15 per cent and an out-of-quota tariff of 60 per cent (WTO 2013a). Indian imports of maize have been less than the tariff quota volume (USDA–FAS 2013a).

Millet and grain sorghum are both subject to a tariff of 50 per cent, whereas barley and oats can be imported duty-free (WTO 2013b). In addition, genetically modified maize imports are banned and other sanitary and phytosanitary requirements must be met before imports of maize are admitted (USITC 2009).

India does not currently impose export restrictions on coarse grains. However, between July and October 2008 the Government of India temporarily banned exports of corn in response to rising international prices (USITC 2009). No further export restrictions have been imposed since that time.

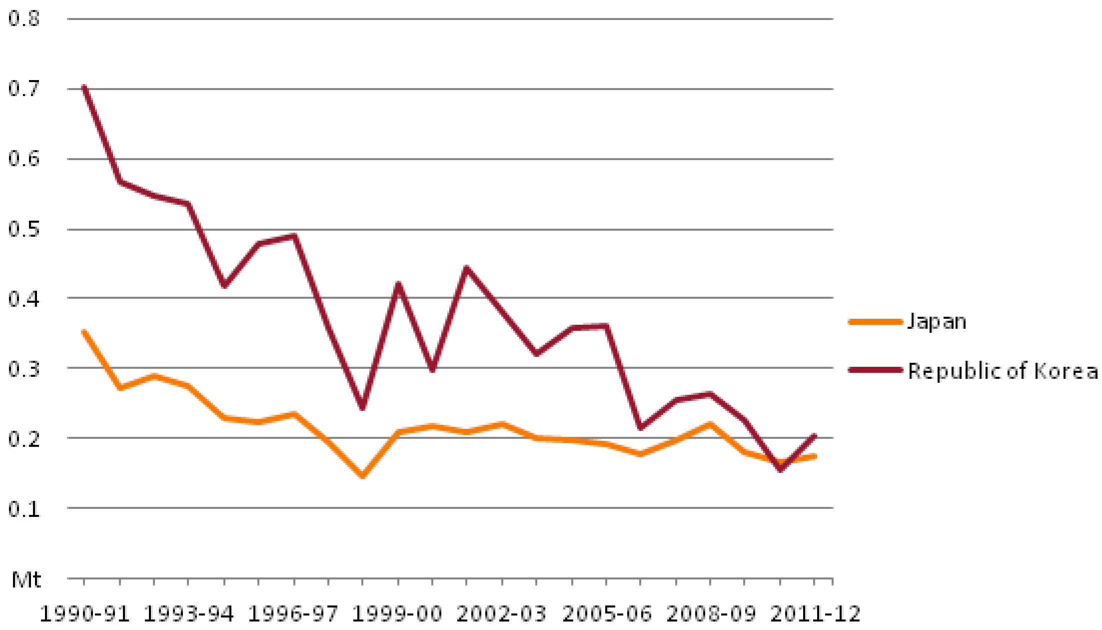
Japan and the Republic of Korea

Production

Although Japan and the Republic of Korea are large consumers of coarse grains, they are minor producers of coarse grains. Self-sufficiency rates of coarse grains in Japan and the Republic of Korea are just 1 per cent and 3 per cent, respectively (USDA–FAS 2013a).

Barley is the major coarse grain produced in Japan and the Republic of Korea. In the five years to 2011–12 barley accounted for 98 per cent and 62 per cent of all coarse grains produced in those countries, respectively. Maize is the second largest coarse grain the Republic of Korea produces, accounting for around 37 per cent of production. For both countries, coarse grains production declined considerably between 1990–91 and 2011–12 (Figure 56).

Figure 56 Coarse grains production, Japan and the Republic of Korea



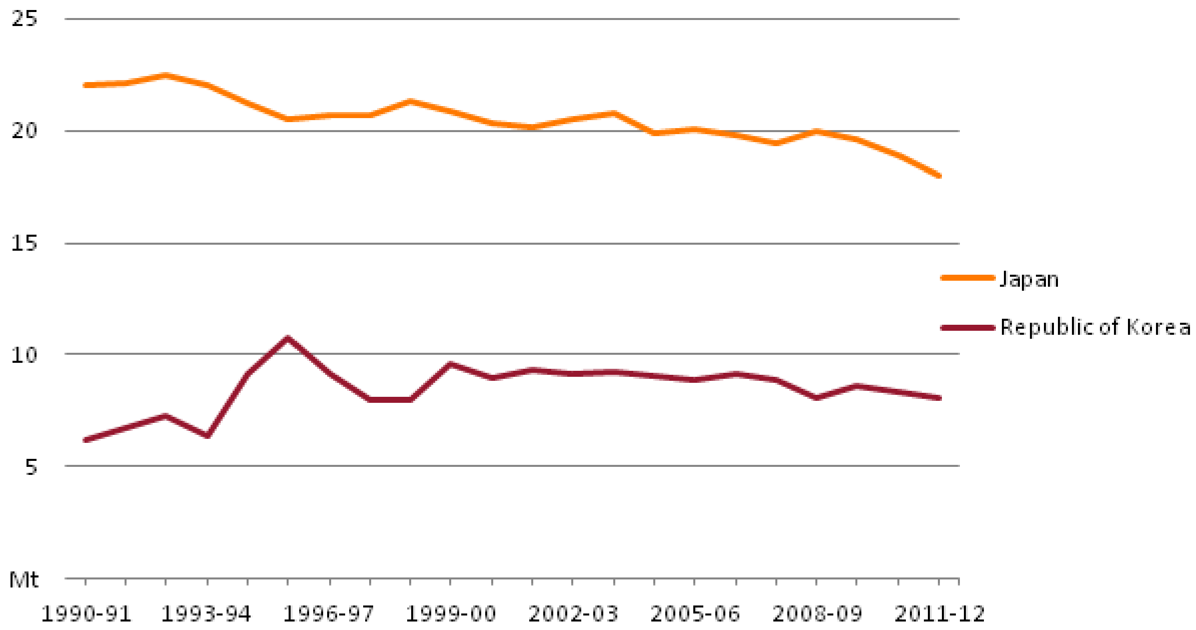
Source: USDA–FAS 2013a

Consumption

In both Japan and the Republic of Korea, coarse grains are mostly consumed as livestock feed and maize is the predominant feed grain. Japanese coarse grains consumption has declined steadily by around 1 per cent a year over the past 20 years, to 18 million tonnes in 2011–12 (Figure 57) (USDA–FAS 2013a). A gradual decline in livestock numbers over the previous 20 years contributed to this decline.

Coarse grains consumption increased in the Republic of Korea over the 1990s led by rapid growth in feed maize consumption. Consumption then declined slightly over the decade to 2011–12 as consumers shifted from food barley consumption, and more favourably priced feed wheat displaced maize in livestock feed (Figure 57) (KREI 2013; USDA–FAS 2013c).

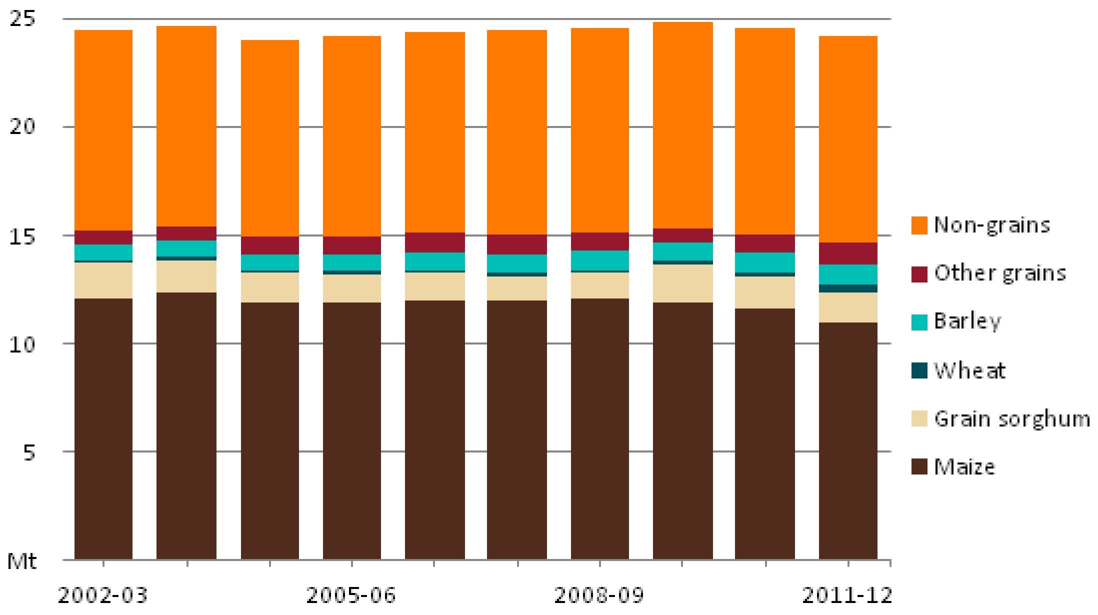
Figure 57 Feed consumption of coarse grains, Japan and the Republic of Korea



*Note: **a** Includes residual consumption.*
Source: USDA–FAS 2013a

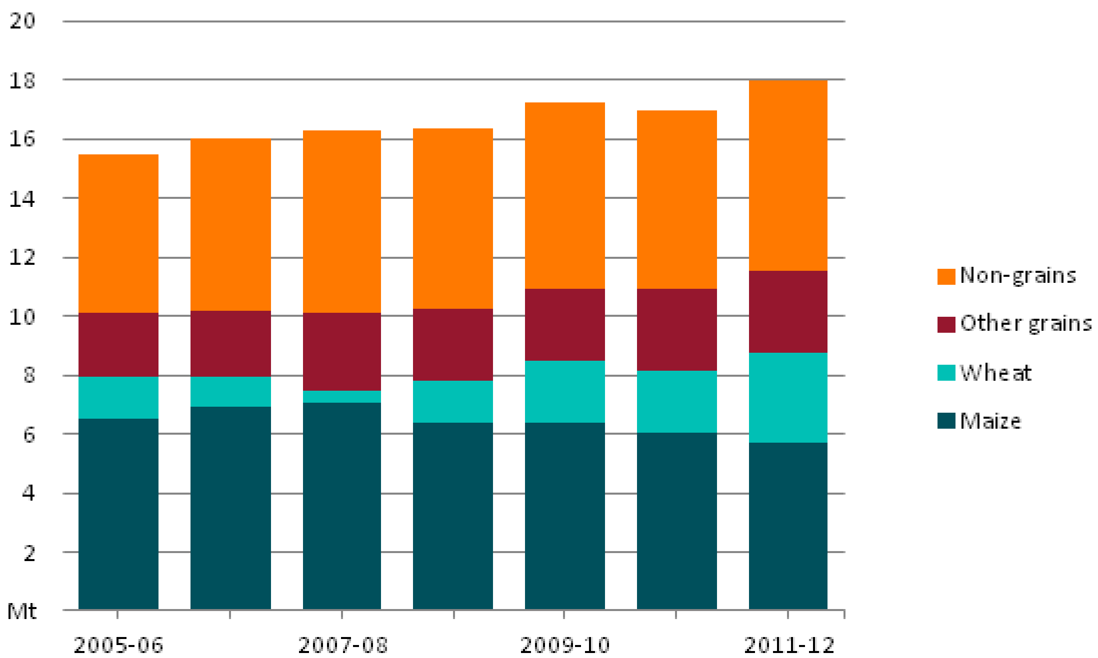
Maize is the main component in compound feed, accounting for around 49 per cent of total compound feed consumption in Japan (Figure 58) and around 37 per cent in the Republic of Korea (Figure 59). The actual share of grain used in compound and mixed feed can vary, depending on availability and relative movements in grains prices (USDA–FAS 2013c). In recent years, relatively high maize prices have led to an increase in feed wheat consumption and a decrease in feed maize consumption in both Japan and the Republic of Korea (USDA–FAS 2013c, d).

Figure 58 Compound and mixed feed ingredient use, Japan



Source: USDA–FAS 2013d

Figure 59 Compound feed ingredient use, Republic of Korea



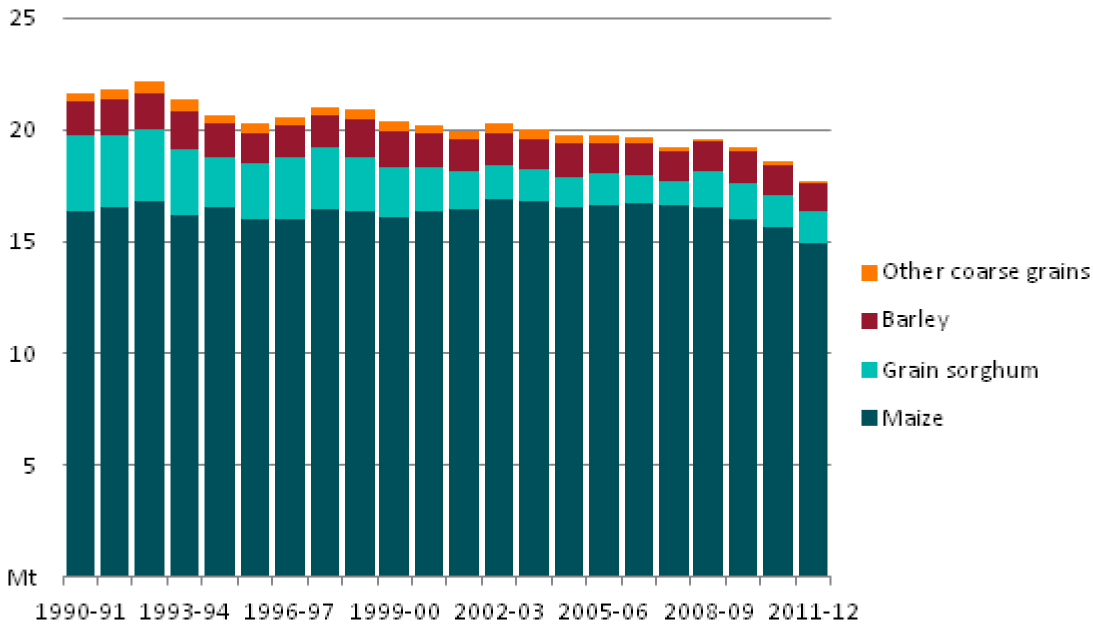
Source: USDA–FAS 2013c, 2011b, 2009

Industrial use of maize is the second largest source of consumption in Japan and the Republic of Korea, in part reflecting strong demand for high fructose corn syrup for use in soft drinks or low alcoholic drinks (USDA–FAS 2013c, d). This sector represents around 23 per cent and 31 per cent of maize consumption for Japan and the Republic of Korea, respectively. Direct food use of maize is negligible in the Republic of Korea, representing only around 1 per cent of total consumption (USDA–FAS 2013c).

Trade

Because of low domestic production, both Japan and the Republic of Korea are almost entirely reliant on imports to meet domestic demand. Given the quantity of maize Japan imports, it is the world's largest importer of coarse grains. In the five years to 2011–12 Japan imported an average of 18.9 million tonnes of coarse grains, of which 15.9 million tonnes was maize, 1.3 million tonnes barley and 1.5 million tonnes grain sorghum (Figure 60) (USDA–FAS 2013a). Over the past decade, around 93 per cent of Japanese maize imports originated from the United States (United Nations Statistics Division 2013). Given the declining use of maize in livestock feed, Japan's maize imports have been trending downwards since 2008–09.

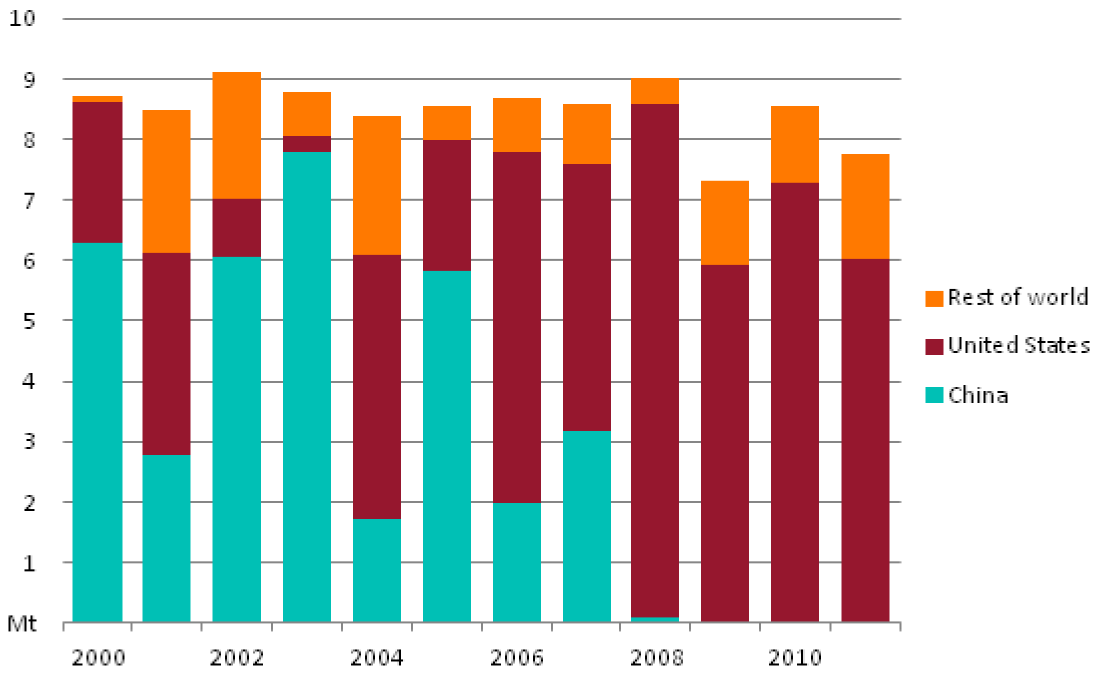
Figure 60 Coarse grain imports, Japan



Source: USDA FAS 2013a

The Republic of Korea is the world's third largest importer of coarse grains, virtually all of which is maize. The Republic of Korea's major trading partners for maize imports over the past decade were China and the United States. However, as maize exports from China have declined since 2005, most maize imported by the Republic of Korea originates from the United States (Figure 61) (United Nations Statistics Division 2013).

Figure 61 Maize imports by country, Republic of Korea



Source: United Nations Statistics Division 2013

Policies

Domestic policies

The Government of Japan considers barley a staple food grain and supports its production (USDA–FAS 2010a) For example, producers that divert rice paddy land to alternative food grains, including barley, are eligible for direct payments under the Rice Diversification Program. Around 90 per cent of all barley is on converted rice paddy (OECD 2009; USDA–FAS 2010a). Domestic producers are eligible for further direct payments based on historical planted area to barley, barley production and quality (OECD 2009).

Under the Stabilization System of Compound Feed Prices, consumers are protected from a sudden rise in compound feed prices (largely comprising maize, grain sorghum and barley) through subsidies provided by industry and government (USDA–FAS 2013d). The Japanese Government maintains emergency stocks of feed grains, including maize and grain sorghum, which can be released to stabilise domestic prices. Since 2005 the target level of these stocks has been set at 950 000 tonnes, most of which is maize (OECD 2009; USDA–FAS 2013d).

In the Republic of Korea a government purchase program exists for maize and barley, but the purchase price has been held constant since 2001 and purchased quantities have dwindled over time. (OECD 2008).

Trade policies

In Japan imports of coarse grains are largely subject to applied tariffs of zero (WTO 2013b). However, the Government of Japan tightly controls cross-border trade of barley (Fukuda et al. 2004). Imports of barley and its processed products are subject to a tariff quota. The tariff quota volume is 1.37 million tonnes, the in-quota tariff is zero and the out-of-quota tariff is 39 yen per kilogram (WTO 2013a).Trading inside this quota is the exclusive right of the Japanese Government (Fukuda et al. 2004). Private traders can import outside the quota but are subject to the out-of-quota tariff.

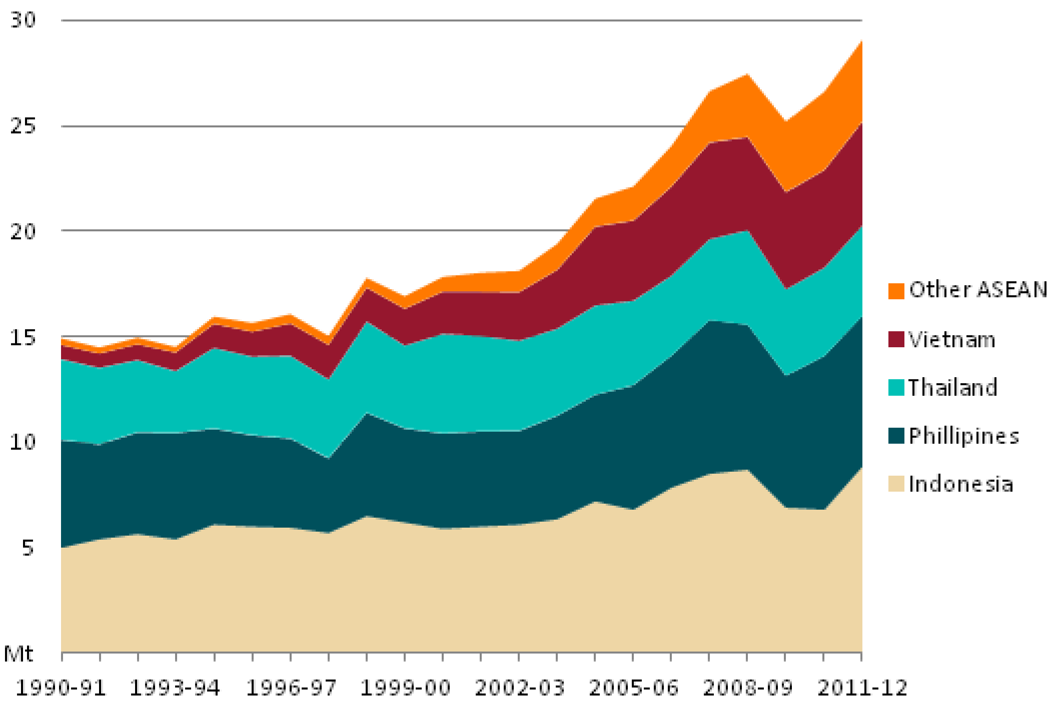
Under its WTO commitments, the Republic of Korea established tariff quotas on maize, barley and several other coarse grains. Imports of maize (including some processed maize products) are subject to a tariff quota of 6.2 million tonnes with an in-quota tariff ranging from 1.8 per cent to 3 per cent and an out-of-quota tariff ranging from 163 per cent to 630 per cent (WTO 2013a). However, in practice the Republic of Korea applies autonomous tariff quotas on coarse grains, with quota volumes that typically exceed its WTO tariff quota volume commitments. In recent years maize imports have exceeded the WTO tariff quota volume, but have been less than the Republic of Korea's autonomous tariff quota volume.

ASEAN

Production

ASEAN coarse grains production averaged 27.3 million tonnes in the five years to 2011–12 and was dominated by maize (USDA–FAS 2013a). Maize production is concentrated in Indonesia, the Philippines, Vietnam and Thailand (Figure 62).

Figure 62 Maize production, ASEAN



Source: USDA–FAS 2013a

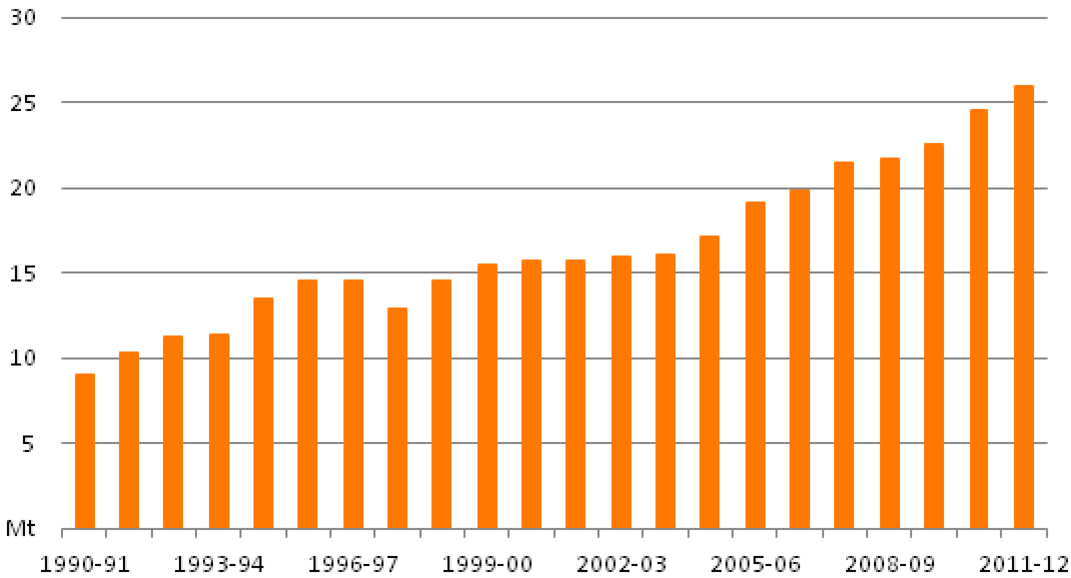
While maize production in each producing ASEAN member state has increased since 1990–91, the most notable increase is in Vietnam. Between 1990–91 and 2011–12 Vietnam's share of ASEAN coarse grains production rose by 12 percentage points (from 5 to 17 per cent). This increase reflects the response to rapid growth in feed demand from expansion of the livestock sector.

Consumption

Maize consumption in the ASEAN region increased from 15.2 million tonnes in 1990–91 to 35.1 million tonnes in 2011–12 (USDA–FAS 2013a). Over the same period, feed consumption of maize increased from 9 million tonnes to 26 million tonnes (Figure 63). Mirroring production, maize accounts for virtually all coarse grains consumed in the ASEAN member states. The major consumers of coarse grains include Indonesia, the Philippines, Vietnam, Thailand and Malaysia.

Pig meat and poultry production are important determinants of maize consumption among ASEAN member states (USDA–FAS 2012e, f). Vietnam has exhibited rapid growth in feed consumption since 1990–91, averaging around 15 per cent a year to reach 5 million tonnes by 2011–12. Indonesian feed consumption of maize grew by around 5 per cent annually to 6 million tonnes over the same period. Similarly, feed consumption in Malaysia and the Philippines grew at around 4 per cent annually to 3 million tonnes and 5.3 million tonnes, respectively.

Figure 63 Maize feed consumption, ASEAN a



*Note: **a** Includes residual consumption.*
Source: USDA–FAS 2013a

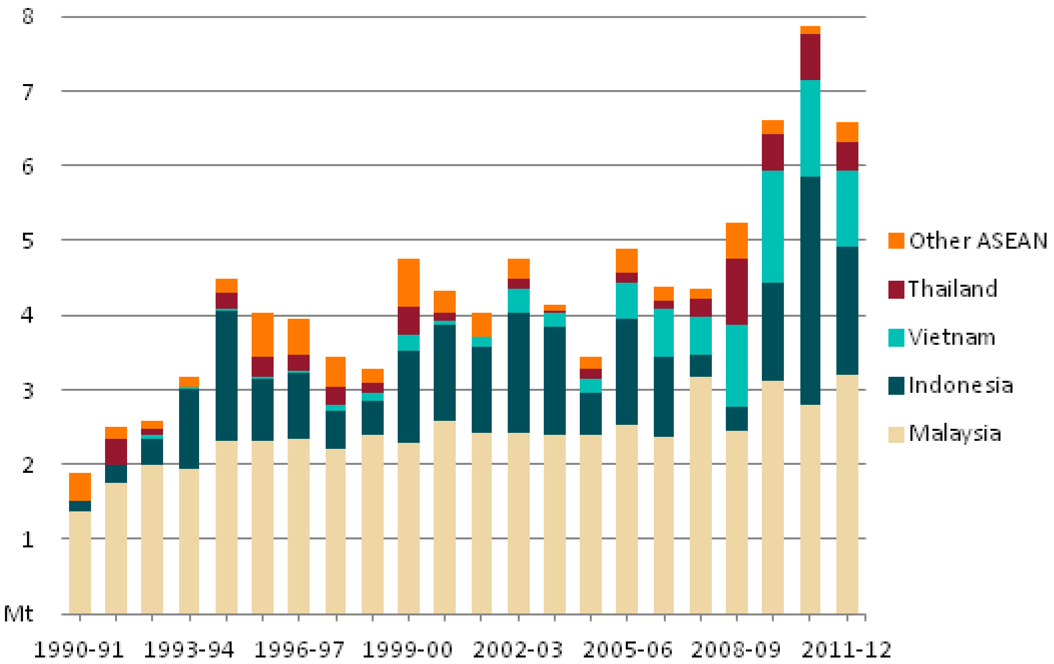
Trade

Despite substantial increases in production, particularly in Vietnam, ASEAN regional production has not been able to match its growing consumption. Self-sufficiency in coarse grains varies among member states ranging from complete dependence on imports (in the case of Malaysia) to having exportable surpluses (in the case of Cambodia). For ASEAN member states as a whole, self-sufficiency in coarse grains averaged around 85 per cent for the five years to 2011–12 (USDA–FAS 2013a).

Consequently, the ASEAN region relies on imports to meet domestic consumption. Imports of coarse grains rose from 1.9 million tonnes 1990–91 to 6.6 million tonnes in 2011–12 (USDA–FAS 2013a). Virtually all coarse grains imports are maize. The ASEAN member states import principally from Argentina, India, Brazil, Thailand and the United States, which collectively account for around 90 per cent of regional maize imports (United Nations Statistics Division 2013).

The largest maize importers among the ASEAN member states are Malaysia, Indonesia and Vietnam. Malaysia is by far the region's largest importing country, accounting for around 50 per cent of all maize imports for the five years to 2011–12 (Figure 64). However, Malaysia's share of the ASEAN region's maize imports has been declining in recent years, partly reflecting a sharp rise in imports by Vietnam and Indonesia.

Figure 64 Maize imports, ASEAN



Source: USDA–FAS 2013a

While the ASEAN region as a whole is a net importer of maize, Thailand has periodically been a net exporter. Thailand maize exports spiked in 2009 and 2010, when the Government of Thailand exported intervention stocks of maize onto the world market, mainly to Malaysia and Vietnam (USDA–FAS 2010b). Since 2010 Thailand's maize exports have dwindled as domestic production has not been able to keep pace with growing domestic consumption.

Policy

Trade policies

ASEAN member states generally impose low or zero ad valorem tariffs on coarse grains imports (WTO 2013b). However, Thailand and the Philippines, which both have relatively sizeable domestic maize industries, impose much higher tariffs on maize imports.

Thailand has established a tariff quota for maize of 54 700 tonnes, with an in-quota tariff equal to the minimum of either 20 per cent or 2.75 baht per kilogram and an out-of-quota tariff of 73 per cent (WTO 2013a). The Philippines has established a tariff quota of 216 940 tonnes, with an in-quota tariff of 35 per cent and an out-of-quota tariff of 50 per cent (WTO 2013a).

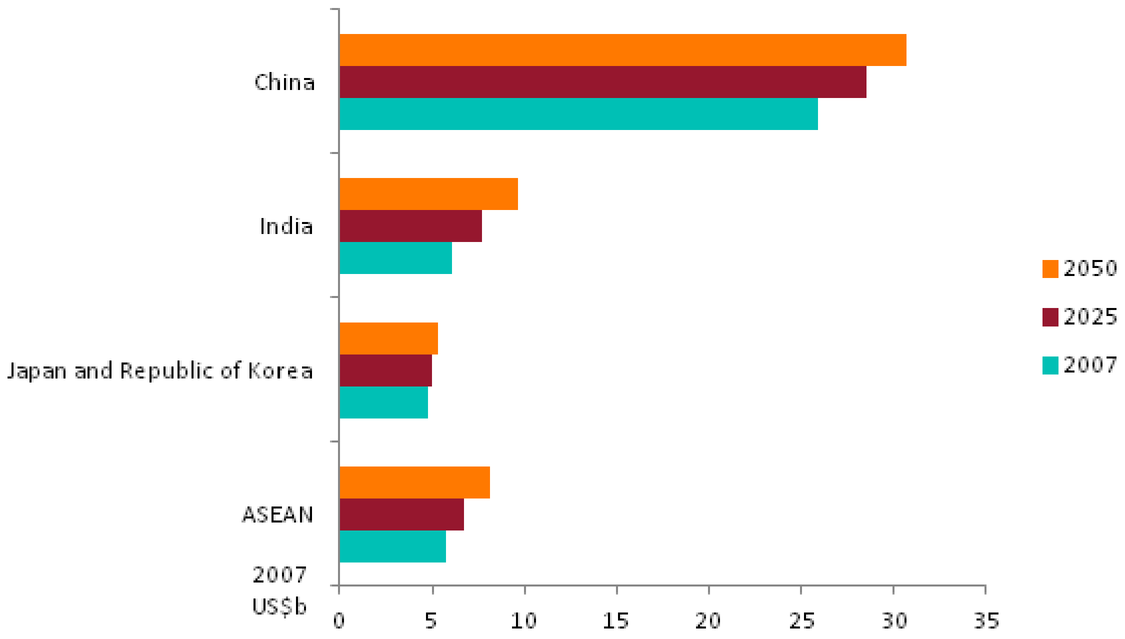
Under the ASEAN Free Trade Agreement maize imports originating from ASEAN member states are mostly duty-free (ASEAN 2013).

Long-term prospects

Consumption

China is projected to remain the largest consumer of coarse grains in Asia by 2050, with the real value of consumption at US$31 billion (2007 dollars), 18 per cent higher than 2007 (Figure 65). At that time, maize will be the predominant coarse grain consumed, accounting for around 94 per cent of total coarse grain consumption. The change in consumer preferences toward a meat-based diet is leading to growth in the livestock sector. As a result, the demand for feed, which includes coarse grains, will increase out to 2050. Feed use of coarse grains is projected to represent 72 per cent of China's total coarse grains consumption in 2050. The remaining 28 per cent will be used for other purposes such as starch and ethanol production and, to a lesser extent, direct food consumption.

Figure 65 Real value of Asia's coarse grain consumption



Source: ABARES model output

The real value of coarse grain consumption in India is projected to be around US$10 billion in 2050, 58 per cent higher than 2007, making it the second largest consumer of coarse grains in Asia. Historically, feed use made up only a small proportion of total consumption, as India's feed requirements were met mostly by crop residues and by-products gathered from cultivated and uncultivated lands (Dikshit & Birthal 2010). Like China, the expected development and expansion of India's livestock production systems will lead to an increase in the demand for higher quality feed. This demand is likely to be met by coarse grains such as maize, and in 2050 feed use is projected to account for 20 per cent of India's total coarse grain consumption. Growth in food use of coarse grains is projected to be lower than the growth in feed use. The combined effect of relatively high per person consumption (24 kilograms in 2007) and rising incomes are likely to see consumers shift their dietary composition away from basic staples, such as millet and maize, to meat, dairy and horticultural products.

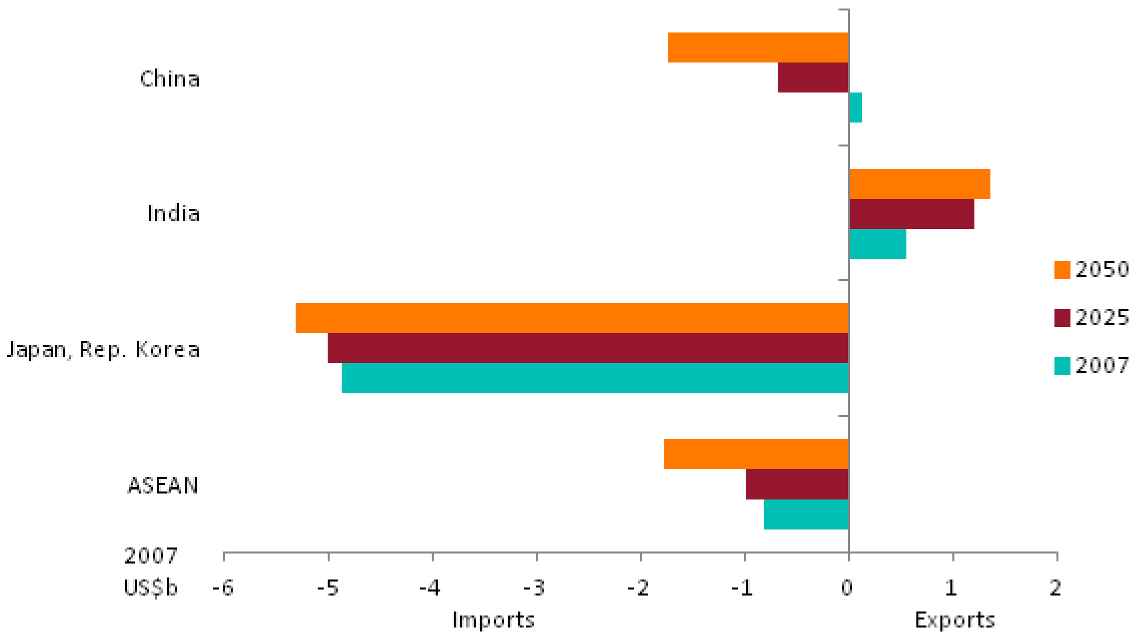
Growth in coarse grain consumption for Japan and the Republic of Korea is projected to be relatively small, with the real value of consumption projected to be US$5 billion in 2050, 10 per cent higher than 2007. Through the projection period, per person food consumption of coarse grains is projected to remain relatively stable at around 16 kilograms for both Japan and the Republic of Korea. This consumption is mostly accounted for by processing, including the use of barley for beer production.

For the ASEAN member states, the real value of coarse grain consumption is projected to be US$8 billion, 41 per cent higher than 2007. This is projected to be underpinned by consumption growth in Indonesia, where the real value of maize consumption is projected to increase by US$1 billion. Limited feed use of coarse grains will restrict growth in consumption out to 2050. Per person food consumption of coarse grains for the ASEAN member states in 2050 is projected to remain relatively low, and with the exception of Malaysia, it will vary between 7 and 10 kilograms. Per person consumption is projected to be 21 kilograms for Malaysia because of high historical consumption rather than growth over the projection period.

Trade

In 2007, China was a small net exporter of coarse grains. With consumption growth and the continuation of production just above historical levels over the projection period, the real net value of China's coarse grain imports is projected to increase to around US$2 billion by 2050 (Figure 66). Imports will consequently account for 10 per cent of China's total coarse grain consumption in 2050, compared with less than 1 per cent in 2007.

Figure 66 Real value of Asia's net trade for coarse grains



Source: ABARES model output

India is projected to remain a net exporter of coarse grains in 2050, with the real net export value to increase to around US$1.5 billion. Between 2007 and 2025 exports are projected to increase at a higher rate than between 2025 and 2050 because of a relatively stronger rise in domestic production. From 2025, production growth is expected to slow and when combined with sustained consumption growth, the real net value of exports is projected to remain relatively stable over this period.

Limited domestic production, combined with feed demand for livestock production, will underpin the demand for coarse grain imports for Japan and the Republic of Korea out to 2050. Although the region is projected to remain the largest importer of coarse grains in Asia by 2050, the growth will be relatively subdued. For example, the real value of Japan and the Republic of Korea's coarse grain imports (in 2007 US dollars) in 2050 is projected to be around US$5 billion, 10 per cent higher than 2007. Historically, almost all of Japan and the Republic of Korea's coarse grain consumption has been met by imports and in 2050 this is projected to remain unchanged.

For the ASEAN member states, import growth is projected to be moderate, with the real net value of coarse grain imports in 2050 projected to be nearly US$2 billion. With consumption projected to be US$8 billion in 2050, coarse grain imports will account for around 25 per cent of the region's total consumption, with domestic production to meet the majority of demand.

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6 Oilseeds and oilseeds products

Beth Deards and Andrew Haylen

China

Production

China grows a number of oilseeds, including peanuts, soybeans, rapeseed, cottonseed and sunflower seed. Over the past two decades, oilseeds production in China increased by 77 per cent, reaching a record 59 million tonnes in 2011–12 (Figure 67). Between 1990–91 and 2001–02 production grew by almost 19 million tonnes, reflecting higher yields and a 23 per cent increase in harvested area. Despite continued yield improvements, growth in oilseeds production slowed in the 10 years to 2011–12 as the area harvested fell by 5 per cent. In 2011–12 peanuts were the main oilseed grown in China, followed by soybeans, rapeseed and cottonseed.

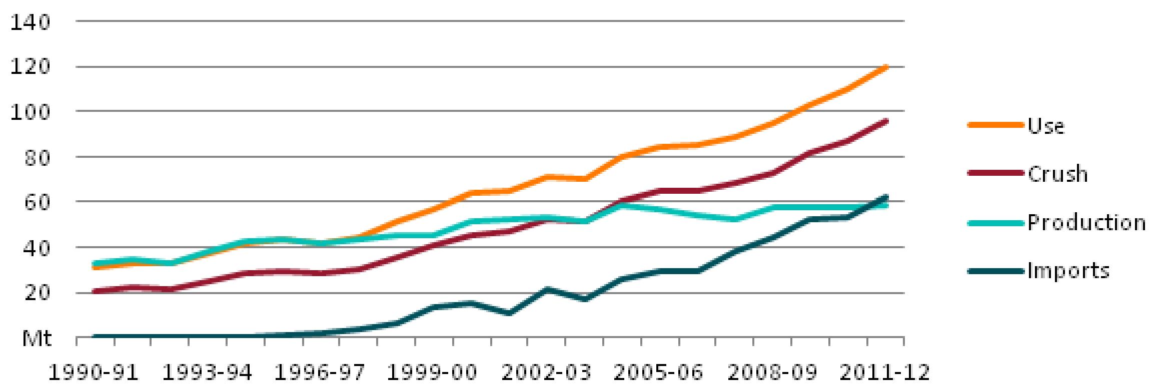
In 1993–94 China overtook India as the world's largest producer of peanuts. Peanut production grew by more than 150 per cent between 1990–91 and 2011–12, reaching a record 16 million tonnes in that year. This rise was achieved through adopting higher yielding seed varieties and improved cultivation practices (Yao 2004).

China is the world's fourth largest soybean producer and, until recently, soybean was the main oilseed produced in China. However, over the past decade soybean production has fallen by 6 per cent, to 14.5 million tonnes in 2011–12. A 17 per cent fall in the area of soybeans harvested is behind this trend as producers switched to more profitable crops, such as corn and rice (USDA–FAS 2012a). In contrast to other oilseeds produced in China, soybean yields are below the world average.

China is the world's third largest producer of rapeseed (canola). Rapeseed production in China rose by 93 per cent between 1990–91 and 2011–12, as both harvested area and yields increased. However, agricultural land suitable for growing rapeseed in China is limited and subject to competition from winter wheat (ABARE 2006).

China is the world's largest producer of cottonseed. Over the past two decades, cottonseed production in China rose by almost 70 per cent, to 13 million tonnes in 2011–12. This increase was driven entirely by higher yields, which more than offset a 3 per cent decline in harvested area. Cottonseed yields in China are well above the world average, reflecting high use of irrigation (Huang et al. 2005).

Figure 67 Oilseeds supply and use, China



Source: USDA–FAS 2013a

Crush of oilseeds in China rose from 20 million tonnes in 1990–91 to 96 million tonnes in 2011–12. This increase was driven by strong domestic demand for oilseeds by-products, such as vegetable oil and protein meal, and was supported by a rise in oilseeds imports. In line with the rise in crush, production of vegetable oils and protein meals increased by 370 per cent and 460 per cent, respectively, to 21 million tonnes and 67 million tonnes over the same period. In 2011–12 China was the world's second largest producer of vegetable oils and the largest producer of protein meals.

Soybeans are the main crushed oilseed in China, followed by rapeseed. Soybean crush increased significantly over the past two decades, from 3.9 million tonnes in 1990–91 to 61 million tonnes in 2011–12. Similarly, soybean meal and soybean oil production increased from 3.3 million tonnes and 600 000 tonnes in 1990–91, respectively, to 48 million tonnes and 11 million tonnes in 2011–12. Rapeseed crush increased by almost 160 per cent over the same period to 16.1 million tonnes in 2011–12, producing 10 million tonnes of rapeseed meal and 5.7 million tonnes of rapeseed oil.

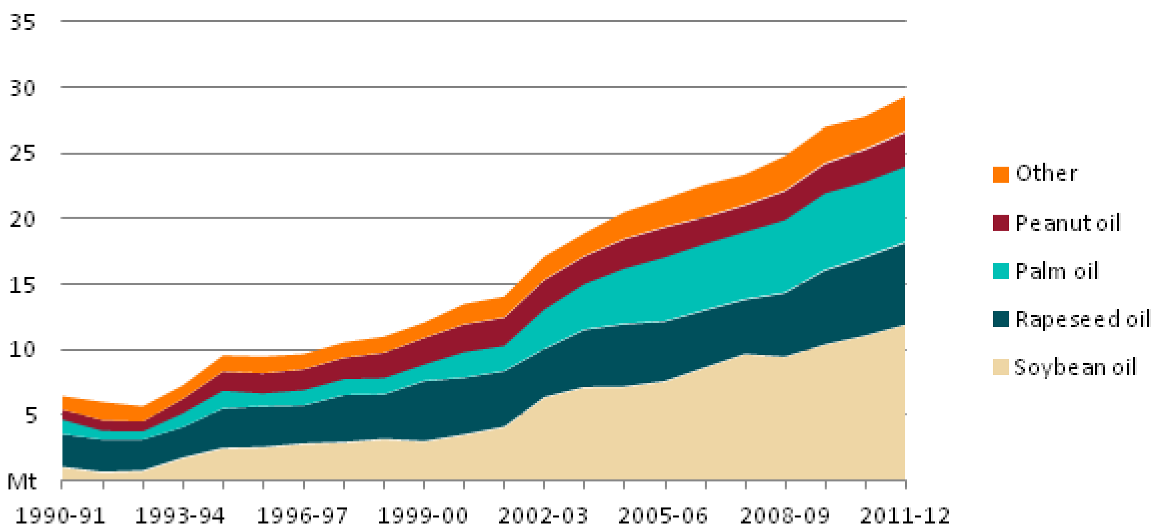
Consumption

Over the past two decades, the significant increase in Chinese consumption of vegetable oils and protein meals was caused by the rapid increase in household incomes and changing consumer preferences toward a more western diet. As a result, Chinese demand for meat products has increased. To meet this demand, domestic livestock industries have expanded significantly, driving up consumption of protein meals for use in animal feed.

Total oilseeds use in China increased from 32 million tonnes in 1990–91 to 120 million tonnes in 2011–12. Crush accounted for 86 per cent of this rise. Other uses of oilseeds, such as food and feed, rose by only 9 million tonnes and 3 million tonnes, respectively, over the period.

China is the world's largest consumer of vegetable oils. In China, consumption of vegetable oils rose by around 350 per cent from 1990–91, reaching a record 29 million tonnes in 2011–12. This represents growth in per person consumption of vegetable oils from 5.7 kilograms in 1990–91 to 21.7 kilograms in 2011–12, slightly higher than the world average (United Nations Population Division 2011; USDA–FAS 2013a). In 2011–12 soybean oil was the largest consumed vegetable oil in China, followed by rapeseed oil and palm oil (Figure 68).

Figure 68 Vegetable oil consumption, China



Source: USDA–FAS 2013a

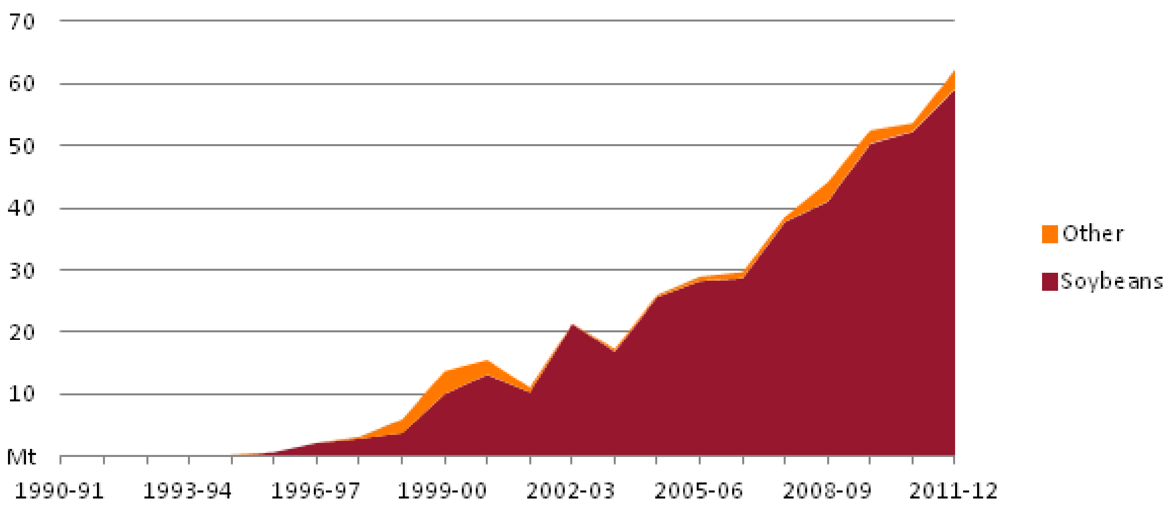
Soybean oil consumption grew by almost 11 million tonnes between 1990–91 and 2011–12, while rapeseed oil and palm oil consumption grew by 3.8 million tonnes and 4.6 million tonnes, respectively. The growth in Chinese consumption of soybean oil has been greater than that of palm oil. This is because, as incomes rise, consumers have shown a preference for vegetable oils with lower levels of saturated fats.

China is also the world's largest consumer of protein meals; consumption grew from just under 9 million tonnes in 1990–91 to a record 68 million tonnes in 2011–12. The feed requirements of the expanding livestock sector largely explain this increase. Soybean meal and rapeseed meal are the primary protein meals consumed in China. Soybean meal consumption rose from 1 million tonnes in 1990–91 to 47 million tonnes in 2011–12. Consumption of rapeseed meal tripled over the same period to 10.7 million tonnes in 2011–12.

Trade

Until the mid-1990s China was a minor importer of oilseeds. However, Chinese use of oilseeds has since outpaced domestic production, requiring a significant increase in imports. Imports of oilseeds reached a record 62 million tonnes in 2011–12, accounting for more than half of domestic use (Figure 69). Soybeans represented 95 per cent of total oilseeds imports. The largest supplier of soybeans to China is the United States, followed by Brazil and Argentina. China also imports small amounts of rapeseed, primarily from Canada (United Nations Statistics Division 2013).

Figure 69 Oilseeds imports, China



Source: USDA–FAS 2013a

Demand for protein meals in China is mostly satisfied by crushing domestically produced and imported oilseeds. By contrast, a shortfall in domestic production of vegetable oils has been met by imported vegetable oils. In 2011–12 Chinese imports of vegetable oils reached 9.2 million tonnes, compared with 2.2 million tonnes in 1990–91. Palm oil is the main imported vegetable oil, accounting for 63 per cent of total vegetable oil imports in 2011–12. Most palm oil imports are sourced from Malaysia and Indonesia (United Nations Statistics Division 2013).

Policies

Domestic policies

Chinese oilseeds producers receive some government support, though not as much as grain producers. This includes seed subsidies for soybeans, peanuts and rapeseed (USITC 2011).

Trade policies

Chinese imports of oilseeds and oilseeds products are subject to tariffs that are bound under its accession agreement with the World Trade Organization (WTO). They are also subject to a value added tax, which is 13 per cent for relatively unprocessed goods, and 17 per cent for processed or refined goods (USDA–ERS 2012a).

China's applied tariffs on oilseeds and oilseeds products are equal to the respective WTO bound tariffs. Soybean imports are subject to an applied tariff of 3 per cent, which is lower than the tariff applied to rapeseed (9 per cent) and other oilseeds (10 per cent to 20 per cent) (WTO 2013a). This has contributed to the dominance of soybean imports in China compared with other oilseeds. In addition, the tariff applied to soybean imports is lower than that applied to soybean oil (9 per cent) and soybean meal (5 per cent).

The tariffs applied to other vegetable oils in China range between 9 per cent and 10 per cent, while the tariffs applied to protein meals range between 5 per cent and 15 per cent (WTO 2013b).

India

Production

Over the past two decades, oilseeds production in India increased by 74 per cent, reaching a record 36 million tonnes in 2011–12 (Figure 70). This increase is attributable to a 37 per cent rise in the area harvested to oilseeds, which was supported by favourable oilseed prices and government interventions aimed at stimulating edible oil production (FAO 2007; USITC 2009). Higher yields also contributed to production growth over the period. However, oilseeds yields in India are low by world standards. In 2011–12 the main oilseed produced in India was cottonseed, followed by soybeans, rapeseed and peanuts.

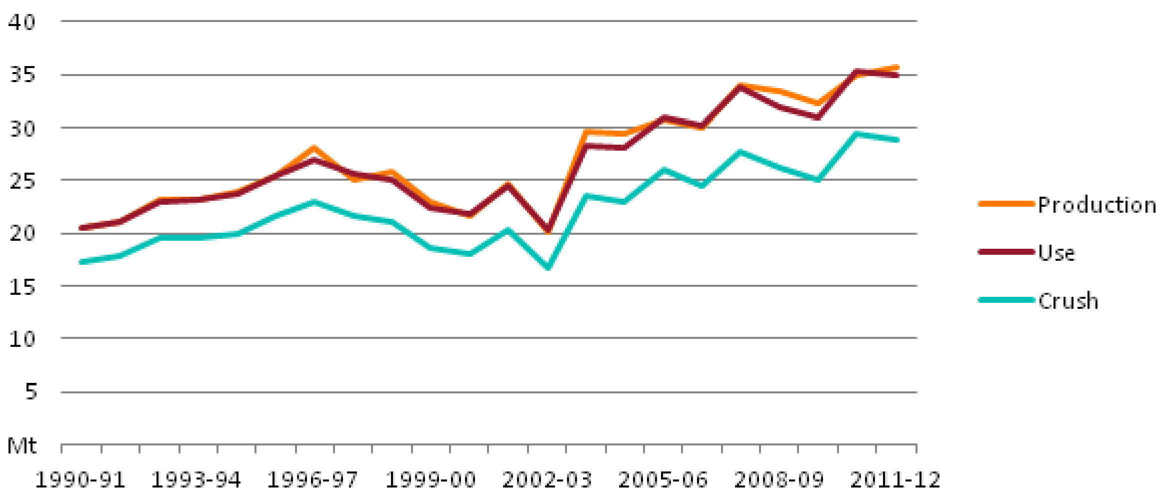
India is the world's second largest producer of cottonseed, behind China. Cottonseed production in India increased from 3.9 million tonnes in 1990–91 to 11.3 million tonnes in 2011–12. Most of this rise occurred over the past decade. India plants the largest area to cotton in the world, but with only 35 per cent irrigated, average yields are lower than other major world producers (Kumar et al. 2011).

Soybean production grew at the fastest rate of all Indian-produced oilseeds over the past two decades, rising by an average of 7 per cent a year from 2.6 million tonnes in 1990–91 to 11 million tonnes in 2011–12. The increase stemmed from a rise of 7.7 million hectares in the area harvested to soybeans over the same period, reflecting the suitability of soybean cultivation in fallow land. Prices for soybeans were also favourable relative to alternative crops, such as cereals and pulses (FAO 2007).

India is the world's fourth largest rapeseed producer. Between 1990–91 and 2011–12 domestic rapeseed production increased by 24 per cent, to 6.5 million tonnes, as the area harvested to rapeseed increased by 16 per cent. The rise in rapeseed production reflects increased domestic demand for rapeseed oil.

India is the world's second largest producer of peanuts, behind China. Until 2004–05 peanuts were the main oilseed produced in India. However, peanut production fell by 28 per cent over the past decade to 5.5 million tonnes in 2011–12. A 35 per cent decline in harvested area is behind this fall as producers switched to other crops, such as soybeans and cottonseed (USDA–ERS 2011). India plants the largest area to peanuts in the world. However, poor soil fertility and erratic rainfall in the dryland belt of India (where peanuts are traditionally grown) means yields are low compared with other major producers (USDA–FAS 2003).

Figure 70 Oilseeds supply and use, India



Source: USDA–FAS 2013a

Oilseeds crush in India rose from 17 million tonnes in 1990–91 to almost 29 million tonnes in 2011–12 as demand for edible vegetable oils strengthened. Over the same period, vegetable oil production and protein meal production rose by 52 per cent and 82 per cent, respectively, to 7.1 million tonnes and 17.2 million tonnes in 2011–12.

In 2011–12 soybean crush accounted for 33 per cent of total oilseeds crush in India, followed by cottonseed (29 per cent), rapeseed (21 per cent) and peanut (12 per cent). Soybean crush increased by 300 per cent over the past two decades, reaching a record 9.6 million tonnes in 2011–12. This crush produced 7.7 million tonnes of soybean meal and 1.7 million tonnes of soybean oil. Cottonseed crush experienced the second highest growth rate over the period, almost tripling to reach 8.4 million tonnes in 2011–12. Additionally, over the same period, rapeseed crush rose by 28 per cent to 6.1 million tonnes in 2011–12, while peanut crush declined more than 40 per cent, to 3.5 million tonnes in 2011–12.

Consumption

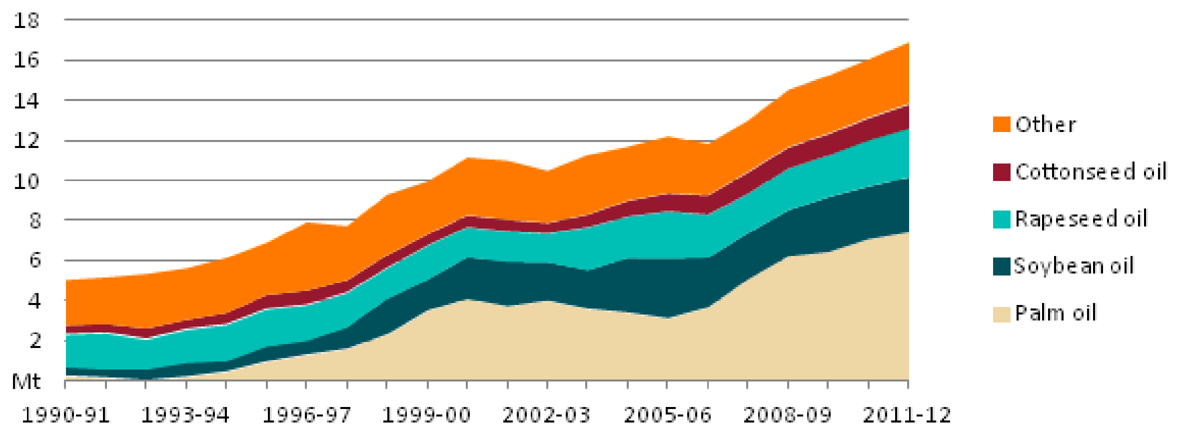
Over the past two decades, total use of oilseeds in India closely followed production trends, increasing from 20.5 million tonnes in 1990–91 to 35 million tonnes in 2011–12 (Figure 71). Although crush accounted for most of this rise, feed and food uses of oilseeds also rose, reaching 4.3 million tonnes and 1.8 million tonnes in 2011–12, respectively.

India overtook the United States as the world's third largest consumer of vegetable oils in 1998–99. Between 1990–91 and 2011–12 domestic consumption grew by almost 240 per cent, reaching 16.9 million tonnes as the population grew and incomes rose (Figure 72). However, India's per person consumption of vegetable oils is still well below the world average of 21.5 kilograms, at only 13.6 kilograms in 2011–12 (United Nations Population Division 2011; USDA–FAS 2013a). In 2011–12 palm oil was the main vegetable oil consumed in India, followed by soybean oil and rapeseed oil.

Palm oil consumption increased significantly between 1990–91 and 2011–12, accounting for around 60 per cent of the total increase in domestic vegetable oil consumption. Consumption of palm oil reached a record 7.4 million tonnes in 2011–12, compared with only 260 000 tonnes in 1990–91. This increase is largely due to the relatively lower price of palm oil compared with other vegetable oils. Over the same period, domestic consumption of soybean oil increased from

450 000 tonnes to 2.8 million tonnes, while rapeseed oil increased from 1.6 million tonnes to 2.4 million tonnes.

Figure 71 Vegetable oil consumption, India



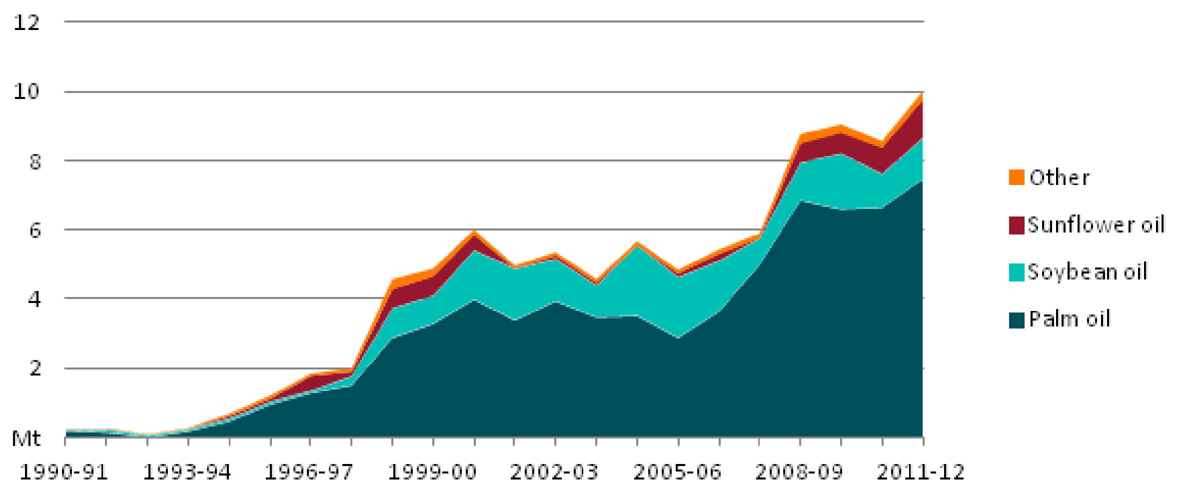
Source: USDA–FAS 2013a

Consumption of protein meals in India grew more slowly than vegetable oil consumption. From 1990–91 consumption of protein meals rose by 66 per cent, to almost 12 million tonnes in 2011–12. In that year, cottonseed meal consumption accounted for 33 per cent of total protein meal consumption, followed by soybean meal (28 per cent) and rapeseed meal (22 per cent).

Trade

Demand for vegetable oils is high in India. Despite significant domestic production, imports are needed to meet demand. In 2011–12 vegetable oil imports reached a record 10 million tonnes, accounting for almost 60 per cent of domestic consumption (Figure 72). Palm oil is the primary imported vegetable oil, accounting for 75 per cent of total vegetable oil imports in 2011–12. As palm oil is not produced domestically, imports have grown in line with increases in consumption. Most palm oil imports are sourced from Indonesia and Malaysia (United Nations Statistics Division 2013). India also imports small amounts of soybean oil and sunflower oil.

Figure 72 Vegetable oil imports, India



Source: USDA–FAS 2013a

Until the late 1980s, India was a minor exporter of protein meals. However, since 1990–91 high domestic demand for vegetable oils has driven rising protein meal production and increased exportable supplies. Protein meal exports grew significantly over the past two decades, reaching more than 5 million tonnes in 2011–12, compared with 2 million tonnes in 1990–91. Soybean meal is the major exported protein meal, accounting for more than 80 per cent of total protein meal exports in 2011–12. Japan, Vietnam and Bangladesh were the largest export destinations for Indian soybean meal in that year (United Nations Statistics Division 2013). India also exports small amounts of rapeseed meal.

Policies

Domestic policies

The Indian Government supports oilseeds producers by providing a minimum support price which is set annually. However, international oilseeds prices are often higher than the minimum support price. Oilseeds producers in India also benefit from various input support programs (USITC 2009).

Trade policies

India's applied tariffs on oilseeds and oilseeds products are generally less than their respective WTO bound tariffs. India applies a 7.5 per cent tariff on most edible vegetable oils (WTO 2013a). Unprocessed oils have been largely duty free since 2008 (USDA–ERS 2012b). However, in January 2013 India raised the import tariff on unprocessed oils to 2.5 per cent (USDA–FAS 2013b). India's WTO bound tariffs for vegetable oils range from 40 per cent to 300 per cent.

The applied tariffs on oilseeds and protein meals in India are generally 30 per cent and 15 per cent, respectively (WTO 2013b). This compares with a WTO bound tariff of 100 per cent for most oilseeds and protein meals.

Japan and the Republic of Korea

Production

Oilseeds production in Japan and the Republic of Korea is small at a combined 381 000 tonnes in 2011–12. Japan accounted for more than 60 per cent of this production. Over the past two decades, oilseeds production in Japan and the Republic of Korea declined by 28 per cent, as the harvested area fell by 32 per cent. Soybeans are the main oilseed produced in Japan and the Republic of Korea, accounting for more than 90 per cent of combined oilseeds production in 2011–12.

Over the past two decades, soybeans production in Japan was highly variable, reaching a low of 99 000 tonnes in 1994–95 and a high of 271 000 tonnes in 2001–02. In 2011–12 soybeans production was 220 000 tonnes, largely unchanged from 1990–91.

Soybeans production in the Republic of Korea declined by 45 per cent to 129 000 tonnes between 1990–91 and 2011–12, as the area harvested to soybeans fell. Since 2011 the Korean Government has provided direct payments to soybean producers as part of a three-year program to reduce domestic rice production. In 2011–12 the area of soybeans harvested in the Republic of Korea reached its highest level since 2006–07.

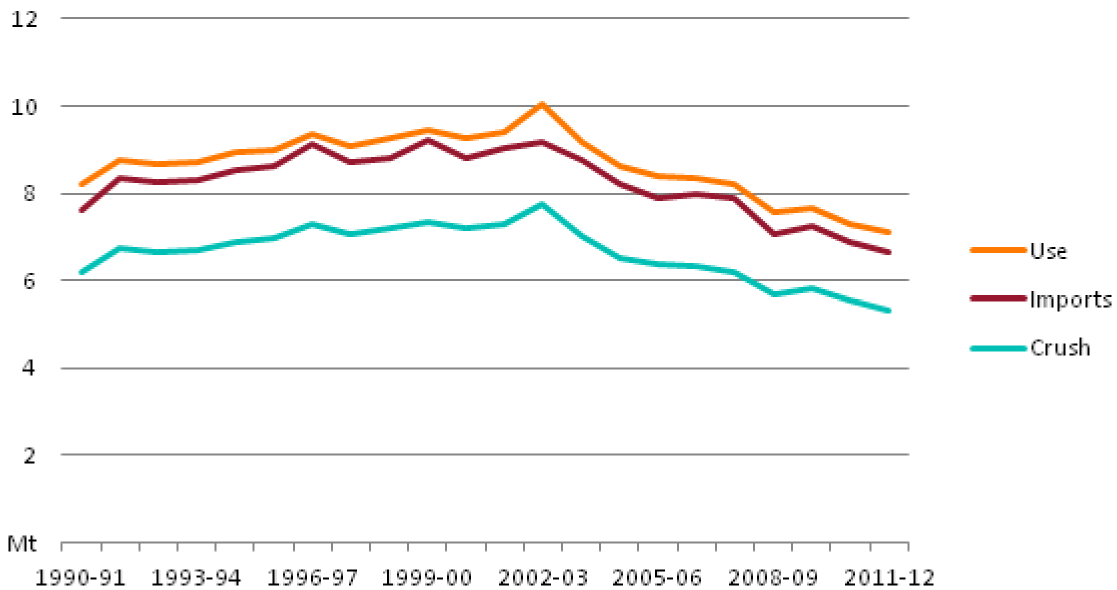
A significant volume of oilseeds imports supports oilseeds crush in both Japan and the Republic of Korea. In 2011–12 combined oilseeds crush in these countries was 5.3 million tonnes (Figure 73). Between 1990–91 and 2001–02 crush of oilseeds in Japan and the Republic of Korea rose by 17 per cent before declining by 27 per cent over the past decade. Lower soybeans crush, particularly in Japan, and increasing imports of vegetable oils and protein meals largely explained this shift. In 2011–12 Japan and the Republic of Korea produced a combined 1.6 million tonnes of vegetable oils and 3.9 million tonnes of protein meals.

In 2011–12 soybean crush accounted for more than half of total oilseeds crush in Japan and the Republic of Korea. However, soybean crush in Japan declined significantly over the past decade, from a peak of 4.2 million tonnes in 2002–03 to 2 million tonnes in 2011–12, as an increase in the world price of soybeans caused imports to fall. In 2011–12 Japan and the Republic of Korea produced a combined 534 000 tonnes of soybean oil and 2.2 million tonnes of soybean meal. Over the past decade, rapeseed crush in Japan rose by 12 per cent to 2.4 million tonnes in 2011–12, producing 1.1 million tonnes of rapeseed oil and 1.3 million tonnes of rapeseed meal. Since 2010–11 rapeseed has been the main oilseed crushed in Japan.

Consumption

Between 1990–91 and 2001–02 total use of oilseeds in Japan and the Republic of Korea increased by 15 per cent to 9.4 million tonnes, before declining by 25 per cent over the past decade to 7.1 million tonnes in 2011–12 (Figure 73). While this trend was largely driven by oilseeds crush, food and feed uses of oilseeds also declined.

Figure 73 Oilseeds supply and use, Japan and the Republic of Korea



Source: USDA–FAS 2013a

By contrast, consumption of vegetable oils in Japan increased by 16 per cent to 2.2 million tonnes between 1990–91 and 2011–12, while consumption of vegetable oils in the Republic of Korea doubled to 1 million tonnes over the same period. This growth reflects a shift to a more western diet with greater reliance on vegetable oil use, particularly in cooking (Son 2003; USDA–FAS 2012b). Per person consumption of vegetable oils in Japan and the Republic of Korea increased from 15 kilograms and 11 kilograms in 1990–91, respectively, to 17 kilograms and 20 kilograms in 2011–12 (United Nations Population Division 2011; USDA–FAS 2013a).

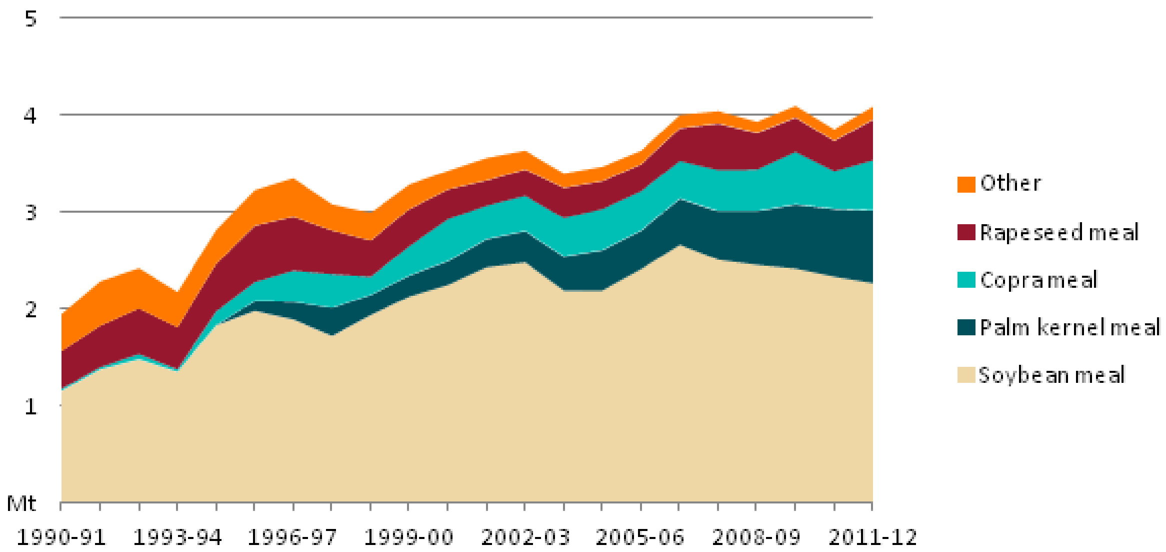
In 2011–12 rapeseed oil was the largest consumed vegetable oil in Japan, followed by palm oil and soybean oil. Over the past two decades consumption of rapeseed oil and palm oil in Japan rose by 29 per cent and 91 per cent, respectively, to 1 million tonnes and 580 000 tonnes in 2011–12. Over the same period, consumption of soybean oil in Japan rose to a high of 730 000 tonnes in 2002–03 before falling to 390 000 tonnes in 2011–12. High international prices for soybean oil and increasing consumer preference for rapeseed oil precipitated this decline (USDA–FAS 2012b).

Soybean and palm are the main vegetable oils consumed in the Republic of Korea. Between 1990–91 and 2011–12 consumption of soybean oil in the Republic of Korea increased by 160 per cent to 465 000 tonnes, while consumption of palm oil rose by almost 50 per cent to 310 000 tonnes.

Soybean meal and rapeseed meal are the main protein meals consumed in Japan; protein meal consumption increased by 9 per cent between 1990–91 and 2001–02, before falling by 6 per cent to 5.7 million tonnes over the 10 years to 2011–12. This decline reflected the drop in feed demand that resulted from a fall in domestic livestock numbers.

By contrast, consumption of protein meals in the Republic of Korea grew by 1.6 million tonnes between 1990–91 and 2001–02, followed by smaller growth of 530 000 tonnes over the past decade to 4.1 million tonnes in 2011–12 (Figure 74). Soybean meal accounted for 56 per cent of consumption in 2011–12, followed by palm kernel meal (18 per cent), copra meal (13 per cent) and rapeseed meal (10 per cent).

Figure 74 Protein meal consumption, Republic of Korea



Source: USDA–FAS 2013a

Trade

The shortfall between production of oilseeds in Japan and the Republic of Korea and domestic demand is filled by imports. Soybeans are the main imported oilseed in both countries, accounting for 58 per cent of total oilseeds imports in 2011–12. In line with the decline in domestic use, imports of oilseeds in Japan and the Republic of Korea trended downward in 2002–03, reaching a combined 6.7 million tonnes in 2011–12 (Figure 73). This downward trend was driven primarily by high international soybean prices. From 2002–03 Japanese soybean imports fell by 46 per cent to 2.8 million tonnes in 2011–12. At the same time, Japanese rapeseed imports increased steadily from 1990–91 reaching 2.4 million tonnes in 2011–12. Most soybean imports are sourced from the United States, Brazil, Canada and China, while most rapeseed is imported from Canada and Australia (United Nations Statistics Division 2013).

In 2011–12 vegetable oil imports in Japan and the Republic of Korea accounted for 37 per cent and 85 per cent of domestic consumption, respectively. Over the past two decades, vegetable oil imports in Japan and the Republic of Korea increased by 86 per cent and 150 per cent, respectively, reaching 800 000 tonnes in each country in 2011–12. Palm oil is the main imported vegetable oil in Japan, accounting for more than 70 per cent of total imports in 2011–12. Palm oil imports in Japan are supported by lower domestic tariffs compared with other vegetable oils and are mostly sourced from Malaysia (United Nations Statistics Division 2013). The Republic of Korea's main vegetable oil imports are soybean and palm.

Japanese imports of protein meals rose by 390 000 tonnes between 1990–91 and 2001–02, and by a further 940 000 tonnes to 2.6 million tonnes in the 10 years to 2011–12. The faster growth through the 1990s consisted largely of soybean meal and reflects the decline in domestic production. Japanese imports of soybean meal almost tripled over the past two decades to 2.3 million tonnes in 2011–12. In the Republic of Korea, protein meal imports rose by 170 per cent over the past two decades, to 3.4 million tonnes in 2011–12. Soybean meal is also the main oilseed import in the Republic of Korea. Japan imports most of its soybean meal from India, China and the United States. The Republic of Korea imports most of its soybean meal from Brazil and Argentina (United Nations Statistics Division 2013).

Policies

Domestic policies

The Japanese Government subsidises soybean production through direct payments. These payments are based on historical area planted to soybeans, current planted area, crop quality and current and historical price of soybeans (USDA–ERS 2012c). The Japanese Ministry of Agriculture, Forestry and Fisheries has a non-binding target for soybeans production of 270 000 tonnes based on a planted area of 140 000 hectares (USDA–FAS 2012b).

In the Republic of Korea, soybeans compete with rice for land. In 2011 the Korean Government implemented a three-year rice area reduction program aimed at correcting the oversupply of domestically produced rice. Under the program, producers are paid around US$2600 a hectare for planting soybeans instead of rice and continue to receive the previous payment for rice of US$632 a hectare (USDA–FAS 2012c).

Trade policies

In Japan, applied tariffs on oilseeds and oilseeds products are generally equal to their respective WTO bound tariffs (WTO 2013b). Generally, oilseeds and protein meals can be imported duty free. However, most vegetable oil imports are subject to tariffs. For example, soybean oil and rapeseed oil are subject to a specific duty of 10.9 yen per kilogram if the oil has an acid value exceeding 0.6; or 13.2 yen per kilogram otherwise (WTO 2013a).

Additionally, the applied tariff for palm oil imports ranges between 2.5 per cent and 3.5 per cent. However, palm oil imports from Malaysia and Indonesia are imported duty free under the ASEAN–Japan Free Trade Agreement (WTO 2013b).

Under its WTO commitments, the Republic of Korea has established a tariff quota for soybeans, which sets the tariff quota volume at 1 032 150 tonnes and the in-quota tariff at 5 per cent. The out-of-quota tariff is 487 per cent or 956 won per kilogram, whichever is the greater (WTO 2013a). For soybean oil used for food and soybean meal the WTO bound tariffs are 5.4 per cent and 1.8 per cent, respectively. However, in practice, the Republic of Korea operates what it terms autonomous tariff quotas for soybeans used for crushing, soybean meal used for livestock feed and soybean oil used for food. The Republic of Korea varies the details of these tariff quotas each year. The details for 2013 are set out in Table 10.

Table 10 Autonomous tariff quotas, Republic of Korea

Commodity	2013 applied in-quota tariff (%)	Autonomous tariff quota volume (tonnes)
Soybeans for crushing a	0	1 000 000
Soybean meal for feed b	0	2 700 000
Soybean oil, crude for food c	3	175 000

*Note: **a** Tariff line HS 120190. **b** Tariff line HS 230400. **c** Tariff line HS 150710.*
Source: USDA–FAS 2013c

Tariffs on other protein meals range between zero and 5 per cent, and tariffs on vegetable oils range between 2 per cent and 27 per cent. However, similar to Japan, palm oil from Malaysia and Indonesia is imported duty free under the ASEAN–Korea Free Trade Agreement (WTO 2013b). Additionally, under the United States–Korea Free Trade Agreement (implemented in March 2012) tariffs on oilseeds and oilseeds products imported from the United States were reduced or eliminated (USDA–FAS 2011a).

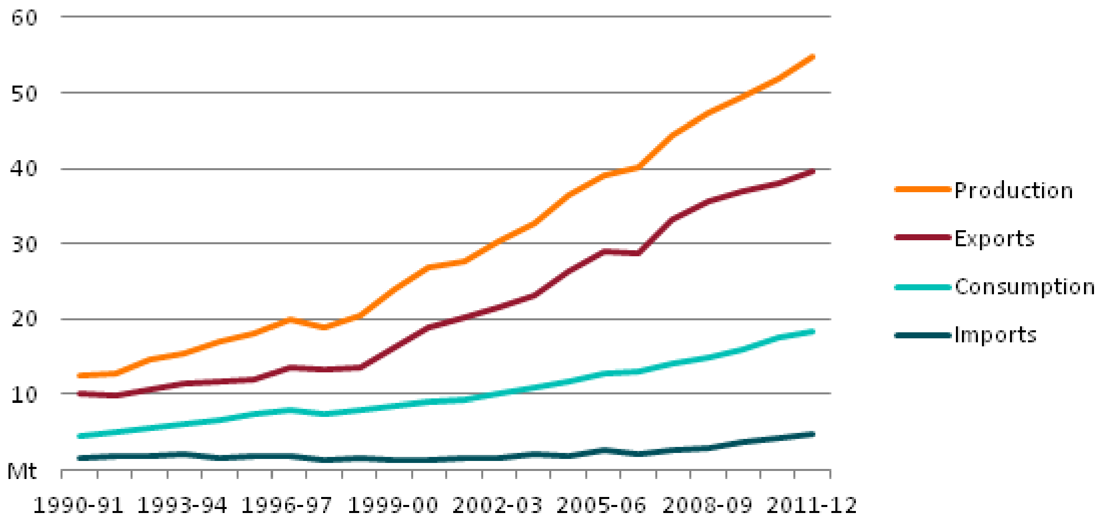
ASEAN

Production

Between 1990–91 and 2011–12, oilseeds production in ASEAN member states as a whole more than doubled, reaching a record 21 million tonnes in 2011–12. This increase was driven by growth in palm kernel production, from 2.5 million tonnes in 1990–91 to 11.7 million tonnes in 2011–12. In that year, palm kernels accounted for 55 per cent of total oilseeds production, followed by copra (19 per cent), peanuts (15 per cent) and soybeans (6 per cent). The largest producers of oilseeds in the ASEAN member states are Indonesia and Malaysia, accounting for 48 per cent and 21 per cent of total oilseeds production in 2011–12, respectively.

The ASEAN region is the largest producer of vegetable oils in the world. Production rose from 12.6 million tonnes in 1990–91 to a record 55 million tonnes in 2011–12 (Figure 75). Palm oil is the most produced vegetable oil in the ASEAN region, accounting for 84 per cent of total vegetable oil production in 2011–12. Indonesia and Malaysia are the main producers of palm oil, with 26 million tonnes and 18 million tonnes produced in 2011–12, respectively.

Figure 75 Vegetable oil supply and use, ASEAN



Source: USDA–FAS 2013a

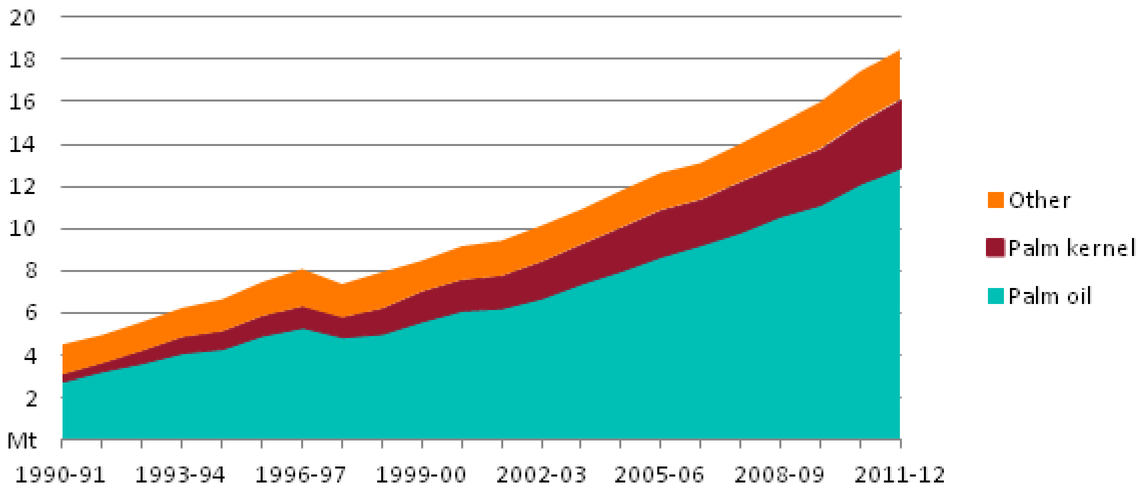
Protein meal production in the ASEAN member states increased from 4 million tonnes in 1990–91 to 11 million tonnes in 2011–12. Palm kernel meal is the main protein meal, accounting for 55 per cent of total production in 2011–12, followed by soybean meal (23 per cent) and copra meal (13 per cent). Indonesia and Malaysia are the main producers of palm kernel meal and copra meal, while Thailand is the largest producer of soybean meal.

Consumption

Oilseeds use in the ASEAN member states increased by 145 per cent over the past two decades, reaching 28 million tonnes in 2011–12. This was driven by increasing use of oilseeds for crush and food. Palm kernels and soybeans are the two main oilseeds consumed. In the ASEAN member states, palm kernels are mostly crushed to produce oil and meal. By contrast, food uses of soybeans accounted for 48 per cent of total soybeans use in 2011–12. Indonesia is the largest consumer of soybeans for food purposes in the ASEAN member states, reflecting high domestic demand for soybean products such as tempe and tofu (USDA–FAS 2013d).

Between 1990–91 and 2011–12 consumption of vegetable oils in the ASEAN member states quadrupled, to 18.5 million tonnes (Figure 76). This reflects increased use of vegetable oils for industrial purposes, which accounted for 48 per cent of total vegetable oil consumption in 2011–12. Palm oil is the main vegetable oil demanded in the region, with 13 million tonnes consumed in 2011–12.

Figure 76 Vegetable oils consumption, ASEAN



Source: USDA–FAS 2013a

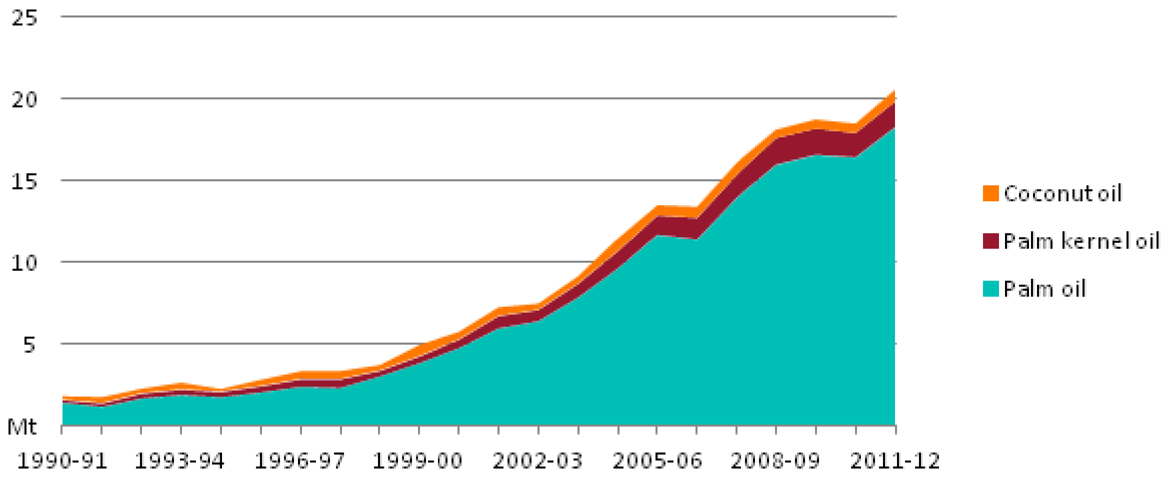
Consumption of protein meals in the ASEAN region rose by 13 million tonnes to almost 17 million tonnes between 1990–91 and 2011–12, as demand for animal feed increased. Soybean meal is the primary protein meal consumed, accounting for 81 per cent of total protein meal consumption in 2011–12. Despite high production of palm kernel meal in the region, little is consumed domestically. Indonesia, the largest producer of palm kernel meal, consumes only small amounts as the product requires expensive treatment before it can be safely used as livestock feed (USDA–FAS 2012d). Consequently, most palm kernel meal is exported to New Zealand and countries in the European Union for use in cattle feed (USDA–FAS 2010).

Trade

Over the past two decades, oilseeds imports in the ASEAN member states increased significantly, particularly soybean imports by Indonesia, Thailand and Vietnam. In 2011–12 soybean imports reached 5.7 million tonnes, compared with 1.2 million tonnes in 1990–91. Soybeans are imported mainly from the United States, Brazil and Argentina (United Nations Statistics Division 2013).

Increasing production of vegetable oils in the ASEAN region has outpaced the increase in domestic demand, resulting in rising exports. Palm oil from Indonesia and Malaysia accounted for most of the rise in vegetable oil exports over the past two decades. Exports of palm oil from Indonesia increased by 17 million tonnes from 1990–91, to a record 18 million tonnes in 2011–12 (Figure 77). Similarly, between 1990–91 and 2011–12, palm oil exports from Malaysia increased by 11 million tonnes to a record 17 million tonnes. The main export markets for palm oil are India, China, the European Union and Pakistan (United Nations Statistics Division 2013).

Figure 77 Vegetable oil exports, Indonesia



Source: USDA–FAS 2013a

The ASEAN region is both a significant exporter and importer of protein meals. Demand for soybean meal in the ASEAN member states is higher than domestic production, and significant imports are needed for use in livestock feed. In 2011–12 soybean meal imports reached 11.5 million tonnes, compared with 1.5 million tonnes in 1990–91. Indonesia, Thailand and Vietnam are the main importers of soybean meal, which they source from Argentina, Brazil, India and the United States (United Nations Statistics Division 2013).

Policies

Domestic policies

The Indonesian and Malaysian governments have supported expansion of palm plantations through various schemes. In Indonesia, this included allocating established plantations to state-owned companies, encouraging private investment and facilitating foreign direct investment. Further, the Indonesian Government has a 10-year target of 20 million hectares of palm oil plantations by 2020 (Hirawan 2011).

Trade policies

In Indonesia, the applied tariffs for oilseeds are generally 5 per cent (WTO 2013b). However, in 2012 the Government of Indonesia lowered the applied tariff on soybean imports to zero in response to high international soybean prices. The tariff was raised back to 5 per cent in 2013 (USDA–FAS 2013d). The bound tariff for soybeans is 27 per cent and the bound tariff for other oilseeds is 40 per cent. The applied tariffs for vegetable oils and protein meals in Indonesia range between zero and 5 per cent (WTO 2013b). By contrast, bound tariffs for vegetable oils and protein meals are 40 per cent, except soybean oil, for which the bound tariff is 35 per cent.

In addition, many exports from Indonesia are subject to taxes. Palm oil exports are subject to an adjustable export tax, which is dependent on the international price of palm oil (USDA–FAS 2011b).

In Malaysia, oilseeds (except groundnuts) and protein meals are generally imported duty free. The tariff applied to vegetable oils ranges between zero and 5 per cent. Bound tariffs for most oilseeds, protein meals and vegetable oils are either 5 per cent or 10 per cent (WTO 2013b). Malaysian exports of palm oil are subject to an export tax. As of January 2013 Malaysia reduced its export tax on crude palm oil to between 4.5 per cent and 8.5 per cent, depending on the international price of palm oil (USDA–FAS 2013d).

In Thailand, soybeans are subject to a tariff quota of 10 992 tonnes, with an in-quota tariff of 20 per cent, and an out-of-quota tariff of 80 per cent. Soybean meal imports are also subject to a tariff quota of 230 559 tonnes with an in-quota tariff of 20 per cent and an out-of-quota tariff of 133 per cent (WTO 2013a). However, unlimited imports of soybeans and soybean meal from WTO member nations are currently subject to a zero tariff and a 2 per cent tariff, respectively (USDA–FAS 2012e).

In Vietnam, soybeans and soybean meal can be imported duty free (WTO 2013a). However, soybean imports are subject to a 5 per cent value added tax (USDA–FAS 2012f).

Long-term prospects

Consumption

The real value of China's oilseeds and oilseeds product consumption (in 2007 US dollars) in 2050 is projected to be US$73 billion, US$23 billion higher than in 2007. If realised, China will remain the largest consumer of oilseeds and oilseeds products in Asia by 2050.

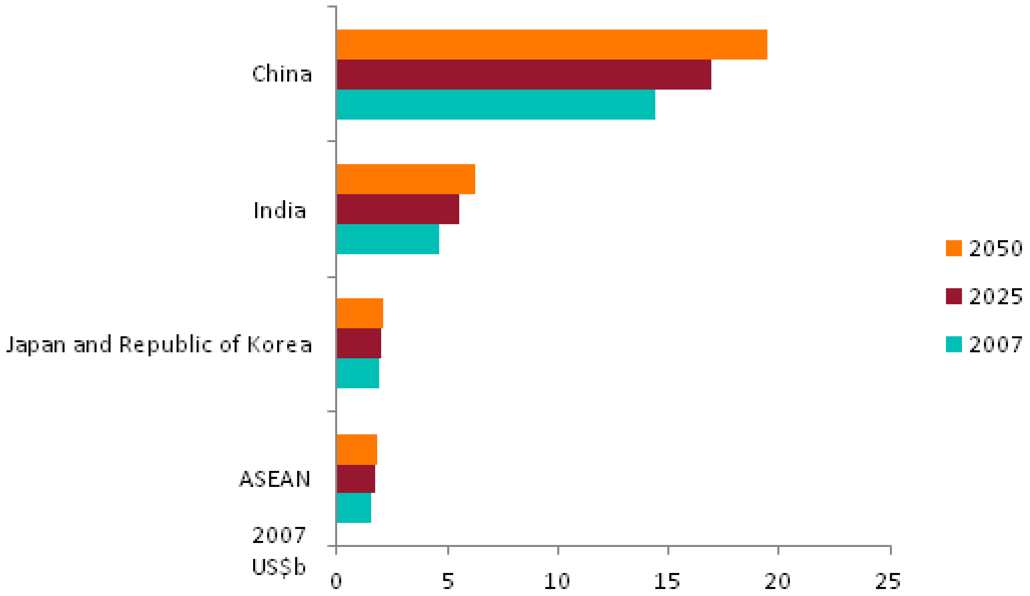
The total real consumption value for China's soybean, rapeseed and sunflower seed crush in 2050 is projected to be US$37 billion, 41 per cent higher than in 2007. This increase reflects the projected growth in vegetable oil and protein meal consumption.

The real value of China's vegetable oil consumption in 2050 is projected to be US$36 billion, 61 per cent higher than in 2007. A large proportion of this consumption is destined for food use, with growth driven by population and income increases. Soybean oil and rapeseed oil are projected to account for more than half of China's vegetable oil consumption out to 2050. By 2050 the real value of consumption is projected to be US$15 billion for soybean oil and US$6 billion for rapeseed oil. Palm oil accounts for most of the remaining vegetable oils consumed in 2050.

Consumption of protein meals in China is also projected to increase out to 2050. The real value of consumption at that time is projected to be US$17 billion, 22 per cent higher than in 2007. Soybean meal accounts for 75 per cent (US$13 billion) of this. One factor underlying this projected increase is the forecast increase in demand for livestock products, leading to higher protein meal demand.

The real value of China's oilseeds consumption (excluding crush) in 2050 is projected to be US$20 billion, 36 per cent higher than in 2007 (Figure 78). Oilseeds consumption accounts for one-quarter of the total value of oilseeds and oilseeds product consumption by 2050. Of that share, soybeans account for 83 per cent (US$16 billion), while rapeseed and sunflower seed are projected to account for the remaining 17 per cent, at almost US$3 billion and US$500 million, respectively.

Figure 78 Real value of Asia's oilseeds consumption (excluding crush)



Source: ABARES model output

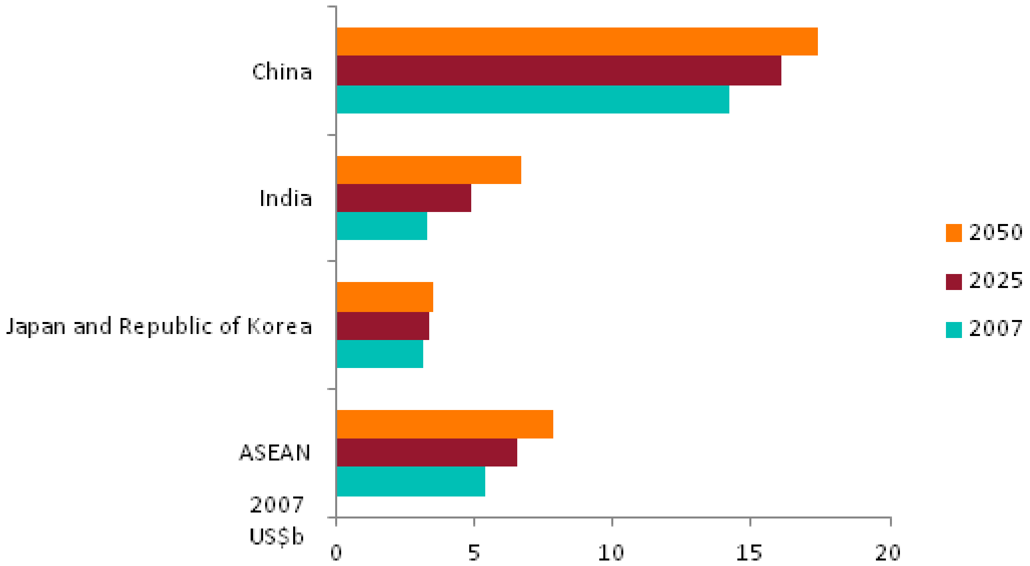
The real value of India's oilseeds and oilseeds product consumption in 2050 is projected to be US$30 billion, US$12 billion higher than in 2007. If realised, India will remain the second largest consumer of oilseeds and oilseeds products in Asia over the projection period. The total real consumption value of soybean, rapeseed and sunflower seed crush is projected to be US$10 billion in 2050. This increase reflects the projected growth in vegetable oil and protein meal consumption in India.

Consumption of vegetable oils in India is projected to increase by 60 per cent in 2050 to US$17 billion. Palm oil is projected to account for the highest proportion of vegetable oil consumed, at US$9 billion. Soybean oil also represents a significant share at US$4 billion, and rapeseed oil and sunflower oil account for US$3 billion and US$1 billion, respectively.

Consumption of protein meals in India is projected to double by 2050, to US$7 billion (Figure 79). This growth reflects the increased use of protein meal as a feed input for domestic livestock production.

The real value of India's oilseeds consumption (excluding crush) in 2050 is projected to be US$6 billion, 35 per cent higher than in 2007. Soybeans and rapeseed account for US$5 billion of this consumption. Given that oilseeds not used for crush are used predominantly for food, the consumption growth for oilseeds predominantly reflects population growth out to 2050.

Figure 79 Real value of Asia's protein meal consumption



Source: ABARES model output

Consumption of oilseeds and oilseeds products in Japan and the Republic of Korea is projected to be relatively steady out to 2050. At that time, the real value of consumption for oilseeds and oilseeds products is projected to be US$9 billion, around US$1 billion higher than in 2007.

Consumption of protein meal in Japan and the Republic of Korea is projected to be US$4 billion in 2050, 12 per cent higher than in 2007. Soybean meal, which is used as a feed stock, accounts for almost all of this consumption in 2050. The result reflects the relatively small projected increase in livestock production in these countries, combined with a projected increase in feed efficiency.

A projected decline in population, combined with only moderate income growth, is likely to mitigate consumption growth for vegetable oils in Japan and the Republic of Korea out to 2050. For example, the real value of vegetable oil consumption in these countries is projected to be only 6 per cent (US$3 billion) higher than in 2007. Likewise, oilseeds consumption (excluding crush) is projected to be 12 per cent (US$2 billion) higher than in 2007.

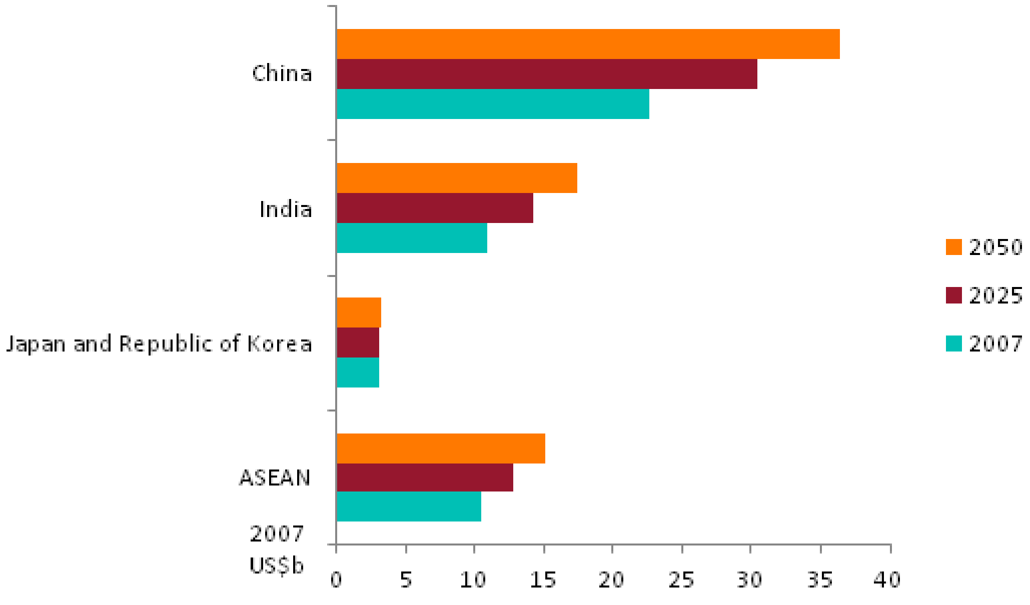
The real value of oilseeds and oilseeds product consumption for ASEAN member states in 2050 is projected to be US$25 billion, 44 per cent higher than 2007. Consumption in 2050 is dominated by Indonesia (US$12 billion), Thailand (US$3 billion), the Philippines (US$2 billion) and Vietnam (US$2 billion).

The total real consumption value of ASEAN's soybean, rapeseed and sunflower seed crush in 2050 is projected to be US$8 billion, 44 per cent higher than in 2007. This increase reflects the ASEAN member states' projected growth in vegetable oil and protein meal consumption. The growth in crush is considerably less than that of China and India because of relatively weaker growth in feed demand in the region. Also, a large proportion of ASEAN's edible oil consumption is expected to be met by other vegetable oils, such as palm oil.

Vegetable oil consumption is projected to grow significantly for ASEAN member states, rising by US$5 billion over the projection period to US$15 billion in 2050 (Figure 80). ASEAN member states have historically been large consumers of palm oil; it is therefore projected that growth in vegetable oil consumption will be underpinned by growth in palm oil consumption, under the assumption that consumer preference will remain largely unchanged.

Growth in protein meal consumption is projected to be relatively modest for ASEAN member states, with the real value of consumption in 2050 projected to be US$8 billion, US$3 billion higher than in 2007. Soybean meal is projected to account for 83 per cent (US$6.6 billion) of the protein meal consumed in 2050.

Figure 80 Real value of Asia's vegetable oil consumption



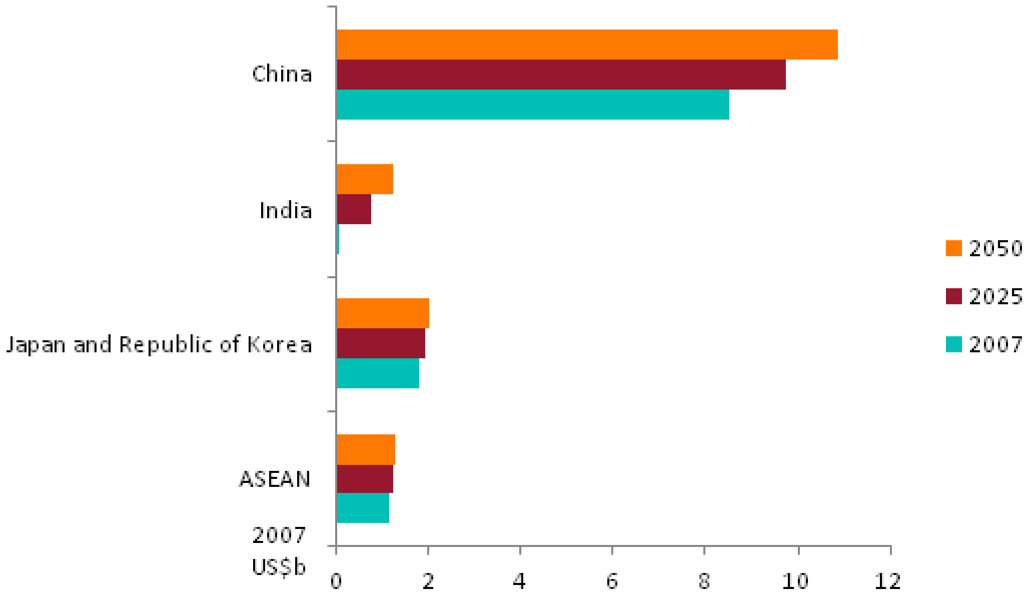
Source: ABARES model output

Trade

The real net value of China's imports of oilseeds and oilseeds products in 2050 (in 2007 US dollars) is projected to be US$28 billion, nearly double the value in 2007. With the real value of China's consumption in 2050 projected to be US$23 billion higher than 2007, and production set to increase by US$9 billion, oilseeds imports are projected to account for a significant share of China's consumption increase out to 2050. China's oilseeds and oilseeds product imports are consequently projected to account for 38 per cent of total consumption in 2050, compared with 33 per cent in 2007.

Vegetable oils comprise a significant share of China's projected imports of oilseeds and oilseeds products. For example, the real net value of China's vegetable oil imports (mostly soybeans and palm oil) is projected to be US$17 billion in 2050 (Figure 81). The real value of oilseeds imports (excluding crush) is projected to be US$11 billion in 2050, with soybeans accounting for 96 per cent of this total value.

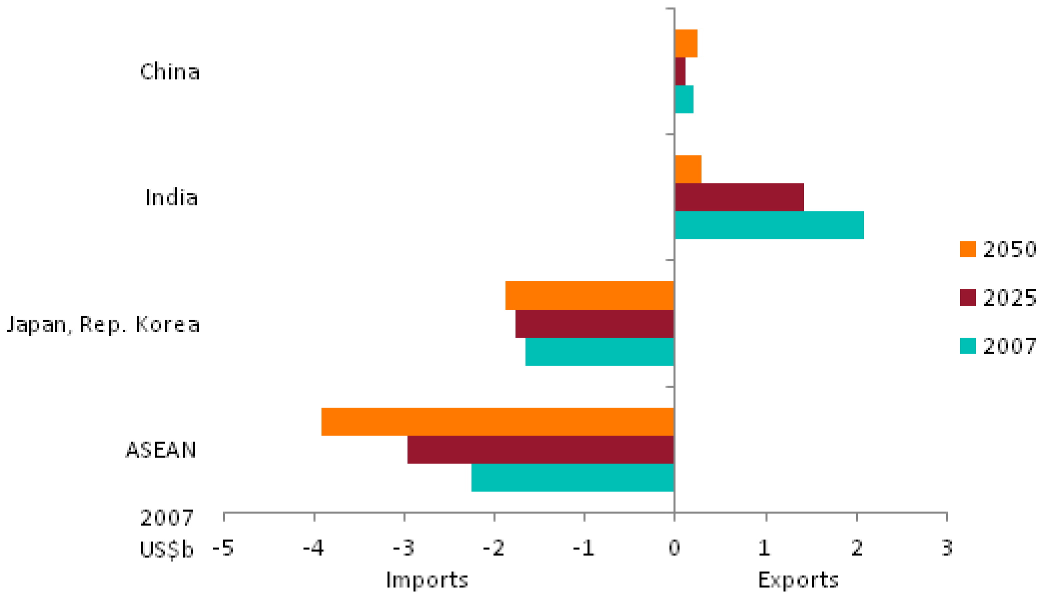
Figure 81 Real value of Asia's oilseeds imports (excluding crush)



Source: ABARES model output

Because the demand for protein meals in China is satisfied mostly by crushing domestically produced and imported oilseeds, China is projected to be a small net exporter of protein meals by 2050 (Figure 82).

Figure 82 Real value of Asia's net trade in protein meals



Source: ABARES model output

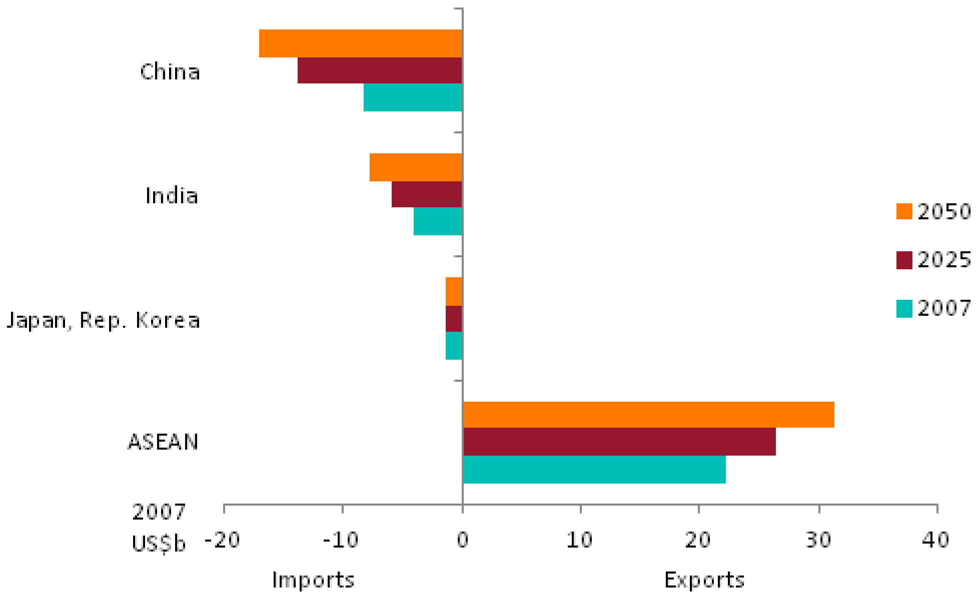
India is projected to be the second largest importer of oilseeds and oilseeds products in Asia by 2050, with the real net value of India's imports of oilseeds and oilseeds product projected to be US$10 billion, US$6 billion higher than in 2007. Vegetable oils (particularly palm oil) account for most of India's oilseeds and oilseeds product imports and are projected to total US$8 billion by 2050. Palm oil will remain the preferred vegetable oil over the projection period, accounting for half of India's oilseeds imports in 2050. Soybean and sunflower seed oils will account for most of the remaining vegetable oil imports.

Imports in Japan and the Republic of Korea are expected to increase marginally out to 2050 as a result of modest consumption growth. The collective real net value of Japan and the Republic of Korea's oilseeds and oilseeds product imports in 2050 is projected to be US$5 billion, a rise of 9 per cent compared with 2007. In 2050 imports of protein meals and oilseeds are projected to increase by 14 per cent and 11 per cent respectively, while vegetable oils are projected to be 2 per cent lower. Protein meal and oilseeds imports are both projected to be US$2 billion, while vegetable oil imports are projected to be US$1 billion.

Indonesia and Malaysia are the main producers and exporters of vegetable oils, such as palm oil, in Asia. The real value of vegetable oil production in Indonesia is projected to increase from US$15 billion in 2007 to US$20 billion in 2050. Similarly, Malaysia is projected to increase production from US$14 billion in 2007 to US$20 billion in 2050. Indonesia and Malaysia are consequently projected to remain significant exporters. Since both countries are members of ASEAN, the ASEAN region will also remain a net exporter of vegetable oils in 2050 (Figure 83).

For ASEAN member states, import growth for oilseeds and protein meals over the projection period is relatively subdued compared with China and India. The collective real net value of these imports is projected to be US$5 billion in 2050, 53 per cent higher than in 2007. Protein meals are projected to account for around US$4 billion of this.

Figure 83 Real value of Asia's net trade in vegetable oils



Source: ABARES model output

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7 Sugar

Benjamin Agbenyegah and Andrew Haylen

China

Production

China is the fourth largest producer of sugar in the world, accounting for around 8 per cent of world sugar produced in the 10 years to 2011. In Asia, China is the second largest sugar producer behind India and over the same period accounted for around 23 per cent of Asian sugar production.

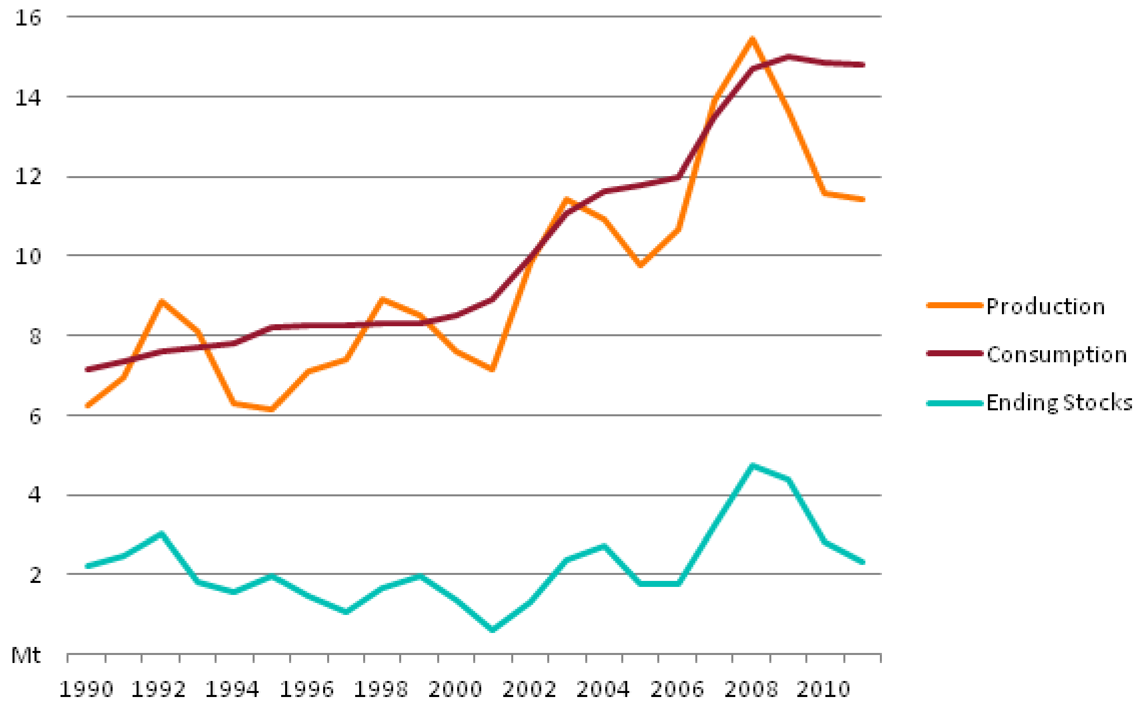
China's sugar industry has large cane and beet sugar producing sectors. Since the 1990s, government price incentives to producers have aimed to lift domestic output to reduce imports and achieve greater self-sufficiency (FAO 1997). With the establishment of new refineries and the adoption of improved technologies, the sugar industry expanded rapidly over the past two decades into a highly integrated industry. Over the same period, an alternative sweetener industry developed, making China a large producer and consumer of starch sugars (glucose, maltose syrup, high fructose corn syrup and sorbitol), sourced mainly from maize.

Sugar cane accounts for over 85 per cent of sugar production in China, and sugar beet makes up the balance. Around 80 per cent of China's sugar cane crop is grown in the south and south-west regions and over 95 per cent of the sugar beet crop is grown in the north-east and north-west regions. Returns from sugar cane are, on average, not as competitive as those from fruits, vegetables, grains and oilseeds. For this reason, diversification into other crops is pushing sugar cane production westward, where there is less competition from alternative crops. For sugar beet production, returns have also not been as favourable as those of alternatives, such as maize, leading to a decline in sugar beet production in recent years. With the small size of cane plots and low labour costs, sugar cane is largely harvested by hand, rather than using mechanical harvesters.

While sugar production in China has been quite variable, it has more than doubled since the early 2000s, increasing from 7.2 million tonnes in 2001 to 15.5 million tonnes in 2008, before declining to 11.7 million tonnes in 2011 (Figure 84). The growth between 2001 and 2008 reflects increases in sugar cane area and overall sugar yields. The sugar cane area harvested increased from 1.3 million hectares in 2001 to 1.75 million hectares in 2008, while overall sugar yields (measured as total sugar production divided by total area harvested of sugar cane and sugar beet) increased from 4.2 tonnes a hectare in 2001 to 7.7 tonnes a hectare in 2008 (Figure 85).

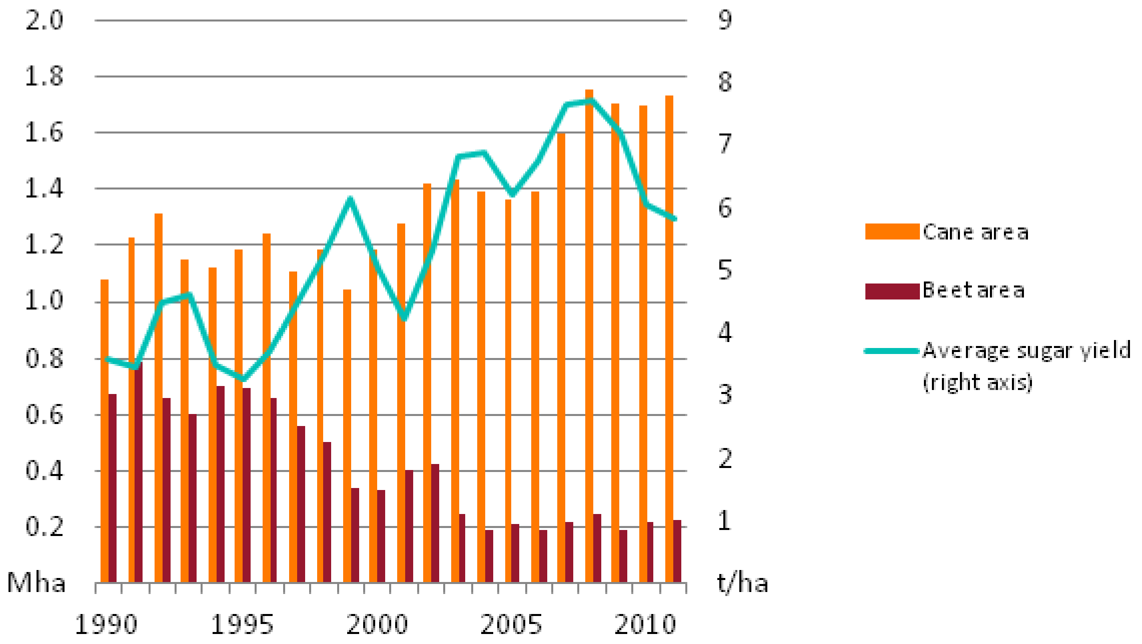
In general, sugar yields have increased over the past decade in response to an increase in farm irrigation and the adaptation of genetically modified varieties (Brookes & Barfoot 2013). Lower yields in 2010 and 2011 were mainly due to adverse seasonal conditions, plant disease and lower temperatures in key sugar cane and beet growing areas, leading to a decline in sugar production.

Figure 84 Sugar production, consumption and stocks, China



Source: ISO 2011, 2012

Figure 85 Sugar cane and beet area harvested and yield, China



Note: Average yield is total sugar production divided by total area of cane and beet.
Source: FAO 2013

In China, between 250 and 300 sugar cane mills and nine cane sugar refineries operate with an average sugar recovery across all mills of 12 per cent to 13 per cent (Buzzanell 2010).

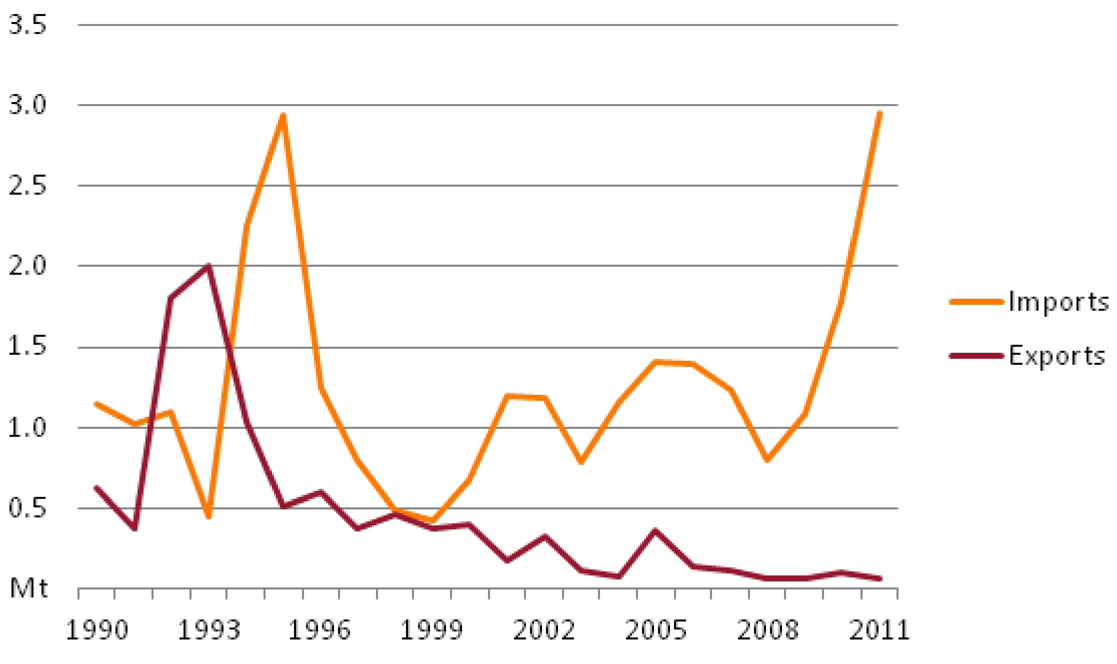
Consumption

China is the second largest consumer of sugar in both the world and Asia, behind India, accounting for around 9 per cent and 23 per cent respectively of world and Asian sugar consumed in the 10 years to 2011. Domestic consumption of sugar has increased, and the requirements have been met from both domestic production and imports. Sugar consumption grew at around 5 per cent a year in the 10 years to 2011 to 14.8 million tonnes (Figure 84). It was boosted mainly by population growth and higher consumer incomes. Consumption per person was estimated at only 11 kilograms in 2011, compared with the world average of 23 kilograms (ISO 2011, 2012; World Bank 2012), suggesting there is scope for future growth in Chinese sugar consumption. Growth in sugar consumption has been constrained by the extensive use of saccharin (an artificial sweetener that is 375 times as sweet as sugar) in food and non-food products. Use of saccharin was estimated at around 2900 tonnes in 2011—equivalent to around 1.1 million tonnes of raw sugar.

Trade

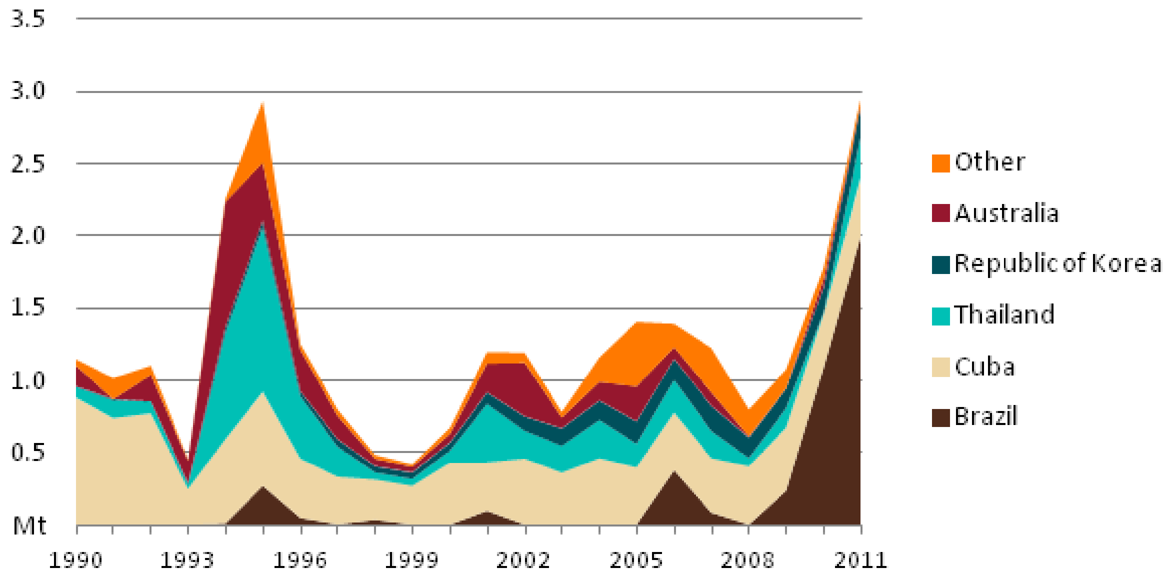
Although China exports some sugar, it is a net importer, accounting for around 11 per cent of total Asian sugar imports in the 10 years to 2011 (Figure 86). In recent years, domestic sugar production has been unable to keep pace with the growth in domestic consumption and China has been using its large stocks and imports to fill the gap. Brazil has become the major source of China's sugar imports and accounted for around 68 per cent of total imports in 2011. Cuba and Thailand together accounted for 23 per cent (Figure 87).

Figure 86 Sugar trade, China



Source: ISO 2011, 2012

Figure 87 Source of sugar imports, China



Source: ISO 2011, 2012

In 2011 China imported around 3 million tonnes of raw sugar—far more than its tariff quota volume (see Trade policies). In 2011 the National Development and Reform Commission of China issued a special permit to import 1 million tonnes of sugar, most of which was added to the state reserve (USDA–FAS 2012a, 2012b, 2011a, 2010a). No out-of-quota tariff was charged on these imports.

China's sugar exports reached 2 million tonnes in the early 1990s, but have declined to less than 100 000 tonnes in recent years (Figure 86).

Policies

Domestic policies

Provincial governments provide price support and input subsidies to growers. Sugar mill operators have been providing extension services to farmers to improve yields. They have also been providing free or subsidised fertiliser, mechanical equipment (for ploughing), irrigation and plastic film (to retain soil moisture and temperatures).

The Chinese Government authorised the China Sugar Association to maintain domestic consumption of sugar by setting limits on production and sales of domestic saccharin (USDA–FAS 2011a). The China Sugar Association was also given the authority to supervise and inspect the production activities of saccharin plants that operate in China.

Trade policies

Under its accession agreement with the World Trade Organization, China operates a tariff quota for its sugar imports. The tariff quota volume is 1945 million tonnes, with an in-quota tariff of 15 per cent and an out-of-quota tariff of 50 per cent. The accession agreement allows China to assign 70 per cent of the tariff quota volume to state trading enterprises. This includes imports of 450 thousand tonnes of sugar from Cuba each year, an arrangement that has existed for more than 40 years.

India

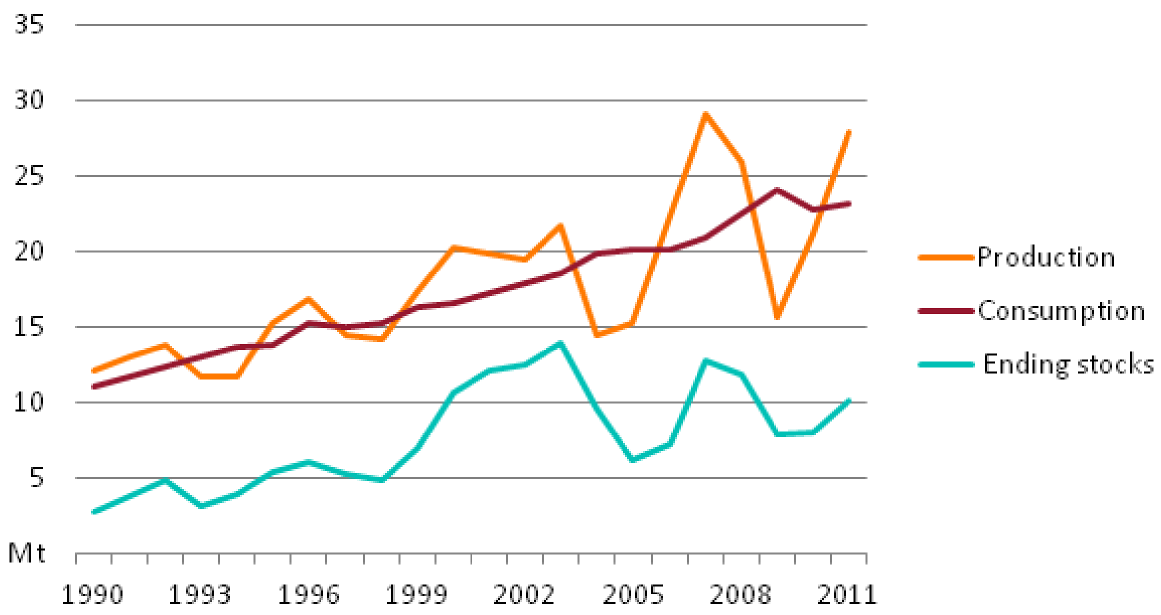
Production

India is the largest sugar producer in Asia, accounting for 41 per cent of the total sugar produced in Asia in the 10 years to 2011. Sugar production grew by 8 per cent a year over the 10 years to 2011 to reach 28 million tonnes (Figure 88). This has occurred as a result of increases in both the area planted to sugar cane and yields. However, in 2009 sugar production declined significantly to 15.7 million tonnes in response to widespread payment delays to sugar growers and higher returns on production of alternatives, particularly rice, wheat, maize and pulses, and a reduction in sugar yields.

The annual monsoons are crucial to the success or failure of each year's sugar crop. Sugar cane and sugar production in India typically follow a cycle, where two to three years of higher production are followed by two years of lower production. The cyclical nature of sugar production has resulted in India regularly switching between being an exporter and being an importer.

The Government of India regulates nearly every aspect of the industry, including the distance between sugar mills, the specific region from which a particular mill can buy cane and the price it must pay for cane (USDA–FAS 2012c, 2011b, 2010b).

Figure 88 Sugar production, consumption and stocks, India



Source: ISO 2011, 2012

The bulk of Indian sugar cane is processed at mills into centrifugal sugar. However, cane is also processed—largely by cottage industries using open pan evaporation methods—into the traditional sweetener forms of gur and khandsari. The cottage processing industries have lower sugar extraction rates than cane processed in sugar mills (USDA–FAS 2012c).

Consumption

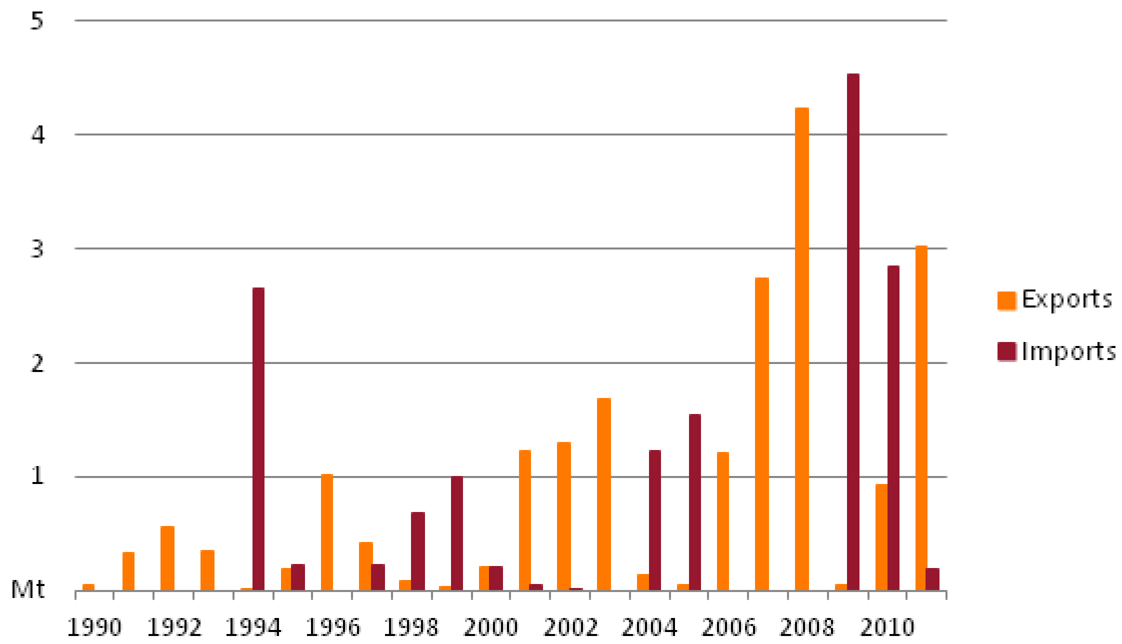
India accounted for 37 per cent of total sugar consumed in Asia in the 10 years to 2011. Domestic sugar consumption grew at around 3 per cent a year in the 10 years to 2011 and reached 23.1 million tonnes (Figure 88). Sugar consumption per person increased from 17 kilograms in 2002 to 19 kilograms in 2011. Consumption growth in India during this period was driven by a rapidly growing population and higher consumer incomes. Bakeries, makers of candy and local sweets, soft drink manufacturers, and hotel and restaurant consumers account for more than 60 per cent of the annual mill sugar demand (IIFT 2011; USDA–FAS 2012c). Most bulk consumers use only cane sugar as India does not produce high fructose corn syrup in significant quantities.

Trade

The volume of India's sugar trade in a particular year is determined by the level of production, which largely depends on the success of the monsoon season. Although India is a large producer of sugar, the bulk of production goes into domestic consumption and stock rebuilding for domestic food security. As a result, India is an irregular exporter of sugar.

In 2011 India exported around 3 million tonnes of sugar, accounting for 18 per cent of total Asian sugar exports (Figure 89).

Figure 89 Sugar exports and imports, India



Source: ISO 2011, 2012

From 2000 to 2011 around 13 per cent of India's sugar exports went to Sri Lanka, 12 per cent to Bangladesh and 10 per cent to the United Arab Emirates. Many other countries imported smaller volumes of sugar from India. India has a country-specific allocation for exports of 8424 tonnes of raw cane sugar to the United States under the US tariff quota. In individual years this figure may vary depending on the result of annual quota reallocation by the United States.

India periodically imports sugar to supplement domestic consumption. India's main suppliers are Brazil and Thailand. From 2002 to 2011 Brazil accounted for 85 per cent and Thailand 7 per cent of India's sugar imports. In 2009 India imported a record 4.5 million tonnes of sugar to supplement domestic production when production was 15.7 million tonnes and consumption was 24.1 million tonnes.

Policies

Domestic policies

The government supports production of sugar cane and sugar by conducting research and development, providing training to farmers and transferring improved production technologies and new varieties (seed, implements, pest management) to growers in its effort to raise cane yields and sugar recovery rates (USDA–FAS 2012c). The Indian Council of Agricultural Research, state agricultural universities, state extension agencies and regional research institutions perform these roles at national, regional and state levels.

The central and state governments ensure that finances and input supplies to sugar cane growers are at affordable prices. The Sustainable Development Fund of Sugarcane Based Cropping System Area under the Macro Management Mode of Agriculture is a centrally sponsored scheme designed to boost the area cultivated and production in India (USDA–FAS 2012c, 2011b). The scheme is being implemented in various sugar cane growing states.

The Indian Government sets a minimum support price for sugar each year. In some states, the minimum cane price is supplemented by additional payments from state governments. In 2009 the government announced a new price system that links cane prices with sugar price realisation by sugar mills. Sugar mills are required to pay the state advised price to sugar cane farmers irrespective of the market price of sugar (USDA–FAS 2012c, 2011b).

The Indian Government also pursues a range of other policies to ensure affordable sugar prices to Indian consumers and adequate returns to Indian cane producers and sugar mills. These policies can have an important influence on world sugar prices because India, as a large producer and consumer, can switch between being an exporter and importer in some years. The Indian Government regulates the domestic sugar market and domestic prices. Local sugar mills are required to supply 10 per cent of their output as a levy to the Indian Government at below prevailing market prices. The levy is distributed at subsidised rates through the Targeted Public Distribution System (see Box 2) to households who are living below the poverty line. Sugar mills are allowed to sell the remaining 90 per cent of their output as free sugar at market prices. Nevertheless, the sale of free-sale sugar and levy sugar is administered by the government through quotas designed to maintain price stability in the market (USDA–FAS 2012c, 2011b).

The Indian Government has a policy to ensure that sugar stocks do not fall below a level equivalent to three months of consumption. In response to rapidly increased sugar prices in recent years, the Indian Government has sought to contain price increases through releases from sugar buffer stocks, removing duty payments on sugar imports and introducing prohibitions on excessive stockholding by private agents.

Trade policies

The Indian Government often intervenes in sugar trade by banning exports or relaxing import restrictions and customs duty obligations. It does this when there is a substantial fall in India's sugar production and domestic sugar prices start rising. Between 1994 and 2008 the Government of India imposed a basic customs duty ranging from 5 per cent to 60 per cent and a countervailing duty of between 850 and 950 rupees a tonne on imported sugar. In addition, an educational tax of 3 per cent is imposed on the total import duty (that is, the basic import duty plus the countervailing duty) (USDA–FAS 2011b, 2010b). Depending on the level of domestic production, the government allows duty-free imports of sugar. Currently, the import duty on sugar is zero.

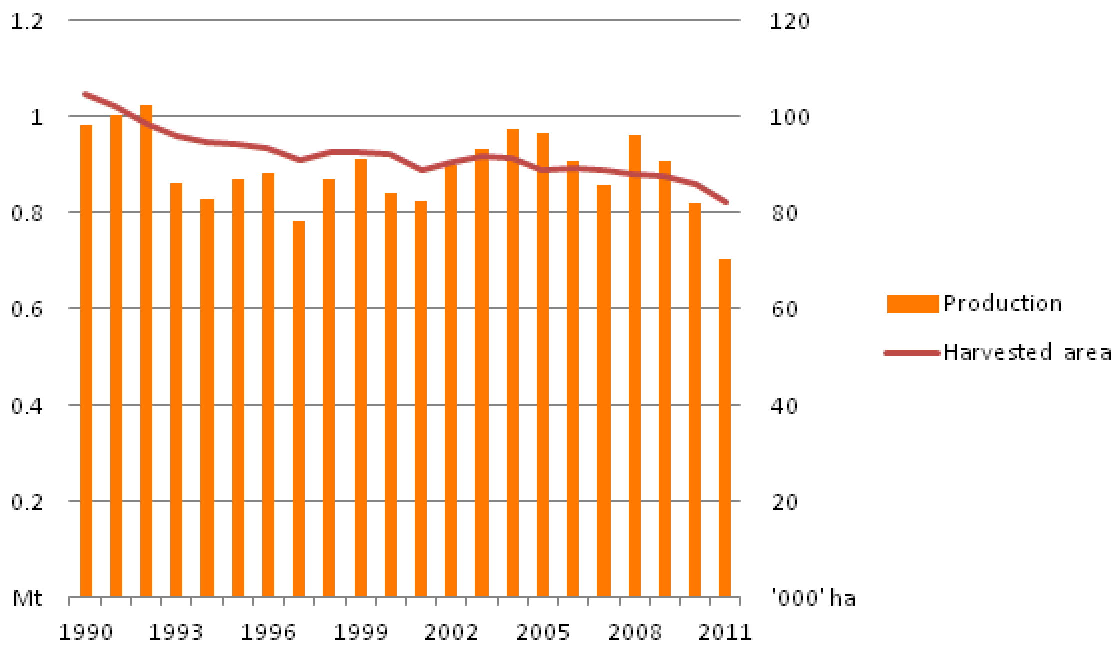
Japan and the Republic of Korea

Production

Sugar production in Japan includes both cane and beet sugar production. Sugar beet production accounted for 74 per cent of the total sugar produced in the 10 years to 2011. However, domestic sugar production provided for only 36 per cent of sugar consumption over the same period, with the balance imported as raw sugar for processing by Japan's large sugar refining industry. Over 75 per cent of total refined sugar is produced on the northern island of Hokkaido.

Since 1990 sugar production in Japan has generally varied between 800 000 tonnes and 1 million tonnes (Figure 90). However, production fell from 960 000 tonnes in 2008 to 700 000 tonnes in 2011. The area harvested has declined continually since 1990 (Figure 90). While sugar yields (measured as the total volume of sugar divided by the total beet and cane harvested area) vary from year to year, average yields increased from 8.7 tonnes a hectare in 1994 to 11 tonnes a hectare in 2011.

Figure 90 Sugar production and area harvested, Japan



Note: Area harvested is the total of cane and beet.
Source: ISO 2011, 2012

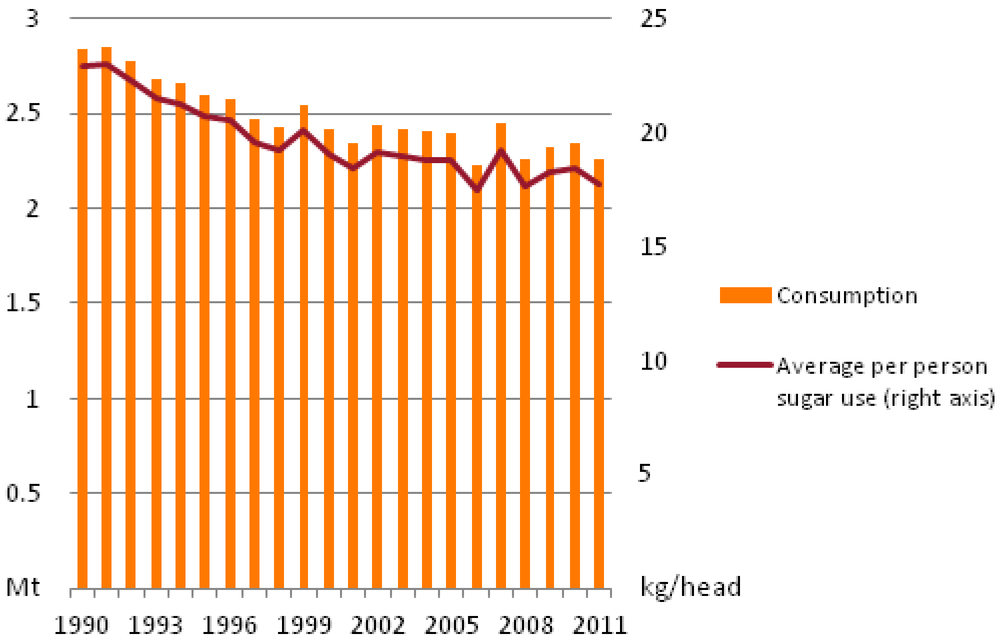
Japan has over 12 sugar mills (Licht 2011). Domestically produced raw cane sugar and beet sugar, along with imported sugar, are refined at multiple refineries, many of which have a very small refining capacity.

The sugar industry in the Republic of Korea depends entirely on the refining of imported raw sugar to satisfy domestic consumption and for the re-export of refined sugar. With no sugar-growing industry, refined sugar production depends on the activities of the country's three refining companies. These companies are the only ones permitted to import raw sugar and export refined sugar. The Korean Government closely monitors the three refineries since the refined sugar price affects the price of locally produced processed food products that contain sugar (USDA–FAS 2009). The three companies have a combined refining capacity of around 4300 tonnes a day.

Consumption

Sugar consumption in Japan declined from 2.8 million tonnes in 1990 to 2.3 million tonnes in 2011 (Figure 91). This reflects declining consumption per person in conjunction with low population growth. Sugar consumption per person declined from 23 kilograms in 1990 to 18 kilograms in 2011, which was 5 kilograms lower than the world average. The decline in the annual sugar consumption per person reflects an ageing population and increased competition from high fructose corn syrup, artificial sweeteners and imports of products containing sugar (primarily cocoa preparations). In Japan, high fructose corn syrup provides an alternative sweetener to sugar for the food and beverage manufacturing industry (Sheales et al. 1999).

Figure 91 Sugar consumption and per person sugar use, Japan

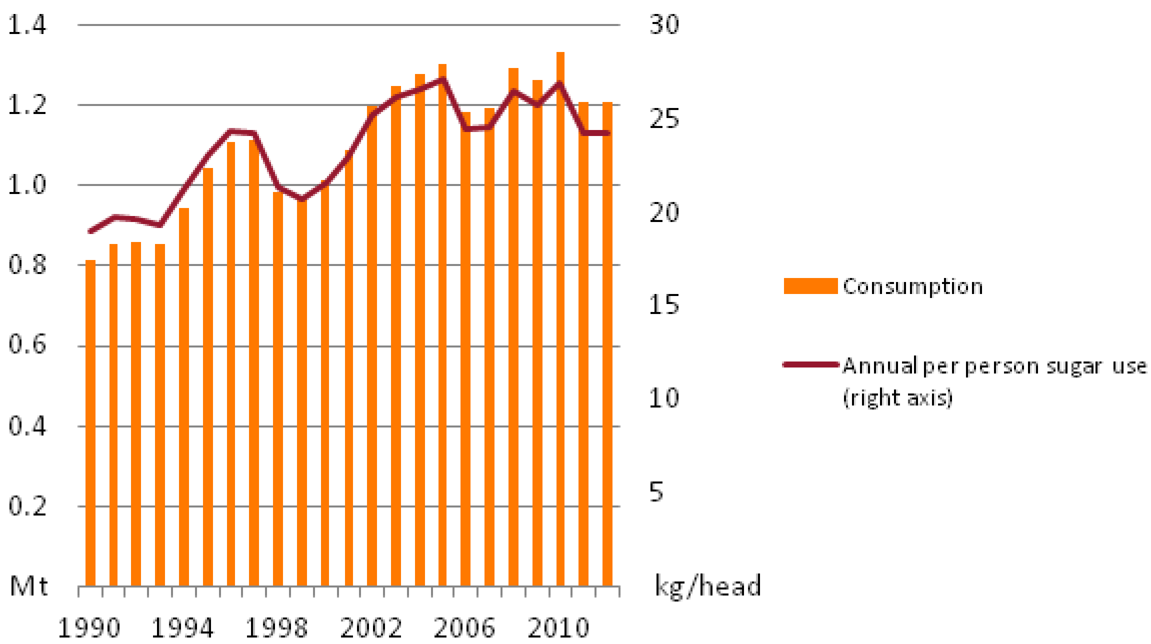


Source: ISO 2011, 2012; World Bank 2012

In the Republic of Korea, the beverage and food industries account for 25 per cent and 30 per cent, respectively, of total sugar consumption. Direct home and institutional use accounts for 35 per cent of consumption.

Total sugar consumption in the Republic of Korea increased to 1.2 million tonnes in 2011, 48 per cent more than in 1990 (Figure 92). The increase was driven mainly by income growth. However, a decline in sugar consumption in 2010 and 2011 was the result of local food and beverage industries shifting to high fructose corn syrup in lieu of sugar because sugar prices were relatively higher (Goran et al. 2013). This shift to high fructose corn syrup also affected per person consumption. Annual sugar consumption per person rose to a high of 27 kilograms in 2005 before declining to 24 kilograms in 2011 (Figure 92).

Figure 92 Sugar consumption and per person sugar use, Republic of Korea

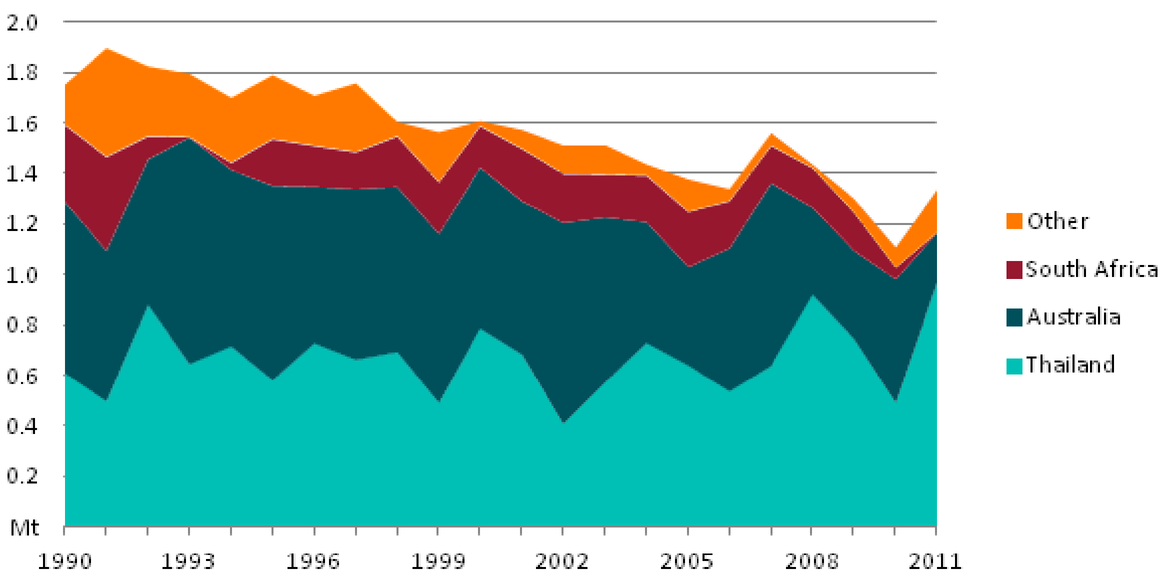


Source: ISO 2011, 2012; World Bank 2012

Trade

Japan's sugar imports declined from 1.8 million tonnes in 1990 to 1.4 million tonnes in 2011. The main sources of sugar imports for Japan in the 10 years to 2011 have been Thailand, Australia and South Africa, which accounted for 48 per cent, 36 per cent and 10 per cent, respectively (Figure 93). In the same period, Japan exported small quantities of sugar to Hong Kong and China.

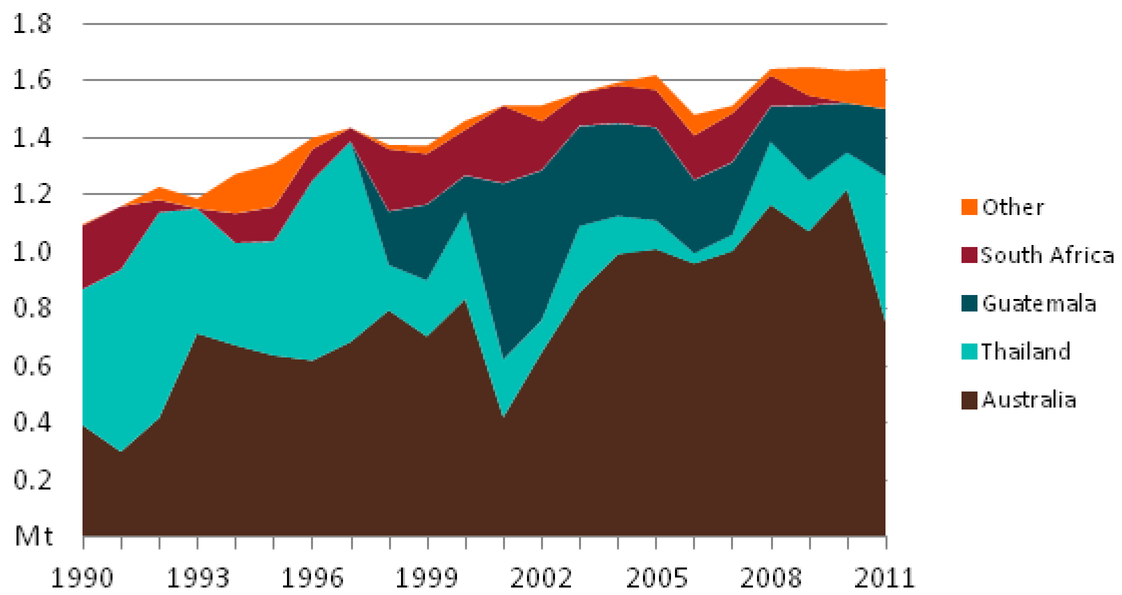
Figure 93 Source of sugar imports, Japan



Source: ISO 2011, 2012

The Republic of Korea imports raw sugar, which it then refines. Since 2000 raw sugar imports have ranged from 1.4 million tonnes to 1.6 million tonnes. The main sources of raw sugar imports in the 10 years to 2011 were Australia (61 per cent), Guatemala (18 per cent), Thailand (11 per cent) and South Africa (6 per cent) (Figure 94).

Figure 94 Source of raw sugar imports, Republic of Korea



Source: ISO 2011, 2012

The Republic of Korea exports small quantities of refined white sugar. In the 10 years to 2011 its main export markets for refined white sugar included China (40 per cent), Hong Kong (36 per cent), Indonesia (7 per cent) and Japan (6 per cent) (ISO 2012, 2011).

Policies

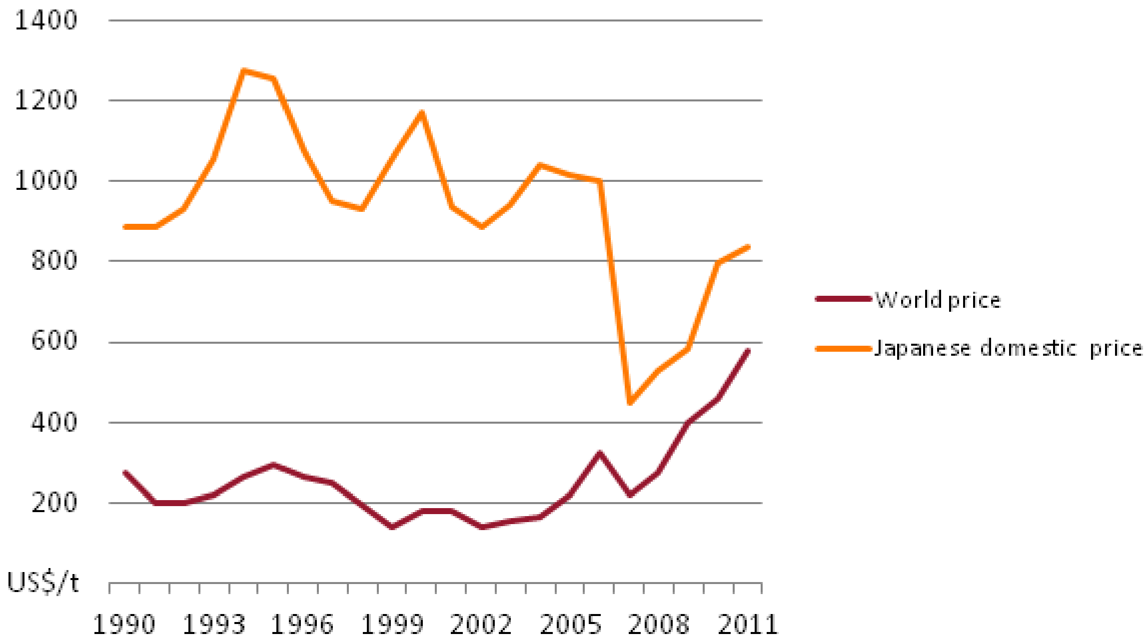
Domestic policies

Before reforms were introduced in 2007, sugar beet and sugar cane producers in Japan received guaranteed minimum prices that were set each year by the Ministry of Agriculture, Forestry and Fisheries and which the sugar cane miller or beet processor were required to pay. In exchange, the sugar miller or beet processor received a subsidy financed from a surcharge on imported sugar and from the national budget (OECD 2009).

Under the reforms introduced in 2007, price support to sugar producers was partially replaced by direct payments. Beet producers receive payments based on the historical area planted to sugar beet and the current planted area, while output-based payments have been introduced for producers of sugar cane (OECD 2009).

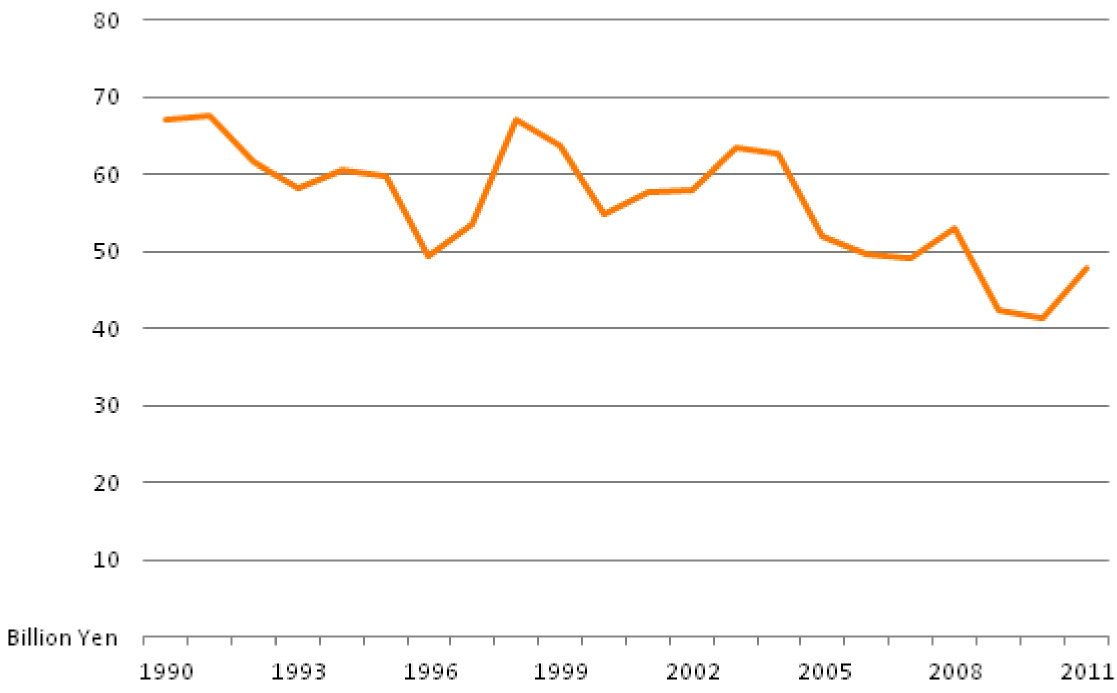
Historically, the domestic price of raw sugar in Japan has been well above the world price (Figure 95). However, the gap between domestic and world sugar prices has narrowed since 2007 following the change in policies from price support toward direct payments to producers. While the form of support has changed, income transfers to domestic sugar producers remain high (Figure 96).

Figure 95 Japanese and world raw sugar prices



Source: FAO 2013; IMF 2012; OECD 2013

Figure 96 Income transfers to sugar producers, Japan



Note: OECD estimates of the single commodity transfer for sugar.
Source: OECD 2013

The Government of the Republic of Korea protects sugar refiners from import competition through regulating domestic refined sugar prices, which are set in consultation with the industry. Wholesale prices for refined sugar are controlled by the government. This policy ensures that refiners can import raw sugar and sell the refined product profitably in the domestic market.

Trade policies

The Japanese Government, through the Agriculture and Livestock Industries Corporation (ALIC), acts as a state-trading agency in the Japanese sugar market, with a monopoly on imported raw sugar purchases and the domestic resale of these raw sugar imports. The government, in consultation with ALIC, controls the volume of raw sugar imports by establishing a quarterly raw sugar import volume target for each import company (OECD 2012). Japan has tariff-only protection for raw sugar. The bound tariff rate on centrifugal cane sugar is 71.8 yen a kilogram.

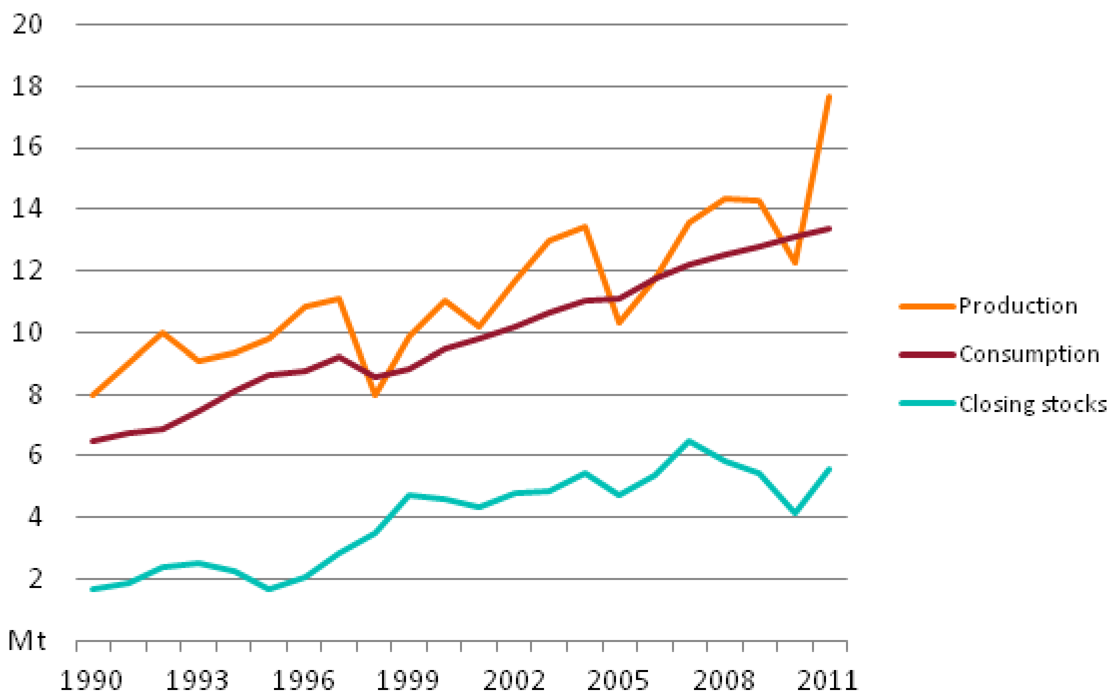
The Government of the Republic of Korea imposes an applied tariff of 3 per cent on raw sugar imports, while the bound tariff is 18 per cent (WTO 2013a). Tariff quota restrictions are not imposed on sugar imports. Each of the three refining companies is allowed to import raw sugar for domestic use under the import licence system approved by the Korean Sugar Manufacturers Association.

ASEAN

Production

ASEAN member states accounted for around 9 per cent of world sugar production in the 10 years to 2011. ASEAN is the second largest producer of sugar in Asia, next only to India. It accounted for around 26 per cent of the sugar produced in Asia in the 10 years to 2011. During this period, sugar production increased from 11.7 million tonnes in 2002 to 17.7 million tonnes in 2011 (Figure 97). This was 3.3 million tonnes more than the previous historical high of 14.4 million tonnes in 2008. This increase was driven mainly by higher world sugar prices in 2010 and 2011, which led farmers to increase areas planted to sugar cane at the expense of alternative crops.

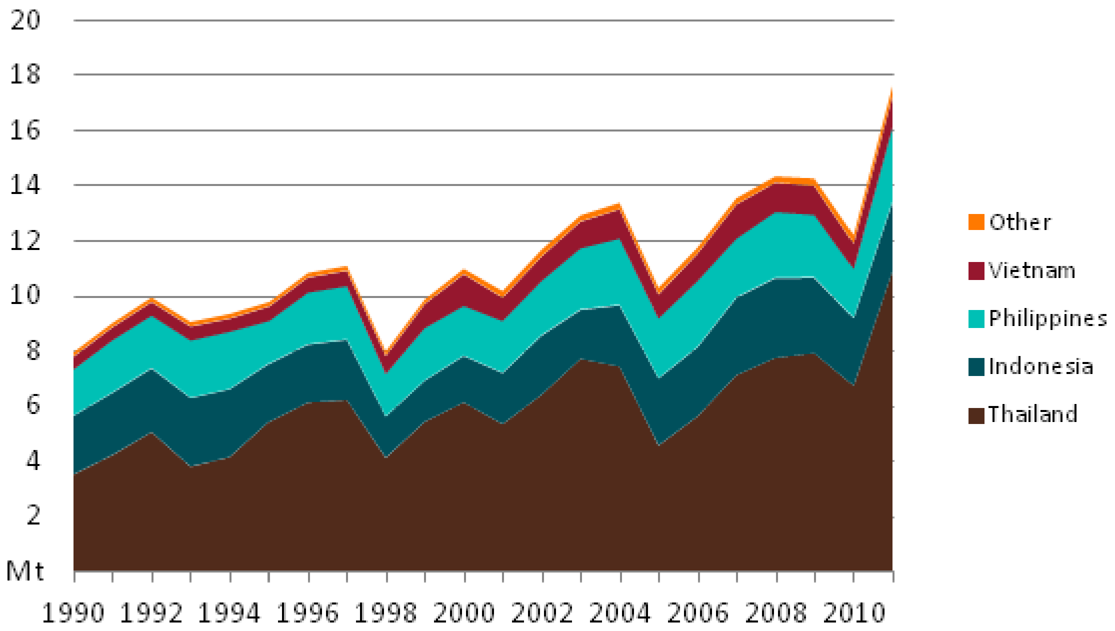
Figure 97 Sugar production, consumption and stocks, ASEAN



Source: ISO 2011, 2012

Thailand, the Philippines, Indonesia and Vietnam are the main sugar producers among the ASEAN member states (Figure 98). The four countries together accounted for around 98 per cent of the region's sugar production in 2011. Thailand is the largest producer in the region, accounting for around 62 per cent of production in 2011. The Philippines, Indonesia and Vietnam accounted for 15 per cent, 14 per cent and 7 per cent, respectively. Sugar cane production in the region competes for land with cassava, rice, maize and soybeans.

Figure 98 Sugar production by country, ASEAN



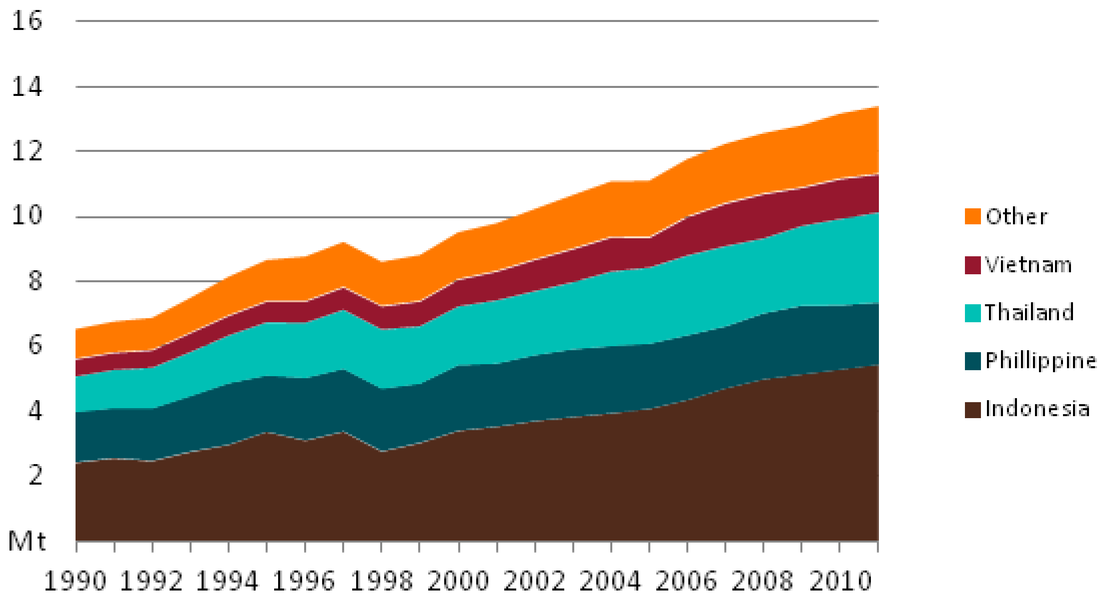
Source: ISO 2011, 2012

Currently, over 190 sugar mills and a number of sugar refineries are located in the ASEAN member states. Of these sugar mills, 47 are in Thailand, 61 in Indonesia and 38 in Vietnam. The Philippines has 29 sugar mills and 14 sugar refineries (PDA–SRA 2011).

Consumption

ASEAN member states accounted for 8 per cent of world sugar consumption and 21 per cent of Asian sugar consumption in the 10 years to 2011. Consumption in ASEAN member states grew at an average of 4 per cent a year, from 10.2 million tonnes in 2002 to 13.4 million tonnes in 2011. The main drivers of sugar consumption in the region have been growth in consumer incomes and population. Sugar consumption per person in 2011 was 22.4 kilograms, which was 3.3 kilograms more than in 2002. The bulk of ASEAN sugar consumption growth took place in the four main sugar producing countries, Thailand, the Philippines, Indonesia and Vietnam (Figure 99).

Figure 99 Sugar consumption by country, ASEAN



Source: ISO 2011, 2012

Indonesia is the largest sugar consumer in the region and accounted for around 41 per cent of ASEAN sugar consumption in 2011. From 2002 to 2011 sugar consumption per person in Indonesia increased by 6 kilograms to reach 22.4 kilograms in 2011.

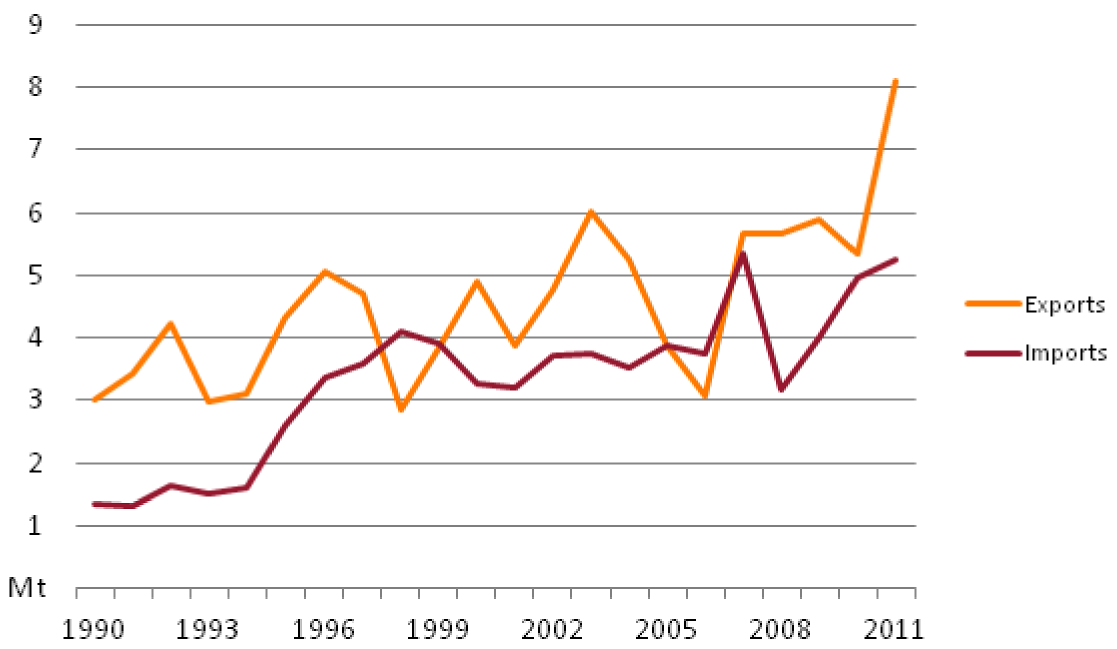
Thailand is the second largest sugar consumer in the region, accounting for 20 per cent of ASEAN consumption in the 10 years to 2011. Sugar consumption per person in Thailand rose to 40 kilograms in 2011, 9 kilograms higher than in 2002 (ISO 2012, 2011; World Bank 2012). This level of sugar consumption per person was far larger than the world average of 23.4 kilograms. Thailand's sugar consumption growth was boosted mainly by increased consumer incomes and population growth.

The Philippines accounted for 17 per cent and Vietnam 10 per cent of total ASEAN sugar consumption. Consumption per person in Vietnam increased from 11.9 kilograms in 2002 to 13.2 kilograms in 2011. By contrast, sugar consumption per person in the Philippines declined from 26 kilograms in 2002 to 23 kilograms in 2009 and 20 kilograms in 2011. The decline was precipitated by relatively high sugar prices in 2010 and 2011, which led industrial users of sugar to shift from using cane sugar to other sweeteners (high fructose corn syrup and premixes) imported from Thailand.

Trade

ASEAN member states accounted for around 11 per cent of world sugar exports and 66 per cent of Asia's sugar exports in the 10 years to 2011. During the same period, ASEAN member states accounted for 9 per cent of world sugar imports and 32 per cent of Asian sugar imports. In the 10 years to 2011, ASEAN sugar exports rose by 7 per cent to 8.1 million tonnes, while sugar imports rose by 4 per cent to 5.2 million tonnes (Figure 100).

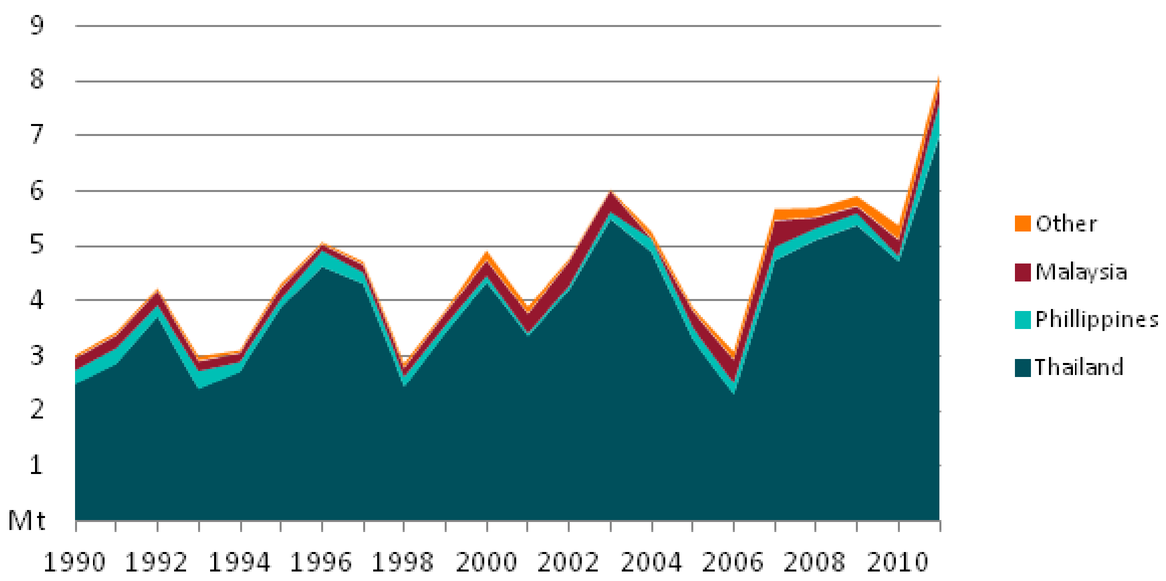
Figure 100 Sugar trade, ASEAN



Source: ISO 2011, 2012

The main sugar exporter among the ASEAN member states is Thailand (Figure 101), which accounted for an average of 88 per cent of ASEAN sugar exports in the 10 years to 2011. However, sugar production in Thailand was affected by adverse seasonal conditions in some years, reducing supplies available for export. Malaysia and the Philippines accounted for 6 per cent and 4 per cent, respectively, of total ASEAN sugar exports in the 10 years to 2011 (Figure 101).

Figure 101 Main sugar exporters, ASEAN

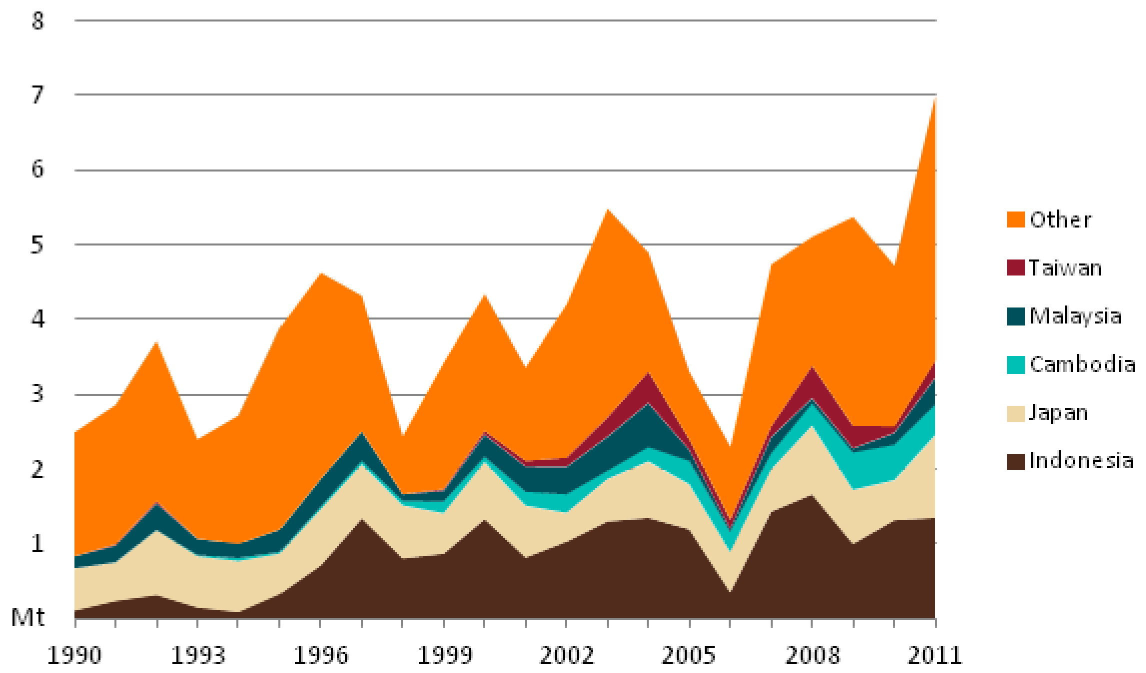


Source: ISO 2011, 2012

Thailand has a country-specific allocation for exports of 14 743 tonnes of raw cane sugar to the United States. In individual years, Thailand may be given an additional allocation depending on the result of annual quota reallocation by the United States. The main sugar export markets for

Thailand in the 10 years to 2011 were Indonesia, Japan, Cambodia, Malaysia and Taiwan (Figure 102). Together, Indonesia and Japan accounted for 40 per cent of Thailand's sugar exports in the 10 years to 2011.

Figure 102 Destination of exports, Thailand



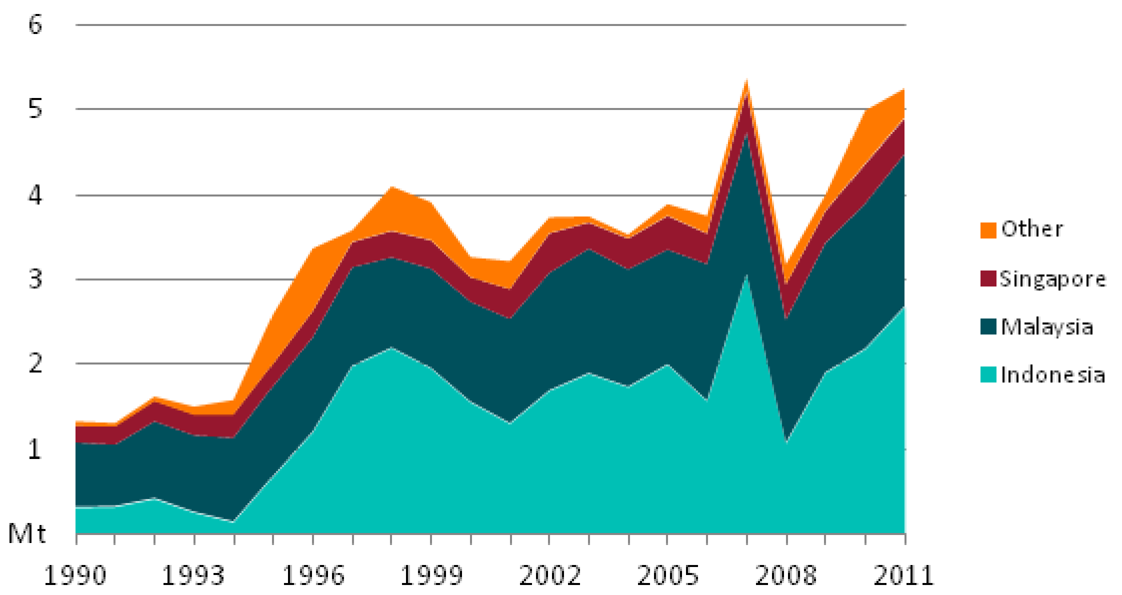
Source: ISO 2011, 2012

The major export markets for Malaysia's refined sugar in recent years have been Indonesia, Singapore and Vietnam.

The Philippines has a country-specific allocation for exports of 142 160 tonnes of raw cane sugar to the United States. In individual years, the Philippines may be given an additional allocation depending on the result of annual quota reallocation by the United States. In addition, the Philippines also exported limited amounts of sugar to Indonesia, Japan and China in the five years to 2011.

The main sugar importers among the ASEAN member states are Indonesia and Malaysia, which accounted for around 48 per cent and 37 per cent, respectively, of ASEAN sugar imports in the 10 years to 2011 (Figure 103). Singapore is the next largest sugar importer within ASEAN and accounted for 5 per cent of ASEAN sugar imports in the 10 years to 2011.

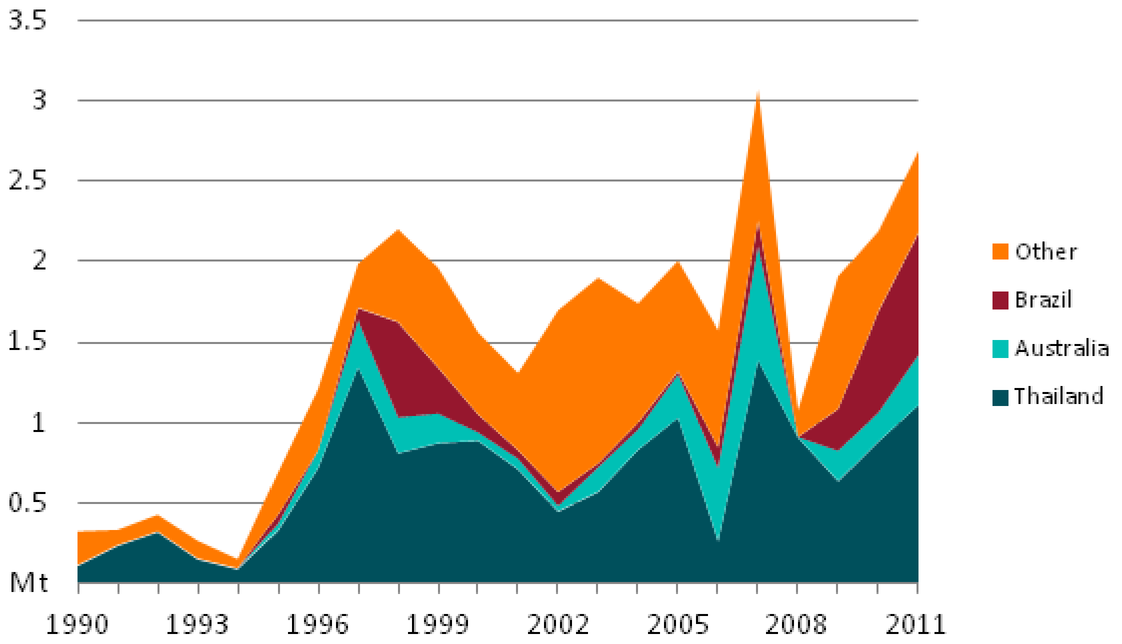
Figure 103 Main sugar importers, ASEAN



Source: ISO 2011, 2012

The main sources of sugar imports for Indonesia in recent years have been Thailand, Australia and Brazil (Figure 104). In the 10 years to 2011, Malaysia imported most of its sugar from Thailand, Australia, Brazil and China.

Figure 104 Source of sugar imports, Indonesia



Source: ISO 2011, 2012

Policies

Domestic policies

The Government of Thailand supports sugar production by setting the domestic price for cane, which is usually well above world prices. The government also operates a revenue sharing arrangement for cane growers and millers and regulates domestic sales. Under the revenue sharing arrangement for growers, 70 per cent of the net proceeds of domestic and export sales of raw sugar and by-products (mainly molasses) are allocated to cane growers and 30 per cent to millers. In addition, cane growers receive around 14 per cent of the additional revenue from refined sugar exports (USDA–FAS 2012d, 2011c, 2010c).

Cane growers receive a preliminary price for cane, determined at the start of each season (December to October), that is not less than 80 per cent of the forecast for the final cane price made by the Office of the Cane and Sugar Board. If the final price announced at the end of the season is higher than the preliminary price, then millers pay growers the final price. Any shortfall between the preliminary and final price is reimbursed to the millers from the Cane and Sugar Fund. The fund is financed through a tax on the value of domestic and export sales but is also augmented by government subsidies when necessary (USDA–FAS 2012d, 2011c, 2010c).

In Vietnam, the government's National Price Commission sets a minimum price for the sugar cane that growers receive from mills, as well as the maximum price for sugar in the domestic market in each year. The government subsidises infrastructure and pays for roads, bridges and irrigation in cane growing regions. The government also initiates, allocates, secures and distributes milling investment and working capital through state-owned enterprises. The government provides additional support to financially troubled mills and controls and regulates direct foreign investment and private investment in the sugar industry (Ellis et al. 2010; Goletti & Rich 1998; Sheales et al. 1999). The government also controls land and other resource allocation procedures to cane farmers.

The Government of Indonesia launched a sugar machines revitalisation program in 2008 as part of its move to achieve a target of sugar self-sufficiency by 2014 and reduce its reliance on sugar imports for domestic consumption. The government sets floor prices for sugar in each season. Indonesia's Ministry of Trade issued a regulation that requires registered sugar importers to support the sugar price should the import price fall below the equivalent domestic floor price. The support is given to farmers through the purchase of domestic sugar production in cooperation with a third party that has secured a sugar import permit from the local Association of Sugarcane Farmers (USDA–FAS 2013, 2012e, 2011d).

The Malaysian Government regulates and controls the wholesale and retail prices of domestic refined sugar as well as imports. The government estimates domestic consumption requirements and sets a quota allocation for refiners and millers to supply the domestic market on an annual basis. As a general policy to stabilise domestic prices, the Malaysian Government permits domestic refiners to make additional profits when raw sugar import prices are low in order to compensate them for when prices are high. The Malaysian Government promotes sugar consumption by giving subsidies on sugar prices (Najib 2012).

Trade policies

Sugar imports in Thailand, the Philippines, Malaysia and Vietnam are subject to tariff quotas (Table 11). While Vietnam has established a tariff quota, Vietnam's most favoured nation applied tariff was 15 per cent in 2012 (WTO 2013b). This was less than the scheduled in-quota tariff.

Table 11 WTO tariff quotas, ASEAN

Country	Tariff quota volume (t)	In-quota tariff (%)	Out-of-quota tariff (%)
Thailand	13 760	65	94
Philippines	64 050	50	80
Malaysia	29 600	5 **b**	15
Vietnam **a**	73 700	25	85

*Note: **a** The tariff quota volume for Vietnam is an estimate for 2013. This reflects Vietnam's WTO commitments for an initial tariff quota volume of 55 000 tonnes in 2007, subject to a 5 per cent annual increase beyond 2007. The in-quota and out-of-quota tariffs for Vietnam are for tariff line HS17011100 (cane sugar). The in-quota and out-of-quota tariffs for tariff line HS17011200 (beet sugar) are 50 per cent and 100 per cent respectively. **b** Plus 220.46 Malaysian ringgit per tonne.*
Source: WTO 2013a, 2013b

Thailand and the Philippines have excluded sugar in their commitments under the ASEAN free trade area. On the other hand, Malaysia allows imports of sugar originating from ASEAN member states to enter duty free. Vietnam applies a 5 per cent tariff on sugar originating from ASEAN member states. In addition, under the ASEAN–Australia–New Zealand Free Trade Agreement, Vietnam's tariff on imports from member countries will be reduced to zero by 2020.

Indonesia uses tariffs and temporary import bans to protect its sugar industry. Indonesia's bound tariff is 95 per cent but the applied tariff is either 790 or 550 rupiah per kilogram, depending on the tariff line (WTO 2013a, 2013b). Sugar imports are temporarily prohibited for a period extending from a month prior to the milling season to two months after the milling season (USDA–FAS 2012e). The Indonesian Minister of Trade issued a regulation stating that specific qualities of white sugar may be imported if the domestic production of white sugar is not sufficient to meet demand (USDA–FAS 2013, 2012e).

Singapore operates a free market regime for sugar, with no duties on imports of raw or refined sugar. Domestic prices are free from intervention and imported refined sugar competes freely with domestically produced refined sugar.

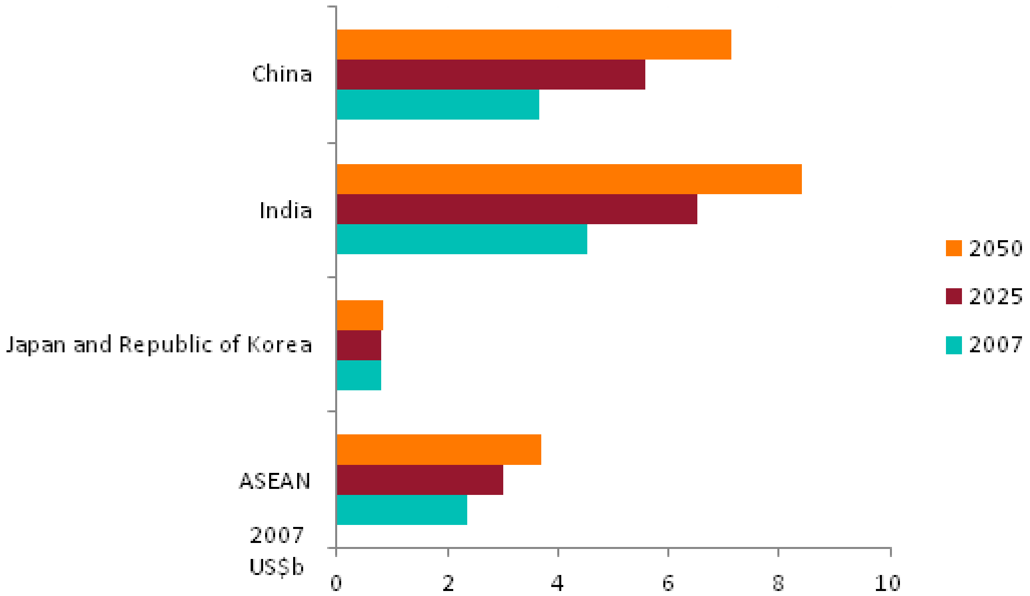
Long-term prospects

Consumption

China is projected to remain the second largest consumer of sugar in Asia by 2050, with the real value of consumption at around US$7 billion, nearly double that of 2007. Consumption growth is projected to be higher between 2007 and 2025 than between 2025 and 2050. This is because of projected higher population (United Nations Population Division 2011) and income growth between 2007 and 2025. Per person consumption of sugar is consequently projected to be 17 kilograms in 2050, around double that in 2007.

India is projected to remain the largest consumer of sugar in Asia by 2050, with the real value of consumption (in 2007 US dollars) projected to be around US$8 billion, 85 per cent higher than in 2007 (Figure 105). Higher growth is also projected between 2007 and 2025 because of higher population growth (United Nations Population Division 2011). Between 2007 and 2025 consumption is projected to increase by 2 per cent annually compared with 1 per cent between 2025 and 2050. Per person consumption is also projected to increase from 17 kilograms in 2007 to 22 kilograms in 2050. Given the relatively small increase in per person consumption, the projected growth in total consumption is largely the result of a rise in population.

Figure 105 Real value of Asia's sugar consumption



Source: ABARES model output

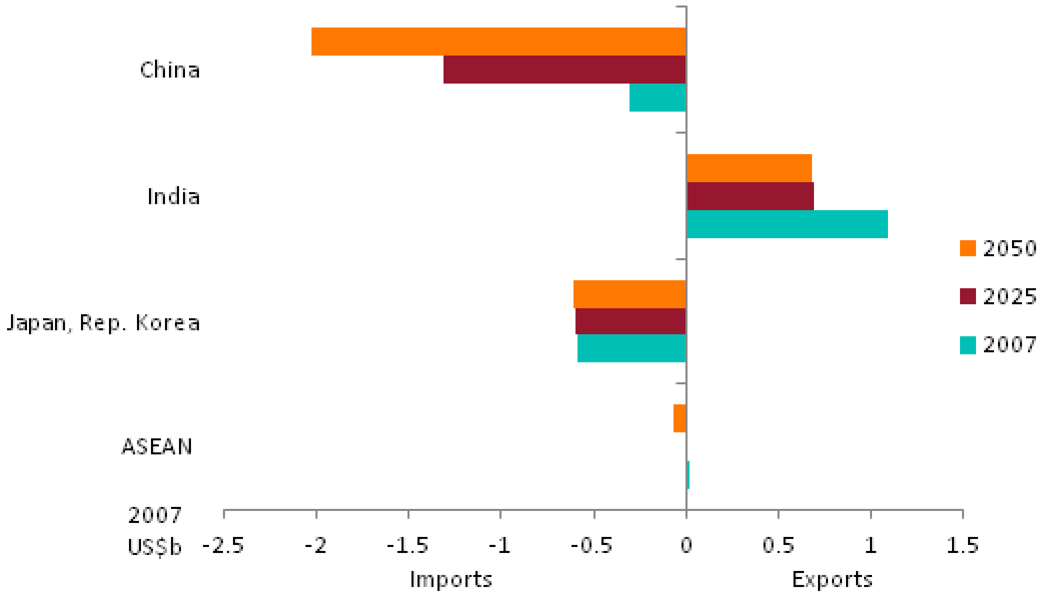
Sugar consumption for Japan and the Republic of Korea is projected to remain relatively constant, with the real value of consumption at US$800 million in 2050. Per person consumption of sugar is projected to remain just above recent historical levels in 2050 for Japan and the Republic of Korea.

For the ASEAN member states, the real value of sugar consumption in 2050 is projected to be around US$4 billion, 56 per cent higher than in 2007. This is projected to be underpinned by population growth and increased per person consumption. By 2050 Indonesia is projected to remain the largest consumer of sugar among the ASEAN member states, with total consumption to increase to around US$1 billion.

Trade

China is projected to be a net importer of sugar in 2050, with the real net value of imports (in 2007 US dollars) at around US$2 billion (Figure 106). Most of this import growth (US$1 billion) is projected to occur between 2007 and 2025 because of the high consumption growth relative to the increase in domestic production over this period. Imports are projected to account for 29 per cent of China's total sugar consumption by 2050, compared with around 8 per cent in 2007, reflecting the increasing role imports will have in meeting China's expanding sugar demand.

Figure 106 Real value of Asia's net trade for sugar



Source: ABARES model output

In 2007 India was a net exporter of sugar and this is expected to remain the case out to 2050, with the real net value of exports projected to be around US$600 million. The projected small decrease in net exports corresponds with the high growth in consumption relative to production over the projection period. With production projected to increase by 60 per cent by 2050, the vast majority of sugar consumed in India is likely to be supplied by domestic production.

The total real net value of sugar imports from Japan and the Republic of Korea in 2050 is projected to be US$600 million, marginally higher than in 2007. This reflects the small projected growth in consumption for both these countries and mostly unchanged production compared with recent historical levels.

Together, the ASEAN member states are projected to be a small net importer of sugar in 2050, with the real net import value projected to be less than US$100 million. By 2050 several ASEAN member states, including Indonesia (US$1.2 billion) and Malaysia (US$400 million), are projected to be net importers. However, production growth projected for Thailand, and the subsequent projected increase in Thailand’s exports, will offset most of the projected growth in sugar imports in other ASEAN member states.

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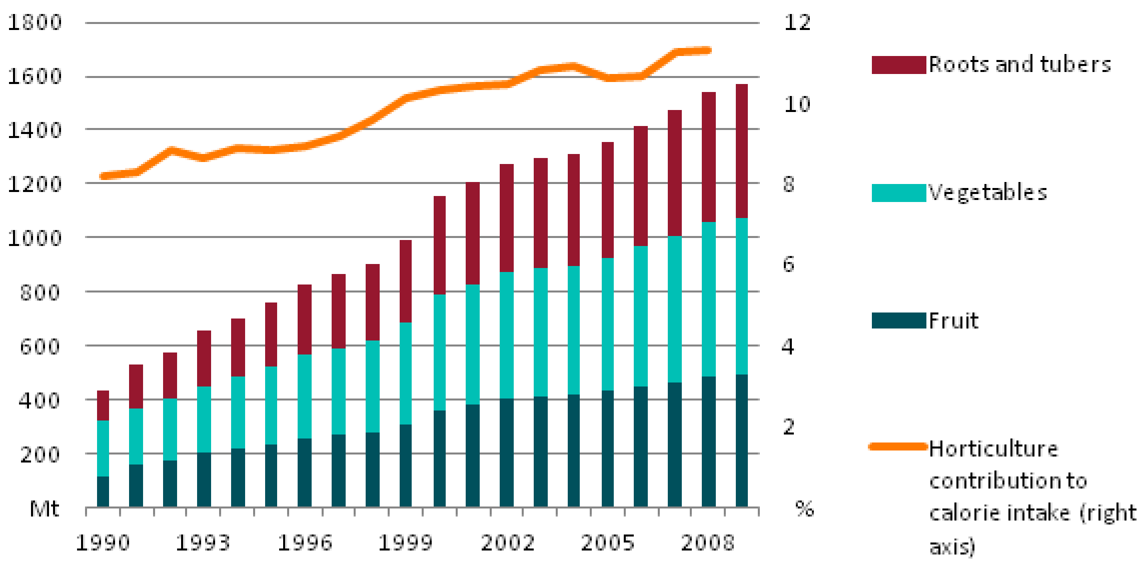
8 Horticultural products

Brian Moir and Andrew Haylen

The countries studied here extend over a wide range of climatic zones; Indonesia spans the equator, while the north of China extends to 53° 25'N. China includes coastal and inland climates over a range of latitudes. It is not surprising that these countries produce a diversity of fruits and vegetables. China is the largest producer of horticultural products in the region (Table 12). Potatoes, sweet potatoes, cassava, watermelons, tomatoes, bananas, cucumbers and gherkins, cabbages, onions, eggplants and apples are the horticultural products produced in the largest volumes in Asia (Table 13). Watermelons, cucumbers, spinach, carrots, grapes and some stone fruits are among those showing the strongest production growth, responding to demand driven by increasing affluence. Production of some tropical fruits and roots and tubers has grown more slowly.

Increasing affluence in the studied countries has given rise to a shift in dietary patterns. Consumption of horticultural products for food, averaged over all the countries, increased from 150 kilograms a person in 1990 to around 280 kilograms in 2009. Horticultural products include fruit, vegetables, roots and tubers and tree nuts. Fruit and vegetable consumption each increased more than 5 per cent a year, while consumption of roots and tubers grew at only 1.2 per cent. The contribution of horticultural products to the total daily calorie intake rose from 8.2 per cent in 1990 to 11.3 per cent in 2009 averaged over all countries in the study (Figure 107).

Figure 107 Consumption of horticultural products, all countries in study



Source: FAO 2013a, b

Table 12 Volume of horticultural products produced by selected Asian countries, 2007 to 2011

Country	2007 (Mt)	2008 (Mt)	2009 (Mt)	2010 (Mt)	2011 (Mt)
Brunei Darussalam	0.0	0.0	0.0	0.0	0.0
Cambodia	3.1	4.6	4.5	5.3	5.5
China	734.7	775.2	794.9	824.8	866.8
India	188.6	205.1	204.7	221.3	232.1
Indonesia	47.6	50.9	52.9	51.9	54.8
Japan	19.6	19.5	18.7	17.2	17.5
Lao, People's Democratic Republic	1.5	1.4	1.9	2.1	2.7
Malaysia	1.7	1.8	2.0	2.3	2.4
Myanmar	7.2	8.0	8.1	8.6	9.0
Philippines	23.2	24.4	24.7	25.4	25.3
Republic of Korea	14.6	15.1	15.3	13.4	14.9
Singapore	0.0	0.0	0.0	0.0	0.0
Thailand	43.4	39.8	44.5	36.5	39.2
Vietnam	23.9	24.8	25.4	25.7	28.6

Note: Includes fruit, vegetables, roots and tubers and tree nuts.
Source: FAO 2013c

Table 13 Major horticultural products produced in selected Asian countries

Product	2007 (Mt)	2008 (Mt)	2009 (Mt)	2010 (Mt)	2011 (Mt)
Apples	30.8	33.2	35.0	36.3	39.9
Bananas	48.5	52.4	54.3	58.1	59.8
Cabbages and other brassica	43.6	44.8	44.1	44.9	47.6
Cassava	72.3	75.8	81.0	74.8	76.4
Cucumbers and gherkins	40.1	44.2	46.3	47.6	49.3
Eggplants	32.5	34.5	37.3	38.4	40.7
Garlic	17.5	20.1	19.5	20.0	20.9
Mangoes, mangosteens, guavas	23.1	24.0	23.1	24.8	26.7
Onions	41.2	41.1	40.9	44.6	48.5
Potatoes	99.0	111.1	113.1	123.4	135.8
Sweet potatoes	82.3	84.9	83.4	80.9	82.2
Tomatoes	48.4	52.5	58.8	61.7	67.9
Watermelons	65.7	66.5	68.5	70.3	72.9

Note: The countries to which this table relates are *Brunei Darussalam, Cambodia, China, India, Indonesia, Japan, People's Democratic Republic of Lao, Malaysia, Myanmar, the Philippines, the Republic of Korea, Singapore, Thailand and Vietnam.*
Source: FAO 2013c

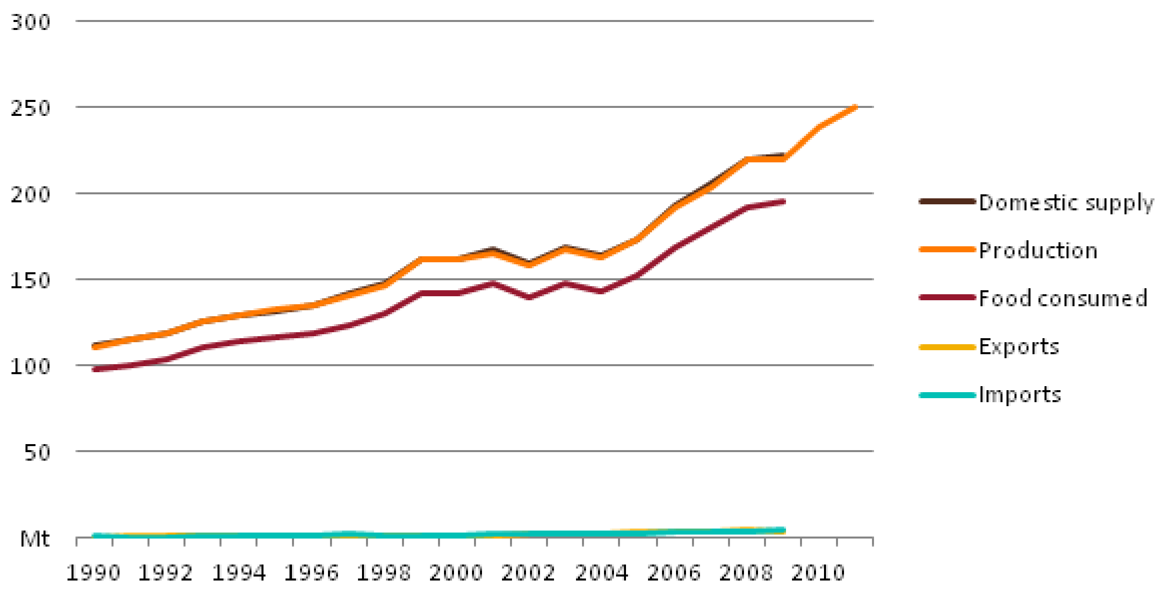
China

Production

Between 1990 and 2011 overall growth in production of horticultural products averaged around 5 per cent a year (Figure 108). China is the largest producer of fruit and vegetables in Asia, accounting for 77 per cent of the vegetables produced in these countries in 2011, and its production grew at 6.8 per cent a year between 1990 and 2011. It accounted for half of the fruit produced in these countries in 2011; its production grew at 8.8 per cent between 1990 and 2011. China's production of roots and tubers grew more slowly at just under 1 per cent a year between 1990 and 2011.

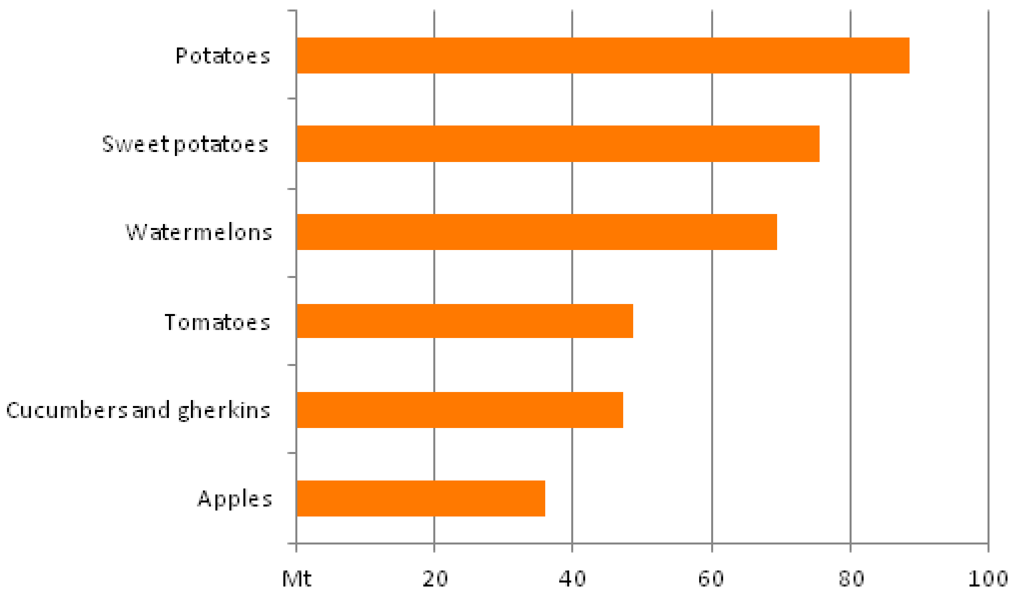
Potatoes, sweet potatoes, watermelons, tomatoes, cucumbers and apples are China's major horticultural products (Figure 109). Production of watermelons, tomatoes, cucumbers and apples has grown, in each case, at an average rate of more than 8 per cent a year.

Figure 108 Horticultural products, supply and use, China



Note: Commodity Balance Sheet data expressed as primary crop equivalent. Domestic supply is defined as production plus imports minus exports plus changes in stocks. It may be taken as a proxy for consumption for all uses, and includes waste. Data on human consumption refer to the total amount of the commodity available as human food, including products derived by processing.
Source: Production available to 2011: FAO 2013c; other series available to 2009: FAO 2013a

Figure 109 Horticulture production, major items, 2011, China



Source: FAO 2013c

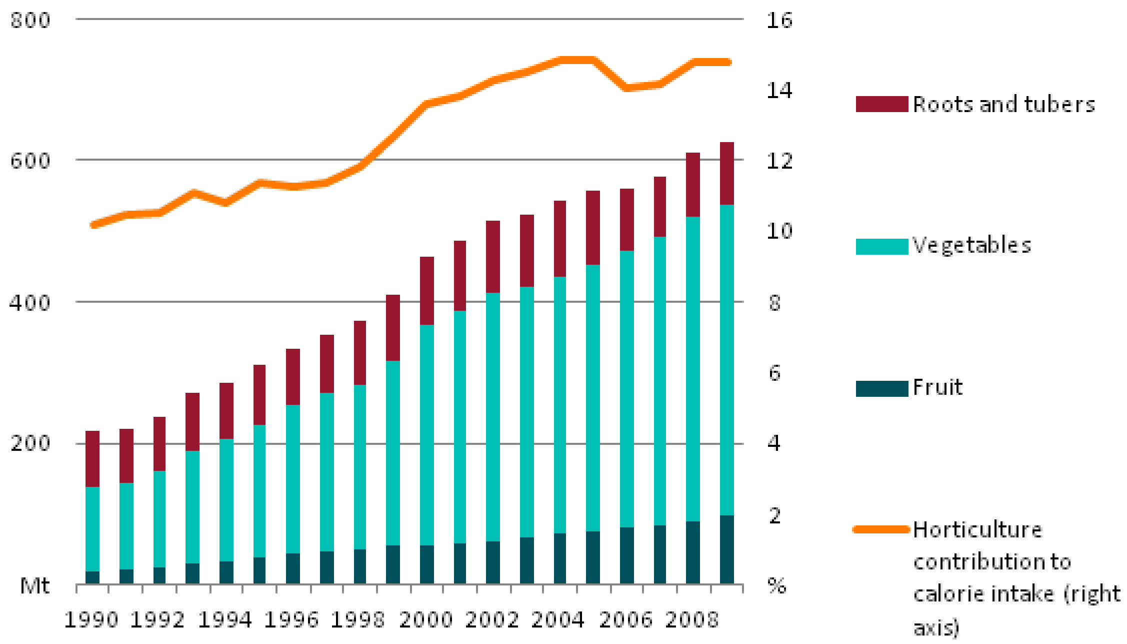
The area harvested for horticultural production in China increased markedly in the past two decades. The area used for vegetable production grew at 5.4 per cent, to triple between 1990 and 2011, while that used for fruit production more than doubled (FAO 2013c). The 'special crops tax', which taxed horticultural production at a higher rate than staple food crops, was abolished in 2003 making horticultural production more attractive relative to staple food crops (Deng 2006). Increases in the scale of production are contributing to a reduction in costs and expansion of output. In some cases the increased scale is achieved by contract farming, where individual farmers work closely with companies to produce the product required, and benefit from technical assistance and inputs provided by the company. In other cases, farmers lease their land to a company which puts together a large consolidated farm employing some or all of the original farmers (USDA–FAS 2011a).

Consumption

Increasing affluence in China has stimulated a change in dietary patterns, which includes increased consumption of fruit and vegetables. At the same time, development of cold storage facilities has extended the seasonal availability of fresh produce, and aggressive marketing by producer associations has also helped boost sales (USDA–FAS 2012).

Consumption of horticultural products in China grew at a little more than 5 per cent a year between 1990 and 2009 (Figure 110). Horticultural products contributed 10 per cent of China's average daily calorie intake in 1990, and this had increased to 15 per cent by 2009 (Figure 110) (FAO 2013a). Sweet potatoes, potatoes, tomatoes, apples and cassava are some of the main items consumed. Consumption of vegetables, except starchy roots, grew at 7 per cent a year during this period and accounted for most of the increase. Consumption of starchy roots grew at only 1 per cent a year. Consumption of fruit grew at nearly 9 per cent a year but is a much smaller component of total consumption. Tomatoes and apples are among those items showing the fastest growth, at 9 per cent and 10 per cent, respectively.

Figure 110 Consumption of horticultural products, China



Note: Commodity Balance Sheet data expressed as primary crop equivalent.
Source: FAO 2013a, b

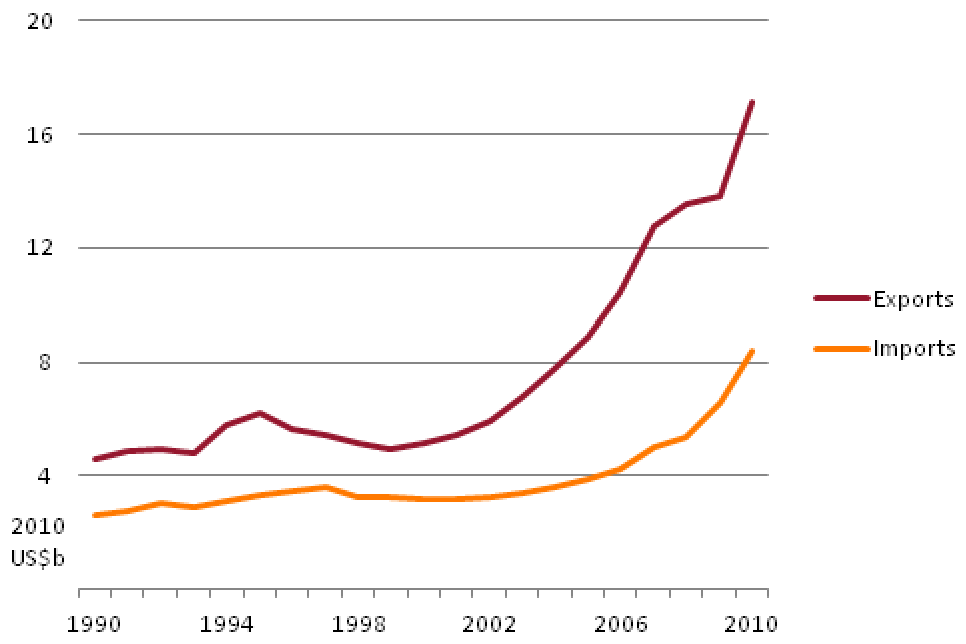
Trade

China is a net exporter (in value terms) of horticultural produce (Figure 111). In 2010 Chinese exports of horticultural products totalled US$15.9 billion; imports amounted to US$5.2 billion (FAO 2013d). The volume produced equates closely to domestic supply, and exports and imports are small by comparison (Figure 108).

China's most valuable horticultural export item in 2010 was garlic, worth US$2.3 billion (Figure 112). Mushrooms and apples, in fresh and processed forms, each earned more than US$1.5 billion, and were followed by tomatoes and beans. Japan, the Republic of Korea, the United States and the Russian Federation were China's top four markets. Other Asian countries were also important markets.

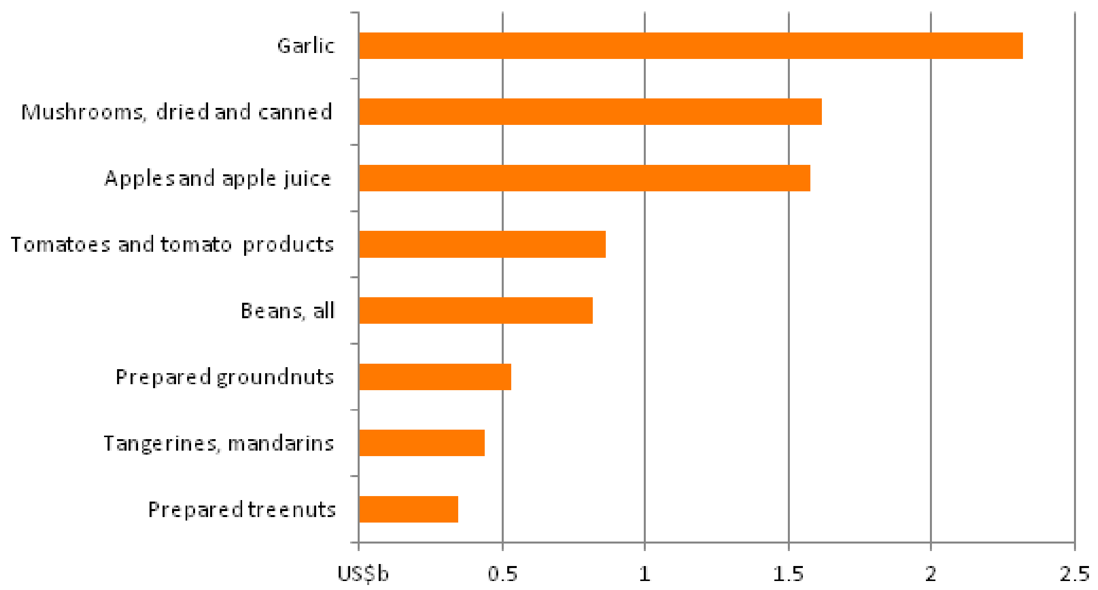
China's horticultural imports were dominated by cassava, with a value of US$1.2 billion in 2010. Imports of apples, peas and beans, bananas, grapes, citrus and pistachios each amounted to between US$200 million and US$310 million in 2010 (Figure 113). Thailand, the United States and Chile were the largest suppliers of horticultural products to China in 2010.

Figure 111 Trade in horticultural products, China



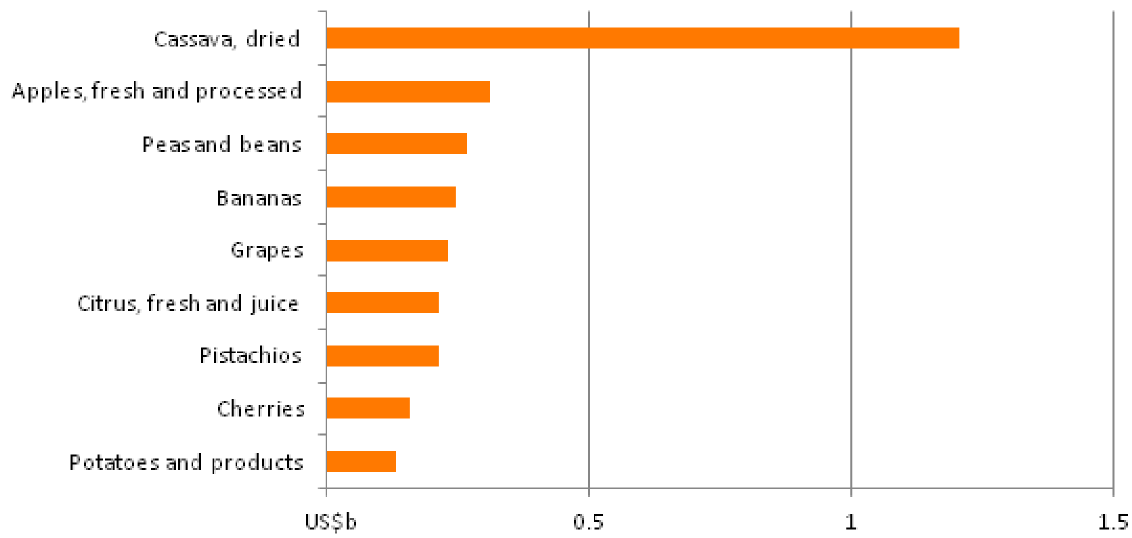
Source: FAO 2013d

Figure 112 Horticulture exports, major items, China, 2010



Source: FAO 2013d

Figure 113 Horticulture imports, major items, China, 2010



Source: FAO 2013d

Policies

Applied most favoured nation tariffs for horticultural products entering China are typically between 10 per cent and 30 per cent (WTO 2013).

Phytosanitary restrictions appear to be considerably more restrictive than tariffs on imports of horticultural products. Imported fruit must meet phytosanitary requirements agreed under a bilateral phytosanitary protocol between the General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China (AQSIQ) and the exporting country.

If such a protocol has not been agreed, exporters cannot export their fruit to China. AQSIQ negotiates its phytosanitary protocols on a product-by-product basis with individual exporting countries, and in some cases these negotiations take considerable time (FAO 2011). For example, a protocol to grant market access for Australian table grapes to China was signed in October 2010 after eight years of negotiation (Department of Primary Industries Victoria 2011). And a protocol allowing export of cherries from Australia to China was signed in January 2013 after only two years of negotiations (Sidebottom 2013).

Hong Kong is classified as a separate administrative area from mainland China and does not impose any protocols for import of fruit (Cherry Growers Australia 2012). A significant quantity of imports into Hong Kong finds its way to the mainland unrecorded (the so-called grey trade); consequently official import data are likely to understate the flow of horticultural products into China.

India

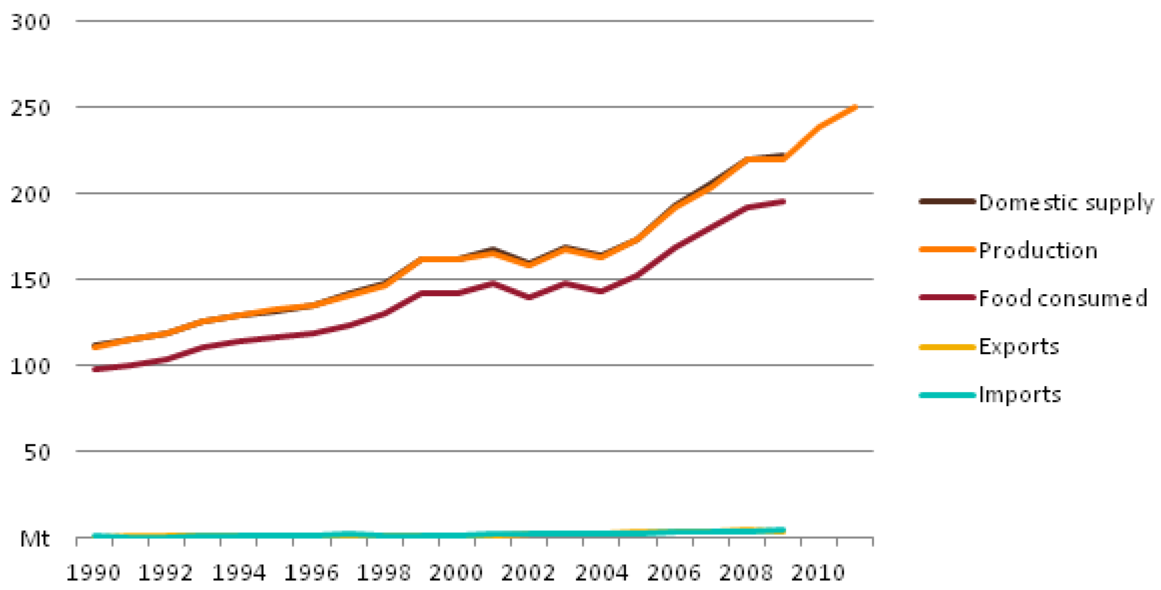
Production

India is the second largest producer of fruit and vegetables in Asia, but well below China in terms of production. India's production of horticultural products grew at an annual average of 4 per cent between 1990 and 2011 (Figure 114) (FAO 2013c), more slowly than China's at 5 per cent. The area of land harvested for horticulture expanded at 2.8 per cent a year. Fruit production grew more rapidly than other horticultural categories.

Production of fruit and vegetables in India is not covered by the minimum support price arrangements that apply to wheat and rice production, and this may have inhibited expansion of these industries. The difficulty of handling a perishable crop with limited cold chain facilities has been an additional limiting factor (Govil 2012).

The horticultural products produced in India in the greatest volume are potatoes, bananas, tomatoes, onions, mangoes and eggplants.

Figure 114 Horticultural products, supply and use, India

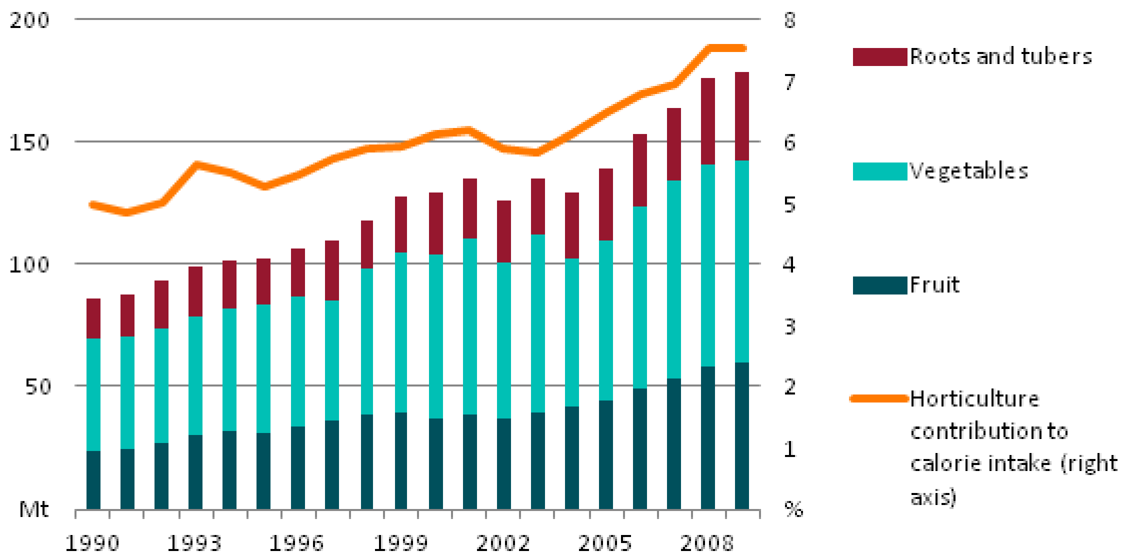


Note: Commodity Balance Sheet data expressed as primary crop *equivalent.* Domestic supply is defined as production plus imports minus exports plus changes in stocks. It may be taken as a proxy for consumption for all uses, and includes waste. Data on human consumption refer to the total amount of the commodity available as human food, including products derived by processing.
Source: Production available to 2011: FAO 2013c; other series available to 2009: FAO 2013a

Consumption

Horticultural products in India contribute less to average diets than they do in China, Japan, the Republic of Korea and ASEAN, but their contribution has grown over the past two decades. In 1990 horticultural products provided 5 per cent of the average calorie intake in India; in 2009 they provided 7.5 per cent (Figure 115). Consumption of fruit in particular is low compared with many other countries; consumers reportedly spend an average of just 4 per cent of their food expenditure on fresh fruit (USDA–FAS 2008). The quantity of horticultural products consumed grew by an average of 3.6 per cent a year between 1990 and 2009, a little slower than in China. Consumption of fruit, vegetables and starchy roots all increased during this time (Figure 115). Potatoes, bananas, tomatoes, onions and cassava are the major horticultural items consumed in India.

Figure 115 Consumption of horticultural products, India



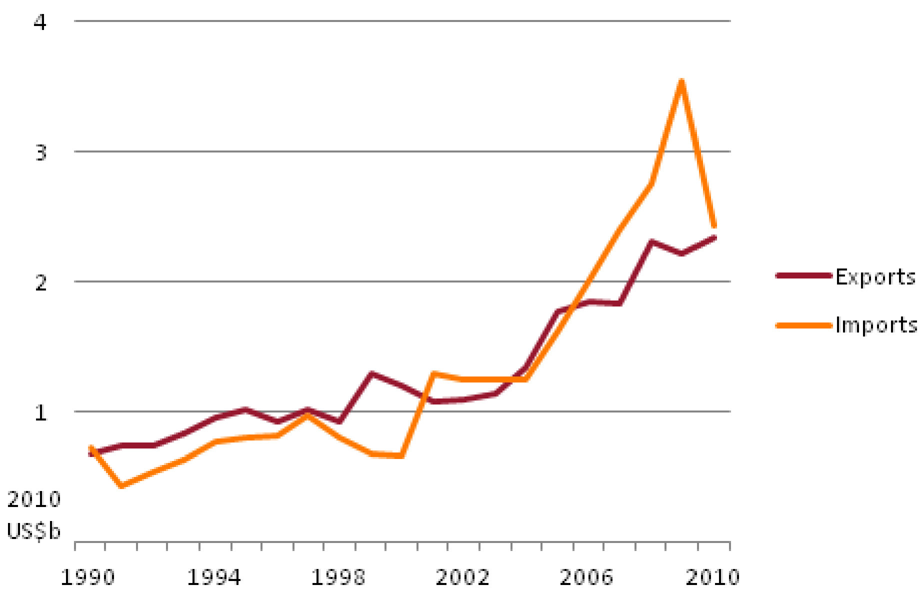
Note: Commodity Balance Sheet data expressed as primary crop equivalent
Source: FAO 2013a, b

Trade

India's exports and imports of horticultural products are very small compared with its levels of production and domestic supply (Figure 114). In 2009 imports amounted to less than 1 per cent of consumption, by volume (FAO 2013a). From 2007 to 2010 (the most recent four years for which data are available) India was a net importer of horticultural products, in value terms, but in previous years it alternated between being a net importer and a net exporter (Figure 116). In real terms, the value of imports and exports each increased by an average of around 6 per cent a year between 1990 and 2010.

India's exports have been assisted by developments in cold chain infrastructure and quality assurance measures (APEDA 2012). However, cold chain and transportation infrastructure facilities remain limited and continue to inhibit India's ability to export and import fresh produce, as well as constraining the domestic market (USDA–FAS 2008). Exporters face difficulties associated with their small scale and inability to obtain regular supplies of a consistent quality (Chandra & Kar 2006).

Figure 116 Trade in horticultural products, India



Source: FAO 2013d

India's most valuable exports in 2010 included shelled cashews, onions, mangoes, chick peas and grapes. The most important destinations for Indian exports are Bangladesh, the United Arab Emirates, the United States, the Netherlands and Malaysia.

India's top imports in 2010 included dried beans, peas, lentils and other pulses, cashews in shell, almonds in shell, dates and apples. Canada, Myanmar, the United States, Cote d'Ivoire and Tanzania were major sources of India's imports.

Policies

India applies a most favoured nation tariff of 30 per cent to many fruit and vegetable imports but some items, including garlic and dried grapes, carry tariffs as high as 100 per cent (WTO 2013). These tariffs are somewhat higher than most other Asian countries. In addition, import permits are required for many plant products, as well as phytosanitary certificates issued by the exporting country and inspections by Indian authorities. Quarantine treatments such as fumigation and cold treatment may also be required. Subject to these requirements, horticultural products can generally be imported into India free of quantitative restrictions.

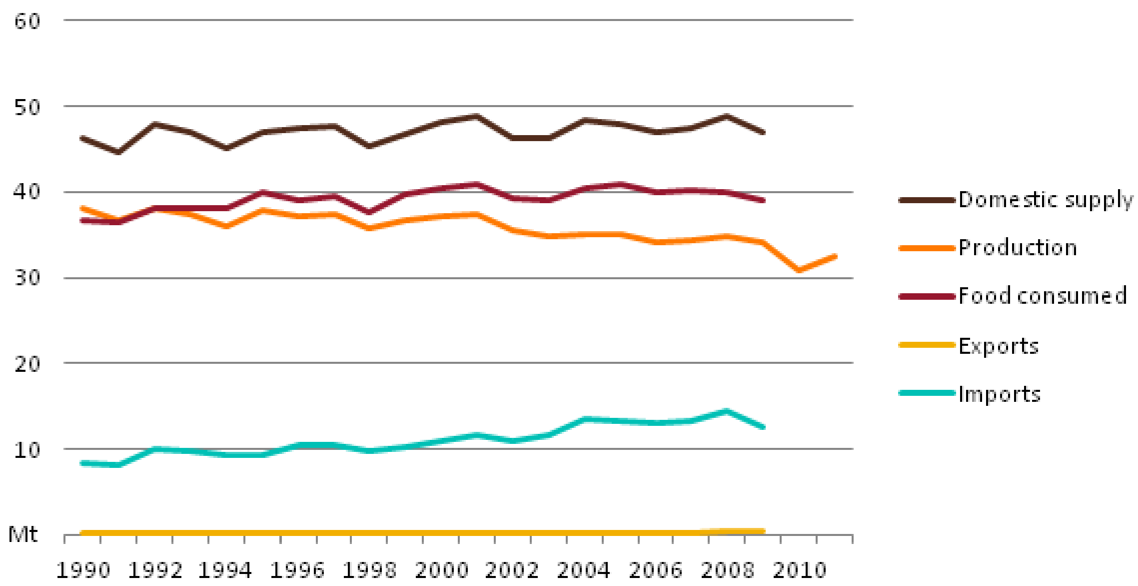
Japan and the Republic of Korea

Production

Horticultural production in Japan and the Republic of Korea declined slightly between 1990 and 2011 (Figure 117) (FAO 2013c). Production in Japan declined by an average of 1.6 per cent a year, while in the Republic of Korea it grew slowly, at an average of around 0.75 per cent a year. The area harvested in these two countries in 2011 amounted to 78 per cent of the area harvested in 1990. Imports increased to meet slowly growing domestic demand.

Cabbages, potatoes, onions and tangerines are the horticultural items produced in the greatest volumes in these countries. Production is generally on a small scale, and is labour intensive. In the Republic of Korea, for example, 85 per cent of orchards are less than 1 hectare (Lee 2006). Covered production is important for much of Japan's vegetable production, and increasingly for fruit, with 70 per cent or more of tomatoes, sweet peppers and cucumbers grown under cover (Dyck & Ito 2004).

Figure 117 Horticultural products, supply and use, Japan and the Republic of Korea

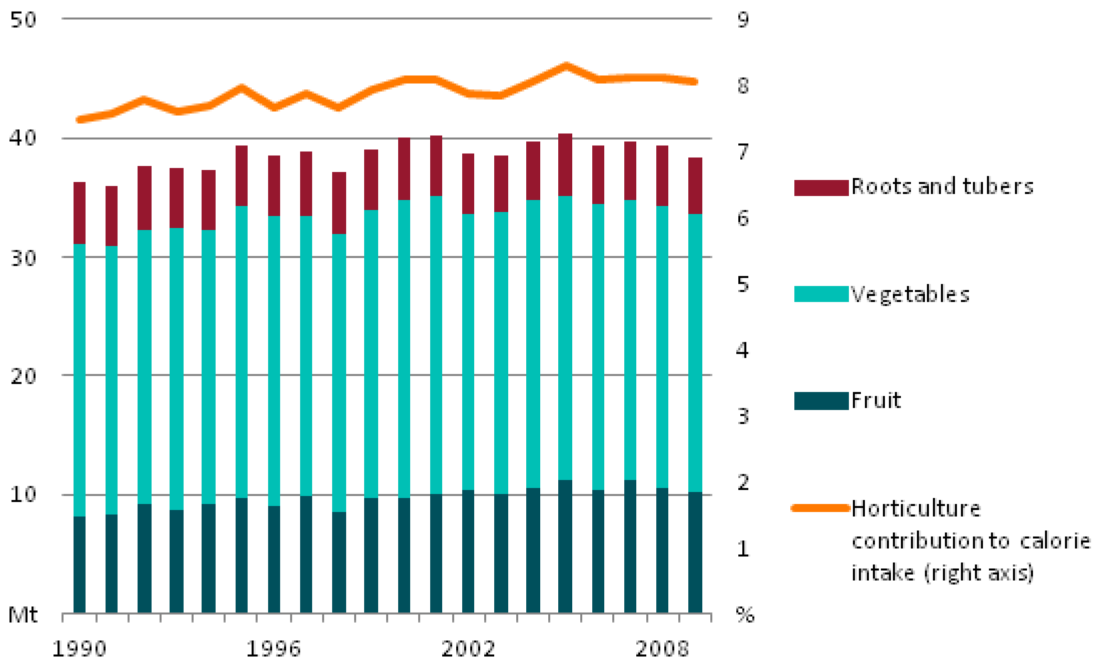


Note: Commodity Balance Sheet data expressed as primary crop equivalent. Domestic supply is defined as production plus imports minus exports plus changes in stocks. It may be taken as a proxy for consumption for all uses, and includes waste. Data on human consumption refer to the total amount of the commodity available as human food, including products derived by processing.
Source: Production available to 2011: FAO 2013c; other series available to 2009: FAO 2013a

Consumption

In contrast to other countries in this study, consumption of horticultural products in Japan and the Republic of Korea has shown little growth over the past two decades (Figure 118). The quantity of horticultural products consumed for food increased by an average of 1.4 per cent a year in the Republic of Korea during this time, and fell by 0.3 per cent a year in Japan. However, this decline in Japanese consumption represents a shift in the mix of vegetables consumed rather than a decline in the nutrition derived from fruit and vegetables (Dyck & Ito 2004). Potatoes, onions, apples, citrus fruits and cassava are the major items consumed. The contribution of horticultural products to the average daily calorie intake in Japan and the Republic of Korea together rose from 7.5 per cent to 8.1 per cent between 1990 and 2009 (Figure 118).

Figure 118 Consumption of horticultural products, Japan and the Republic of Korea



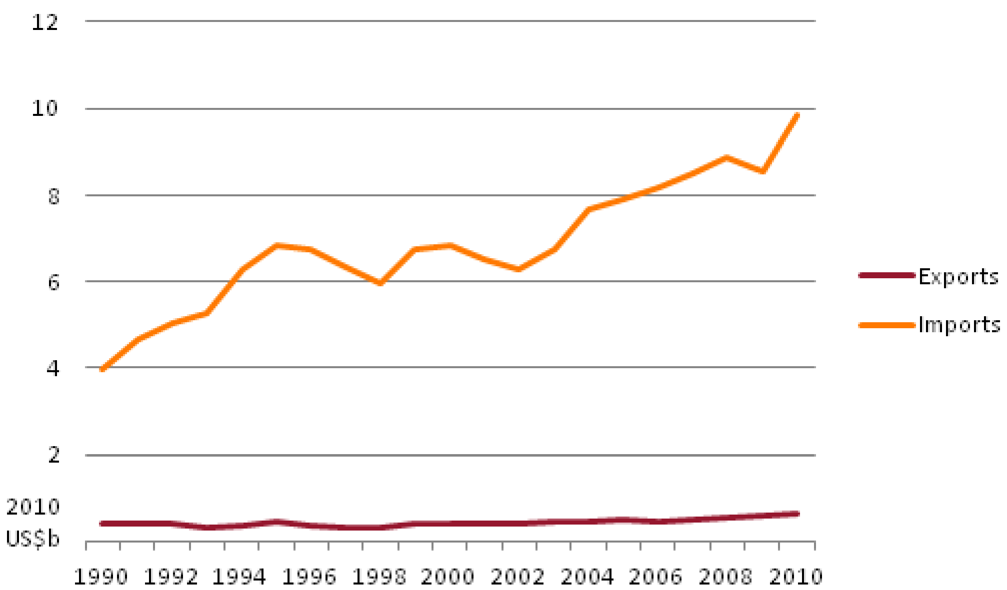
Source: FAO 2013a, 2013b

Trade

Japan and the Republic of Korea are net importers of horticultural products (Figure 119). Exports, which amount to only 7 per cent of the value of imports, include processed fruit and vegetable products, apples, chilli and peppers and pears. The major imports are bananas, various processed fruit and vegetable products, and frozen vegetables including potatoes.

Japan's imports of horticultural products from the Republic of Korea are significant but the Republic of Korea imports little from Japan. Japan and the Republic of Korea, together, source most of their horticultural products (by value) from China, the United States, New Zealand, Thailand and Mexico.

Figure 119 Trade in horticultural products, Japan and the Republic of Korea



Source: FAO 2013d

Policies

Most horticultural products enter Japan with tariffs of 10 per cent or less (most favoured nation applied and bound rates), but tariffs of up to 24 per cent are applied, for example, to oranges (WTO 2013). The Republic of Korea applies a wide range of tariffs to horticultural imports, most being less than 50 per cent but some dried pulses and some roots and tubers face applied and bound tariffs of 100 to 700 per cent. Citrus fruit faces a tariff of almost 100 per cent.

Japan prohibits fruit and vegetable imports from many parts of the world due to pests that may be found in or on the product. Codling moth and fire blight are of particular concern for temperate fruits. Some countries, notably the United States, Australia, New Zealand and Chile, have negotiated exceptions to trade bans on some fruits (Ito & Dyck 2010). The United States successfully appealed to the WTO that Japan's restrictions on import of apples based on concern over fire blight were not consistent with the WTO Agreement on the Application of Sanitary and Phytosanitary Measures. This action concluded with Japan issuing revised regulations on 25 August 2005 eliminating former measures on import of US apples (USTR 2005).

The Republic of Korea specifies plants and plant products that are prohibited imports, those that are subject to inspection, and those exempted from inspection. Many fruits and vegetables may be imported only from specific countries or from specific areas in those countries; in some cases only after specific treatment (ASEAN–Korea Centre 2010).

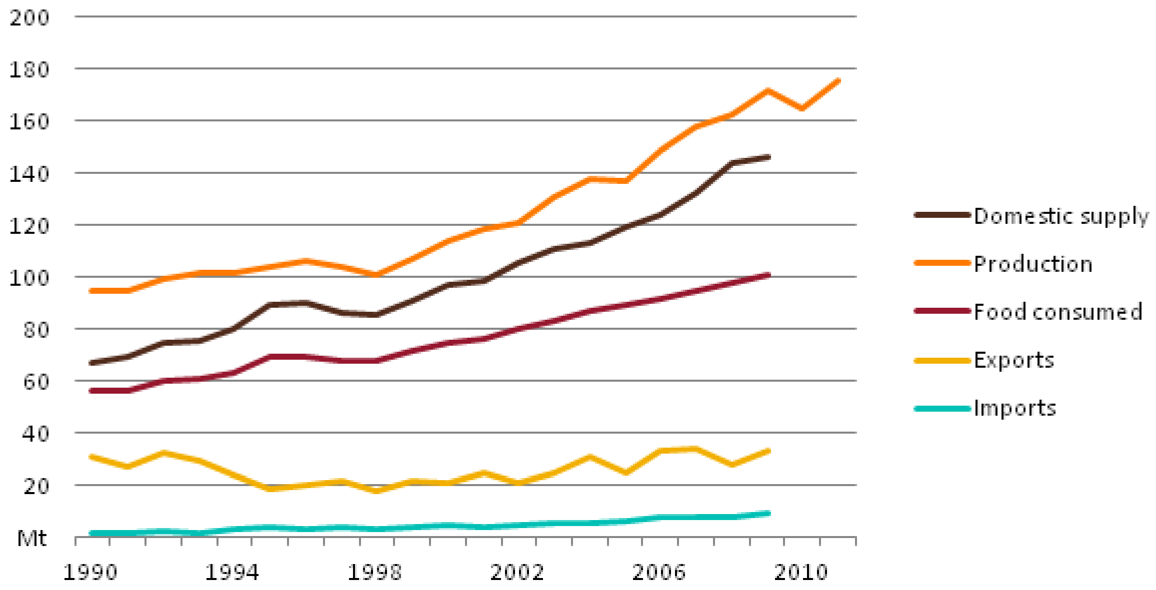
ASEAN

Production

Horticultural production in the ASEAN region grew by 2.8 per cent a year on average between 1990 and 2011 (Figure 120) (FAO 2013c). Land use grew more slowly at 1.5 per cent a year. Horticultural production is dominated by cassava, produced primarily in Indonesia and Thailand. Bananas, pineapples and mangoes are other important products.

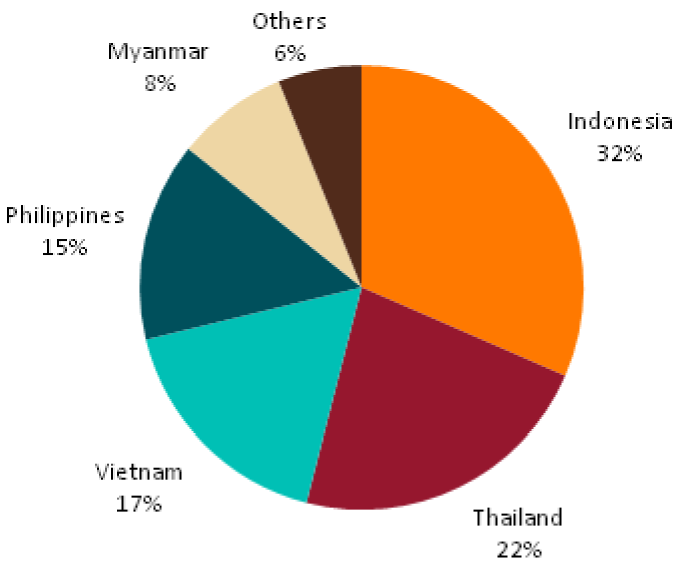
Indonesia, Thailand, Vietnam and the Philippines are the major ASEAN horticultural production countries, together accounting for 86 per cent of the group's total (Figure 121).

Figure 120 Horticultural products, supply and use, ASEAN



Note: Commodity Balance Sheet data expressed as primary crop equivalent. Domestic supply is defined as production plus imports minus exports plus changes in stocks. It may be taken as a proxy for consumption for all uses, and includes waste. Data on human consumption refer to the total amount of the commodity available as human food, including products derived by processing.
Source: Production available to 2011: FAO 2013c; other series available to 2009: FAO 2013a

Figure 121 Countries' share in total volume of horticultural production, ASEAN, 2011



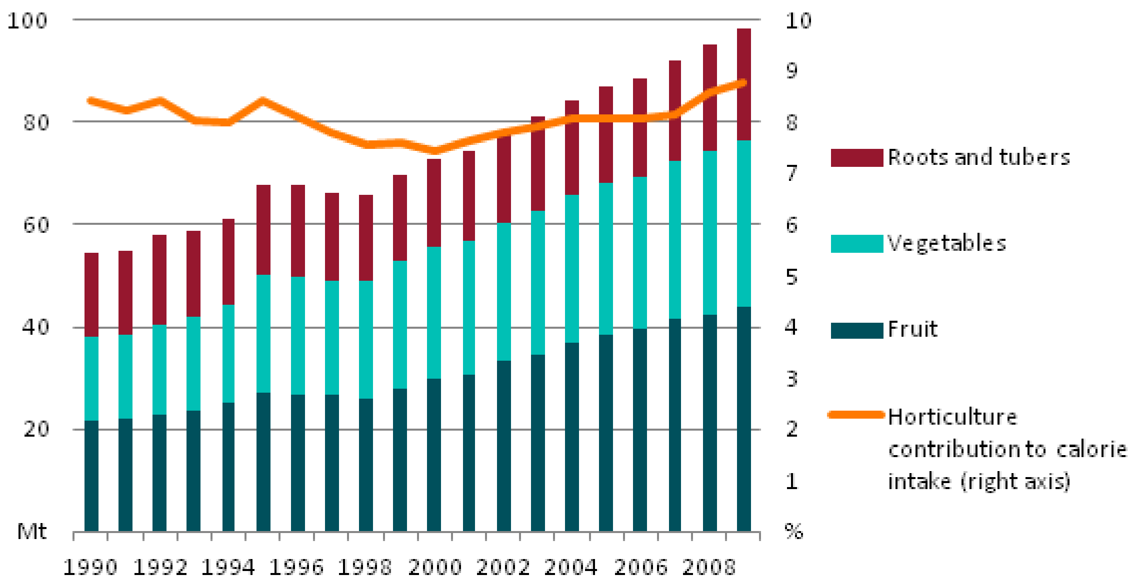
Source: FAO 2013c

Consumption

Total food consumption of horticultural products in ASEAN member states grew by a little under 3 per cent a year on average between 1990 and 2009 (Figure 122). Cassava is the largest single horticultural product consumed in ASEAN, ahead of bananas. Citrus, pineapples, sweet potatoes and potatoes are eaten in much smaller quantities.

In 2009 horticultural products contributed 8.4 per cent to the average daily calorie intake in ASEAN countries, a little more than India but much less than China (FAO 2013b). The contribution of horticultural products to average diets in ASEAN member states fluctuated but grew little over the past two decades (Figure 122).

Figure 122 Consumption of horticultural products, ASEAN

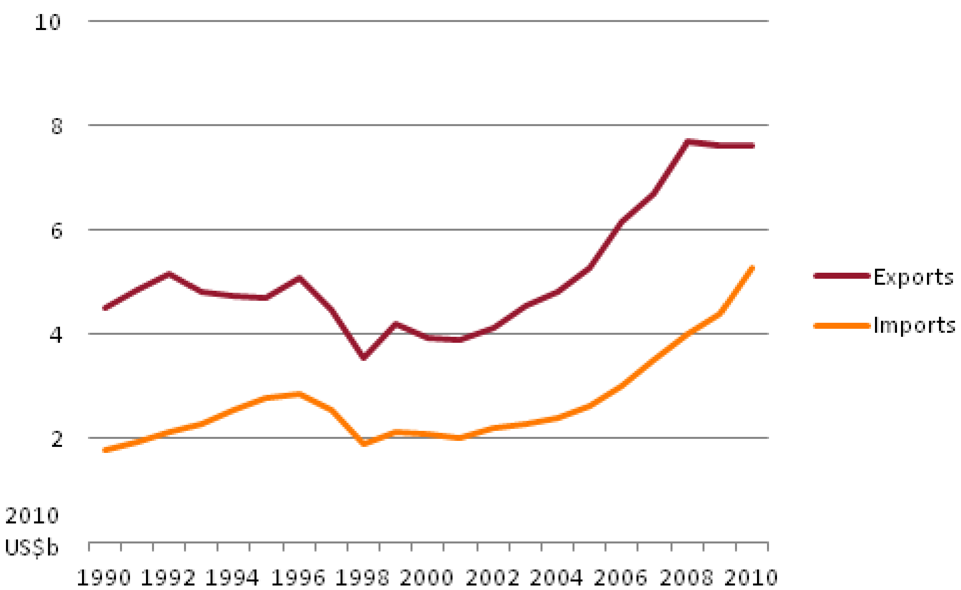


Source: FAO 2013a, b

Trade

The ASEAN countries, in total, are net exporters of horticultural products (Figure 123). Cashews, dried cassava, pineapples and pineapple products, and dried peas and beans are some of the major exports in value terms. Garlic, apples, onions and grapes, tangerines and mandarins, and pears are the major import items (FAO 2013d).

Figure 123 Trade in horticultural products, ASEAN



Source: FAO 2013d

In 2010 Thailand, Vietnam and the Philippines were the largest exporters of horticultural products (by value) among ASEAN member states. Malaysia, Indonesia and Singapore were the major importers.

Much of the trade by ASEAN member states is within ASEAN. For example, 30 per cent of Malaysia's horticultural imports in 2010 were sourced from other ASEAN countries, and 50 per cent of its exports were destined to other ASEAN countries.

Major trading partners with ASEAN countries from outside the group include China, the United States, the Netherlands and Japan as export markets; and China, the United States, India, Australia, South Africa and New Zealand are important sources of imports. China, for example, supplied more than 40 per cent of Indonesia's fruit imports in 2010 (FAO 2013d).

Policies

Brunei and Singapore do not apply any tariffs to horticultural imports. Countries that have free trade agreements with Thailand (including China, Australia and New Zealand) have tariff-free entry for many products (USDA–FAS 2011b). Tariffs vary in other cases, with up to 60 per cent applied to some products imported by Thailand from non-treaty countries (WTO 2013).

Fruit and vegetables imported into ASEAN member states must generally be accompanied by a phytosanitary certificate from the country of origin. Products originating in areas that are not pest free may be prohibited or need treatment. Import permits are typically required (APEDA 2013).

Some of the specific prohibitions that ASEAN member states apply to horticultural imports are:

- Thailand prohibits import of banana, pineapple and pomegranate (APEDA 2013).
- Indonesia announced in 2012 that four out of the country's eight main sea ports will be closed to horticultural products because of the lack of facilities, such as laboratories for testing and quarantine (Global Business Guide 2013).
- Vietnam introduced new import regulations in 2012 following detections of unacceptable pesticide residue levels on imported fresh produce (Fruitnet 2012).

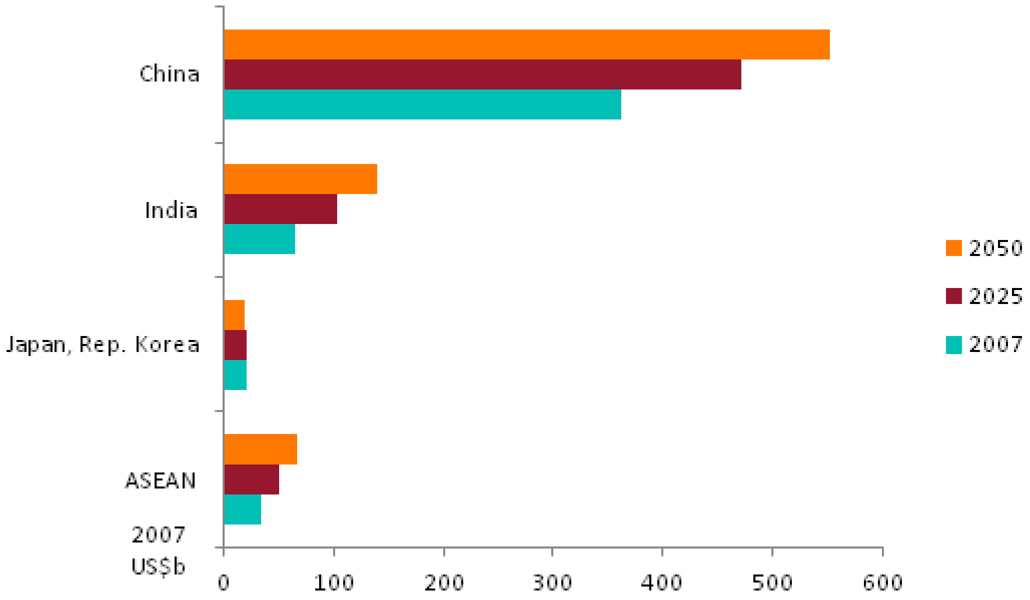
Long-term prospects

Consumption

Vegetables

China will remain the largest consumer of vegetables (including roots and tubers) in Asia, with the real value of consumption in 2050 projected to be US$551 billion (in 2007 dollars), 52 per cent higher than in 2007 (Figure 124). Most of this growth (US$110 billion) is projected to occur between 2007 and 2025 because of higher projected population growth over this period than between 2025 and 2050 (United Nations Population Division 2011). In 2007 China was a significant consumer of vegetables on a per person basis, with a large share of that attributed to consumption of staple vegetables such as potatoes. Out to 2050 the growth in per person vegetable consumption is likely to come from a rise in consumption, particularly from low income households, and an increase in consumption of higher value vegetables.

Figure 124 Real value of Asia's vegetable consumption



Source: ABARES model output

India's vegetable consumption is expected to increase significantly, with the real value of consumption in 2050 projected to be US$140 billion, more than double that of 2007. This increase reflects population and per person income growth over the projection period. Per person vegetable consumption in India is consequently projected to increase to 151 kilograms by 2050.

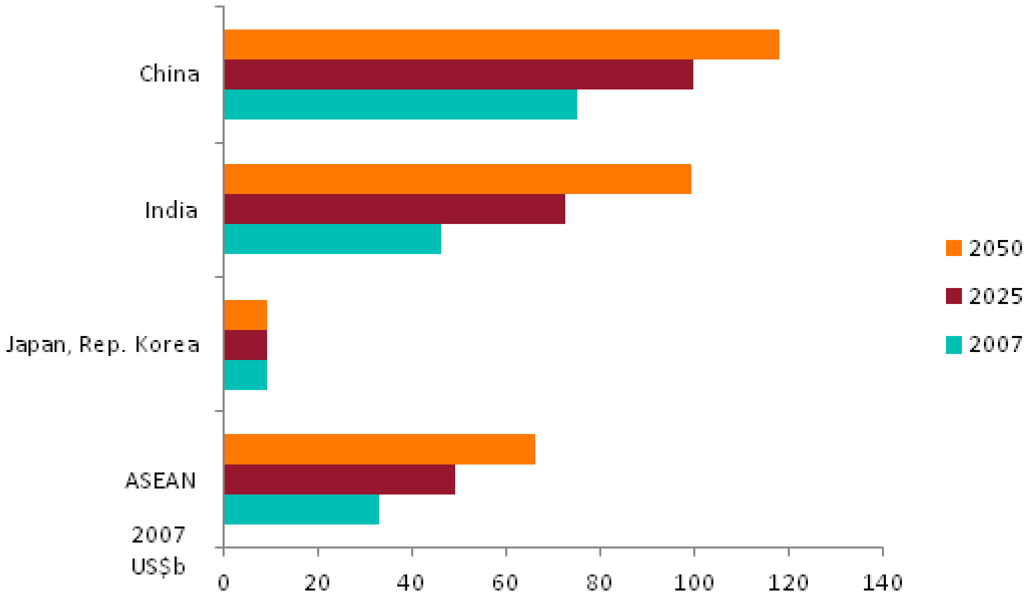
In Japan and the Republic of Korea vegetable consumption is projected to decline, with the real value of consumption in 2050 projected to be US$20 billion, 5 per cent lower than in 2007. A projected decline in population is responsible for this contraction. However, per person consumption is projected to remain around current levels in 2050 at 164 kilograms and 240 kilograms for Japan and the Republic of Korea, respectively.

For ASEAN member states the real value of vegetables consumed is projected to be US$67 billion, nearly double that of 2007. Indonesia (US$27 billion), Vietnam (US$14 billion) and the Philippines (US$9 billion) are projected to account for most of this consumption. The highest projected per person consumers among ASEAN member states in 2050 are Indonesia (160 kilograms) and the Philippines (103 kilograms).

Fruit

China will remain the largest consumer of fruit in Asia by 2050, with the real value of consumption (in 2007 US dollars) in 2050 projected to be US$118 billion, 57 per cent higher than in 2007 (Figure 125). Most of the growth (US$25 billion) is also projected to occur between 2007 and 2025 because of higher population and income growth over this period than between 2025 and 2050. The growth in China's fruit consumption can also be attributed to a dietary shift away from staple foods, such as cereals, to fruits as real per person incomes increase.

Figure 125 Real value of Asia's fruit consumption



Source: ABARES model output

India will remain the second largest consumer of fruit in Asia, with the real value of consumption in 2050 projected to be US$99 billion, US$53 billion higher than in 2007. Further population growth, and sustained income growth, will see higher consumption growth than China beyond 2025.

Consumption growth for Japan and the Republic of Korea is expected to be relatively flat, with the real value of consumption in 2050 projected to be US$9 billion, 3 per cent lower than in 2007. A projected decline in population, combined with low income growth, is largely responsible for this small decline in consumption. However, per person consumption in Japan and the Republic of Korea is projected to remain largely unchanged in 2050 compared with 2007.

For ASEAN member states, the real value of fruit consumption in 2050 is projected to be US$66 billion, double that of 2007. Indonesia (US$26 billion), the Philippines (US$17 billion) and Vietnam (US$9 billion) are projected to account for most of this consumption. High per person consumption, resulting from rises in per person incomes, is projected to underpin the growth in ASEAN fruit consumption.

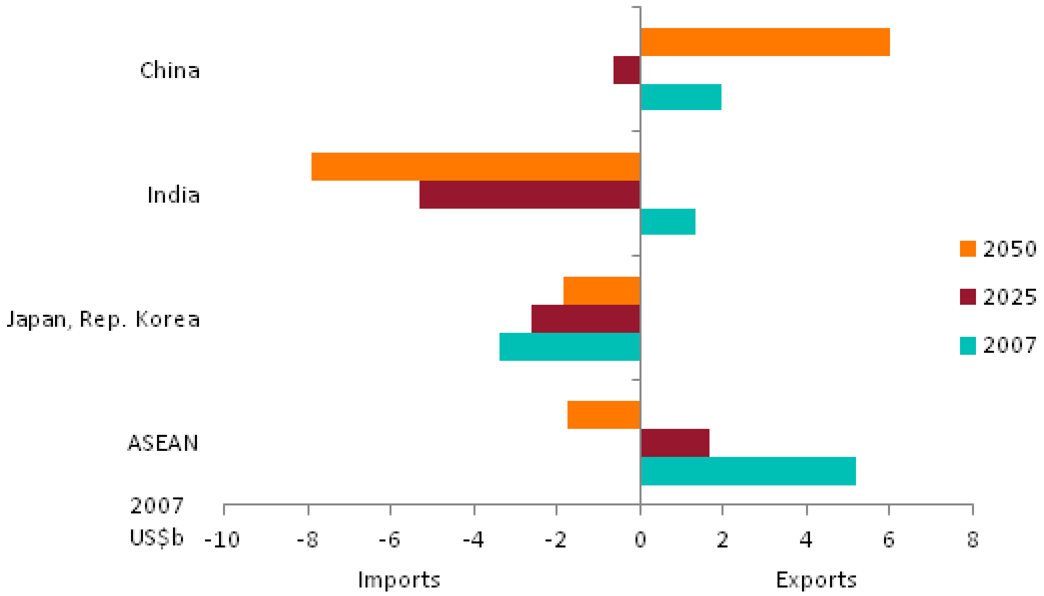
Trade

Vegetables

Between 2007 and 2025 China is projected to switch from a net exporter of vegetable products to a net importer of vegetable products. This switch corresponds with higher growth in consumption stemming from population and income growth over this period. With consumption growth projected to slow beyond 2025 and production projected to increase by 18 per cent, import demand is expected to weaken by that time. As a result, China is projected to remain a net exporter of vegetable products by 2050, with a real net value of exports of around US$6 billion.

The real net value of India's vegetable imports in 2050 is projected to be US$8 billion (Figure 126). Most of India's import growth is also projected to occur between 2007 and 2025. However, vegetable production is projected to be US$133 billion in 2050, around double that in 2007. As a consequence, it is projected that most vegetables consumed in India will be supplied domestically and imports will account for a relatively small share (6 per cent) of total consumption in 2050.

Figure 126 Real value of Asia's net trade for vegetables



Source: ABARES model output

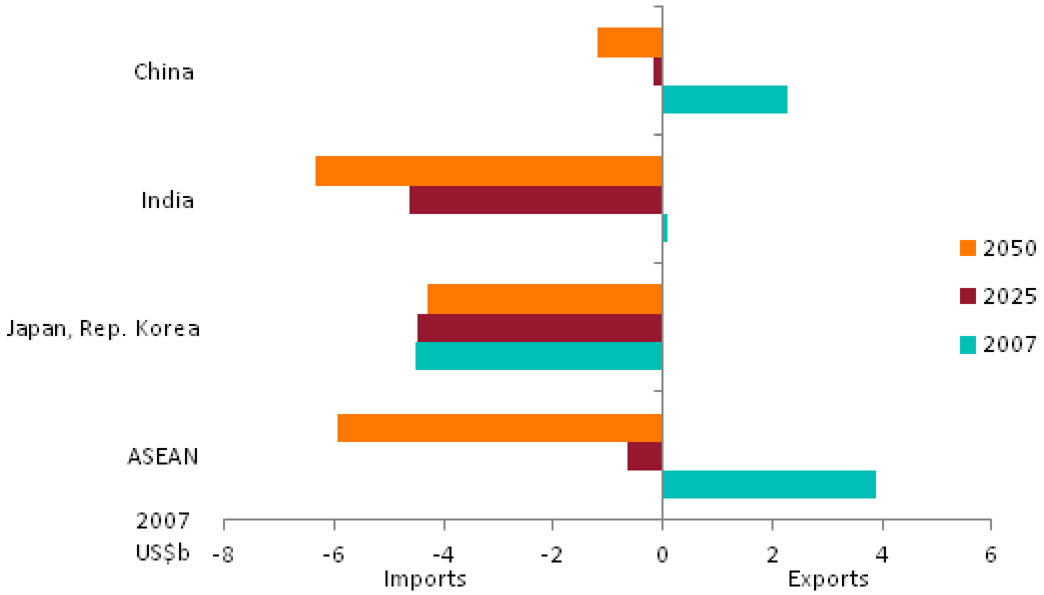
Japan and the Republic of Korea are collectively projected to remain net importers of vegetables, with the real net value of imports projected to be around US$2 million, 40 per cent lower than in 2007. This is a reflection of declining vegetable consumption for both countries over the projection period.

The ASEAN member states are collectively projected to become a small net importer of vegetable products, with the real net value of imports at around US$2 billion in 2050. Over the projection period, import demand from Indonesia, Malaysia and the Philippines will be offset by exports of vegetable products from Thailand. Although Indonesia is projected to be the largest producer of vegetables among the ASEAN member states by 2050, most of its production will be consumed domestically.

Fruit

In 2007 China was a net exporter of fruit and by 2050 is projected to become a small net importer. The real net value of China's fruit imports in 2050 is projected to be just over US$1 billion (in 2007 dollars) (Figure 127). The change in China's net trade position is projected to occur between 2007 and 2025 and corresponds with the high growth in consumption relative to production growth over this period. By 2050 imports will still only account for a small share of China's total fruit consumption, at around 1 per cent, with domestic production to meet most of China's fruit demand.

Figure 127 Real value of Asia's net trade for fruit



Source: ABARES model output

In 2007 India was also a relatively small net exporter of fruit. By 2050 it is projected to become a significant net importer, with the real net value of imports projected to be around US$6 billion. Most of the import growth is projected to occur between 2007 and 2025 as consumption growth outpaces production growth.

The real net value of fruit imports from Japan and the Republic of Korea in 2050 is projected to be US$4 billion, 5 per cent lower than in 2007. This decline corresponds with the projected decrease in consumption for both countries.

The ASEAN member states are, collectively, projected to become a net importer of fruit by 2050, with the real net value of ASEAN's fruit imports projected to be nearly US$6 billion. Import demand is projected to come predominantly from Indonesia, Vietnam and to a lesser extent Malaysia. However, with Thailand's fruit production projected to increase significantly toward 2050 it is projected to remain a significant net exporter of fruit, accounting for a significant share of the ASEAN fruit trade.

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9 Wine

Caroline Gunning-Trant and Brian Moir

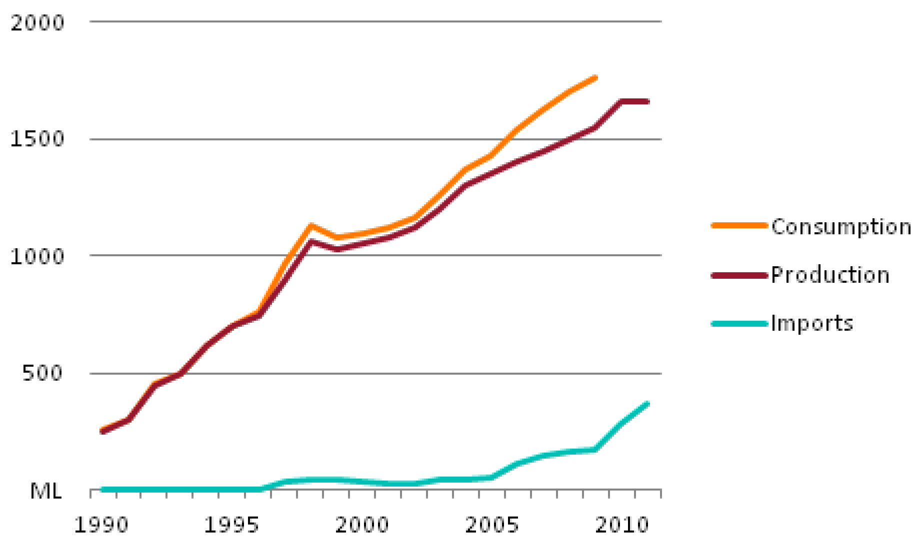
China

Production

As rising incomes have driven a stronger demand for western-style foods in China, demand has also shifted toward western beverages, such as wine made from grapes (as opposed to rice or other fruits. Wine production has grown steadily since 1990, from 254 million litres to 1.66 billion litres in 2011, when China ranked fifth in the world for production (Figure 128) (FAO 2013b).

Shandong, Jilin and Henan provinces produce about two-thirds of China's wine. Shandong is the most important producer, with approximately one-third of total production (Wine-searcher 2012). Although the three provinces have climates poorly suited to wine grape production, with severe monsoons and freezing winter temperatures, investment in the industry is ongoing and will support continued production growth. The remaining one-third of domestic production is spread across the country: from Greater Beijing and surrounding Hebei province, to the far north and north-east regions of Dongbei and Inner Mongolia, to Gansu and Ningxia in central China, and Yunnan in the south-west (Wine-searcher 2012).

Figure 128 Wine production, consumption and imports, China



Note: Consumption data available to 2009.
Source: FAO 2013a, b; United Nations Statistics Division 2013

Consumption

A growing awareness and appreciation of grape-based wines, and the association of wine with the elite and wealthy, has increased consumption of wine (USDA–FAS 2012a). Red wine is particularly popular with Chinese consumers (Rabobank 2010).

Seasonal wine consumption is characteristic of the Chinese market. About 60 per cent of annual wine sales occur during Chinese New Year and the Mid-Autumn Festival, when family and businesses gather to celebrate. Sales of bottled wines packaged in gift boxes (often together with bottle openers) are popular during these times (Rabobank 2010).

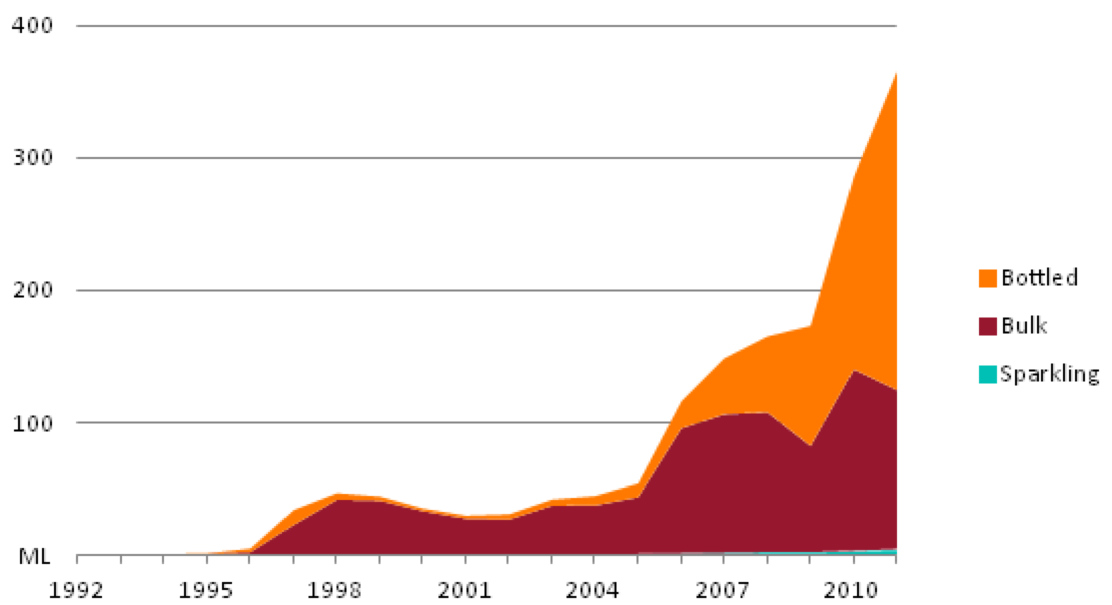
Total consumption of grape-based wine has increased steadily since 1990, from 260 million litres to 1.76 billion litres in 2009 (Figure 128) (FAO 2013a). By 2009 China was the ninth largest consumer of wine in the world (Wine Institute 2013). Per person consumption of wine has also increased in recent years, although it remains low at 0.7 litres a year compared with the global average of 3.5 litres a year. It is also low compared with some other Asian countries, such as Japan, where the average is 1.9 litres per person a year (Wine Institute 2013).

Trade

The market for imported wine has expanded dramatically in China over the past two decades, although it accounts for less than a quarter of total wine consumed. Since 1992 the volume of imported wine has increased from about 157 000 litres to 366 million litres in 2011 (Figure 129). In the past decade, the factors most strongly influencing import growth have been rising incomes and an associated change in consumer preferences that favour imported wine over other alcoholic beverages (ABARES 2012). Another feature of the Chinese imported wine market is a strong preference by consumers for red wine (Rabobank 2010), which accounts for around 85 per cent of the total value of imported wine.

Almost all the wine imported by China is still wine, such as table wine, which excludes sparkling wines and vermouth (USDA–FAS 2012a). In 2000, 94 per cent of the volume of imported still wine was in bulk. Bulk wine has a much lower value per litre than bottled wine and was typically blended with domestically produced wine. Although import volumes of both types of wine increased over the past decade, the stronger demand for bottled wine, especially for higher-priced wine, reduced the share of bulk wine to 33 per cent by 2011 (Figure 129).

Figure 129 Wine imports, China



Source: United Nations Statistics Division 2013

Since 2009 China has sourced about 80 per cent of its imported wine (by volume) from France, Spain, Australia and Chile. Wine imported from France and Australia is principally higher-priced bottled wine, while the other two major suppliers ship most of their wine in bulk. In 2011, 35 per cent of the volume of imported bottled wine in the Chinese market was from France, followed by Australia at 20 per cent (United Nations Statistics Division 2013).

China exports very little grape-based wine. Since 1990 exports have averaged 3.6 million litres a year, over 80 per cent of which was in bottles. About 11 per cent was bulk wine and the remainder sparkling wine. In 2011 the top three export markets for Chinese wine (by volume) were Hong Kong (24 per cent), France (14 per cent) and Belgium (10 per cent) (United Nations Statistics Division 2013).

Policies

Domestic policies

Imported wine must satisfy Chinese wine standards and wine labelling law before being sold on the domestic market. The General Administration of Quality Supervision, Inspection and Quarantine (AQSIQ) administers both these laws. Some standards that apply to wine include the Standards for the Administration of Wholesaling of Alcoholic Products, the Standards for Administration of Retailing of Alcoholic Products, the Measures for the Administration of Wine Distribution and the Hygiene Standards of Distilled and Brewed Wine. These standards do not necessarily correspond with international standards (HKTDC 2013).

The labelling law requires information originally in English on wine labels also be in Chinese and in the same size font. All labels must be attached permanently to the bottles. Labelling verification must be sought from AQSIQ.

Once AQSIQ has cleared imported wine for sale on the domestic market, it is subject to a value added tax of 17 per cent and a consumption tax of 10 per cent, as is domestically produced wine.

Trade policies

After joining the World Trade Organization (WTO), China lowered its most favoured nation (MFN) wine import tariff rate from 65 per cent to 14 per cent for sparkling and bottled still wine and 20 per cent for bulk still wine. The bound and applied tariffs are the same for each type of wine (WTO 2013).

China's free trade agreements with Chile, New Zealand, Pakistan, and ASEAN have provisions that allow wine to be imported at a lower tariff rate than the MFN tariff. Sparkling and bottled wine imported from Chile and New Zealand is subject to an 8.4 per cent tariff and the tariff on bulk wine is 12 per cent. Sparkling and bottled wine from Pakistan is subject to a 12.6 per cent tariff, while the tariff on bulk wines is unaffected by the agreement. All wine imported from ASEAN member states is subject to a 5 per cent tariff (WTO 2013).

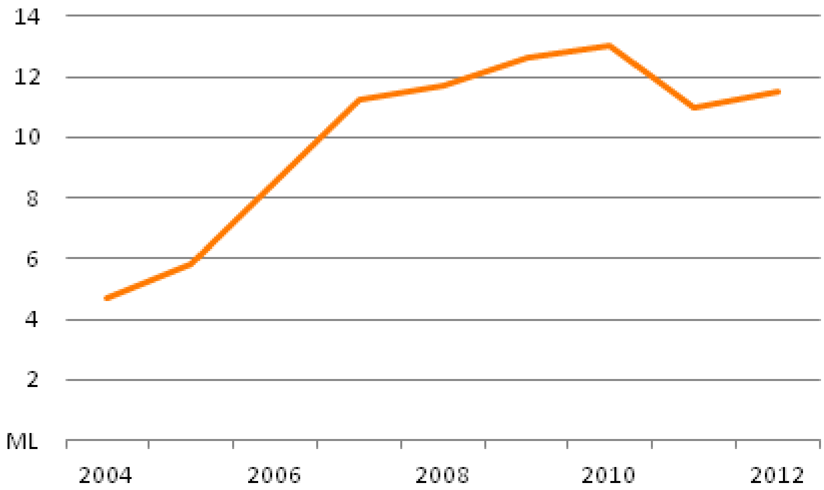
A small amount of bottled wine is imported duty free from Hong Kong under the terms of the Mainland and Hong Kong Closer Economic Partnership Arrangement. The agreement has allowed tariff-free imports of products from Hong Kong since 1 January 2006 but only if those products are manufactured in Hong Kong. Wine imported from Hong Kong that originates from other countries is still subject to the tariff rates identified in the previous paragraph (HKTDC 2013; USDA–FAS 2011a).

India

Production

Production of wine in India in 2012 has been estimated at 11.5 million litres from 2000 hectares of grapes (USDA–FAS 2012b). Production has doubled since 2005 (Figure 130). However, press reports (Burke 2012) indicate that some producers who invested in vineyards in recent years are struggling to remain viable, particularly those in the Nashik region near Mumbai.

Figure 130 Wine production, India



Source: USDA–FAS 2012b

Consumption

India does not have a culture of wine drinking, and consumption is very low. Alcohol consumption is discouraged by the constitution and in most states it is highly taxed. In some states it is prohibited. To the extent that alcohol is consumed, spirits and beer dominate.

Domestic supplies of wine in India were estimated at 14.8 million litres in 2012, equivalent to 0.01 litres per person. This is one of the lowest levels of wine consumption in the world (Wine Institute 2013).

Increasing affluence in India—and with it the growth of the middle classes—has generated an interest in wine consumption, which on a per person basis grew by 40 per cent between 2005 and 2012 (calculated from USDA–FAS 2012b). Despite this, India's wine consumption remains low, with a significant proportion consumed by tourists and expatriates. Many consumers prefer sweeter wines than are normally available, and wine producers in India have struggled to match their production to consumer tastes (Burke 2012).

Trade

In 2012 around one-third of India's wine requirements were imported. Half the imports were destined for the tourist trade, under special zero-tariff arrangements. As with other aspects of the Indian wine industry, imports are very small but have increased at a rapid rate from less than 1 million litres in 2004 to 4.4 million litres in 2012 (USDA–FAS 2012b).

Policies

The Government of India imposes a tariff of 150 per cent on all categories of wine imports. However, hotels and other tourist operators can, in certain cases, gain exemption from paying the tariff. Each state imposes its own excise duties and restrictions on production and consumption. Some states restrict the interstate movements of wine, while others ban the sale of wine completely. State taxes and restrictions generally apply even where tariffs for the tourist trade are waived by the Government of India (USDA–FAS 2012b).

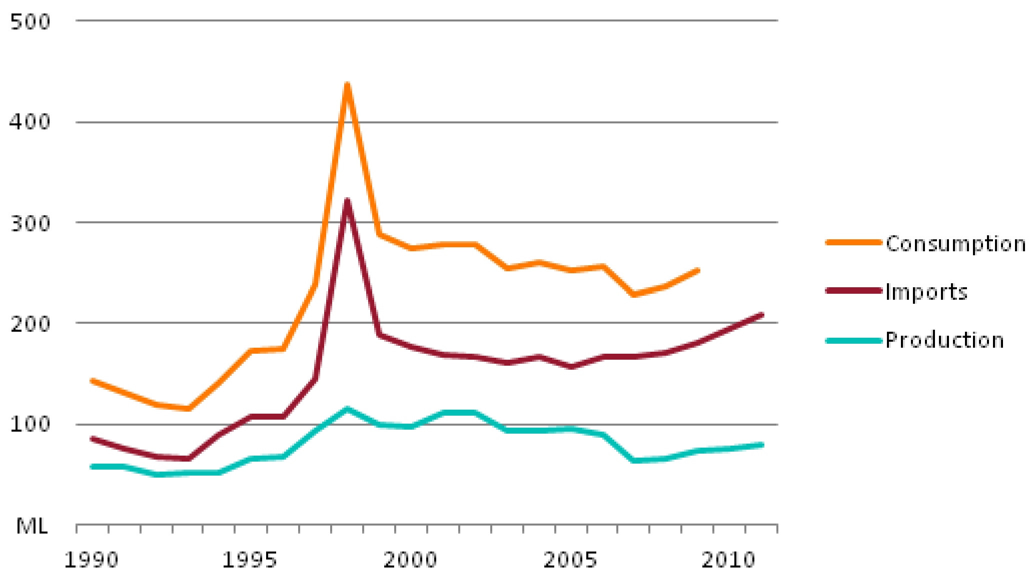
These restrictions inhibit growth in production and consumption as well as imports of wine. Despite the high growth rates of recent years, the wine sector in India is expected to remain relatively small for the foreseeable future.

Japan and the Republic of Korea

Production

Although wine grapes are grown in almost every prefecture, Japan is a small producer of wine made from grapes (Maxwell et al. 2006). At its peak in 1998 wine production was 116 million litres; by 2011 it was estimated at 79 million litres (Figure 131) (FAO 2013b). Although Japan has over 100 wineries, the domestic industry is concentrated around five major producers that account for approximately 80 per cent of production (USDA–FAS 2013). Growth in the viticulture sector is constrained by the availability and high cost of land, combined with characteristically acidic soils and high humidity during the growing season. Most domestically produced wine is made from imported grape concentrate or juice (known as must) (Maxwell et al. 2006). Domestic wine producers are also blending an increasing amount of imported bulk wine with domestically produced wine, which is then sold as Japanese wine (see Trade) (USDA–FAS 2013).

Figure 131 Wine production, consumption and imports, Japan



Note: Consumption data available to 2009.
Source: FAO 2013b; United Nations Statistics Division 2013

The Republic of Korea produces several traditional fruit wines by combining fruits or berries with rice-derived alcohol. The production of grape-based wine is a very small industry as there is no common European variety of wine grape that is suitable for commercial production in the Republic of Korea (USDA–FAS 2012c). While producers create small quantities of souvenir wines and low value blends of local table grape wine and imported bulk wine, production is generally insufficient to enter national statistics. Growth of domestic grape-based wine production is limited by high agricultural land prices, unfavourable weather conditions and a lack of price competitiveness and quality relative to imported wines.

Consumption

Although the consumption of alcohol in Japan ranks in the top 25 per cent of countries globally, consumption of wine made from grapes only accounts for about 3.2 per cent of total alcohol consumption. Sake, shochu and beer remain the preferred options. The consumption of wine in Japan has been trending upward in recent years. Total consumption of wine increased from 144 million litres in 1990 to 253 million litres in 2009 (calculated from FAO 2013b and United Nations Statistics Division 2013). Per person consumption of wine has been steady since 2007 at 1.86 litres a year (Wine Institute 2013).

Most wine is consumed in urban areas, with over 70 per cent of premium wines consumed in the greater Tokyo region (USDA–FAS 2013). Low priced wines have become easily accessible given the increase in bulk wine imports from countries such as the United States, Spain, Chile and France. This has assisted consumption growth in restaurants and in supermarkets.

In the Republic of Korea, the consumption of alcoholic beverages is considered an important part of social and business occasions, as well as part of everyday life. However, the Korean wine market is still in the early stage of development since the shift away from the consumption of hard liquor only began in the late 1990s (ABARES 2012). This relatively recent shift in demand to wine appears to have coincided with increased interest in physical wellbeing and greater interest in western culture and diets. Like Japan, red wine is more popular than white wine because of the highly publicised associated health benefits (USDA–FAS 2012c).

Despite the growing demand for wine, consumption is still relatively low and generally aligns with import volumes (Figure 133). Between 1990 and 2009, the total consumption of grape-based wine increased from 1.9 million litres to 23 million litres (FAO 2013a). In 2011 wine accounted for an estimated 2 per cent of total alcohol consumption (USDA–FAS 2012c). Per person consumption in 2009 was 0.53 litres a year, lower than China and 25 per cent lower than before the global financial crisis (Wine Institute 2013).

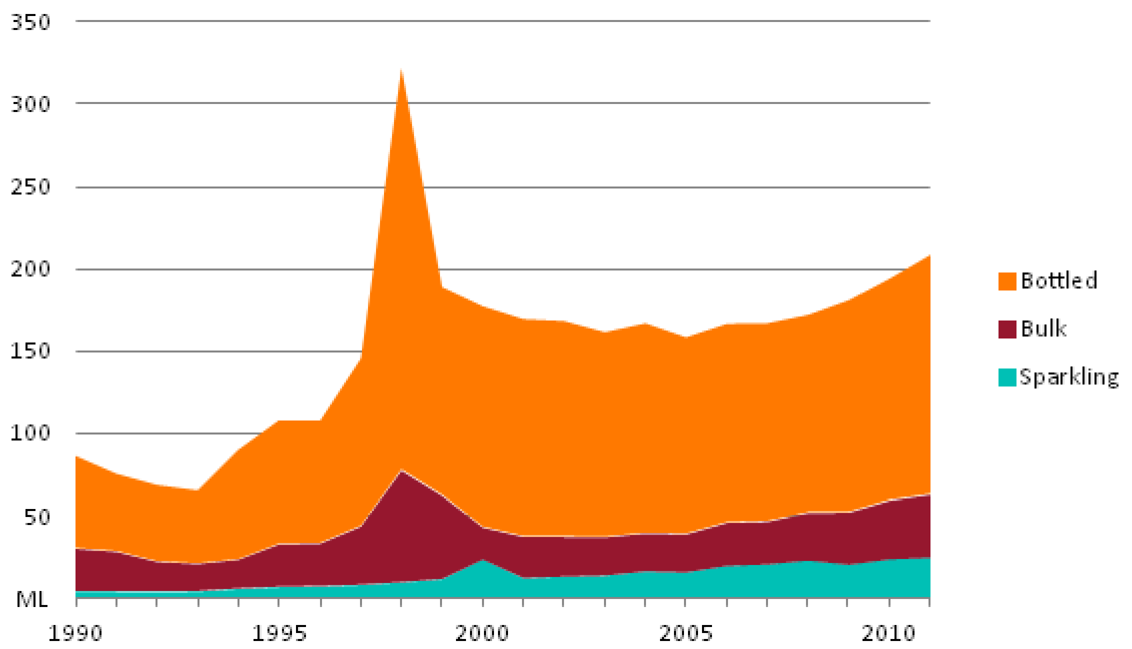
Trade

The growth of wine imports in Japan is attributed to increased consumption in hotels and inexpensive restaurants (USDA–FAS 2013). Imports of bulk wine have increased steadily since the early 2000s as domestic winemakers have used imported wine to blend and bottle with domestically grown wine, which is then sold on the domestic market as Japanese wine.

Imports of wine spiked in 1998 (Figure 132). The sudden increase in imports was associated with a strong increase in demand for red wine following a series of studies linking the consumption of red wine with health benefits (USDA–FAS 2013). Most of that wine was sourced from France (for bottled wine) and Bulgaria (for bulk wine).

In 2011, 88 per cent of the volume of wine imported by Japan came from five countries: France (30 per cent), Chile (17 per cent), Italy (17 per cent), the United States (12 per cent) and Spain (12 per cent). By value, France commanded over half of the Japanese market for imported wine given the higher unit value of French wine. Italy held second place at 13 per cent. Chile, the United States and Spain each held 7 per cent of the market by value because of the higher proportion of low-value bulk wine imports from these countries (United States Statistics Division 2013).

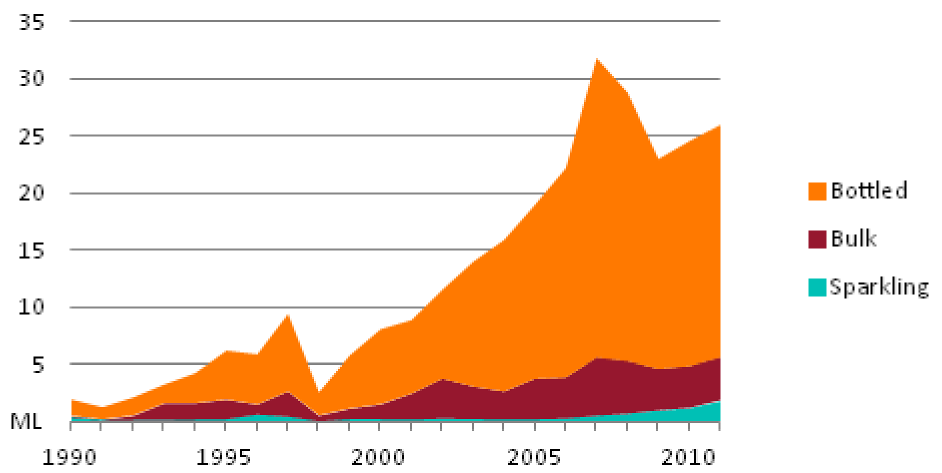
Figure 132 Wine imports by type, Japan



Source: United Nations Statistics Division 2013

Almost all wine sold in the Republic of Korea is imported and imports have increased significantly since the late 1990s to meet the growing demand. Between 1990 and the peak in 2007, the total volume of wine imported by the Republic of Korea rose from 1.9 million litres to almost 32 million litres (Figure 133) (United Nations Statistics Division 2013). Wine imports declined in 2008 and 2009 because of the impact of the global financial crisis on economic activity, and hence import demand, but demand has begun to rebound. In 2011 roughly 26 million litres of wine were imported, about 78 per cent of which was bottled wine and 70 per cent red wine.

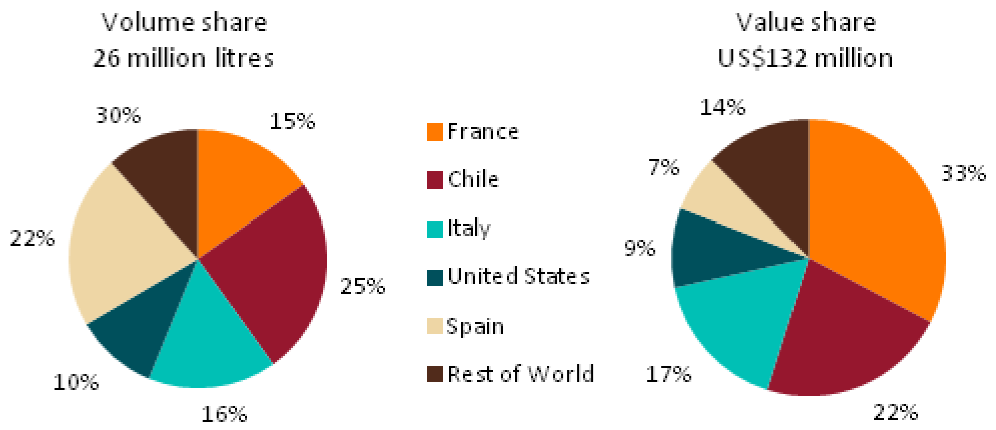
Figure 133 Wine imports by type, Republic of Korea



Source: United Nations Statistics Division 2013

In 2011, 88 per cent of the volume of wine imported by the Republic of Korea came from five countries: Chile (25 per cent), Spain (22 per cent), Italy (16 per cent), France (15 per cent) and the United States (10 per cent) (Figure 134). By value, however, France was the most important source of imports, commanding a third of the total value of Korean imports in that year on account of the significant proportion (90 per cent) of high-value bottled wines. By contrast, one-half of the wine imported from Spain was lower-value bulk wine (United Nations Statistics Division 2013).

Figure 134 Market share of imported wine by volume and value, Republic of Korea, 2011



Source: United Nations Statistics Division 2013

Policies

Domestic policies

In Japan, several regulations govern the importation, labelling and distribution of wine. For example, the Food Sanitation Law outlines permissible quantities of wine colouring agents and preservatives used as additives. Wine labelling requirements are regulated by the Measurement Law, the Law Concerning Liquor Business Association and Measures for Securing Revenue from Liquor Tax and the Act Against Unjustifiable Premiums and Misleading Representation. By law, wine labels must be in Japanese and include information such as the product name, food additives, alcohol content, container volume, the type of wine and the name and address of the importer and distributor. Labels must also indicate the packaging type and list mandatory health warnings (USDA–FAS 2013).

The distribution of wine and all other alcoholic beverages in Japan is regulated under the Liquor Tax Law, which is applied to retailers that hold liquor licenses. A domestic liquor tax is also charged on all wine sold at retail. Each 750 millilitre bottle of wine is taxed at 60 yen per bottle, while sweetened wine is taxed at 90 yen per bottle (USDA–FAS 2013).

In the Republic of Korea, the sale of wine is tightly controlled. Only licensed liquor importers are allowed to import alcoholic beverages, including wine, although there is no limit on the number of licenses issued (USDA–FAS 2012c). Importers may sell directly to wholesalers, retailers (restaurants and liquor stores) and individual consumers but they are not allowed to purchase from other importers or wholesalers.

Imported wine is subject to a range of domestic taxes and fees in the Republic of Korea, including a liquor tax of 30 per cent, an education tax of 10 per cent and a value added tax of 10 per cent. An additional charge of between 7 per cent and 8 per cent for customs clearance is also applied to every litre of imported wine.

Wine labelling law in the Republic of Korea requires a separate Korean language label on imported wine (USDA–FAS 2012c). This label must list information about the product (including, product name, country of origin and date of bottling), the importer, food additives, storage and return information, and mandatory warnings about risks to health and the illegality of selling to minors.

Trade policies

Japan has complex tariff arrangements for imported wine that combine ad valorem tariffs with specific duties. For example, both the bound and applied MFN tariffs on table wine in bottles less than 2 litres and bulk wine in containers between 2 litres and 150 litres are 15 per cent, or 125 yen a litre, whichever is less, with a minimum customs duty of 67 yen a litre (USDA–FAS 2012d; WTO 2013). Bulk table wine in containers greater than 150 litres is subject to a specific duty of 45 yen a litre and the applied and bound duty on sparkling wine is 182 yen a litre (USDA–FAS 2013; WTO 2013).

Japan has free trade agreements with Chile, Switzerland, Peru, Mexico, ASEAN and Vietnam. Under the Japan–Chile Free Trade Agreement, signed in 2007, the applied MFN tariffs on imported bottled and bulk Chilean wine are to be systematically lowered to zero between 2008 and 2018. Under the Japan–Switzerland Free Trade and Economic Partnership Agreement imported Swiss table wine in bottles up to 2 litres is subject to a 9 per cent tariff or 75 yen a litre, whichever is less, subject to a minimum customs duty of 40.2 yen a litre. Imported sparkling wine from Switzerland is subject to a specific duty of 126 yen a litre and bulk wine to a tariff of 10.4 per cent or 86.54 yen a litre, whichever is less, subject to a minimum customs duty of 46.38 yen a litre. Wine imported from Mexico enters duty free (WTO 2013). Under the free trade agreements with Peru and ASEAN, MFN rates apply.

The Republic of Korea applies an MFN tariff of 15 per cent on all bottled and bulk still wine and sparkling wine. The bound rate is 30 per cent.

The Republic of Korea has free trade agreements with Chile and the United States. Under the terms of the Republic of Korea–Chile Free Trade Agreement, which came into effect in 2005, the Korean import tariff on Chilean wine was eliminated by 2010. Similarly, import tariffs on US wine were eliminated following implementation of the US–Korea Free Trade Agreement in March 2012.

ASEAN

Production

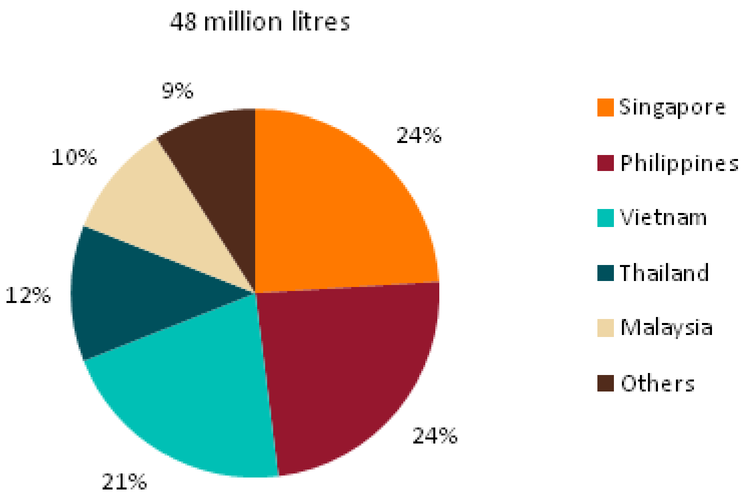
Small quantities of wine have been produced in recent years in some ASEAN member states, but production is generally insufficient to enter national statistics. Some wine production occurs from grapes in Malaysia and Thailand. Vietnam has been estimated to produce between 1.5 and 2 million litres annually (JBC 2010). Some countries, including the Philippines, produce wine from other domestic crops, such as mangoes and rice.

Consumption

In 2010 ASEAN member states consumed on average around 0.1 litres per person (Wine Institute 2013). Most member states consume well under 1 litre per person per year, but Singapore consumes around 5 litres per person (Wine Institute 2013). Total wine consumption among the ASEAN member states in 2010 was about 48 million litres. Singapore and the Philippines, the two largest wine consumers, collectively consumed around half that amount, equivalent to 23.3 million litres (Figure 135). Vietnam, Thailand and Malaysia are other significant consuming countries in the region (FAO 2013a).

Tourists and expatriates are likely to account for a significant proportion of the total wine consumed in the ASEAN member states. This suggests that future sales will depend on growth in tourist numbers rather than on any change in domestic consumption patterns (USDA–FAS 2012e, 2011b).

Figure 135 Wine consumption, ASEAN, 2010



Source: FAO 2013a

Trade

ASEAN member states imported nearly 68 million litres of wine valued at US$554 million in 2010 (FAO 2013a). However, more than half the total wine imported (by value) is re-exported, predominantly by Singapore, which serves as a distribution centre for wine. The total net imports for the group in 2010 amounted to 48 million litres, valued at US$235 million. The major net importing countries are Singapore, the Philippines and Vietnam, with smaller quantities imported by Thailand, Malaysia and Myanmar.

Policies

Tariffs on wine imports into ASEAN member states range from zero in Singapore and Brunei Darussalam to 150 per cent on some categories in Indonesia (WTO 2013). Indonesia (for some categories) and Malaysia charge specific tariffs equivalent to between A$2.40 and A$7.80 a litre (at April 2013 exchange rates).

The governments of Malaysia and Indonesia impose other restrictions on the consumption of alcohol that reflect the religious beliefs of the Islamic population. In Indonesia, wine and spirit consumption is permitted only in licensed four and five star hotels, certain restaurants, bars, pubs, and nightclubs. However, in 2010 the Indonesian Government dropped a luxury tax on alcoholic beverages in order to stimulate the tourist industry.

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10 Pig meat

Kelly Chow, Clay Mifsud and Andrew Haylen

China

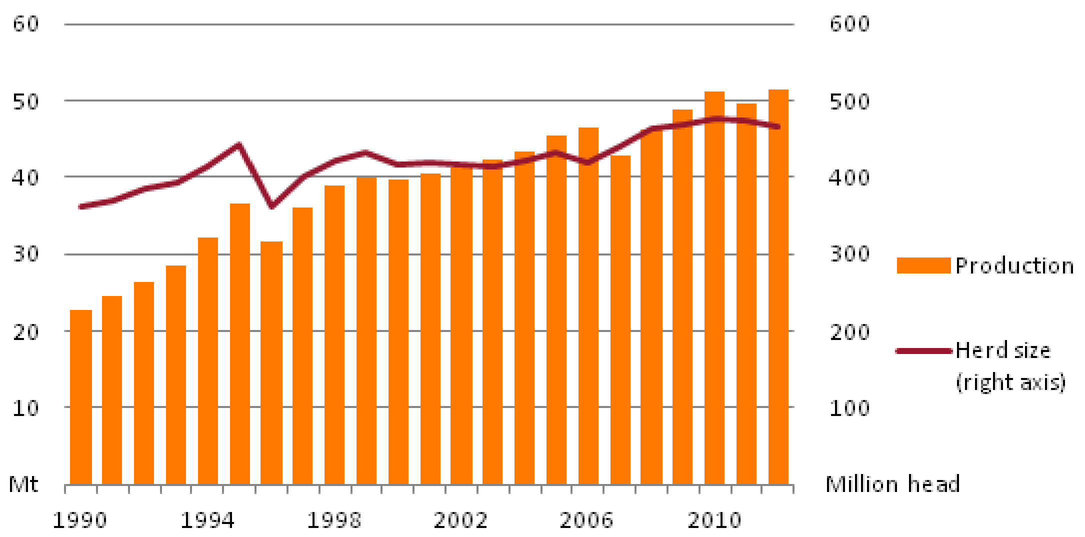
Production

China is the world's largest producer of pig meat accounting for 49 per cent of world production in 2012 (USDA–FAS 2013). Pig meat production in China has grown from 22.8 million tonnes in 1990 to 51.4 million tonnes in 2012, an increase of 125 per cent. Over this period, pig numbers increased by 29 per cent from 362 million head to 467 million head (Figure 136). On several occasions over this period, pig meat production was influenced by livestock diseases. For example, in 2007 an outbreak of porcine reproductive and respiratory syndrome virus (PRRS), led to a significant cull of pigs. As a result domestic production fell by 8 per cent to 42.9 million tonnes in that year (Gale et al. 2012; Nelson & Pan 2012; USDA–FAS 2013).

Government policy changes and income growth have supported the rapid increase in pig meat production. Since the 1980s the Chinese Government has implemented policies encouraging pig meat production. Some of these policies include abolishing low pig procurement prices and quotas, establishing specialised household production units and expanding the feed industry (Gale et al. 2012; Schneider 2011; Tisdell 2011).

The pig meat industry is the largest meat industry in China, accounting for around two-thirds of total meat production in 2012. In comparison, the poultry meat and beef industries accounted for 19 per cent and 8 per cent of production, respectively. While still the largest component, the relative importance of pig meat within the livestock sector has gradually declined over the past two decades. In 1990 pig meat accounted for 86 per cent of total meat production, but by 2012 it had fallen to 73 per cent (USDA–FAS 2013).

Figure 136 Meat production and herd size, China



Source: USDA–FAS 2013

The structure of the pig meat industry in China has changed in recent years (Table 14). It has shifted from small-scale, backyard farms to specialised household production systems and large-scale integrated production systems. The percentage of pigs slaughtered from farms with a herd of less than 50 head fell from 73 per cent in 2002 to 34 per cent in 2010 (Chen & Wang 2013; McOrist et al. 2011).

Table 14 Share of pigs slaughtered by farm size, China

Number of pigs on farm	Pigs slaughtered by farm size (%)		
	2002	2008	2010
1–49	73	44	34
50 and above	27	56	66
50–99	9	13	13
100–499	8	16	17
500–2999	5	15	19
3000 +	3	7	9

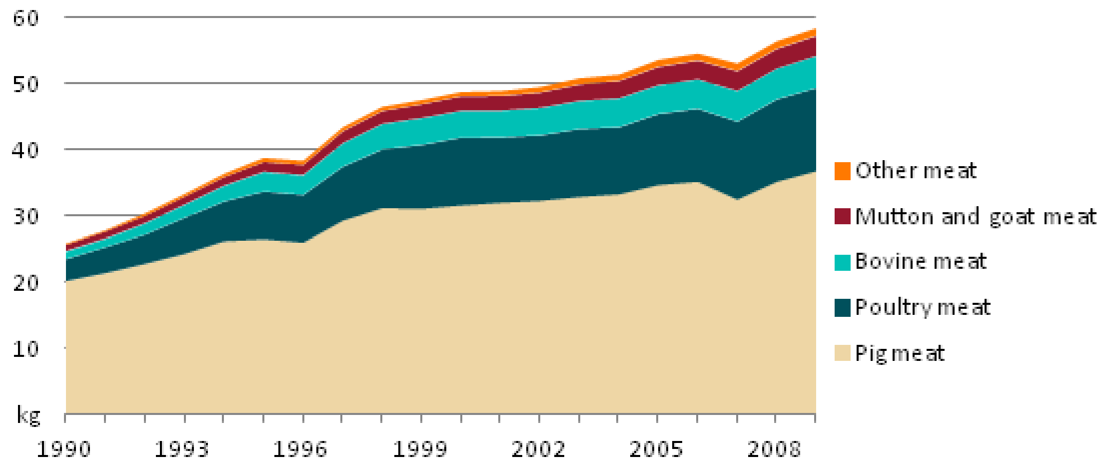
Source: Chen & Wang 2013

Pig meat production in China is concentrated in the south east, in close proximity to the main grain producing areas and large consumer markets. The provinces of Hebei and Shandong (in north-eastern China), Henan (in the east), Hubei and Sichuan (in central China), Guangdong (in the south-east) and Hunan (in the south) are the main pig producing provinces in China, and are also among the 10 largest grain producers. These provinces are located close to Beijing, Shanghai or Hong Kong, which are among the largest markets in the region. With production in close proximity to grain producing regions and urban centres, transportation costs are reduced (Wang & Zhang 2012).

Consumption

China is the largest consumer of pig meat, accounting for just under half of world consumption in 2009. Pig meat consumption in China more than doubled between 1990 and 2009, from 23.7 million tonnes to 50.2 million tonnes (FAO 2013). It rose from 20.2 kilograms in 1990 to 36.8 kilograms per person in 2009, an increase of 82 per cent (Figure 137).

Figure 137 Meat consumption per person, China



Source: FAO 2013

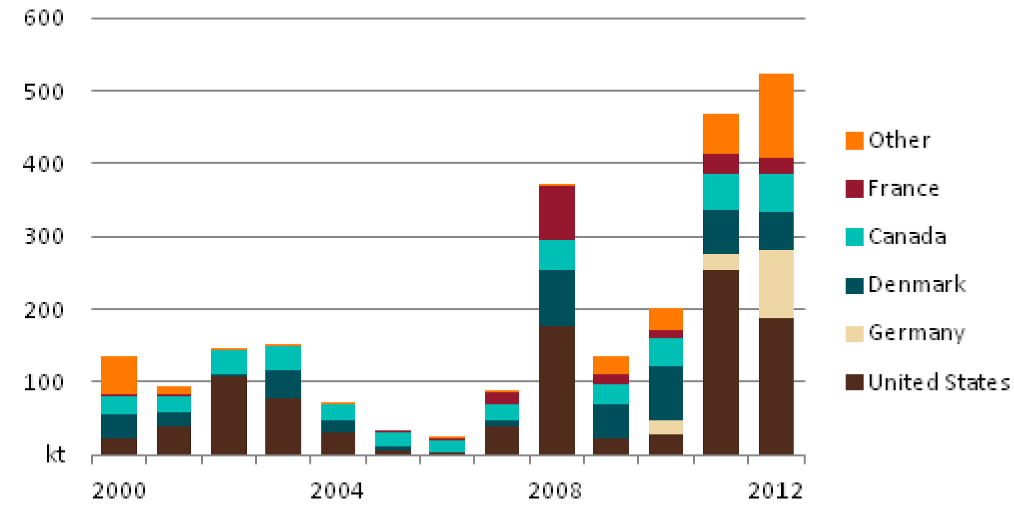
Pig meat is the most consumed meat in China, accounting for 63 per cent of total meat consumption in 2009. However, this share is lower than it was in 1990 because of the increased popularity of other animal proteins such as poultry and bovine meat over the past two decades (FAO 2013).

Pig meat is typically sold as fresh meat to consumers. It is estimated that sales of chilled, frozen and processed pig meat account for less than 10 per cent of China's pork market. Consumption of processed pork products has also been rising. Of these processed products, more than half is in western-style products such as frankfurters and ham. The remainder is made up of Chinese-style products (Hoste et al. 2013).

Trade

Before 2008 pig meat imports in China were very low relative to the size of domestic pig meat production. From 2000 to 2007 annual pig meat imports averaged 92 000 tonnes a year (shipped weight), compared with average annual production of 42.8 million tonnes (carcass weight). The primary suppliers were the United States, Denmark and Canada, the world's three largest pig meat exporters. However, Germany emerged as the second largest pig meat exporter in 2012, with exports almost quadrupling to reach 95 000 tonnes that year (Figure 138).

Figure 138 Principal suppliers of pig meat to China



Source: United Nations Statistics Division 2013

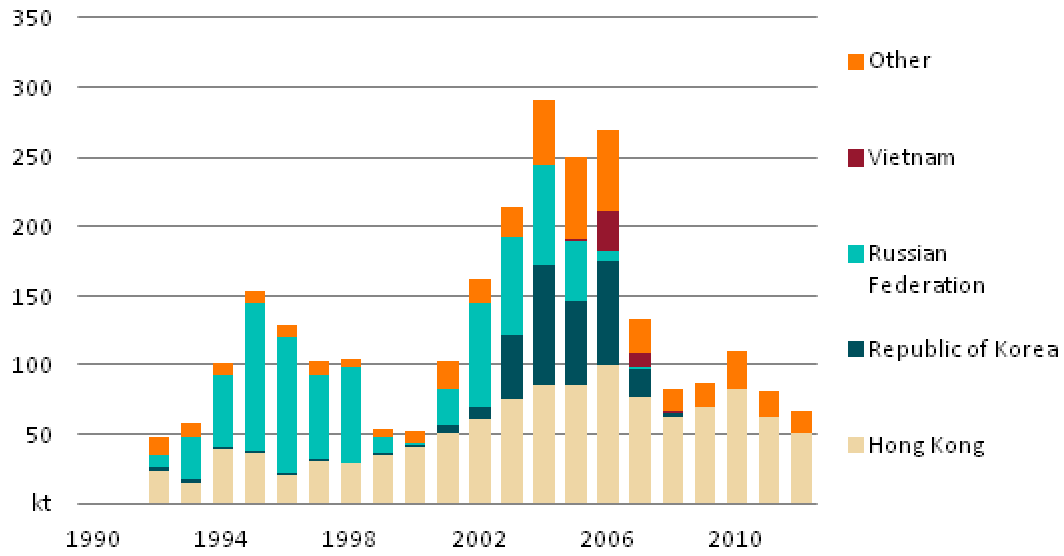
Following the 2007 outbreak of PRRS, domestic pork prices almost doubled between late 2007 and 2008 prompting a significant increase in imports (Gale et al. 2013; Nelson & Pan 2012; USDA–FAS 2009a). In 2008 Chinese pig meat imports more than quadrupled to reach 373 000 tonnes (Figure 138).

As the pig herd recovered from PRRS, pig meat imports fell. However, in 2009 imports were affected by a temporary ban imposed by the Chinese Government on pig meat from regions affected by swine flu (H1N1 influenza), including 36 states in the United States and all of Canada. The ban was lifted in late 2009 (Gale et al. 2012; USDA–FAS 2009b, 2010a).

Chinese pig meat imports, particularly from the United States, were significantly higher in 2011 as high domestic pork prices led to stronger demand for more competitively priced imported pig meat. A further rise in total imports in 2012 reflects the continuing growth in demand outstripping increases in domestic production (USDA–FAS 2011a, 2012a).

Pig meat exports represent a small component of the pig meat industry in China, accounting for less than 1 per cent of total pig meat production between 1990 and 2012. Over this period exports ranged from their lowest at 48 000 tonnes (1992) to their highest at 291 000 tonnes (2004). Hong Kong is the largest export market, averaging 49 000 tonnes over the past two decades. The Russian Federation and the Democratic People's Republic of Korea were also markets for Chinese pig meat exports until 2007 when they effectively ceased (Figure 139). Since 2007 the overall decline in Chinese pig meat exports mainly reflects an increase in domestic demand, the outbreak of diseases and food safety concerns in key export markets. For example, the Russian Federation implemented an import quota system on Chinese pig meat in 2003 based on food safety concerns. Also affecting imports are the more stringent export inspections and quarantine practices the Chinese Government enforced to reduce the quantity of illegal pig meat exports to other countries (USDA–FAS 2007).

Figure 139 Pig meat exports, China



Source: United Nations Statistics Division 2013

Policies

Domestic policies

The Chinese Government has implemented several targeted policy measures since 2007, with a view to increase the profitability and productivity of pig meat production. Grants have been provided to commercial pig farms to improve pig housing and genetics. Over the six years to 2012 the number of counties benefiting from these grants increased from 253 to 536, and the total value of grants paid out rose from 1.5 billion to 5.4 billion yuan (US$238 million to US$856 million) (RBA 2013). Other programs have included free mandatory immunisation of pigs, a 25 per cent tax cut for corporate pig farms, subsidised loans and a sow subsidy program (Chen & Wang 2013; Gale et al. 2012; Hoste et al. 2013).

The Chinese Government initiated a national pork reserve system in 2007 in an attempt to stabilise domestic pig meat prices. Under this system the central government holds stocks equivalent to a week's worth of pig meat consumption. When prices are low pig meat is purchased to stimulate demand and increase prices. When prices are high pig meat is sold from the reserves into the market to increase supply and put downward pressure on prices (Chen & Wang 2013; Gale et al. 2012; Nelson & Pan 2012).

Trade policies

China's ad valorem tariffs on pig meat imports are bound under its accession agreement with the World Trade Organization (WTO). The applied and bound tariffs on imports of fresh and chilled pig meat are the same at 20 per cent, while the applied and bound tariffs on frozen pig meat are both 12 per cent. China does not have a free trade agreement with any of its significant pig meat suppliers (WTO 2013).

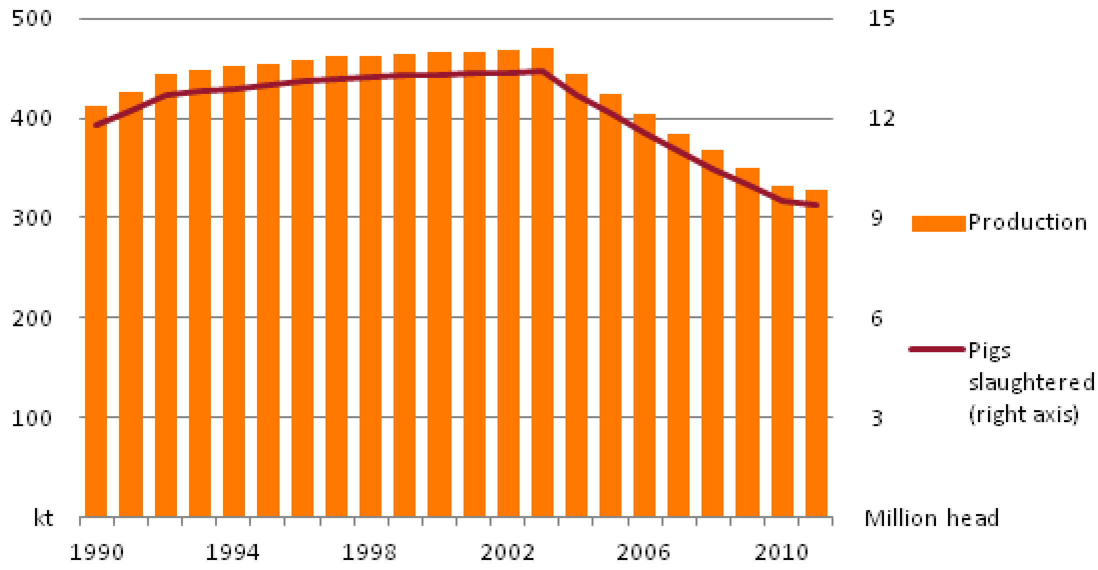
Most of China's pig meat exports are shipped to markets where they face either no, or minimal, import restrictions. Exports to Hong Kong—China's largest market since 2005—are traded under the Mainland and Hong Kong Closer Economic Partnership and as a result are not subject to any trade restrictions (WTO 2013).

India

Production

The pig meat industry accounts for a small proportion of livestock production in India, around 9 per cent of national meat production over the 20 years to 2011. Indian pig meat production increased gradually from the early 1990s to 2003. However, production has since declined by an average of 4 per cent a year from 470 000 tonnes in 2003 to 329 000 tonnes in 2011 (Figure 140). The number of pigs slaughtered fell from 13.4 million head to 9.4 million head over the same period (FAO 2013).

Figure 140 Pig meat production, India



Data source: FAO 2013

The fall in pig meat production largely reflects the change in consumer preferences for poultry meat and the consequent growth of the Indian poultry sector. In addition, Indian dietary patterns, largely influenced by cultural and religious reasons, have limited the intake of meat products in general to a small proportion of consumers' diets (USDA–FAS 2011b).

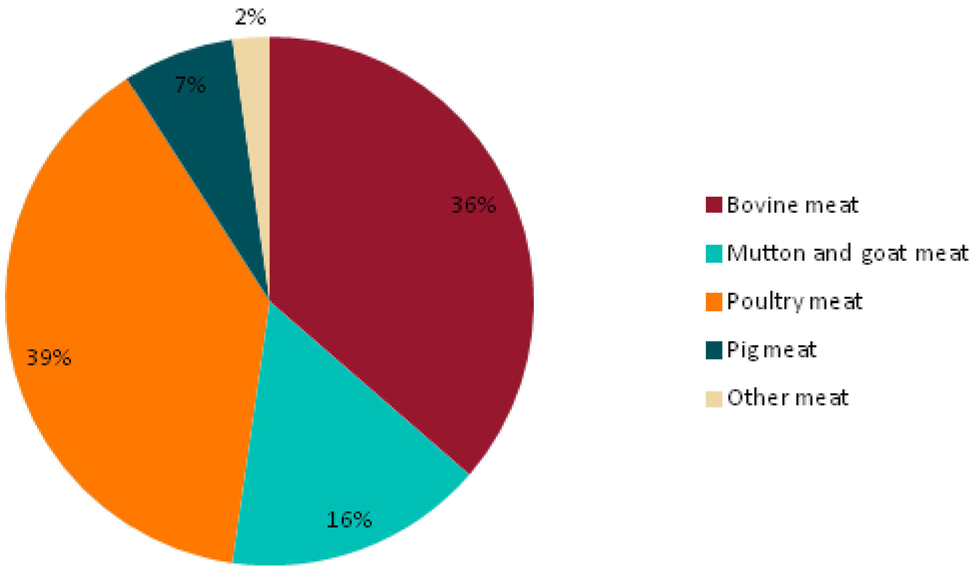
Most pig meat producers in India are small farm families who rely on pig rearing for their livelihood. Pig meat production is concentrated in the north-eastern states of India. Within that region, Bihar and West Bengal are the largest pig meat producing states, together accounting for more than one-third of total Indian pig meat production in 2009–10 (USDA–FAS 2011b).

To improve productivity in pig meat production, a five-year research project partly funded by the government (starting in 2007) was undertaken to examine the pig industry in north-east India. The project conducted by the International Livestock Research Institute (ILRI) attempted to achieve this through manuals that provided information to help small-scale farmers with pig management, feeding and veterinary care (ILRI 2012).

Consumption

Between 1990 and 2003 pig meat consumption in India rose slightly. However, consumption has since declined from 470 000 tonnes in 2003 to 351 000 tonnes in 2009, in line with falling production and low imports (FAO 2013). Over the past two decades, pig meat has accounted for around 10 per cent of meat consumption in India. By contrast, over the same period, poultry meat and bovine meat together accounted for around three-quarters of meat consumption (Figure 141).

Figure 141 Per person meat consumption, India, 2009



Source: United Nations Statistics Division 2013

Two distinct segments of the Indian population consume pig meat. Most is consumed by the lower caste and by ethnic Chinese, especially in the north-east of the country. This consumption is typically sourced from locally raised fresh pig meat. The remainder is largely consumed in metropolitan areas, particularly those which attract significant numbers of international travellers. Most of this meat is processed or cured products, including bacon, ham, sausages and canned meat products (USDA–FAS 2011b).

Trade

India is largely self-sufficient in pig meat production. It did not import pig meat between 1990 and 2004 and since then yearly shipments have been negligible. Indian pig meat exports over the past two decades have always been less than 2000 tonnes—equivalent to less than 1 per cent of domestic production a year.

Policies

The Government of India has focused on improving productivity in the pig meat industry. The pig development scheme implemented in 2010 aimed to encourage commercial pig farmers to improve production performance of native breeds through cross breeding, using selected animals of high performing breeds. Farmers can apply for capital subsidies to help with pig breeding, rearing and related activities (DAHDF 2013).

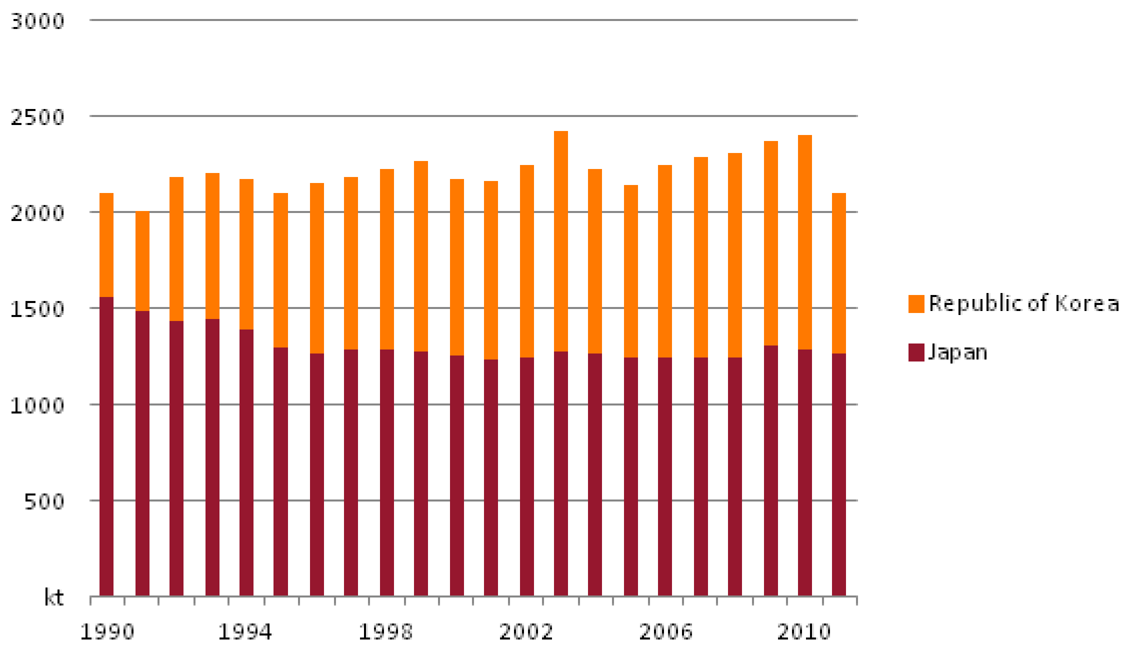
India's imports of pig meat are subject to an applied tariff of 30 per cent while the bound tariff is much higher at 100 per cent (WTO 2013).

Japan and the Republic of Korea

Production

Since 1990 pig meat production in Japan has declined by an average of 1 per cent a year, from 1.6 million tonnes to 1.3 million tonnes in 2011. By contrast, pig meat production in the Republic of Korea grew from 550 000 tonnes in 1990 to 1.1 million tonnes in 2010 (Figure 142). Over this period Korean pig meat production was influenced by outbreaks of foot and mouth disease in 2000, 2002 and 2010 (USDA–FAS 2010b). In 2011 pig meat production fell to 837 000 tonnes, largely as a result of lower pig slaughter and lower pig numbers following an outbreak of foot and mouth disease (USDA–FAS 2010b, 2012b).

Figure 142 Pig meat production, Japan and the Republic of Korea



Source: FAO 2013

While the pig meat industry represents a large component of meat production in Japan and the Republic of Korea, its relative importance has fallen gradually over the past two decades. In Japan, pig meat production as a share of total meat production declined from 44 per cent in 1990 to 40 per cent in 2011. In the Republic of Korea, pig meat's share of total meat production declined from 58 per cent to 46 per cent over the same period (FAO 2013).

Pig meat production in Japan is concentrated in six prefectures including Kagoshima, Miyazaki, Chiba, Ibaraki, Gunma and Hokkaido, which together accounted for just under half of national pig meat production in 2011 (MAFF 2013). Between 2004 and 2011 the number of pig farms fell by 29 per cent from 7418 to 5286. This fall reflects the exit of small farm operations with herds of 1000 or less, which accounted for around 97 per cent of the total decline in pig farms over the period (MAFF 2013).

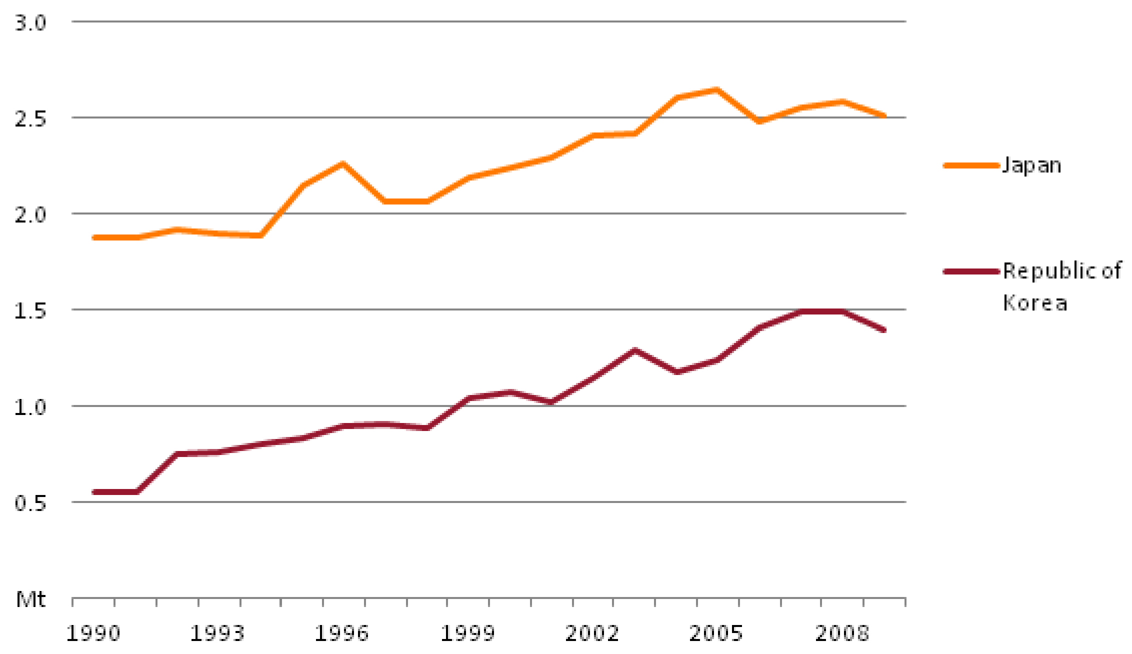
In the Republic of Korea, the pig meat industry is mainly concentrated in the province surrounding Seoul and also in the south-east and central parts of the country. The Korean pig meat industry is shifting from small-sized to larger-scale operations. The increase in the number of specialised pig farms largely reflects the exit of a large number of small-sized farms (KREI 2010; Oh & Whitley 2011). Between 1990 and 2011 the number of small-sized pig farms with a herd of 1000 or less fell from an average of 141 888 to 3590 (KOSIS 2013).

Consumption

Over the past two decades pig meat has been the main meat consumed in Japan and the Republic of Korea. In the 20 years to 2009 pig meat consumption in Japan accounted for an average of 41 per cent of total meat consumption. In the Republic of Korea it accounted for about half of total meat consumption on average over the same period (FAO 2013).

The growth in pig meat consumption in Japan has been slow, rising by an average of 1 per cent a year from 1.9 million tonnes in 1990 to 2.5 million tonnes in 2009 (Figure 143). Pig meat consumption per person in Japan rose from 15.4 kilograms to 19.9 kilograms over the same period (FAO 2013). Japanese consumers have a preference for 'Boston butt' and loin cuts because they are used in popular pork dishes, such as tonkatsu and shabu shabu (Oh & See 2012).

Figure 143 Pig meat consumption, Japan and the Republic of Korea



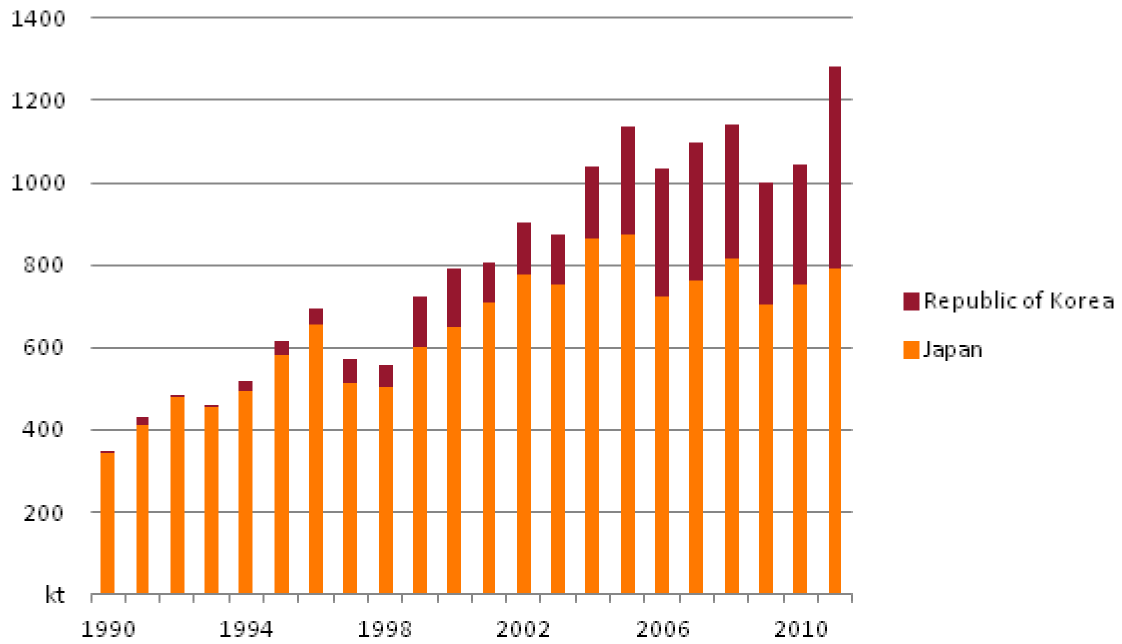
Source: FAO 2013

Pig meat consumption grew faster in the Republic of Korea compared with Japan, at around 5 per cent a year, from 551 000 tonnes in 1990 to 1.4 million tonnes in 2009 (Figure 143). Pig meat consumption increased from 12.8 kilograms per person in 1990 to 29.1 kilograms in 2009 (FAO 2013). This increase largely reflects substitution away from chicken and beef meat because of food safety concerns relating to outbreaks of bovine spongiform encephalopathy (BSE) and avian influenza (APL 2009; Blayney et al. 2006; USDA–FAS 2004). Koreans also have a strong preference for particular cuts. Pig meat cuts containing a high percentage of fat such as the belly and 'Boston butt', are favoured because they are used in popular Korean dishes, such as sahm-gyeop-sahl and jok-bahl (Oh & See 2012).

Trade

Japan and the Republic of Korea are net importers of pig meat. Imports almost quadrupled from 346 000 tonnes in 1990 to 1.3 million tonnes in 2011. Most of this growth occurred between 1990 and 2005 when imports grew, on average, by 9 per cent a year. Since then, growth has slowed, averaging 3 per cent a year in the six years to 2011 (Figure 144).

Figure 144 Pig meat imports, Japan and the Republic of Korea



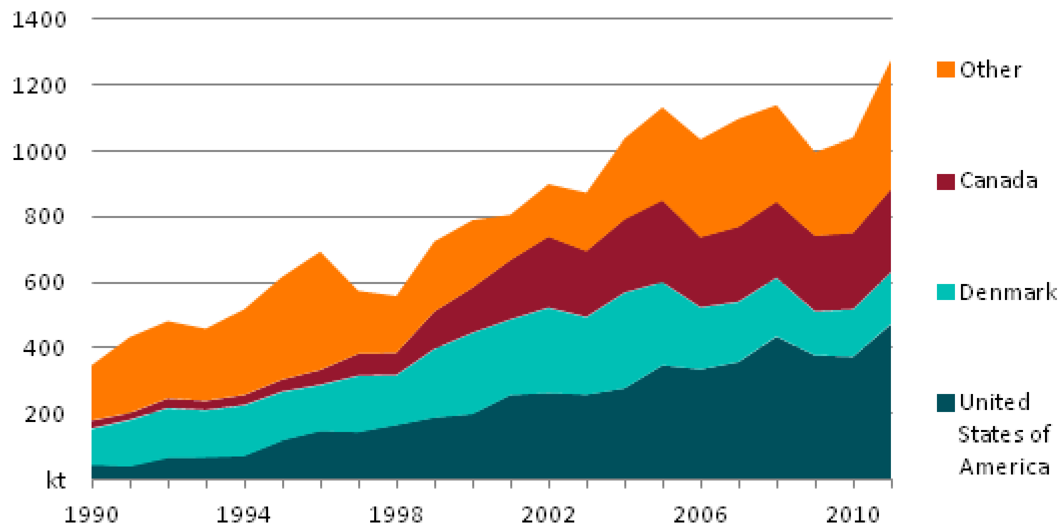
Source: United Nations Statistics Division 2013

Disease outbreaks of BSE and avian influenza in the 2000s led to several temporary bans on imports of beef and poultry meat in some years. As a result consumer concerns about food safety led to reductions in consumption of beef and poultry meat and concurrent increases in consumption of other meats such as pig meat (USDA–FAS 2004).

In the Republic of Korea, the rise in pig meat imports was driven predominantly by strong demand growth. Imports by the Republic of Korea grew from 2300 tonnes in 1990 to 487 000 tonnes in 2011, making it the world's sixth largest importer of pig meat that year. Japan's imports of pig meat more than doubled from 343 000 tonnes to 793 000 tonnes over the same period, making Japan the world's third largest importer in 2011 (Figure 144). In December 2003 the emergence of BSE in the United States resulted in the Republic of Korea imposing a temporary ban on imports of US beef, which was partially removed in September 2006 (APL 2009, USDA–FAS 2004). As a result, pig meat imports grew from 122 000 tonnes to 311 000 tonnes between 2003 and 2006. Following the resumption of beef trade, pig meat imports fell from 339 000 tonnes in 2007 to 289 000 tonnes in 2010 (United Nations Statistics Division 2013).

Japan and the Republic of Korea, together source most of their pig meat imports from the United States, Canada and Denmark. In 2011 these three suppliers accounted for around 69 per cent of total pig meat imports by Japan and the Republic of Korea combined (Figure 145). Before 1997, Taiwan was a significant supplier of pig meat imports to Japan. However, following the emergence of foot and mouth disease in Taiwan in March 1997, imports of pig meat were increasingly sourced from Canada (Blayney et al. 2006; USDA–FAS 1998). Other smaller suppliers included Chile, Spain, Mexico, Poland, Germany, Austria, France the Netherlands and Hungary. Over the past two decades, the three main suppliers principally shipped frozen pig meat, which accounted for 75 per cent of total imports. Fresh, chilled pig meat accounted for the remainder (United Nations Statistics Division 2013).

Figure 145 Principal suppliers of pig meat to Japan and the Republic of Korea



Source: United Nations Statistics Division 2013

Pig meat exports represent a small component of the pig meat industry in Japan and the Republic of Korea combined, accounting for less than 2 per cent of total pig meat production between 1990 and 2011. Over this period exports ranged from their lowest at 449 tonnes (2010) to their highest at 186 000 tonnes (1998) (United Nations Statistics Division 2013).

Policies

The Government of Japan continues to deliver support to the pig industry through measures that support producer returns and by maintaining market prices above world market levels. The regional pork production stabilisation fund was established to compensate farmers for loss of income. Payments are made to pig farmers in the form of check-off payments per hog and a local government contribution which differs by prefecture (Obara et al. 2003).

Japanese pig meat imports operate under the 'gate price system' which imposes a minimum import price on pork shipments into the country, currently set at 525 yen per kilogram of pig meat cuts (USDA–FAS 2012c). When imported pig meat enters the country below the gate price, importers pay the difference between the shipment value and the gate price, in addition to the 4.3 per cent tariff. For pig meat imported above or at the gate price, importers are only required to pay the 4.3 per cent tariff (Obara et al. 2003; USDA–FAS 2012c). In addition, safeguard provisions apply under the gate price system. The gate price will be temporarily raised if the volume of imports in a given period exceeds 119 per cent of the average volume recorded in the same period over the preceding three years (Obara et al. 2003; OECD 2009).

In Japan the applied tariffs on imported pig meat are between zero and 4.3 per cent and are set equal to the bound tariffs (WTO 2013). Japan has no free trade agreements with the three major suppliers (the United States, Canada and Denmark) that apply to pig meat imports. However, in April 2013 Japan accepted the invitation to join the Trans–Pacific Partnership negotiations, which currently include eleven other members (MFAT 2013).

The Government of the Republic of Korea has established measures to strengthen control of livestock diseases including opening pollution control facilities, managing disposal of livestock manure, registering farms, establishing minimum space requirements for pigs, developing stronger foot and mouth disease standard operating procedures and sharing costs for vaccination expenses (OECD 2008; USDA–FAS 2011c).

In the Republic of Korea, applied tariffs for pig meat are equal to the bound tariffs. For fresh chilled pig meat the applied and bound tariffs are 22.5 per cent, while frozen pig meat is subject to tariffs of 25 per cent (WTO 2013). The US–Korea Free Trade Agreement entered into force on 12 March 2012. Under this agreement, most tariffs will be eliminated on US frozen pig meat by 1 January 2016. Tariffs applied on other fresh, chilled pig meat (fresh bellies and miscellaneous fresh cuts) will be eliminated by 1 January 2021. These fresh cuts are also subject to a safeguard mechanism that will be phased out the following year (Cooper et al. 2011; USATO 2013).

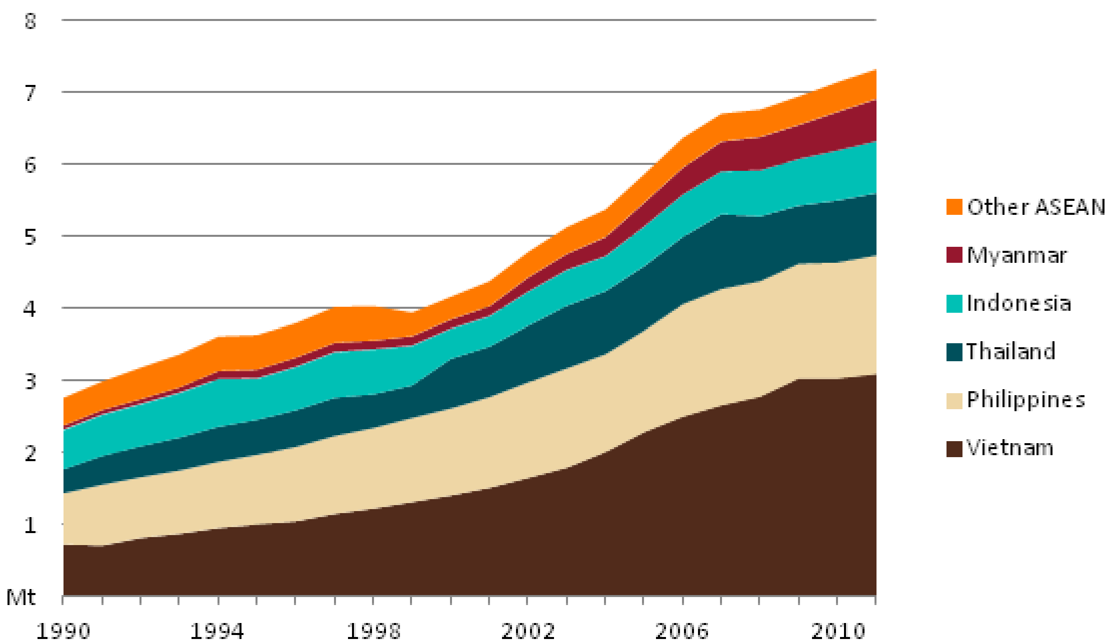
ASEAN

Production

Over the past two decades, pig meat has accounted for most meat produced among the ASEAN member states. While the pig meat industry remains significant, its relative importance has declined as demand for poultry meat has grown and the poultry industry has expanded. In 2011, 44 per cent of meat produced was pig meat compared with 43 per cent for poultry meat and 11 per cent for beef (FAO 2013).

Pig meat production rose significantly in the ASEAN member states between 1990 and 2011, increasing by around 166 per cent to 7.3 million tonnes in 2011. Over this period, growth in regional production was largely driven by rapid production growth in Vietnam and the Philippines. From 1990 to 2011 Vietnamese production more than quadrupled from 729 000 tonnes to 3.1 million tonnes while production in the Philippines more than doubled from 712 000 tonnes to 1.6 million tonnes in 2011 (Figure 146).

Figure 146 Pig meat production, ASEAN



Source: FAO 2013

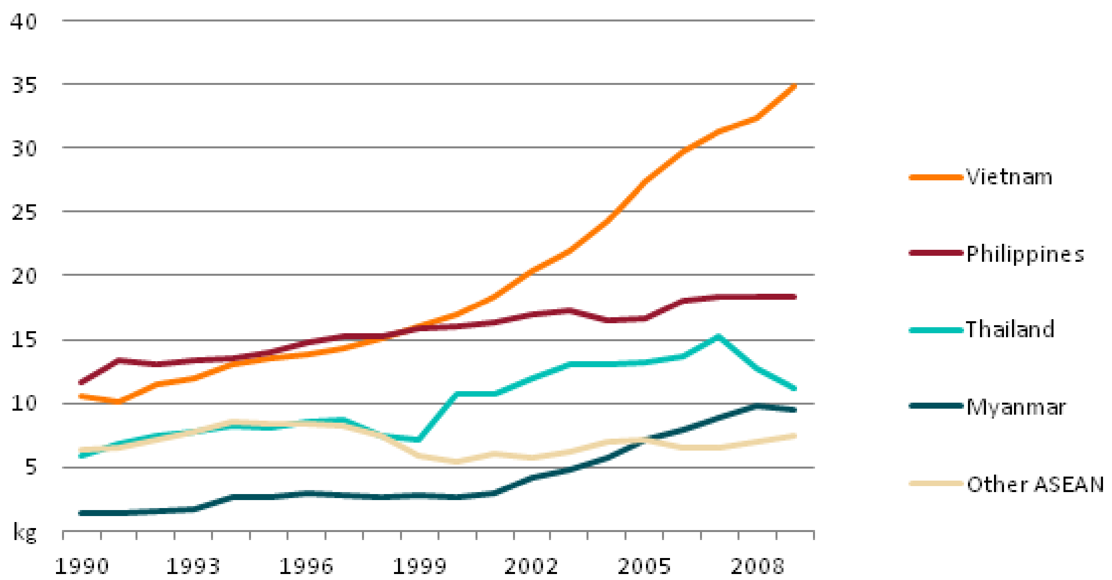
Vietnam and the Philippines are the largest pig meat producers of the ASEAN member states, accounting for 42 per cent and 22 per cent, respectively of total pig meat production in 2011. Other key pig meat producers include Thailand and Indonesia, accounting for 12 per cent and 10 per cent, respectively, of ASEAN meat production over the same period (FAO 2013).

Consumption

Pig meat is the most widely consumed source of animal protein in a number of countries within the ASEAN region, including Vietnam, the Philippines, Cambodia and the Lao People's Democratic Republic (FAO 2013).

Since 2001 pig meat consumption has risen significantly in a number of countries in the ASEAN member states, with rapid growth occurring particularly in Vietnam and Myanmar. Pig meat consumption in Vietnam doubled from 1.5 million tonnes in 2001 to 3 million tonnes in 2009. On a per person basis, pig meat consumption nearly doubled, from 18.4 kilograms to 34.9 kilograms. Pig meat consumption in Myanmar grew by about 241 per cent, from 132 000 tonnes to 450 000 tonnes. On a per person basis, it grew from 2.9 kilograms in 1990 to 9.5 kilograms in 2009 (Figure 147).

Figure 147 Pig meat consumption per person, ASEAN



Source: FAO 2013

Vietnam and the Philippines were the largest consumers of pig meat among ASEAN member states in the 20 years to 2009 (FAO 2013). Vietnamese total pig meat consumption grew from 27 per cent of total ASEAN consumption in 1990 to 43 per cent in 2009. The Philippines' share declined from 27 per cent to 24 per cent over the same period (FAO 2013).

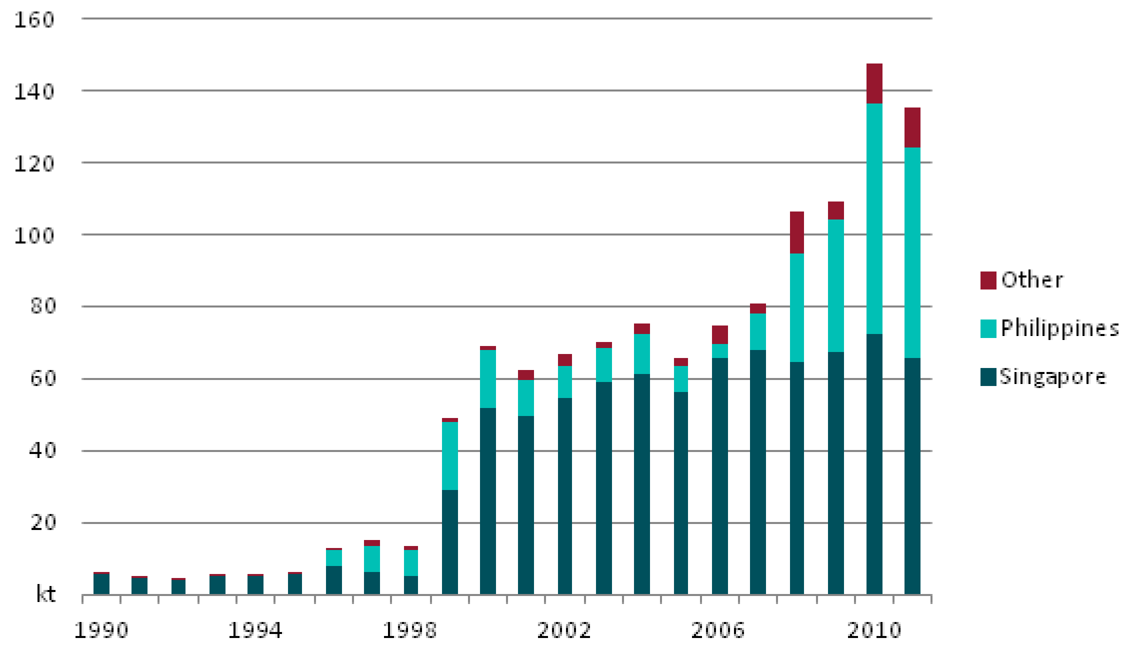
Philippine consumers have a strong preference for processed pork in the form of canned food. Chilled and processed pork products, such as hot dogs, hams, sausages, salami and meat patties for burgers are also popular (USDA–FAS 2008). Vietnamese consumers prefer fresh pig meat purchased from traditional wet markets (Tisdell 2009).

Trade

Among the ASEAN member states, imports of pig meat have accounted for less than 1 percent of consumption over the past two decades. Before 1998 pig meat imports averaged less than 8000 tonnes. Since then, regional imports have grown from 14 000 tonnes in 1998 to 135 000 tonnes in 2011 (United Nations Statistics Division 2013).

Singapore is the largest importer of pig meat within the region, averaging 79 per cent of ASEAN pig meat imports between 1990 and 2007. However, in 2008 the Philippines became a significant importer of pig meat, at 30 000 tonnes increasing to 58 000 tonnes in 2011. Singapore and the Philippines together accounted for 92 per cent of ASEAN pig meat imports in 2011 (Figure 148). The growth in Philippine imports largely reflects a growing preference for western-style meals, an increase in the number of dual-income families, increasing popularity of branded processed products and urbanisation (USDA–FAS 2008).

Figure 148 Pig meat imports, ASEAN



Source: United Nations Statistics Division 2013

Most ASEAN pig meat imports were sourced from Australia and Brazil between 1997 and 2007. However, since 2007 imports from the United States and Canada have increased rapidly, accounting for 2 per cent and 6 per cent, respectively, of ASEAN pig meat imports in 2007 and rising to 19 per cent and 12 per cent, respectively, in 2011. Over the same period, the proportion of ASEAN pig meat imports sourced from Australia declined from 27 per cent to 9 per cent (United Nations Statistics Division 2013).

Policies

Singapore has an applied most favoured nation tariff of zero on all imports of pig meat and a bound tariff of 10 per cent (WTO 2013).

In the Philippines, pig meat imports are subject to an applied most favoured nation tariff of 40 per cent. The Philippines has a free trade agreement with the ASEAN, with applied tariffs of between 5 per cent and 20 per cent on all pig meat imports (WTO 2013).

Malaysian imports of pig meat are subject to an applied most favoured nation tariff of 50 per cent on all carcasses and an applied tariff of zero on all pig meat cuts. Pig meat imports are subject to a bound rate of 139 per cent. Malaysia has a free trade agreement with ASEAN that eliminated all tariffs on imports of pig meat from ASEAN member states (WTO 2013).

In Thailand, applied tariffs for pig meat are equal to bound tariffs. For frozen carcasses and fresh, chilled bone-in cuts, the applied and bound tariffs are 30 per cent. While fresh, chilled carcasses and frozen boneless cuts are subject to tariffs of 40 per cent (WTO 2013).

Indonesia imposes an applied most favoured nation tariff of 5 per cent on all pig meat imports while the bound tariff is 50 per cent. Indonesia has free trade agreements with China, India, the Republic of Korea and the ASEAN member states. Imports from China, the Republic of Korea and ASEAN member states enter duty free while imports from India are subject to a 2 per cent tariff (WTO 2013).

Vietnam imposes applied most favoured nation tariffs on frozen pig meat of 15 per cent and on fresh and chilled pig meat of 25 per cent. The bound tariffs on pig meat range from 15 per cent to 25 per cent. Countries that are not members of the World Trade Organization are subject to 'general duty' for imports of pig meat, which range from 22.5 per cent to 37.5 per cent.

Vietnam has free trade agreements with China, the Republic of Korea and ASEAN. Under these agreements, pig meat imports from China and ASEAN member states are subject to tariffs of zero and 5 per cent, respectively. A tariff of 15 per cent is levied on imports of fresh, chilled pig meat from the Republic of Korea (WTO 2013).

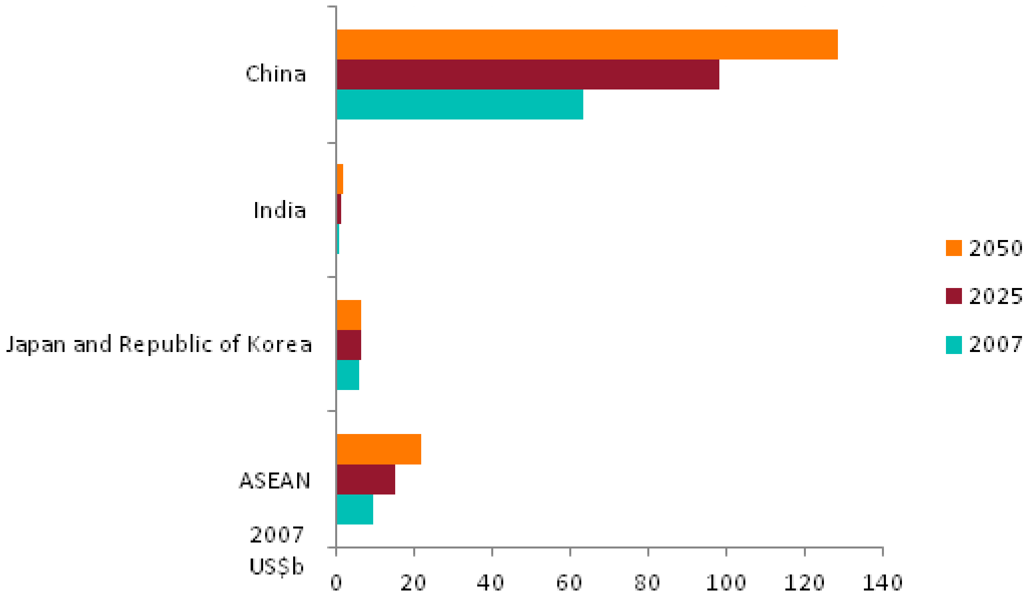
In Myanmar the applied tariff on all pig meat imports is 15 per cent and the bound tariff is 165 per cent. Myanmar has free trade agreements with China, the Republic of Korea, India and ASEAN. Pig meat imports from China are subject to an applied tariff of zero, while those from ASEAN member states are subject to an applied tariff that varies between zero and 5 per cent. Applied tariffs of 10 per cent and 12.5 per cent are imposed on imports from the Republic of Korea and India, respectively (WTO 2013).

Long-term prospects

Consumption

China has historically been a significant consumer of pig meat and this is projected to remain the case toward 2050, with the real value of consumption at US$128 billion (2007 dollars) in 2050, US$65 billion higher than in 2007 (Figure 149). If realised, China will remain the principal consumer of pig meat in Asia. Most of the consumption growth (US$35 billion) is projected to occur between 2007 and 2025 because of higher population (United Nations Population Division 2011) and income growth during this period than between 2025 and 2050. For example, between 2007 and 2025, consumption is projected to grow by 4.2 per cent a year, compared with 1.7 per cent between 2025 and 2050.

Figure 149 Real value of Asia's pig meat consumption



Source: ABARES model output

India is projected to remain a relatively small consumer of pig meat products by 2050, with the real value of consumption projected to increase from US$680 million in 2007 to US$1.4 billion in 2050. India has historically been a relatively small per person consumer of pig meat (400 grams in 2007) because of the large proportion of the population that is vegetarian. For the current set of projections presented in this report, this situation is assumed to remain unchanged toward 2050.

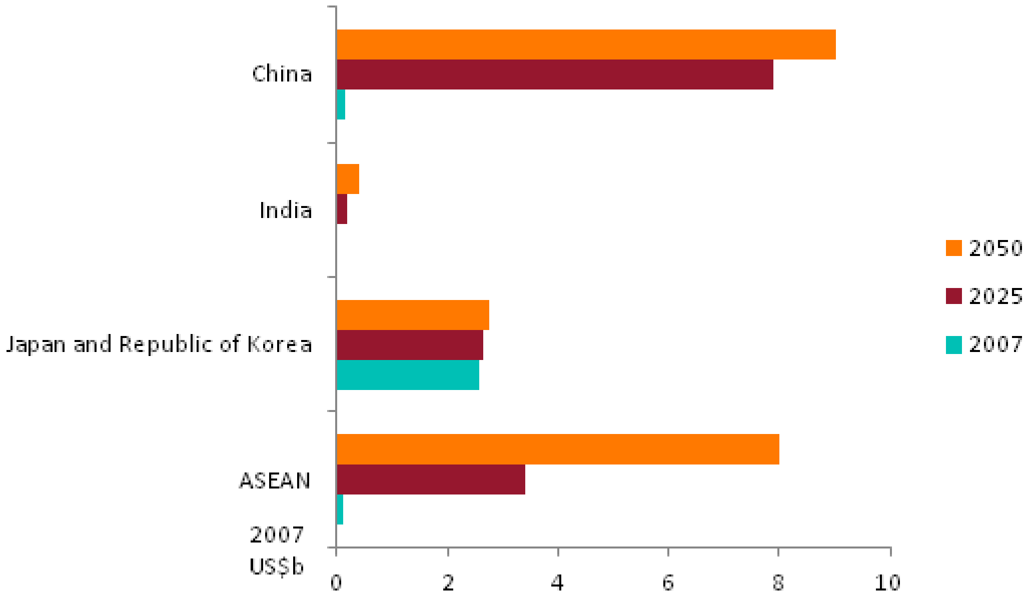
Japan and the Republic of Korea are not projected to experience any significant growth in pig meat consumption, with the real value of consumption unchanged in 2050 at US$6 billion. A projected decline in population and low income growth are largely responsible for this projected trend. Per person consumption is projected to remain around historical levels of 25 and 34 kilograms for Japan and the Republic of Korea, respectively.

For the ASEAN member states, the real value of pig meat consumption is projected to be US$22 billion, US$12 billion higher than 2007. This growth is projected to be underpinned by consumption growth in Vietnam (US$6 billion) and the Philippines (US$3 billion) between 2007 and 2050. Of the ASEAN member states, Vietnam is projected to be the largest consumer of pig meat because of the high per person consumption growth between 2007 (30 kilograms) and 2050 (61 kilograms).

Trade

China is projected to be a net importer of pig meat products in 2050, with the real value of China's pig meat imports at US$9 billion (2007 dollars) (Figure 150) Most of this import growth (US$8 billion) is projected to occur between 2007 and 2025 because of the significant growth in consumption over this period. Domestic production, which is projected to increase by 88 per cent out to 2050, is projected to meet most of China's growth in consumption.

Figure 150 Real net value of Asia's pig meat imports



Source: ABARES model output

India is projected to become a small net importer of pig meat products by 2050, with a real net value of imports of US$400 million.

In Japan and the Republic of Korea, production and consumption are projected to remain around recent historical levels over the projection period. Both countries are projected to remain net importers of pig meat products in 2050. At that time, the combined real value of net imports is projected to be around US$3 billion, an increase of 6 per cent from 2007.

For the ASEAN member states, the real net value of pig meat imports in 2050 is projected to be US$8 billion higher than in 2007. Most of this import growth is projected to occur between 2025 and 2050 as a result of higher consumption growth, stemming from sustained population and income growth during this period. Although pig meat consumption for the ASEAN member states will be met predominantly by domestic supply, imports will have an increasing role in meeting consumption out to 2050.

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11 Poultry

Caitlin Murray and Andrew Haylen

China

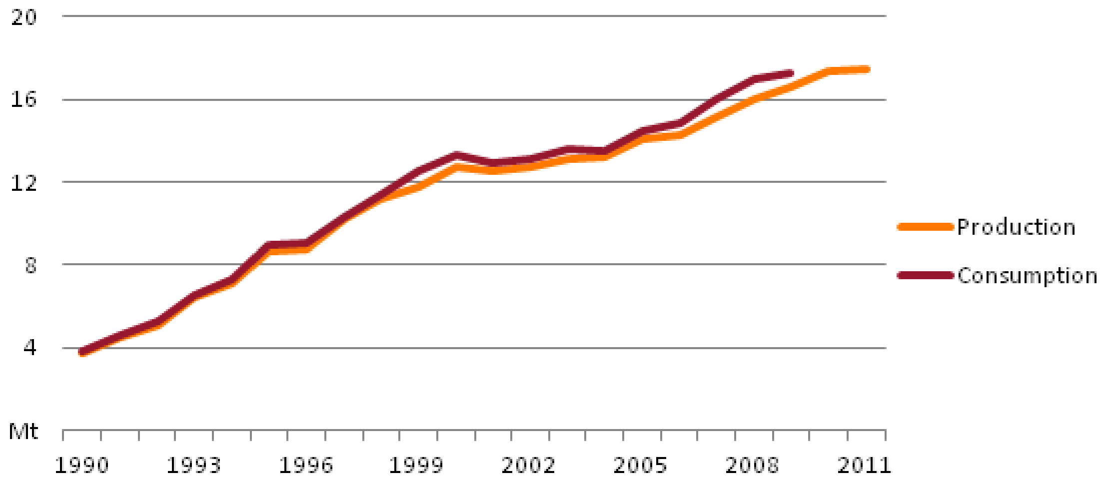
Production

China is the world's second largest poultry meat producer behind the United States. Poultry meat production grew by over 350 per cent over the past two decades, from 3.7 million tonnes in 1990 to 17.4 million tonnes in 2011 (Figure 151). Chicken meat production plays a dominant role in the poultry industry, accounting for around 69 per cent of poultry meat production in 2011. Duck and goose meat were around 17 per cent and 14 per cent, respectively.

Production growth over the past two decades has been achieved through expansion of bird numbers as well as intensification of the production process (Bingsheng & Yijuan 2007). Poultry numbers rose from 2.5 billion head in 1990 to 5.8 billion head in 2011 (FAO 2013). The number of poultry farms in China declined by 67 per cent in the 10 years to 2006 reflecting the move to large-scale industrialised operations (Bingsheng & Yijuan 2007).

Poultry meat production, as a proportion of total meat production, increased over the past two decades, from 12.3 per cent in 1990 to 21.5 per cent in 2011. In recent years more than 95 per cent of poultry meat consumed in China has been produced domestically.

Figure 151 Poultry meat production and consumption, China



Source: FAO 2013

Consumption

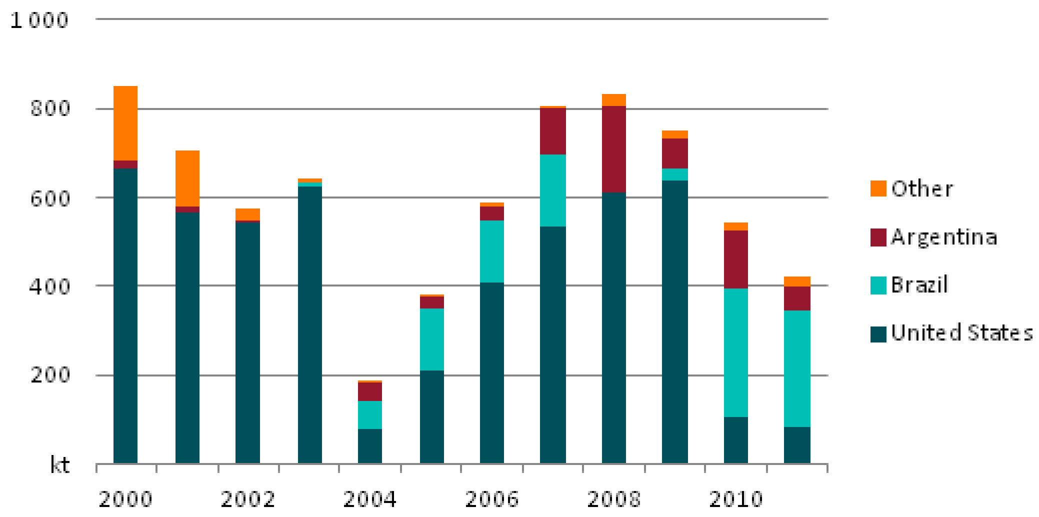
Poultry meat has become an increasingly important protein source in Chinese diets over the past 20 years. Total poultry meat consumption in China increased from 3.9 million tonnes in 1990 to 17.2 million tonnes in 2009. Consumption per person also rose significantly, from 3.3 kilograms to 12.6 kilograms over the same period. Breaks in these consumption trends occurred twice since 2000 (in 2001 and 2004) when avian influenza outbreaks in Asia caused a temporary substitution away from poultry meat (Figure 151). In 2001 avian influenza was reported in Hong Kong and Macau, while in 2004 an outbreak was reported in mainland China.

Trade

Chinese poultry meat imports consist mostly of chicken meat, including chicken feet (a delicacy in China). The United States Department of Agriculture estimates that chicken feet account for 50 to 60 per cent of total Chinese poultry meat imports (USDA–FAS 2010a).

China has been a net importer of poultry meat since 1999, although imports are a small proportion of total consumption. From 1999 to 2009, the United States was the principal source of poultry meat imports (Figure 152). In 2004 imports from the United States fell significantly when US poultry meat was banned because of a US outbreak of avian influenza (USDA–FAS 2004a). Once the ban was lifted, imports of US poultry meat rose quickly over the next few years. However, in 2010 Brazil overtook the United States as the dominant foreign supplier of poultry meat when anti-dumping and countervailing duties (see Glossary) were imposed on all imports of US poultry meat (Li et al. 2011). In 2011 China imported 421 000 tonnes of poultry meat, 61 per cent of which came from Brazil, 20 per cent from the United States and 14 per cent from Argentina.

Figure 152 Poultry meat imports, China



Source: United Nations Statistics Division 2013

Chinese exports of poultry meat consist largely of processed chicken (United Nations Statistics Division 2013). In 2011 mainland China exported 211 000 tonnes of poultry meat; more than 70 per cent of shipments were destined for Hong Kong and another 13 per cent for Malaysia. The remainder was largely sent to the Middle East and Central Asia.

Policies

China imposes both ad valorem and specific duties (see Glossary) on poultry meat imports. The most favoured nation bound and applied tariffs for fresh and chilled poultry products are the same, at 20 per cent. While frozen cuts of chicken have a bound tariff of 10 per cent, the applied specific tariff varies by type of cut. The midjoint wing has the highest applied tariff of 0.8 yuan per kilogram while chicken feet have the lowest applied tariff of 0.5 yuan per kilogram. Frozen whole chickens also have a specific tariff of 1.3 yuan per kilogram and a bound tariff of 20 per cent (WTO 2013a).

In February 2010 China imposed anti-dumping and countervailing duties on imports of all chicken meat products from the United States. As of September 2010 countervailing duties of between 5.1 per cent and 30.3 per cent and anti-dumping duties of between 50.3 per cent and

105.4 per cent were imposed (USITC 2011). The Chinese Government claims the duties were aimed at offsetting the advantage the US gained in the Chinese poultry market from subsidising its domestic industry and from selling in the Chinese market below the cost of production (MOFCOM 2010a, b).

India

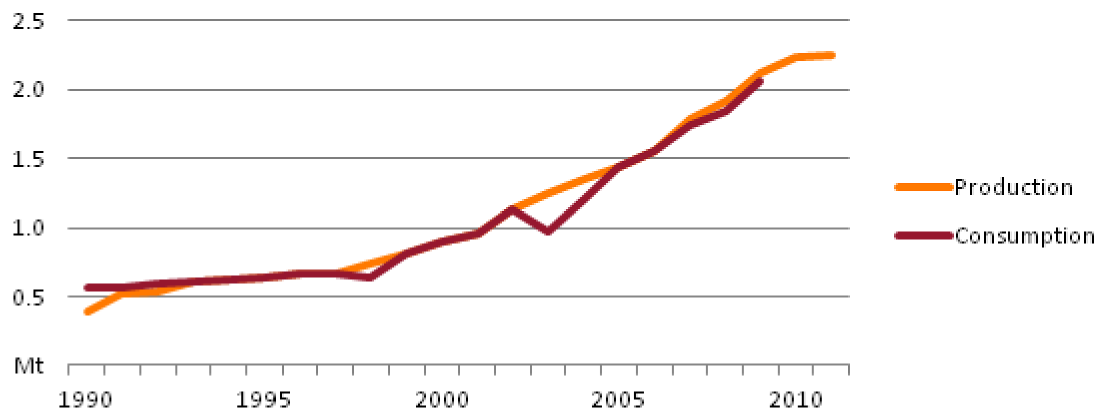
Production

The poultry meat industry has grown the fastest of all the livestock, cereal and food crop sectors in India over the past decade. Poultry meat production increased from 392 000 tonnes in 1990 to 2.2 million tonnes in 2011, an increase of more than 470 per cent (Figure 153). Poultry meat production overtook that of buffalo in 2004 as the most common type of meat produced in India. In 2011 poultry meat accounted for around 36 per cent of the total meat produced. Chicken meat accounted for almost all (98 per cent) the poultry production; the remainder was duck meat. Over the same period, bird numbers rose from 290 million head to more than 968 million head (FAO 2008).

The structure of the Indian poultry industry has changed considerably over the past two decades; private sector contract farming systems have developed and poultry companies have been vertically integrated. Contract farming systems aid smallholder producers to survive competition from large poultry producing firms (FAO 2008). In 2005 around 37 per cent of Indian broiler production was under contract to private farming systems. Contract farming was as high as 90 per cent in some regions (FAO 2008).

Feed is the input with the highest cost share in poultry production in India, accounting for around 70 per cent of the total cost (USDA–FAS 2011b). Maize is the primary feed ingredient in broiler rations, followed by soybean meal (USDA–ERS 2004). From 1990 to 2011 India was able to meet its feed demand for poultry production through domestically produced corn, soybeans and broken rice.

Figure 153 Poultry meat production and consumption, India



Source: FAO 2013

Consumption

Poultry meat consumption in India rose from 561 000 tonnes in 1990 to 2.1 million tonnes in 2009. An outbreak of avian influenza in Asia caused consumption to fall in 2003 (Figure 153).

In 1990 poultry meat consumption was around 14.9 per cent of all meat consumed in India as consumers displayed a strong preference for buffalo. By 2009 consumption patterns had changed and poultry meat accounted for more than 38 per cent of all meat consumed—the largest share of total meat consumption in India.

Although per person consumption of poultry meat increased in the 20 years to 2009 from 0.6 kilograms to 1.7 kilograms, India has the lowest per person poultry consumption of all the nations considered in this study. This is partly because, according to the 2001 National Sample Survey, a significant proportion (42 per cent) of the Indian population is vegetarian (Delgado et al. 2003).

Trade

Over the past decade, India exported and imported negligible quantities of poultry meat. The export volume is small because India has inadequate meat processing facilities, infrastructure bottlenecks and high production costs. Imports are constrained by lack of cold-chain facilities, sanitary import regulations and high tariffs (USDA–FAS 2006a).

Policies

In 2001 India removed all quantitative restrictions on poultry meat imports because of commitments made as part of the Uruguay Round of multilateral trade negotiations (Landes et al. 2004). India currently imposes most favoured nation ad valorem tariffs on poultry meat imports. Almost all bound tariffs on imports of poultry products are 100 per cent, except frozen whole chickens (35 per cent) and livers of ducks or geese (67.5 per cent). The applied tariffs on poultry imports are typically 30 per cent except on cuts of chicken meat, which are 100 per cent (WTO 2013a).

For imports from nations classified as a least developed country, India applies an ad valorem tariff of 12 per cent on all poultry products. India has a number of free trade agreements that apply to poultry meat imports. These include agreements with Malaysia, Singapore, Thailand, the Republic of Korea, Chile, Pakistan, Sri Lanka, Bangladesh, Bhutan, the Maldives and Nepal (WTO 2013a).

India also has strict sanitary and phytosanitary regulations. These regulations prohibit poultry meat imports from countries reporting an occurrence of either the highly pathogenic or the low pathogenic avian influenza (DADF 2013).

From April 2007 to March 2012 India provided a transportation subsidy to assist poultry exporters. The assistance was provided to exporters of frozen poultry meat and processed poultry products shipped by sea to destinations that excluded neighbouring countries. A specific rate of transport assistance was provided that ranged from 1.5 to 8 Indian rupees per kilogram. The specific tariff varied by export destination and type of container ship (APEDA 2008).

Japan and the Republic of Korea

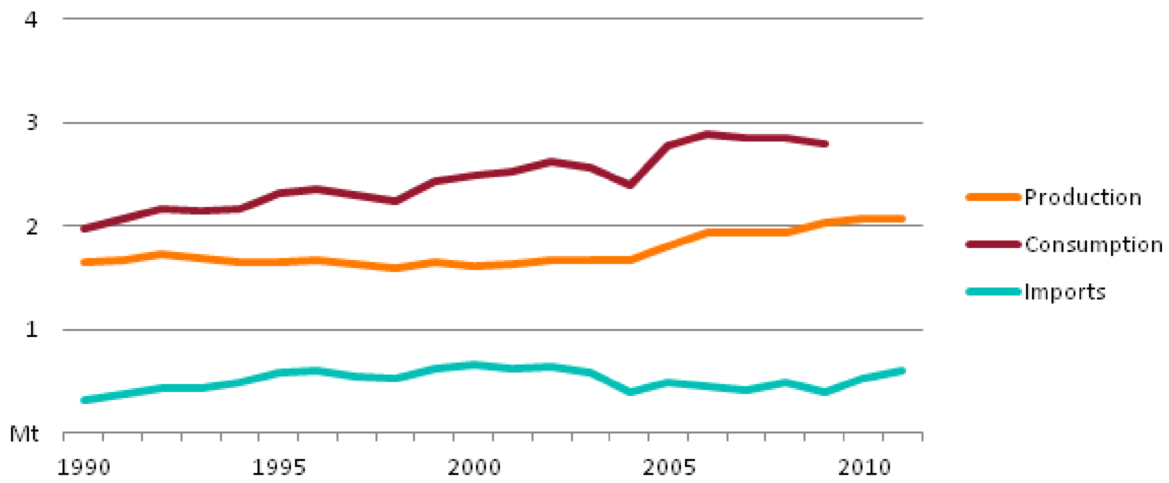
Production

Poultry meat production in Japan and the Republic of Korea increased between 1990 and 2011 from 1.7 million tonnes to 2.1 million tonnes (Figure 154). This growth occurred almost entirely in the Republic of Korea where production increased by more than 150 per cent to 686 000 tonnes in 2011. Production in Japan was around 1.4 million tonnes in 1990, dipped to 1.2 million tonnes by 1998 and returned to around 1.4 million tonnes in 2011.

The number of birds in Japan and the Republic of Korea combined declined by around 16 per cent between 1990 and 2011. The decline (from around 413 million head in 1990 to 345 million head in 2011) was entirely driven by a reduction in bird numbers in Japan which more than offset an increase of 93 million head in the Republic of Korea (FAO 2013).

Poultry meat production in Japan increased from around 40 per cent of total meat production in 1990 to 44 per cent in 2011. In the Republic of Korea the share increased from around 28 per cent to almost 38 per cent over the same period. In 2011 around 90 per cent of poultry production in the Republic of Korea was chicken meat with the remaining 10 per cent consisting of duck and guinea fowl. In Japan, nearly all poultry production was chicken meat.

Figure 154 Poultry meat production, consumption and imports, Japan and the Republic of Korea



Source: FAO 2013; United Nations Statistics Division 2013

Consumption

Poultry meat consumption rose in both Japan and the Republic of Korea between 1990 and 2009 from 2 million tonnes to 2.8 million tonnes (Figure 154). Over that time several outbreaks of avian influenza in Asia caused temporary slowdowns in consumption. Recession caused an additional slowdown in consumption in Japan in 2009.

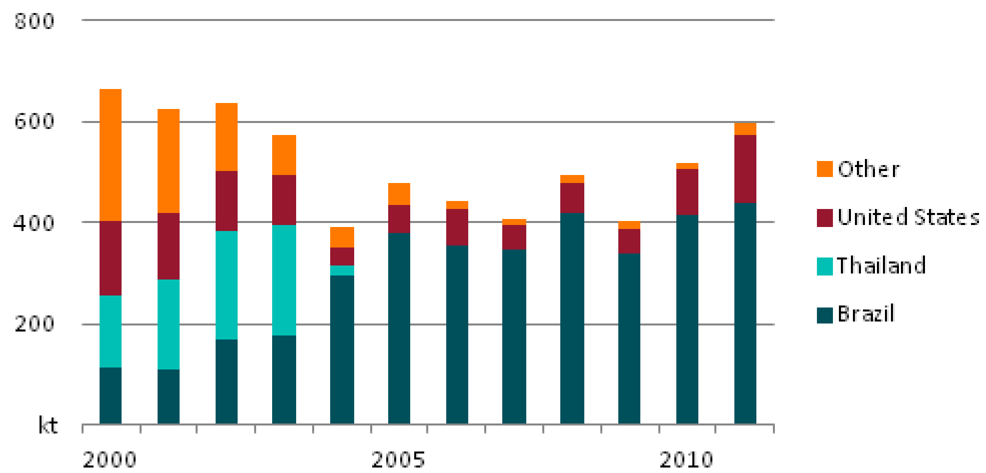
For the decade to 2009 per person poultry meat consumption was higher in Japan (16.7 kilograms) than in the Republic of Korea (12 kilograms). Similarly, it accounted for 36 per cent of total meat consumption in Japan compared with 23 per cent in the Republic of Korea. In both nations, pig meat was the most consumed meat product.

Poultry meat consumption patterns in the Republic of Korea have changed in the past five years because of the rise in popularity of snack foods, like chicken gangjeong (USDA–FAS 2012c). The popularity of snack foods and growing number of chicken fast-food franchises are factors driving the growth of imported processed chicken meat in the Republic of Korea (USDA–FAS 2012c).

Trade

In 1990 Japan imported around 302 000 tonnes of poultry meat and the Republic of Korea imported around 6000 tonnes. By 2011 Japanese imports had increased to more than 477 000 tonnes and the Republic of Korea's to almost 119 000 tonnes. Throughout the 1990s the largest share of poultry imports into these countries came from Thailand and the United States. In 2004 following an avian influenza outbreak in Thailand and the United States, Japan and the Republic of Korea imposed bans on imports from these nations (USDA–FAS 2004b; USDA–FAS 2004c). Brazil subsequently became the largest source of poultry meat imports (Figure 155).

Figure 155 Poultry meat imports, Japan and the Republic of Korea



Source: United Nations Statistics Division 2013

From 1990 to 2011 Japan and the Republic of Korea exported small quantities of poultry meat products, mostly to Vietnam and Hong Kong. In 1990 just over 7000 tonnes of poultry meat was exported, increasing to almost 27 000 tonnes by 2011. Most of these shipments were chicken meat products.

Policies

Japan applies ad valorem tariffs to imports of poultry meat. The most favoured nation tariffs range from 3 per cent to 11.9 per cent. Higher tariffs are applied to chicken meat, uncut meat of ducks, geese and guinea fowl, as well as the offal of these birds; all are applied at the bound rate. Japan also has a number of free trade agreements that apply ad valorem tariffs ranging from zero to 9 per cent on poultry meat. These include agreements with Chile, Switzerland and ASEAN member states. The Japan–Thailand Free Trade Agreement applies tariffs of up to 9 per cent on chicken meat and of between zero and 1.8 per cent on other types of poultry meat. Japan also applies duties for least developed countries and applies a generalised system of preferences scheme (see Glossary) for selected developing countries (WTO 2013a).

The Republic of Korea has higher applied ad valorem tariffs for poultry meat than has Japan. The tariffs range from 18 per cent to 22.5 per cent, and are applied at the bound rate. Higher tariffs are applied to meat cuts than to uncut meat (WTO 2013a). The Republic of Korea–United States Free Trade Agreement applies to poultry meat. Tariffs on poultry meat imports from the United States will be phased out from 2012 in 7, 10 or 12 equal annual stages depending on the tariff line (USTR 2012a, b). Imports of poultry meat are currently only allowed from the United Kingdom, France, Chile, Denmark, Sweden, Australia, Brazil, Netherlands, Hungary, Canada, Poland and the United States. Heat-treated meat is also allowed from Thailand and China (USDA–FAS 2012a).

ASEAN

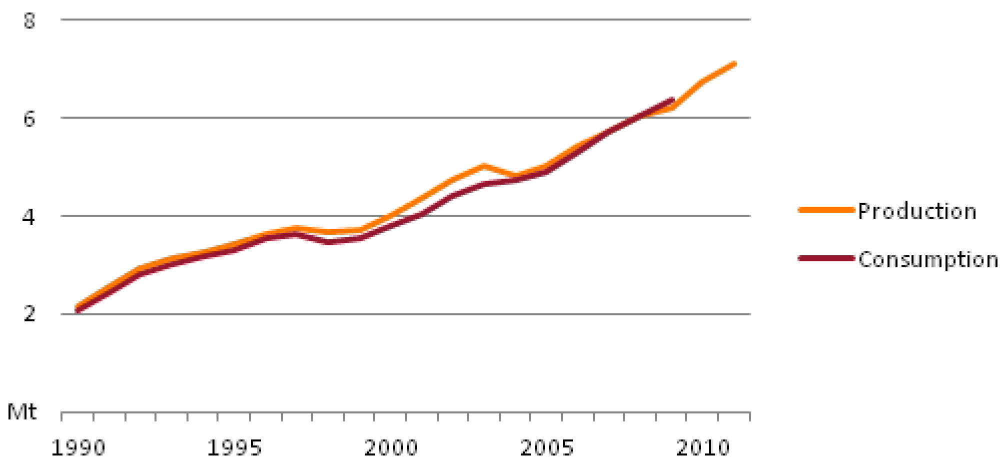
Production

Poultry meat production grew rapidly in the ASEAN member states over the past two decades, from 2.2 million tonnes in 1990 to 7.1 million tonnes in 2011. The rise in production was relatively steady, although the Asian financial crisis in 1998 and 1999 and the outbreak of avian influenza in several ASEAN member states in 2004 slowed growth (Figure 156).

Thailand was the largest poultry meat producer of the ASEAN member states through the 1990s and early 2000s. Indonesia overtook Thailand in 2004 and Malaysia overtook Thailand in 2010.

Myanmar and Brunei Darussalam experienced the fastest production growth in their poultry sectors since 1990. By 2011 these two countries together accounted for around 16 per cent of total poultry production among ASEAN member states. The largest poultry producing nations in that year were Indonesia, Malaysia and Thailand, representing almost 62 per cent of total production in ASEAN member states. In 2011 there were 2.8 billion head of poultry in the ASEAN member states. Of these, Indonesia and Thailand had the largest stocks of poultry, at 1.5 billion head and 267 million head, respectively.

Figure 156 Poultry meat production and consumption, ASEAN



Source: FAO 2013

In 2011 poultry production accounted for around 43 per cent of total ASEAN meat production, ranking second to pork. Chicken meat was the most commonly produced poultry meat, accounting for around 93 per cent of total poultry production; duck meat accounted for 7 per cent.

Consumption

Poultry meat consumption in the ASEAN member states increased threefold between 1990 and 2009, from 2.1 million tonnes to 6.4 million tonnes (Figure 156). Consumption grew every year except 1998, when the Asian financial crisis led to a significant drop in Indonesian consumption.

Poultry meat consumption per person among the ASEAN member states increased markedly between 1990 and 2009, from 4.7 kilograms to 10.9 kilograms. In 2009 Brunei Darussalam consumed the most poultry meat per person (53 kilograms) and Cambodia consumed the least (2.3 kilograms) (Table 15). Myanmar had the most rapid growth in poultry meat consumption per person over the period, from 2 kilograms in 1990 to 18.6 kilograms in 2009.

Table 15 Poultry meat consumption per person in 2009, ASEAN

Country	Poultry consumption per person (kg)	Country	Poultry consumption per person (kg)
Brunei Darussalam	53.0	Myanmar	18.6
Cambodia	2.3	Philippines	10.0
Indonesia	6.0	Singapore	41.0
Laos	3.6	Thailand	11.9
Malaysia	40.7	Vietnam	10.2
ASEAN	**10.9**	–	–

Source: FAO 2013; United Nations Population Division 2011

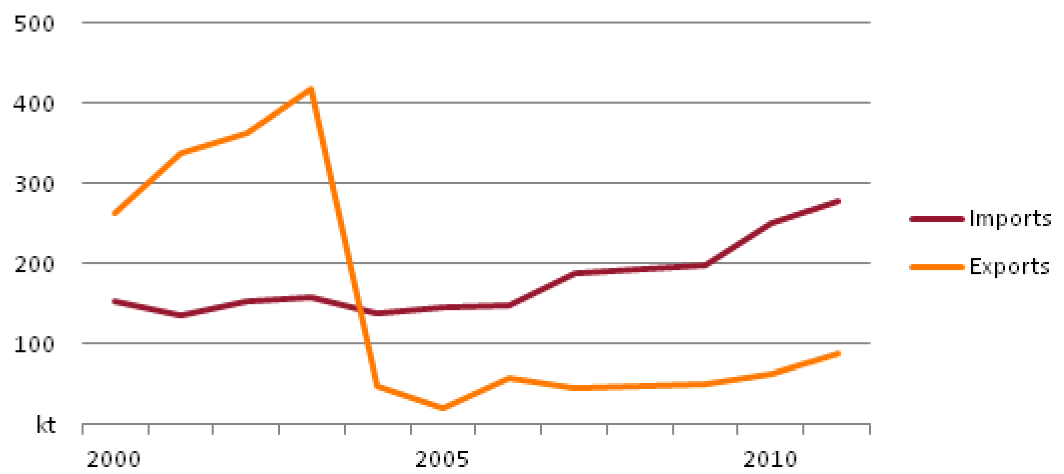
Trade

The ASEAN region was a net exporter of poultry products until 2004 (Figure 157). Exports were predominately driven by Thailand, which shipped over 390 000 tonnes of poultry meat in 2003. In 2004 Thai exports fell to around 27 800 tonnes following the outbreak of avian influenza in that country; the following year Thai exports totalled only 5000 tonnes. Since that outbreak, total exports for the region have been considerably lower, reaching just over 87 000 tonnes in 2011 and consisting mostly of canned chicken meat.

Following the outbreak, Thailand remained the largest exporter among ASEAN member states, with a shift in the type of products exported. An increasing proportion of Thai exports were pre-cooked, with those exports doubling between 2004 and 2006. Around 97 per cent of Thai poultry meat exports in 2006 were pre-cooked (Neal et al. 2008). Japan was the primary destination for poultry meat exports from among ASEAN member states over the past 20 years.

For much of the past decade, Singapore was the largest importer of poultry meat products from among ASEAN member states, importing more than 80 000 tonnes a year. However, in 2010 the Philippines overtook Singapore to become the largest importer of poultry meat, at over 107 000 tonnes. Together, Singapore and the Philippines imported nearly 85 per cent of total ASEAN imports in 2011, which stemmed principally from the United States, Brazil and Canada.

Figure 157 Poultry meat exports and imports, ASEAN



Note: Export and import data for the ASEAN region excludes Brunei, Cambodia, Laos, Myanmar and Vietnam because of unreliable data.
Source: United Nations Statistics Division 2013

Policies

Indonesia has bound tariffs for poultry meat ranging from 35 per cent to 50 per cent (WTO 2013a). However, in practice Indonesia maintains a quota for poultry meat imports as well as non-transparent, trade-restricting licensing requirements. The United States Department of Agriculture considers the licensing requirements and quota to be a de facto ban on imports (USDA–AMS 2013). The United States sought consultations with Indonesia on 10 January 2013 about measures Indonesia imposes on importation of animal products (WTO 2013b). These measures include the quota and licensing requirements for poultry meat imports. Consultations were held on 21–22 February 2013 and resolution was not reached. The United States has since asked that the WTO Dispute Settlement Body establish a panel to examine the matter (WTO 2013c).

Indonesia imposes ad valorem tariffs on poultry meat imports. All products excluding frozen cuts of chicken have an applied tariff of 5 per cent. Frozen cuts of chicken have a higher applied tariff of 8.8 per cent. Indonesia has free trade agreements with China, India, the Republic of Korea and other ASEAN member states. Poultry meat imports from China and ASEAN member states have no applied tariffs while imports from India and the Republic of Korea have an ad valorem tariff of between zero and 3 per cent (WTO 2013a).

Malaysia applies an ad valorem tariff of 40 per cent on all chicken meat imports; other types of poultry meat have no applied tariff. Tariffs on poultry meat are bound between 56.7 per cent and 85 per cent. Malaysia also has a free trade agreement with the ASEAN and applies no tariff to imports from ASEAN member states (WTO 2013a). Import permits are needed to import poultry meat and all imports must be certified halal (USDA–FAS 2006b).

The Philippines maintains a tariff quota of 23 490 tonnes for poultry meat imports, which is referred to as the minimum access volume (USDA–FAS 2010b). This volume exceeds the Philippines' formal WTO tariff quota volume of 11 183 tonnes. Tariffs on imports within the minimum access volume vary. The tariff on frozen cuts of chicken is 33 per cent, while the tariffs on frozen cuts of turkey and frozen whole turkeys are 28.3 per cent and 35 per cent, respectively. All other poultry meat imports are subject to an ad valorem tariff of 40 per cent. Imports beyond the minimum access volume are subject to an out-of-quota tariff of 40 per cent and a price-based special safeguard duty (USDA–FAS 2010b).

The Philippines also has a free trade agreement with the ASEAN, and applies a tariff of between zero and 5 per cent to poultry meat imported from other ASEAN member states (WTO 2013a).

Singapore has no applied tariffs on poultry meat imports. However, it does have a bound tariff of 10 per cent for all poultry meat imports (WTO 2013a). Imports are only permitted from approved countries that the Agri-Food and Veterinary Authority of Singapore has authorised (AVA 2012).

Thailand applies most favoured nation ad valorem tariffs on poultry meat imports. Whole poultry meat has a tariff of 30 per cent while cuts of poultry meat have a tariff of 40 per cent. Frozen, cut chicken is an exception and has a marginally lower tariff than other cut poultry meat at 37.5 per cent. The tariffs are bound between 30 per cent and 40 per cent. For imports from countries that are not members of the WTO, a general duty of 40 per cent is applied (WTO 2013a). The Thai Government also protects the Thai poultry industry through non-transparent import permits and an import fee on uncooked meat of 10 baht per kilogram (USDA–FAS 2012b).

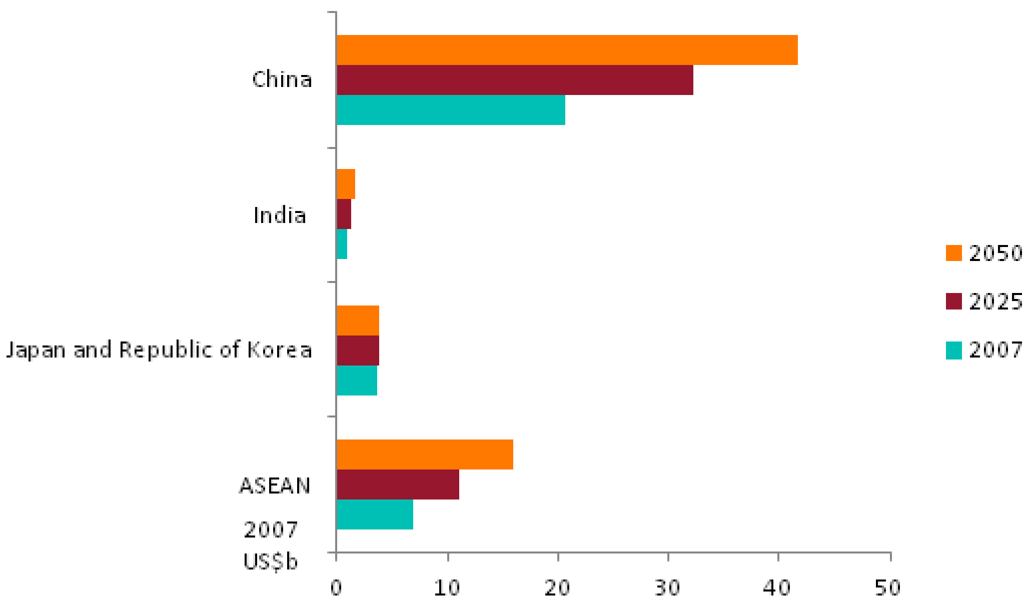
Vietnam applies ad valorem tariffs to poultry meat imports. A tariff of 40 per cent is applied to all uncut meat and fresh and chilled whole meat. Frozen, cut chicken and turkey have a lower applied tariff of 20 per cent. All cuts and livers of duck and goose have an applied tariff of 15 per cent. Tariffs in Vietnam are applied at the bound rate. Vietnam also has free trade agreements that apply to poultry meat imports, including agreements with China, the Republic of Korea and the ASEAN. The applied tariff rates within these agreements range between zero and 12.5 per cent. Vietnam also has a general duty ranging between 22.5 per cent and 60 per cent for imports from non-members of the WTO (WTO 2013a).

Long-term prospects

Consumption

China is projected to remain the largest poultry meat consumer in Asia by 2050, with the real value of consumption at US$42 billion (2007 dollars), nearly double that of 2007 (Figure 158). Most consumption growth (US$12 billion) is projected to occur between 2007 and 2025. Over this period consumption is projected to increase by 2.4 per cent a year, compared with 1 per cent between 2025 and 2050. The higher growth in consumption between 2007 and 2025 is because of higher annual projected population (United Nations Population Division 2011) and income growth during this period than between 2025 and 2050. The growth in poultry meat consumption can also be attributed to an expected dietary shift away from staple foods, such as cereals, to animal-based products as real per person incomes increase. China's per person poultry meat consumption is projected to reach 25 kilograms in 2050, making it one of the predominant consumers in Asia.

Figure 158 Real value of Asia's poultry meat consumption



Source: ABARES model output

India has historically not been a significant consumer of meat products, and assuming unchanged consumer preferences, in 2050, India is projected to remain a small consumer of poultry meat in Asia. At which time the real value of consumption is projected to increase to around US$2 billion.

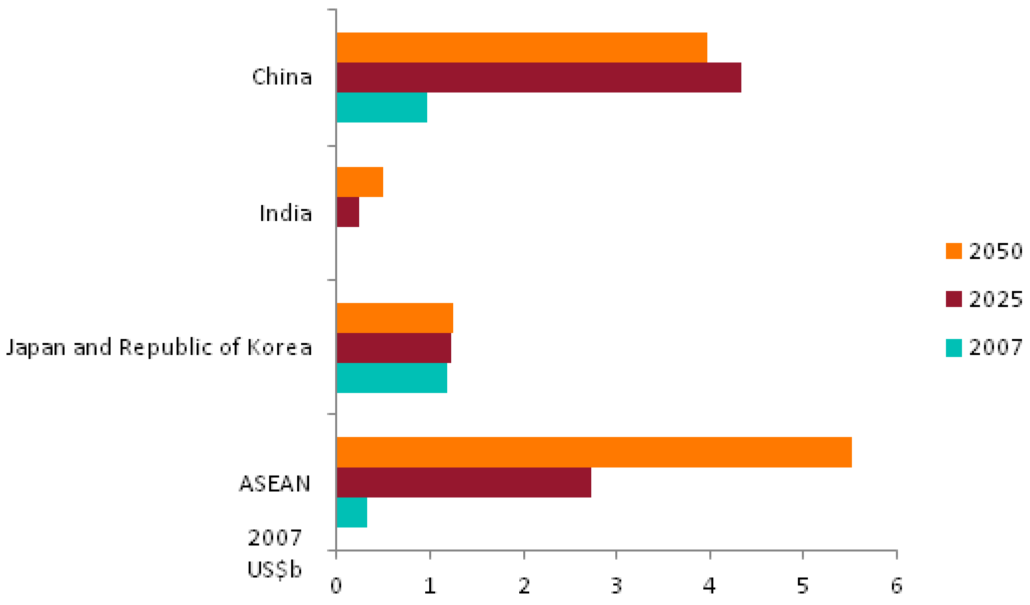
Poultry meat consumption growth for Japan and the Republic of Korea is projected to be relatively small, with the real value of consumption projected to be around US$4 billion in 2050, 4 per cent higher than in 2007. A projected decline in population, along with low income growth, is largely responsible for this trend. However, per person poultry meat consumption is projected to remain relatively high for Japan and the Republic of Korea at 21 kilograms and 14 kilograms, respectively.

For the ASEAN member states, the real value of poultry meat consumption is projected to be US$16 billion in 2050, more than double that of 2007. This is projected to be underpinned by relatively high growth in Indonesia (reaching US$2.5 billion in 2050), Malaysia (US$1.6 billion) and Myanmar (US$1.5 billion). The effect of income growth is reflected through the increase in levels of per person consumption out to 2050. In that year, Malaysia and Myanmar, for instance, are projected to have relatively high per person consumption at 53 kilograms and 36 kilograms, respectively.

Trade

The real net value of China's poultry meat imports in 2050 is projected to be US$3 billion (2007 dollars) higher than in 2007 (Figure 159). All of the import growth is projected to occur between 2007 and 2025 because of the high growth in consumption. Between 2025 and 2050, the real net value of imports is projected to fall as domestic production expands and consumption growth slows in line with the population decline. Domestic production, which is projected to increase by 91 per cent out to 2050, is still projected to account for most of the consumption growth out to 2050.

Figure 159 Real net value of Asia's poultry meat imports



Source: ABARES model output

In India the real net value of poultry meat imports is expected to increase to US$500 million by 2050, which is only a modest increase from 2007. Subdued consumption growth out to 2050 underlies this trend.

Japan and the Republic of Korea are, together, projected to remain a net importer of poultry meat (US$1.2 billion) in 2050 because of modest consumption growth. Continued historically high domestic production will allow most of the rise in demand to be met by domestic supply out to 2050.

The real net value of poultry meat imports from the ASEAN member states in 2050 is projected to be US$5 billion higher than in 2007, with Myanmar (reaching US$1 billion), Vietnam (US$1 billion) and Malaysia (US$800 million) accounting for most of this growth. However, poultry meat consumption among the ASEAN member states will continue to be met predominantly by domestic supply out to 2050. For example, Indonesia (US$3 billion), Thailand (US$2 billion) and Malaysia (US$2 billion) are projected to have relatively high levels of production in 2050.

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12 Beef and veal

Clay Mifsud and Andrew Haylen

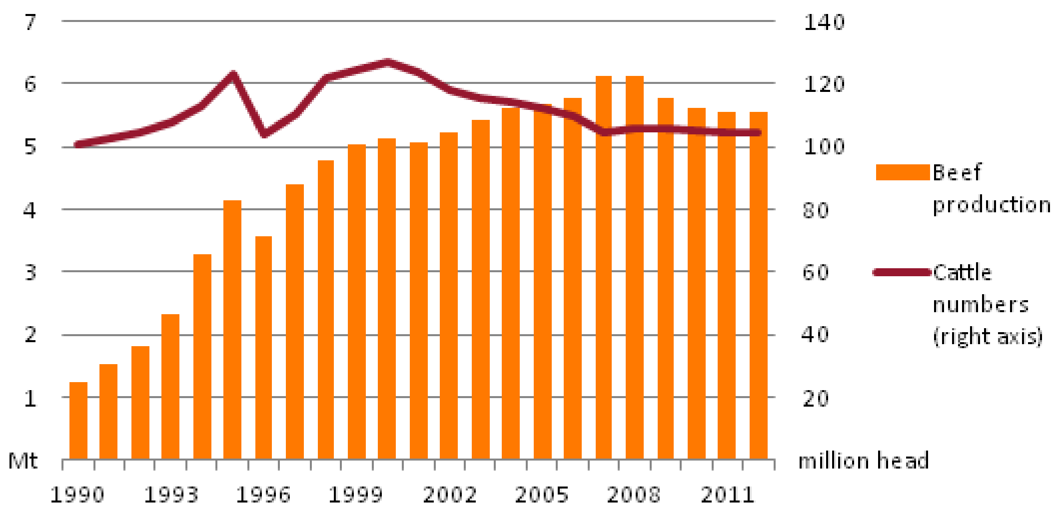
China

Production

China is the world's third largest beef producing country, behind the United States and Brazil. Beef production in China increased from 1.3 million tonnes in 1990 to 5.5 million tonnes in 2012; over the same period cattle numbers fluctuated between 101 million and 127 million head (Figure 160). Between 1990 and 2008 beef production grew at an average of 10 per cent a year, making it one of the fastest growing agricultural sectors in China.

Since 2008 beef production in China has fallen, particularly among smaller producers that constitute most of the industry. Most beef in China comes from cattle raised on small, unspecialised backyard operations owned by farmers with little means to expand. According to Haggard and Daley (2011a), almost 80 per cent of the 14 million cattle farms in China maintain herds with fewer than 50 head. A small number of specialised pastoralists graze cattle on grassland, and even fewer send their cattle to be finished in feedlots. In recent years, declining output from the backyard sector has been the result of an increasing number of farmers withdrawing from the industry because of a rise in input costs, a shortage of farm labour, and poor prices paid for cattle at the point of slaughter (USDA–FAS 2012a).

Figure 160 Beef production and cattle numbers, China



Note: Carcass weight equivalent.
Source: USDA–FAS 2013a

Unlike many vertically integrated farms in the pig and poultry meat sectors that are owned by processing plants, most backyard cattle producers sell their stock through brokers. But because there are relatively few brokers, competition among buyers is limited and returns to producers remain low. This offers little incentive for producers to increase production. The declining interest in raising cattle among small-scale operators has led to a significant reduction in China's cattle supply in many regional areas (USDA–FAS 2012a).

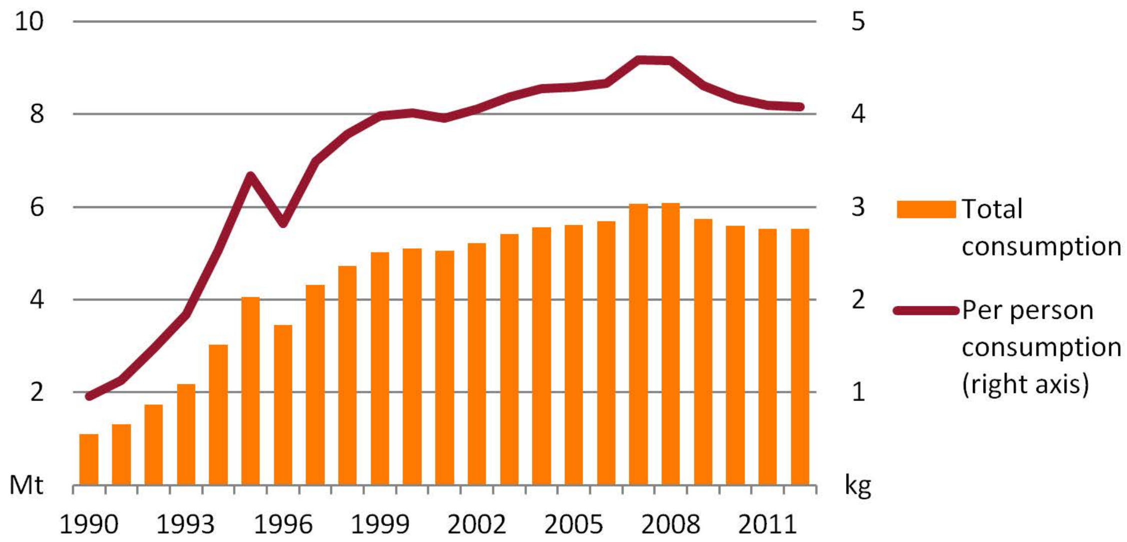
While specialist beef producers remain in the minority, they are growing in number. Transformation of the beef industry to more specialised producers remains in the formative stage because China has limited capacity to intensively lot feed large numbers of cattle on grain-based rations, as is done in the United States and Australia. A small number of medium-sized feedlots operate with capacities of up to 10 000 head, but most feedlots operate with a capacity of fewer than 200 head (Nason 2012). In late 2012 an Indonesian lot-feeding company signed a memorandum of understanding to build a 30 000 head feedlot in Shandong province. If constructed, it would be the largest cattle feedlot in China. The facility is intended to feed locally raised beef and dairy cattle from north-east China with a view to expanding to feeder cattle imported from countries such as Australia (Nason 2012).

Most cattle in China are sold to local abattoirs which slaughter by hand. These facilities operate on a low-cost basis with most beef sold to consumers on-site or at local wet markets. However, in response to growing demand for higher quality beef, a more modern meat processing sector has developed around the larger cities in recent years. Beef processed at these plants is sold mainly to supermarkets, high-end hotels and restaurants in urban areas.

Consumption

Beef consumption in China grew significantly between 1990 and 2008, from 1.1 million tonnes to 6.0 million tonnes, respectively, before falling to 5.5 million tonnes in 2012 (Figure 161). Similarly, consumption per person rose from 1 kilogram a year in 1990 to 4.5 kilograms a year in 2008. This fell slightly in the four years to 2012, in line with falling beef production and comparatively low imports. In 2012 around 98 per cent of beef consumed in China was sourced domestically.

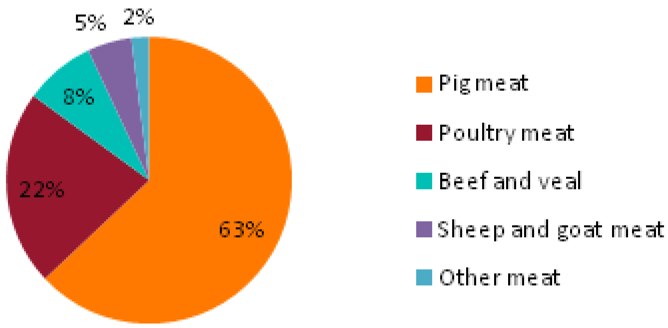
Figure 161 Beef consumption, China



Note: Carcass weight equivalent.
Source: United Nations Population Division 2011; USDA–FAS 2013a

Despite considerable growth since 1990, beef remains a comparatively small proportion of meat consumption in China. Compared with pig meat and poultry meat, which together accounted for 85 per cent of meat consumed in China in 2009, beef accounted for just 8 per cent (Figure 162).

Figure 162 Per person meat consumption, China, 2009



Source: FAO 2013

In October 2012 the Ministry of Taxation and State Administration in China removed the value added tax of 13 per cent for fresh, chilled and frozen meat products and the 17 per cent value added tax for processed meat products. This change will lower the retail price of both domestically produced and imported beef in China (USDA–FAS 2013b).

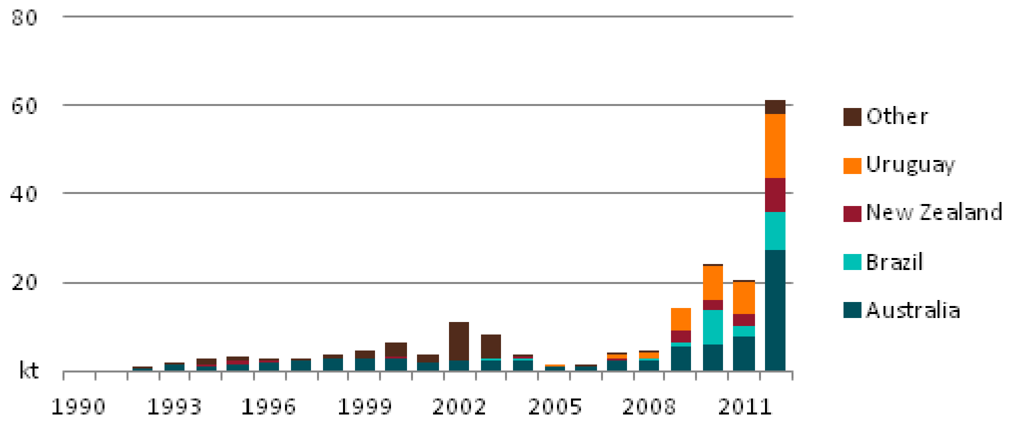
Trade

The volume of beef China imports is low relative to the size of Chinese beef production. From 1990 to 2008, imports averaged less than 5000 tonnes a year, with Australia and the Russian Federation accounting for the largest shares (United Nations Statistics Division 2013). More than 95 per cent of the beef imported during this period was low-value frozen cuts, with the remainder being higher-value chilled cuts.

In 2012 imports of beef increased three-fold to a record 61 000 tonnes, reflecting declining domestic production (Figure 163) (USDA–FAS 2012a). Around 45 per cent of imports originated from Australia. Other supplying countries include Uruguay (24 per cent), Brazil (14 per cent) and New Zealand (12 per cent).

Australia and New Zealand enjoy favourable access arrangements to the Chinese beef import market compared with many other beef exporters. The Chinese Government approves foreign abattoirs on either an individual basis or following assessment of the systems in place in that country. Australia has around 50 approved export establishments, while New Zealand has 85 (some are approved for sheep meat only) (AQSIQ 2013).

Figure 163 Beef imports, China



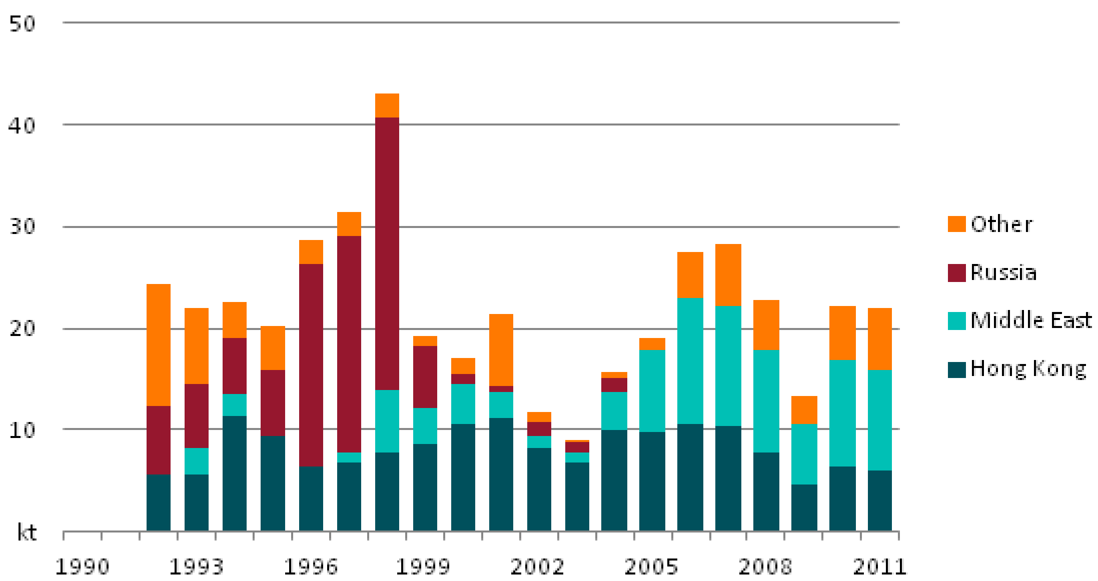
Note: Shipped weight.

Source: United Nations Statistics Division 2013

The Chinese Government banned imports of beef from the United States and Canada in 2004 because of food safety concerns relating to the outbreak of bovine spongiform encephalopathy (BSE) in North America in late 2003. At March 2013 imports of boneless beef from four meat processing plants in Canada were permitted but US beef remains excluded from the Chinese market (Pareles 2013). Imports from Brazil were also banned in late 2012 because BSE was detected in that country.

Exports are a minor component of the beef industry in China, accounting for less than 1 per cent of production, on average, over the 10 years to 2011 (Figure 164). During this period, 80 per cent of shipments were destined for only two markets: the Middle East and Hong Kong. Exports to the Middle East have largely been driven by demand for beef slaughtered to halal standards (Haggard et al. 2011b).

Figure 164 Beef exports, China



Note: Shipped weight.
Source: United Nations Statistics Division 2013

Policies

China imposes a small number of tariffs on beef imports. Chilled beef imports are subject to an applied tariff of 20 per cent for carcasses and 12 per cent for all other cuts, while frozen beef imports are subject to tariffs of 25 per cent and 12 per cent, respectively, on carcasses and all other beef products (WTO 2013). The applied tariffs are equal to the respective WTO bound tariff.

In 2008 the governments of China and New Zealand signed the New Zealand–China Free Trade Agreement. Under this agreement, tariffs on Chinese imports of New Zealand beef will be progressively lowered from 12 per cent for boneless cuts, 20 per cent for chilled carcasses and 25 per cent for frozen carcasses, to zero for all cuts by 1 January 2016 (WTO 2013; NZ Ministry of Foreign Affairs and Trade 2013).

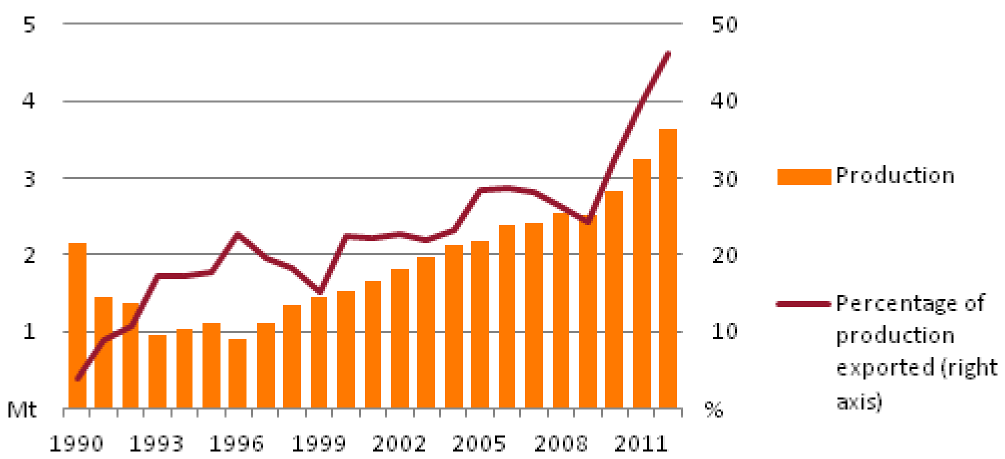
India

Production

Beef production in India principally refers to the production of buffalo. Between 1990 and 1995 beef production declined by 50 per cent as significant economic turmoil in the country lowered domestic demand for beef. The United States Department of Agriculture estimates that from 1996 to 2012, beef production in India increased four-fold, from 0.9 million tonnes to 3.6 million tonnes (Figure 165). A rise in world meat prices, government subsidies and increased demand from South-East Asia and the Middle East provided an incentive for Indian farmers to slaughter underutilised heifers and male cattle from the dairy herd. Stronger demand for beef has also led to increased investment in abattoirs, which has provided farmers with new markets for these animals (USDA–FAS 2012b).

The bovine herd in India, which includes dairy cattle, beef cattle and buffalo, is the largest in the world. The rising demand for dairy products since the early 1990s has led to an 18 per cent rise in the size of the total bovine herd to 327 million head in 2012 (USDA–FAS 2013a).

Figure 165 Beef production, India



Note: Carcass weight equivalent.
Source: USDA–FAS 2013a

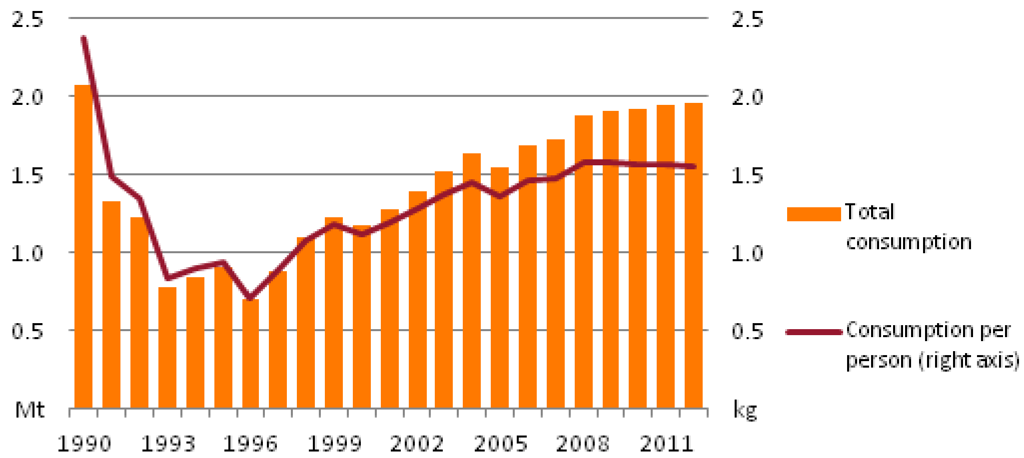
Consumption

Beef consumption in India fell from 2.1 million tonnes in 1990 to 0.7 million tonnes in 1996, reflecting the decline in real per person incomes during the economic downturn of the early

1990s. Beef is generally a luxury good for those residing in provinces where its consumption is permitted, and the decline in average per person incomes made consumption at previous levels unaffordable.

From 1997 beef consumption in India began to rise, reaching around 2 million tonnes in 2012 (Figure 166). On a per person basis, beef consumption rose from 0.7 kilograms in 1999 to 1.6 kilograms in 2012. Despite beef production increasing rapidly in recent years, growth in domestic consumption has slowed since 2008 and an increasing proportion of domestic production was exported (Figure 165).

Figure 166 Beef consumption, India



Note: Carcass weight equivalent.
Source: United Nations Population Division 2011; USDA–FAS 2013a

Compared with other Asian countries, meat consumption in India is generally low. In 2009 total meat consumption was 4.4 kilograms a person (FAO 2013). Of this, poultry meat was the largest component at 1.7 kilograms; beef accounted for 1.6 kilograms, sheep meat 0.7 kilograms and pig meat 0.3 kilograms.

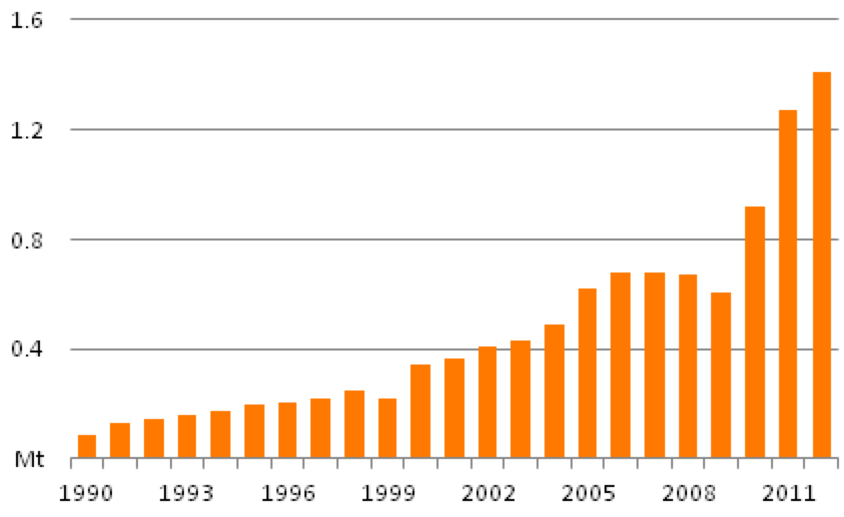
An increase in the number of fast food restaurants contributed to the rise in meat consumption over the 10 years to 2010 (USDA–FAS 2012b). However, in most of these establishments menus focus on poultry meat rather than beef.

Trade

Indian buffalo meat—known as carabeef in the global market—is exported as beef. Exports grew steadily from 1990 until 2009, before increasing substantially in the three years to 2012 (Figure 167). India is currently the world's largest beef exporter, with shipments totalling around 1.4 million tonnes. Increased exports to markets within ASEAN member states, such as Vietnam, the Philippines and Malaysia, reflect the price competitiveness of Indian beef. Growth in exports to the Middle East mainly reflects the ability of Indian processors to provide halal certified meat to that market (USDA–FAS 2012b).

Despite becoming the largest beef exporter in the world, India does not export to three of the most lucrative beef markets in Asia: Japan, the Republic of Korea and Taiwan. Each of these countries requires beef suppliers to hold a freedom from foot and mouth disease (FMD) status with the World Organisation for Animal Health, which India currently does not possess. India is classified as FMD endemic, with the disease controlled by vaccinations (ABARES 2012a).

Figure 167 Beef exports, India



Note: Carcass weight equivalent.
Source: USDA–FAS 2013a

India sporadically imported very small quantities of beef from Australia, New Zealand and the United States between 1990 and 2012.

Policies

Domestic policies

In most Indian states, slaughter of cattle is prohibited. However, some states allow slaughter of buffaloes, unproductive heifers and bulls by obtaining a fit-for-slaughter certificate. In other states no laws exist that govern cattle slaughter, resulting in the legal sale of beef in retail outlets (USDA–FAS 2013c).

In 2007 the Indian Government initiated the Salvaging and Rearing of Male Buffalo Calves subsidy scheme. The scheme was in response to research that revealed potentially significant economic gains to producers from meat production and sale of hides, as well as employment opportunities that could be generated in rural areas (NABARD 2010). Before these findings, the Indian Government estimated that farmers slaughtered about 8 million male buffalo calves each year, predominantly in the dairy industry. Male calves were considered of little value to dairy farmers and were slaughtered to save both the cow's milk and the feed needed for female calves.

To ensure raising male buffalo calves was viable for farmers, the Indian Government devised several types of assistance schemes depending on the size of their herd. For individual farmers with fewer than 10 male buffalo calves, interest subsidies were made available up to a value of 6400 rupees per calf. For farmers with between 10 and 50 calves, capital subsidies of between 21 750 rupees (for 10 calves) and 109 000 rupees (for 50 calves) were provided. Farms with more than 1000 calves also received capital subsidies (NABARD 2010).

The Indian Government also has the Utilisation of Fallen Animal Scheme to combat high mortality rates in the livestock sector, particularly in cattle. This scheme involved founding multiple carcass use centres to prevent and/or control the spread of disease among livestock, and to increase hide and skin production (NABARD 2010).

Trade policies

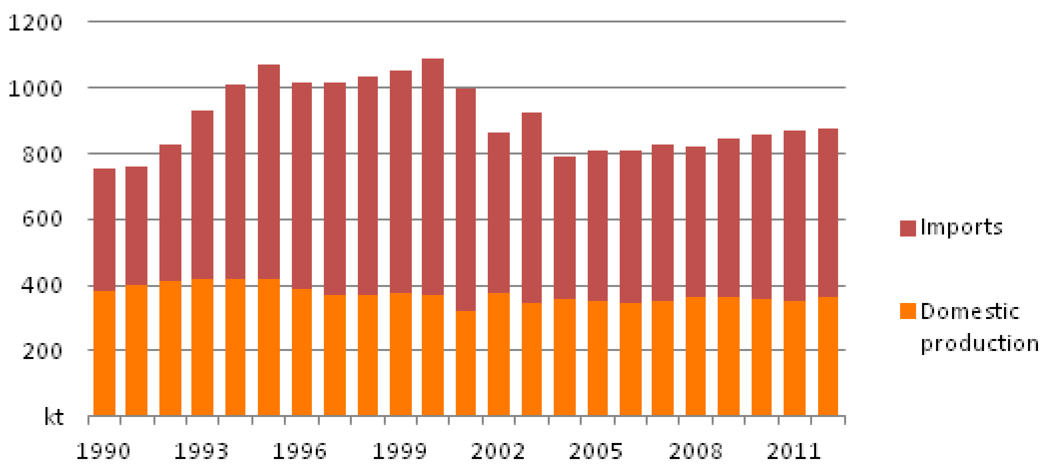
Although the volumes of imports of beef have been small over the past two decades, Indian beef imports are subject to applied tariffs of 30 per cent. Bound rates are much higher at 100 per cent (WTO 2013).

Japan and the Republic of Korea

Production

Beef production in Japan has been relatively stable over the past two decades, averaging 372 000 tonnes a year (Figure 168). Around two-thirds of Japan's beef production is a by-product from the domestic dairy industry, with the remainder from wagyu breeds, including Japanese Black, Japanese Brown and a number of minor breeds (Kondo 2013a). Limited grazing land in Japan has contributed to the domestic beef industry's sluggish growth since the early 1990s.

Figure 168 Beef supply, Japan

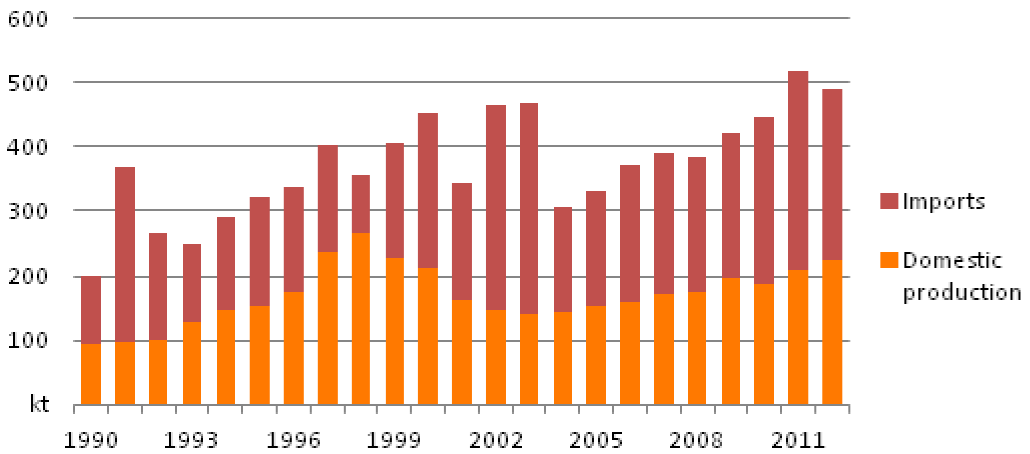


Note: Boneless weight equivalent.
Source: ALIC 2013; Japan Ministry of Finance 2013

In the Republic of Korea, beef production has been variable over the past two decades. Beef production increased from 95 000 tonnes in 1990 to 264 000 tonnes in 1998 (Figure 169). However, following the Asian financial crisis in 1997, production fell steadily as the depreciation of the Korean won led to a steep increase in production costs. Many cattle farmers were forced to slaughter their cattle to minimise financial losses. Following the recovery in the Korean economy, producers started rebuilding herds and cattle slaughter declined. Beef production has been rising slowly since 2003 in response to increased demand for domestic beef (Kim et al. 2009).

The total number of cattle farms in the Republic of Korea fell from 620 000 to 170 000 between 1990 and 2012, while the total number of cattle increased from 1.6 million head to 3.0 million head. Transition of the remaining cattle farms from small-scale to large-scale commercial operations was necessary to increase the efficiency of the beef industry. The proportion of total cattle accounted for by farms with a herd size of 20 cattle or less fell from 86 per cent in 1990 to 35 per cent in 2012. The proportion of cattle farms with a herd size of more than 50 head increased from 6 per cent to 40 per cent over the same period. The increased efficiency of the Korean beef industry is also reflected in the substantial rise in cattle weights. For example, the average live weight of native male cattle increased from 433 kilograms in 1990 to 695 kilograms in 2012 (Nonghyup 2013b).

Figure 169 Beef supply, Republic of Korea

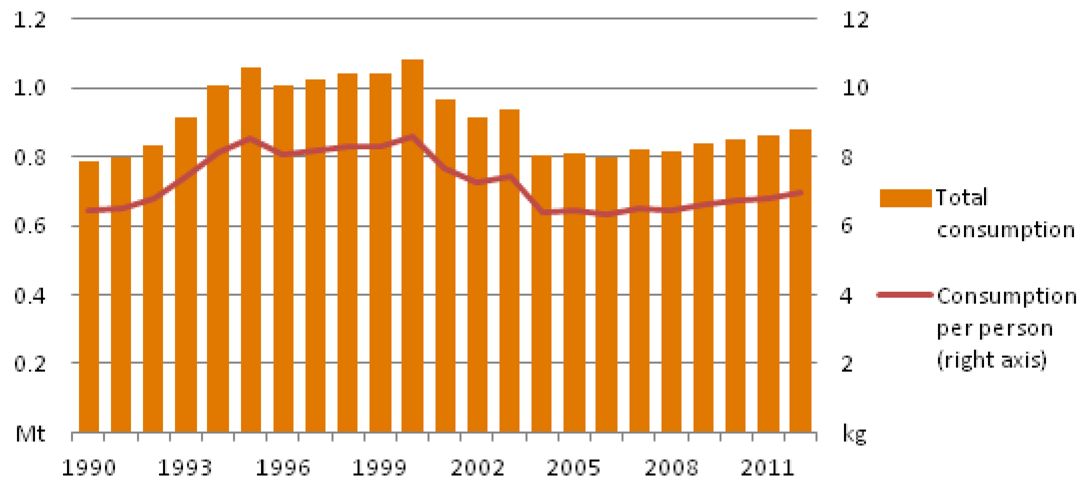


Note: Boneless weight equivalent.
Source: Korea Customs Service 2013; Nonghyup 2013a

Consumption

Beef consumption in Japan peaked at 1.1 million tonnes in 2000, before falling to 800 000 tonnes in 2004 (Figure 170). In the seven years to 2012 it has risen steadily to 880 000 tonnes. Beef consumption per person largely followed total consumption trends between 1990 and 2012, reflecting the relatively stable population of Japan.

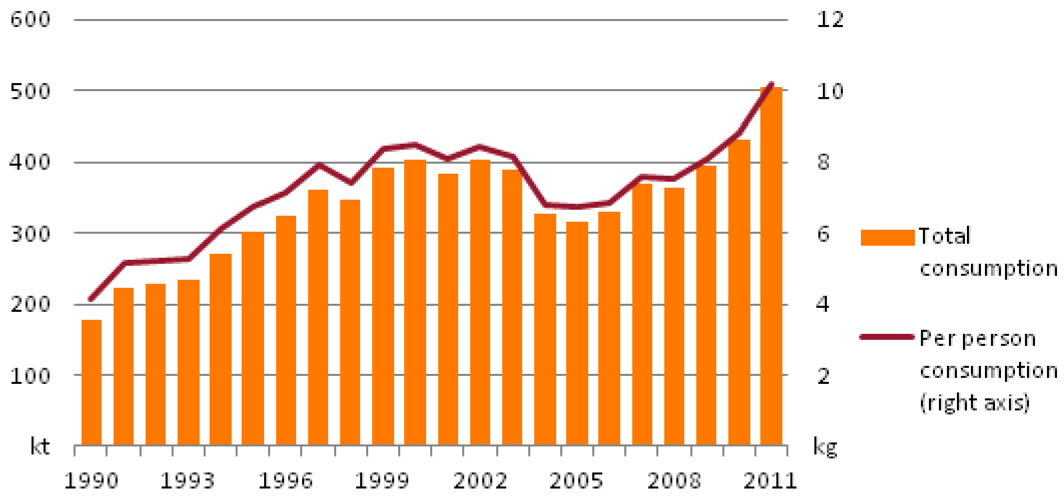
Figure 170 Beef consumption, Japan



Note: Boneless weight equivalent.
Source: ALIC 2013; United Nations Population Division 2011

Beef consumption in the Republic of Korea grew more strongly than in Japan during the 1990s, from 177 000 tonnes in 1990 to 400 000 tonnes in 2000 (Figure 171), reflecting stronger demand as a result of strong income growth. Consumption of beef remained relatively stable at around 8 kilograms per person until 2003, when a drop in imports from the United States led to a temporary contraction in consumption. From 2005 consumption increased, reaching 10 kilograms a person in 2012.

Figure 171 Beef consumption, Republic of Korea



Note: Boneless weight equivalent.
Source: Nonghyup 2013a

The large decline in beef consumption in Japan and the Republic of Korea in 2004 was the result of an import ban on beef from North America in response to detection of bovine spongiform encephalopathy (BSE) in the United States. At the time, beef from North America accounted for 46 per cent of Japanese beef imports and 69 per cent of Korean beef imports. An increase in beef imported from Australia only partially offset the lower supply from North America. The fall in consumer confidence, the reduction in the supply of beef and consequent higher prices resulted in some consumers substituting other meats for beef, such as chicken and pig meat (Kondo 2013a).

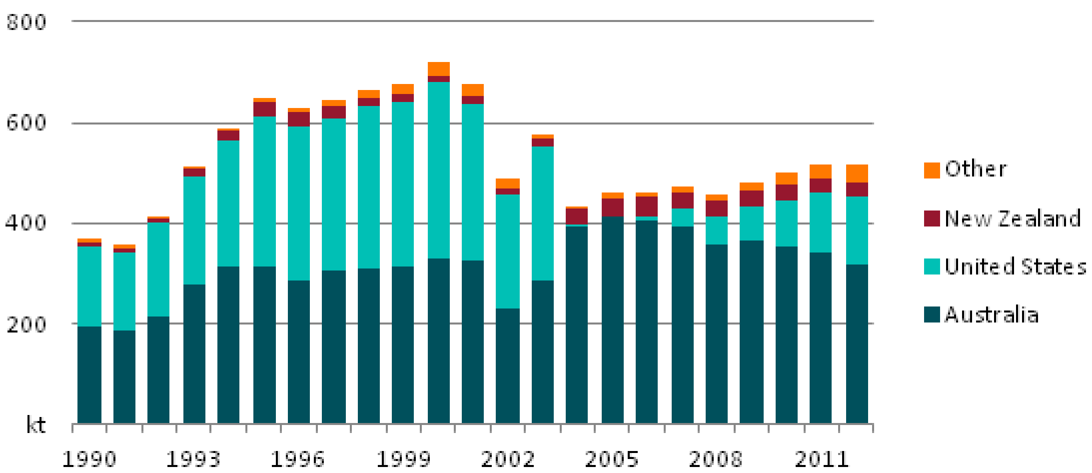
Trade

Imports play an important role in the supply of beef in Japan, and have accounted for up to 68 per cent of consumption in some years. Japanese beef imports grew from 370 000 tonnes in 1990 to 719 000 tonnes in 2000 in response to increased consumer demand for beef more competitively priced than the domestic product.

Since 1990 the two largest suppliers of beef to Japan have been Australia and the United States, together accounting for 93 per cent of all Japanese beef imports (Figure 172). Smaller suppliers have included New Zealand, Canada and Mexico.

In 2004 the ban on beef imports from North America significantly affected total Japanese imports. Despite imports from Australia increasing to a record 394 000 tonnes in 2004, a lack of supply from other major producing countries eligible to export to Japan resulted in total imports falling to their lowest level since 1992. Since 2005 restrictions on imports of US beef have been eased and shipments of US beef to Japan have increased.

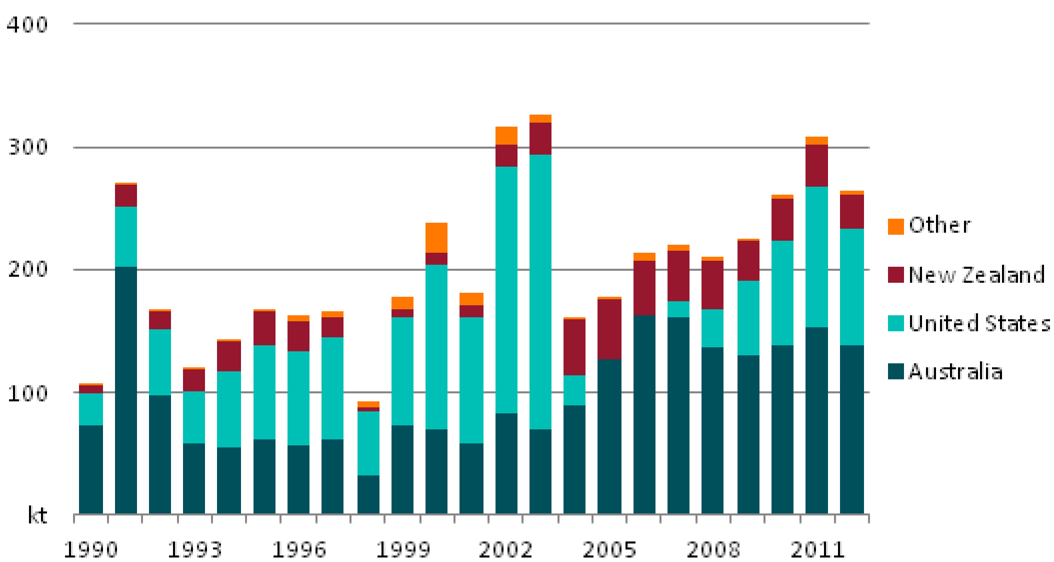
Figure 172 Beef imports, Japan



Note: Boneless weight equivalent.
Source: Japan Ministry of Finance 2013

In the Republic of Korea, imports are also an important component of the total beef supply and have accounted for up to 70 per cent of consumption in some years (Figure 173). Imports fluctuated significantly between 1990 and 2012 in response to changes in domestic beef production, exchange rate movements and supply availability from major beef exporting nations (Kim et al. 2009).

Figure 173 Beef imports, Republic of Korea



Note: Boneless weight equivalent.
Source: Korea Customs Service 2013

Policies

Trade policies

The Japanese Government imposes a most favoured nation applied tariff of 38.5 per cent on imports of beef, which can increase to the bound rate of 50 per cent under a safeguard provision. The safeguard threshold is calculated quarterly and triggered when import volumes are more than 17 per cent higher than in the same period the previous year. If triggered, the safeguard remains in place for the rest of the fiscal year. A special measure for trigger levels—which uses an average of actual imports for Japan fiscal years 2002 and 2003 instead of the 17 per cent rule—was first used in Japan fiscal year 2006 in recognition of the extraordinary circumstance generated by lifting the ban on imports from the United States. For Japan fiscal year 2013 the Ministry of Finance is using an average of quarterly imports for Japan fiscal years 2002 and 2003 to calculate trigger levels for chilled shipments. However, tariffs based on the previous year's imports for frozen shipments will remain (Kondo 2013a).

On 23 January 2013 Japan's Minister for Health announced that import restrictions applying to US beef on grounds of food safety would be relaxed. From 1 February 2013 Japanese imports of US beef have been permitted from cattle slaughtered at up to 30 months of age, relaxing the BSE restrictions applied since the 2003 outbreak in North America. Following the two-year ban that ended in December 2005, imports of US beef had been restricted to beef sourced from cattle slaughtered at 20 months of age or less (ABARES 2013).

In 1988 the Republic of Korea responded to pressure from major beef exporting nations to open its beef market, after 12 years of being self-sufficient in beef consumption. As part of the process, it imposed an import quota of 14 500 tonnes and an ad valorem tariff of 22.5 per cent. The quota was soon increased and imports exceeded 70 000 tonnes by 1989. In 1995 a tariff quota system was established as part of implementing the WTO Agreement on Agriculture. From 1995 to 2000 the tariff quota volume increased from 123 000 tonnes to 225 000 tonnes, while the in-quota tariff fell from 43.6 per cent to 41.6 per cent. The tariff quota system was removed in 2001 and replaced with a bound tariff of 40 per cent. The most favoured nation applied tariff is equal to the bound tariff (Kim et al. 2009).

In late 2011 the governments of the Republic of Korea and the United States signed the Korea–United States Free Trade Agreement. Under the terms of the Agreement, the tariff on Korean imports of US beef will be reduced by 2.67 percentage points a year from 2012 until they are eliminated in 2026. In 2013 the tariff applied to US beef in the Republic of Korea is 34.66 per cent, compared with the most favoured nation rate of 40 per cent.

Domestic policies

The Japanese Government supports cattle producers through several programs partially funded by tariffs levied on imported beef. A government affiliated public corporation, the Agriculture and Livestock Industries Corporation (ALIC), administers these programs.

The first program is the deficiency payment scheme, where registered beef calf producers receive a payment from the Ministry of Agriculture, Forestry and Fisheries (MAFF) when the quarterly average auction price for beef calves falls below an administered price (termed the Guaranteed Standard Price) set by MAFF (Kondo 2013b). If quarterly auction prices fall below a lower administered price (termed the Target Rationalisation Price), additional subsidies funded by prefectural governments and producer organisations are paid to calf producers.

The second program is the beef cattle farming stabilisation support measure (MARUKIN), which pays subsidies to lot feeding cattle farms when their income does not meet their costs of production. If costs of production, excluding family labour costs, exceed gross income, ALIC subsidies 60 per cent of the difference (Obara et al. 2010).

The third program is a beef price stabilisation program operated by MAFF and ALIC. This program controls the supply of beef to ensure prices stay within a predetermined band. MAFF sets the upper and lower bounds of beef prices, and assigns the responsibility to ALIC to purchase beef for their own stocks, or to sell beef from those stocks into the wholesale market to ensure prices stay within the band.

The Government of the Republic of Korea also administers a number of subsidy programs for cattle producers. One is the program of payments to cattle farmers initiated in 2011 for slaughter of lower performing cows and heifers. The program was implemented to stem herd growth and stimulate cattle prices over the medium term (ABARES 2012b).

ASEAN

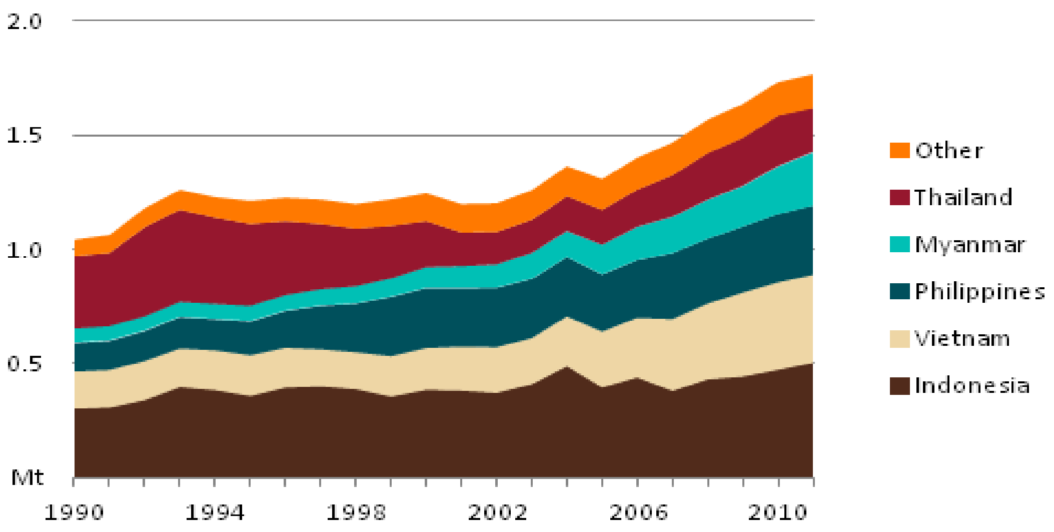
Production

Beef production in ASEAN member states increased by more than 65 per cent in the two decades to 2011 to 1.8 million tonnes (Figure 175). The largest producing member states are Indonesia, Vietnam and the Philippines, which accounted for two-thirds of the beef produced in 2011. Despite a significant increase in production over the past decade, beef's share of total meat production among ASEAN member states remains at around 8 per cent, significantly lower than pig meat and poultry meat (FAO 2013).

Backyard operations have historically dominated beef production in most ASEAN member states. Small numbers of cattle are fattened in household yards to provide food and supplementary income for families. Hygiene and veterinary practices are poor and the technologies used in animal raising and breeding are basic. Consequently, productivity gains and a high level of biosecurity are difficult to achieve (Thorpe et al. 2007).

From the mid 1990s, the number of commercial beef farms in ASEAN member states increased, as existing subsistence operations were unable to meet the growing demand for beef. These were supplemented by increasing numbers of feedlots, most notably in Indonesia, the Philippines and Malaysia, for fattening of low priced feeder cattle imported from Australia and New Zealand. These operations contributed significantly to the increase in beef production and productivity in the ASEAN region. In some ASEAN member states, such as Vietnam and the Philippines, foreign companies have recently set up integrated operations. This foreign investment has brought capital and new technology to local producers (Gleeson et al. 2012).

Figure 174 Beef production, ASEAN member states

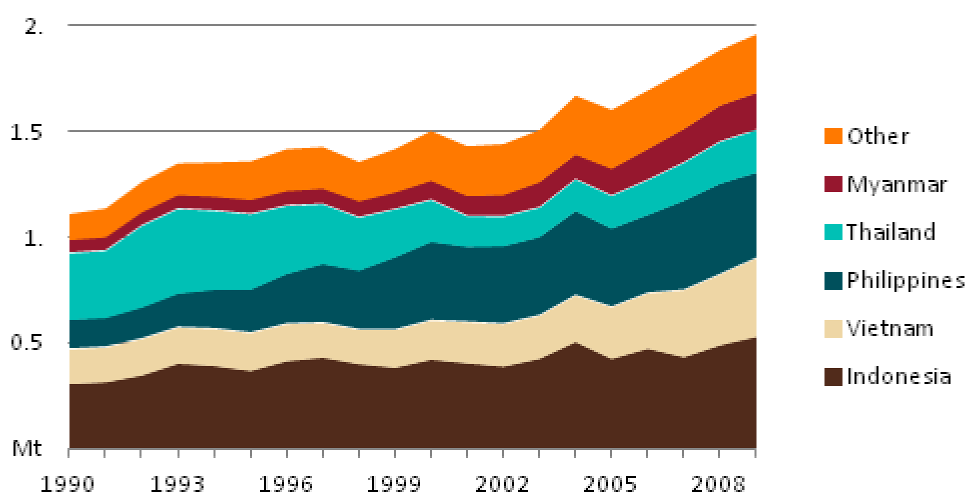


Note: Carcass weight equivalent.
Source: FAO 2013

Consumption

Beef consumption in ASEAN member states increased by 69 per cent between 1990 and 2009, from 1.1million tonnes to 2.0 million tonnes (Figure 175). Total beef consumption was highest in Indonesia, Vietnam and Thailand. However, on a per person basis, Laos had the highest beef consumption at 7.4 kilograms, followed by Malaysia (5.6 kilograms) and Singapore (5.0 kilograms). Indonesia, which is the largest consumer of beef in the region, had the lowest consumption on a per person basis at around 2 kilograms in 2009 (FAO 2013; Government of Singapore 2013).

Figure 175 Beef consumption, ASEAN member states



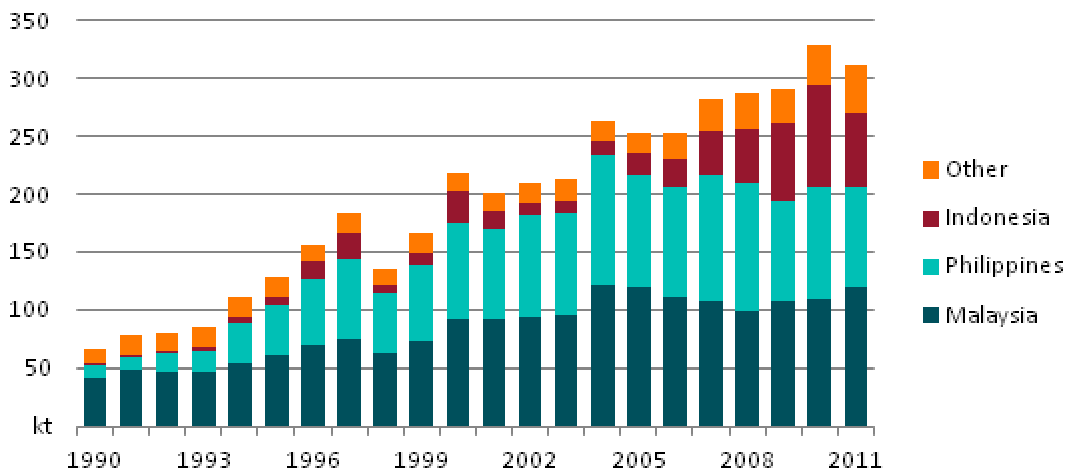
Note: Carcass weight equivalent.
Source: FAO 2013

Despite significant growth over the past two decades, beef consumption remains low compared with pig meat and poultry meat. In 2009 beef made up only 13 per cent of meat consumption within the ASEAN member states, compared with 40 per cent for poultry meat and 45 per cent for pig meat (FAO 2013).

Trade

Growth in demand for beef has contributed to a significant increase in beef imports to the ASEAN member states between 1990 and 2011 (Figure 176). Malaysia, the Philippines and Indonesia were the three largest beef importers, accounting for 90 per cent of beef imported by ASEAN member states over this period. India accounts for the largest share of world beef exports to ASEAN member states, followed by Australia, New Zealand and Brazil.

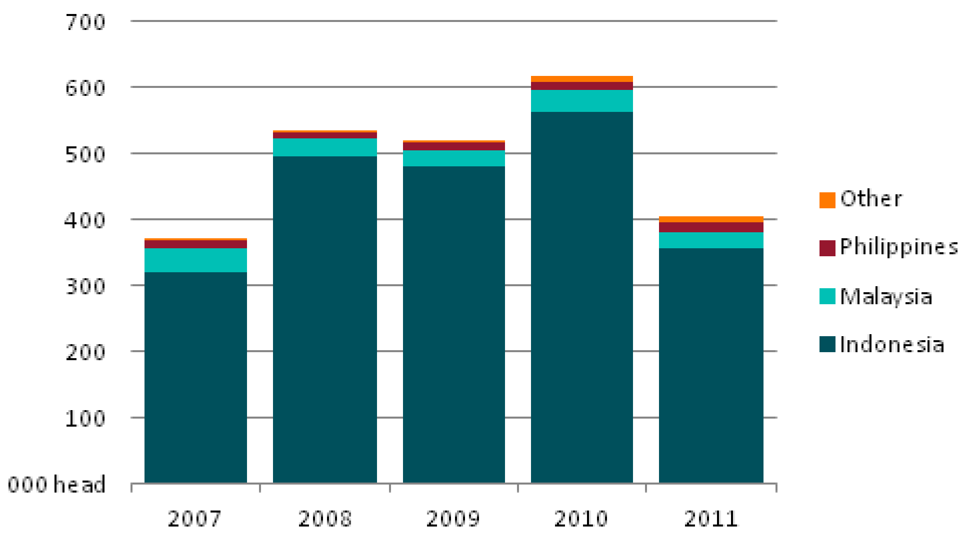
Figure 176 Beef imports, ASEAN member states



Note: Boneless weight equivalent, excluding intra-regional trade.
Source: CountrySTAT Philippines 2013; United Nations Statistics Division 2013

Imports of live cattle in the ASEAN member states have also grown in response to increased demand for beef (Figure 177). Since 2007 Indonesia has accounted for over 85 per cent of ASEAN live cattle imports, with Malaysia and the Philippines accounting for nearly all the remainder. More than 96 per cent of ASEAN live cattle imports over the five years to 2011 were sourced from Australia. Total ASEAN live cattle imports fell significantly in 2011 as a result of the Indonesian Government imposing a substantially lower import quota.

Figure 177 Live cattle imports, ASEAN member states



Note: Excludes intra-regional trade.
Source: United Nations Statistics Division 2013

Religious, demographic and socio-economic factors are significant contributors to Indonesian demand for live cattle imports. Around 86 per cent of Indonesians are Muslim and demand for beef generally peaks at the end of Ramadan, as fasting ends and consumption rises. Around 56 per cent of Indonesians live in rural areas, where access to refrigeration is limited. According to the World Bank, Indonesia's electrification rate was 65 per cent in 2011, among the lowest in South-East Asia (World Bank 2011). Of the 90 million people without access to electricity, around two-thirds live in rural areas. This contributes to a large proportion of beef in Indonesia being sold in traditional wet markets within 24 hours of being slaughtered.

Policies

Tariff barriers on imports of beef in ASEAN member states are set by individual governments and vary significantly between countries. The governments of Brunei Darussalam, Malaysia and Singapore impose no tariffs on imports of beef. The governments of Indonesia, Myanmar and the Philippines impose tariff barriers on imports of beef of 5 per cent, 15 per cent and 10 per cent, respectively. Imports of beef in Cambodia, Laos and Thailand are subject to much higher tariffs of 35 per cent, 30 per cent and 50 per cent, respectively (WTO 2013).

Indonesia's WTO bound tariff is 50 per cent. However, since 2011 the Indonesian Government has imposed a quota on imports of beef. The quota was set at 72 000 tonnes in 2011 before being reduced to 41 000 tonnes in 2012 and 32 000 tonnes in 2013. The tariff on imports within the quota is 5 per cent. Imports greater than the quota volume are not permitted, even at the bound tariff.

In Indonesia the desire to achieve self-sufficiency in beef production has been government policy since 2000, with the target completion date of 2005 postponed to 2010, and then to 2014. Key reasons for the program's implementation are to encourage increased domestic beef production, to reduce price pressure on local producers, and to reduce trade exposure to Australia. Indonesia's self-sufficiency blueprint suggests raising the 5 per cent tariff on imported beef and edible offal, and keeping in place the 350 kilogram weight limit on imported feeder cattle (Gleeson et al. 2012).

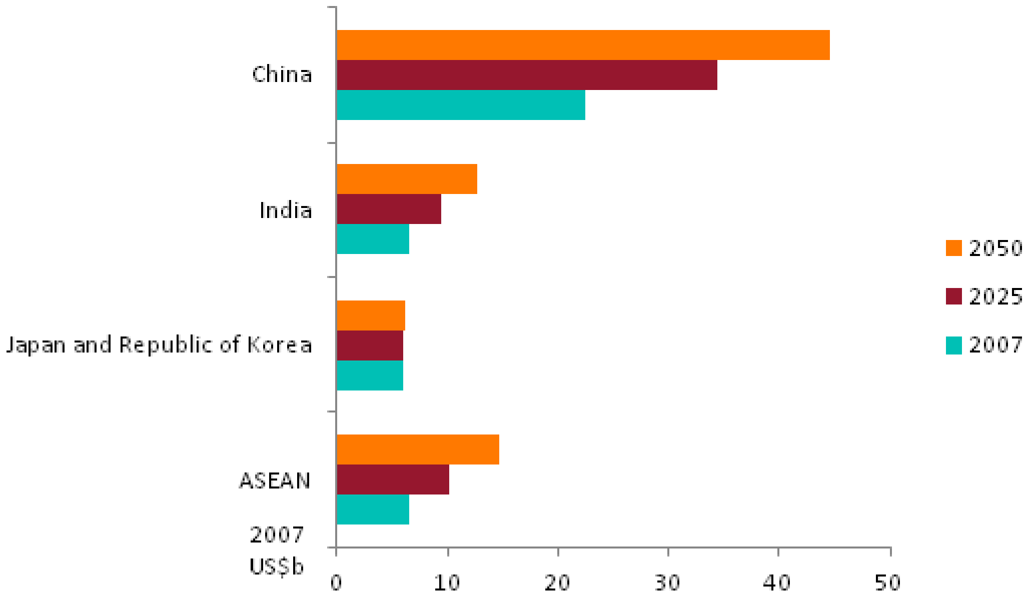
A number of ASEAN member states which have predominantly Muslim populations impose strict certification standards on imports of beef. In Brunei Darussalam all beef imports must have halal certification for importation. Additionally, members of the Brunei Religious Council are required to be present from the time of slaughter to the final packing, to ensure compliance with standards (USTR 2009). In Malaysia all imports of non-pork meat must receive halal certification from an approved Islamic Centre. The production facilities for these products are jointly inspected by the Malaysian Department of Veterinary Services and the Department of Islamic Development (Warr et al. 2008).

Long-term prospects

Consumption

China will remain the largest consumer of beef in Asia by 2050, with the real value of consumption (in 2007 US dollars) projected to be US$45 billion, almost double that of 2007 (Figure 178). Most of the growth (US$13 billion) is projected to occur between 2007 and 2025 because of higher projected annual population and per person income growth over this period (United Nations Population Division 2011). The growth in beef consumption in China can also be attributed to a change in dietary composition away from staple foods, such as cereals, to meat products, as real per person incomes increase. This is reflected in the projected increase in per person beef consumption to around 10 kilograms in 2050, more than double that of 2007.

Figure 178 Real value of Asia's beef consumption



Source: ABARES model output

India is projected to be the second largest consumer of beef in Asia by 2050, with the real value of consumption projected to be US$13 billion, 95 per cent higher than in 2007. Like China, consumption growth is projected to be higher between 2007 and 2025, increasing at an annual rate of 2.1 per cent compared with 1.2 per cent between 2025 and 2050. However, per person consumption of beef is projected to be 2 kilograms, compared with 10 kilograms for China. This can be attributed to the large Hindu population in India which account for 80 per cent of the population (Census of India 2011), and beef is not generally consumed by that portion of the population.

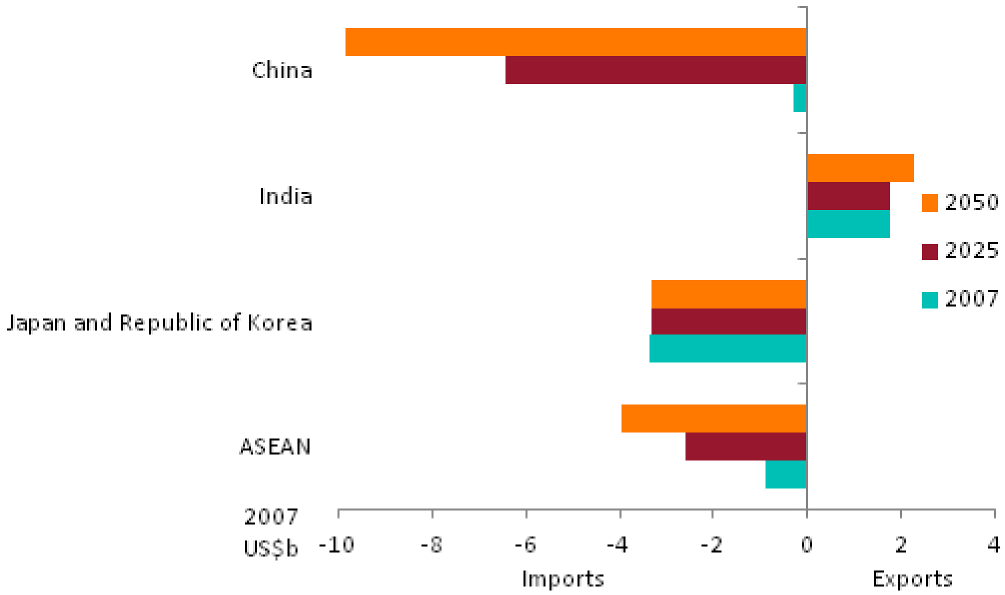
Beef consumption growth for Japan and the Republic of Korea is projected to be relatively flat, increasing by 2 per cent to US$6 billion in 2050. A projected decline in population, combined with low per person income growth, is largely responsible for this trend. Per person consumption is projected to remain relatively high in 2050 at 11 kilograms for Japan and 12 kilograms for the Republic of Korea.

For the ASEAN member states, the real value of beef consumption is projected to be US$15 billion, 120 per cent higher than in 2007. Like the other regions in Asia, the growth in beef consumption will be underpinned by population growth, as well as a dietary shift away from food staples, such as cereals, to meat products as per person incomes increase. Of the ASEAN member states, consumption is projected to be highest in Indonesia (US$4 billion), Vietnam (US$3 billion) and the Philippines (US$3 billion).

Trade

The real net value of China's beef imports in 2050 is projected to be US$10 billion (in 2007 dollars) (Figure 179). Most of this import growth (US$6 billion) is projected to occur between 2007 and 2025 because of the high growth in beef consumption relative to the growth in production over this period. This growth will see the import share of total Chinese beef consumption increase from around 2 per cent in 2007 to 22 per cent in 2050.

Figure 179 Real value of Asia's net trade for beef



Source: ABARES model output

India is projected to remain a net exporter of beef by 2050 because of only modest consumption growth over the projection period. The real value of India's net beef exports in 2050 is projected to be around US$2 billion, 33 per cent higher than in 2007.

The real net value of beef imports for Japan and the Republic of Korea is projected to remain constant at around US$3 billion out to 2050. This is the result of subdued consumption growth, combined with mostly unchanged production for these countries.

The real net value of ASEAN beef imports in 2050 is projected to be US$4 billion; US$3 billion higher than in 2007. Most of this import growth is also projected to occur between 2007 and 2025 as a result of higher projected growth in ASEAN beef consumption relative to the increase in domestic production in this period. In value terms, imports in 2050 are projected to be highest for Indonesia (US$1.3 billion), Malaysia (US$1 billion) and Vietnam (US$600 million).

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13 Sheep and goat meat

Neil Thompson and Andrew Haylen

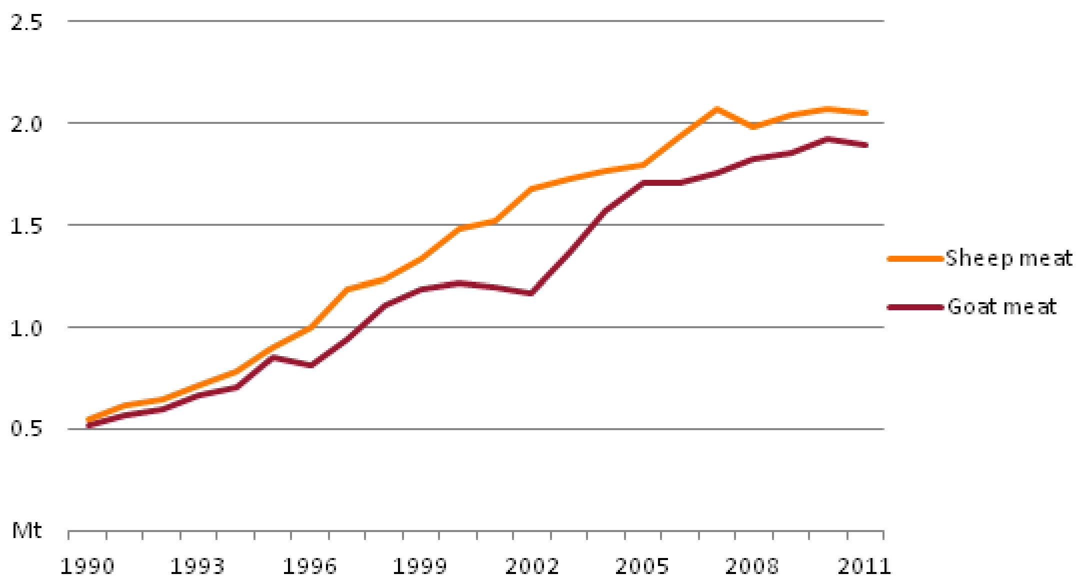
China

Production

China is the world's largest producer of sheep and goat meat. In 2011 sheep and goat meat production reached around 3.9 million tonnes. Of this, sheep meat represented around 2.1 million tonnes, or 52 per cent of total production (Figure 180).

Sheep and goat meat production increased steadily over the past 20 years, rising by an average of around 6 per cent a year to 2011. This compares with average annual growth of around 4 per cent for the production of all meats over the same period.

Figure 180 Sheep and goat meat production, China



Source: FAO 2013

Consumption

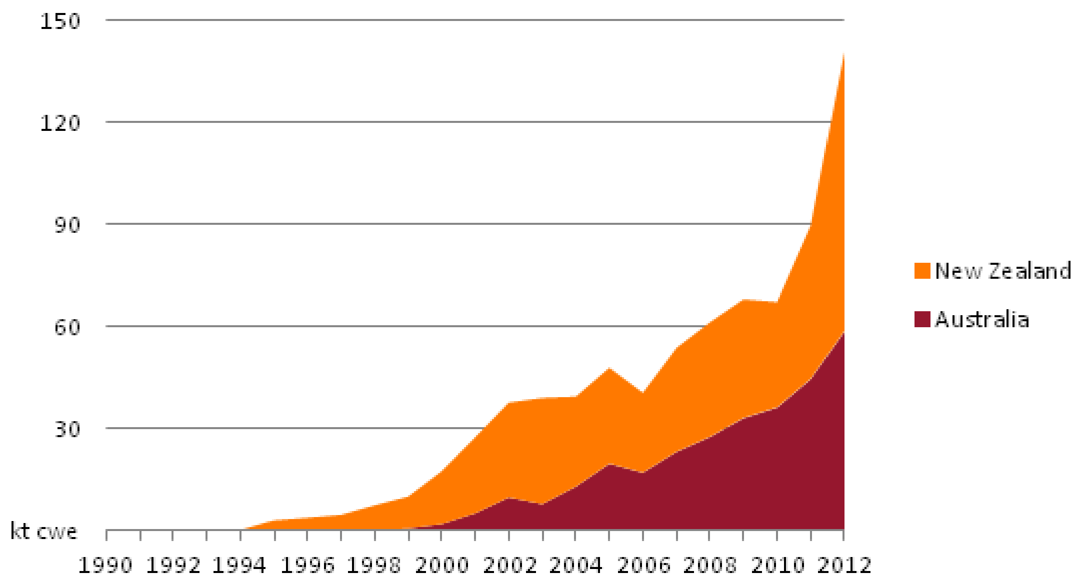
In 2009 consumption of sheep and goat meat in China was estimated to be around 4 million tonnes. Sheep and goat meat consumption increased over the past 20 years by an average of around 7 per cent a year, with per person consumption estimated to have risen from around 1 kilogram in 1990 to 3 kilograms in 2009 (FAO 2013). Despite the strong growth in consumption, sheep and goat meat represents only around 5 per cent of total meat consumed in China.

Trade

While China is largely self sufficient in sheep and goat meat production combined, over the past 20 years sheep meat consumption has grown faster relative to sheep meat production, resulting in a rise in imports. Since 1995 Chinese imports of sheep meat have grown by an average of 23 per cent a year (United Nations Statistics Division 2013). The major suppliers to the Chinese market are New Zealand and Australia, which account for around 60 per cent and 40 per cent of total imports, respectively. In 2012 sheep meat exports from New Zealand to China totalled

82 000 tonnes (carcass weight equivalent) and Australian exports reached almost 60 000 tonnes (carcass weight equivalent) (Figure 181).

Figure 181 Imports of sheep meat, China



Note: ***cwe*** *refers to carcass weight equivalent.*
Sources: ABS 2013; Statistics New Zealand 2013

Chinese exports of sheep and goat meat are limited to less than 1 per cent of domestic production. In 2011 exports of sheep and goat meat totalled 6700 tonnes and 1800 tonnes (carcass weight equivalent) respectively, while a limited number of live goats, around 22 000 head, were also exported (United Nations Statistics Division 2013).

Policies

China has a number of ad valorem tariffs on sheep and goat meat imports; in 2012 they ranged from 12 per cent for frozen bone-in mutton to 23 per cent for mutton carcasses (WTO 2013). For individual tariff lines for sheep and goat meat imports, China's applied tariffs are equal to its WTO bound tariffs. In addition, imports of sheep meat are subject to a value added tax, levied at 13 per cent in 2010 (RedFern Associates 2010).

China has implemented a number of free trade agreements that reduce or eliminate ad valorem tariffs for imports from Chile, Pakistan, New Zealand and ASEAN member states. Of greatest significance is the New Zealand–China Free Trade Agreement, which will gradually reduce tariffs on sheep and goat meat to zero by 2016. In 2013 China's tariffs on sheep meat imports from New Zealand will range from 5 per cent to 7.7 per cent (NZMFAT 2013).

India

Production

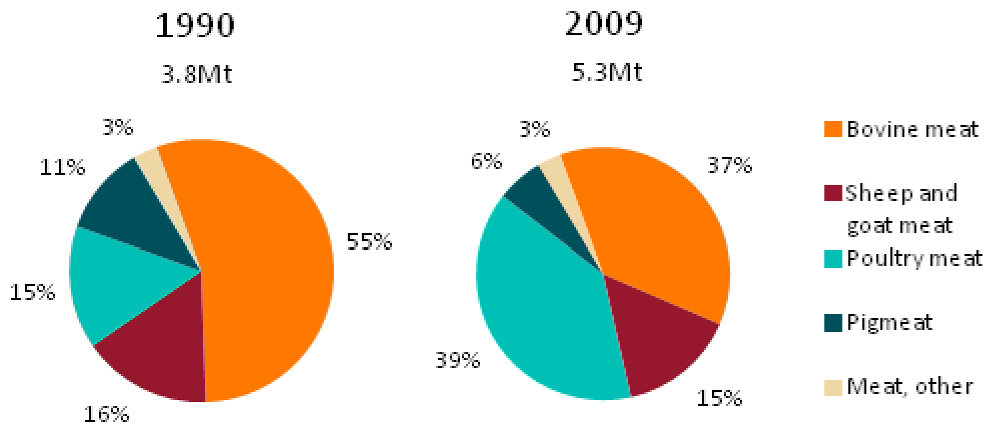
India is a major producer of sheep and goat meat, ranking fourth and second, respectively, in global production. In 2011 the volume of Indian sheep and goat meat production reached 890 000 tonnes. Goat meat represents around two-thirds of production, at 597 000 tonnes in 2011 (FAO 2013).

Sheep and goat meat production increased by an average of 1.9 per cent a year over the 20 years to 2011, compared with a growth rate of 2.5 per cent a year for all meat over the same period.

Consumption

Sheep and goat meat are important sources of animal protein in India, accounting for around 15 per cent (or 800 000 tonnes) of total meat consumption in 2009 (Figure 182). Over the past 20 years, sheep and goat meat consumption has grown by 1.5 per cent a year on average. However, annual per person consumption has declined over the same period (estimated to be 660 grams in 2009 compared with 690 grams in 1990). In contrast, total meat consumption has grown more rapidly, resulting in per person consumption estimated at around 4.4 kilograms in 2009, 3 per cent higher than in 1990 (FAO 2013).

Figure 182 Meat consumption, India



Source: FAO 2013

Trade

Despite being a major producer of sheep and goat meat, India exports only around 2 per cent of domestic production. In 2011 Indian exports of sheep and goat meat were 9800 tonnes and 600 tonnes (carcass weight equivalent), respectively. Over the 20 years to 2011 annual sheep and goat meat exports averaged around 16 000 tonnes (carcass weight equivalent), but volumes varied significantly from year to year (United Nations Statistics Division 2013). India also exports limited numbers of live sheep and goats but, like meat exports, these have been highly variable from year to year.

Policies

In recent years, the Indian Government has supported domestic production under the Centrally Sponsored Scheme for Integrated Development of Small Ruminants and Rabbits. The scheme subsidises capital costs for new commercial producers of sheep, goats and rabbits across a number of states and selected animal breeds (NABARD 2009).

India's applied ad valorem tariffs for sheep and goat meat imports were 30 per cent in 2012, while the tariff for live sheep and goats was 5 per cent. India's bound tariffs for sheep and goat meat are 100 per cent for most tariff lines, with the exception of frozen sheep carcases and half-carcases (excluding lambs), which has a bound tariff of 35 per cent (WTO 2013).While India has a number of free trade agreements, the most important for sheep and goat meat is the South Asia Free Trade Area (Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka), which resulted in tariffs being reduced to between 0 and 11 per cent for some member countries in 2010 (WTO 2013).

Japan and the Republic of Korea

Production

Production of sheep and goat meat in Japan and the Republic of Korea was estimated at around 1600 tonnes in 2011, almost 90 per cent of which was goat meat in the Republic of Korea. This compares with total meat production of around 5 million tonnes, with Japan accounting for around two-thirds of regional production (FAO 2013).

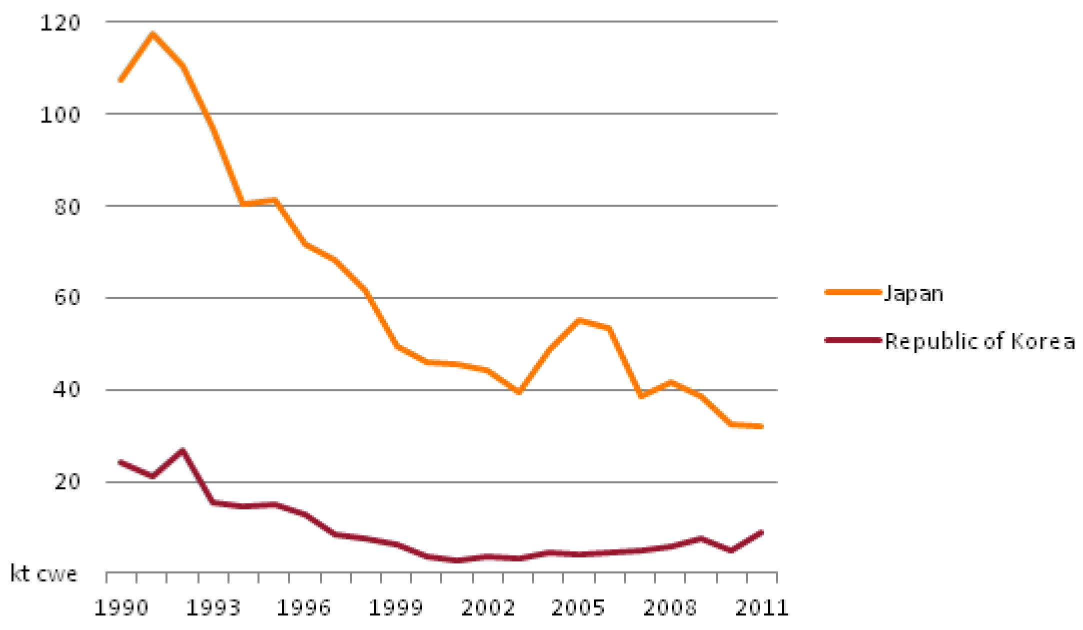
Consumption

Consumption of sheep and goat meat in Japan and the Republic of Korea has steadily declined over the past 20 years. This compares with a 2 per cent a year increase in total meat consumption over the same period. In 2009 consumption of sheep and goat meat in both countries was estimated to be less than 200 grams per person a year (FAO 2013).

Trade

Supplies of sheep and goat meat to domestic consumption are largely sourced from foreign markets. However, the decline in sheep and goat meat consumption over the past two decades has resulted in falling import volumes (Figure 183). In 2011 sheep meat imports totalled 41 000 tonnes (carcass weight equivalent); Australia and New Zealand supplied around 60 and 40 per cent, respectively. In contrast, goat meat imports remained relatively stable over the same period, reaching just over 1100 tonnes (carcass weight equivalent) in 2011 (United Nations Statistics Division 2013).

Figure 183 Sheep meat imports, Japan and the Republic of Korea



*Note: **cwe** refers to carcass weight equivalent.*
Source: United Nations Statistics Division 2013

Policies

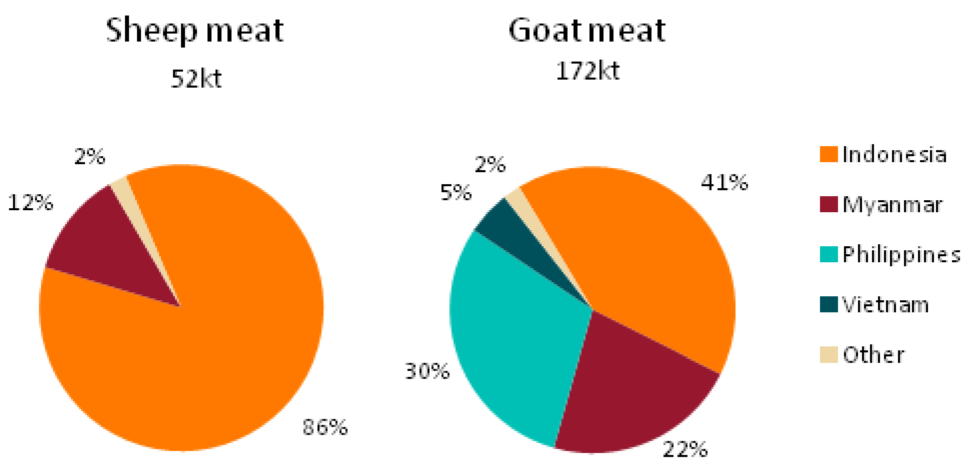
The Republic of Korea levied a 22.5 per cent ad valorem tariff on imports of sheep and goat meat in 2012 and a tariff of between zero and 8 per cent for imports of live sheep and goats. These tariffs are waived for Least Developed Country imports. The Republic of Korea's applied tariffs for sheep and goat meat are equal to their WTO bound tariffs. However, the bound tariff for live sheep and goats is 18 per cent. For Japan, bound and applied tariffs for sheep and goat meat and live imports are zero (WTO 2013).

ASEAN

Production

Sheep and goat meat production in ASEAN member states was estimated to be around 224 000 tonnes in 2011, with goat meat contributing 172 000 tonnes or around 77 per cent of total production. Indonesia and Myanmar are the major regional producers of sheep and goat meat, while the Philippines and Vietnam account for 30 per cent and 5 per cent of goat meat production, respectively (Figure 184).

Figure 184 Sheep and goat meat production, ASEAN member states, 2009



Source: FAO 2013

Sheep and goat meat production is estimated to have increased by around 2.6 per cent a year over the 20 years to 2011. This growth has been largely driven by a significant expansion in goat meat production since 2001, while sheep meat production has remained largely unchanged over the same period.

Consumption

In 2009 consumption of sheep and goat meat in ASEAN member states was estimated to be 247 000 tonnes. Indonesia is the single largest consumer in the region, accounting for more than half of total consumption, while Singapore consumes the most on a per person basis, at 2.1 kilograms.

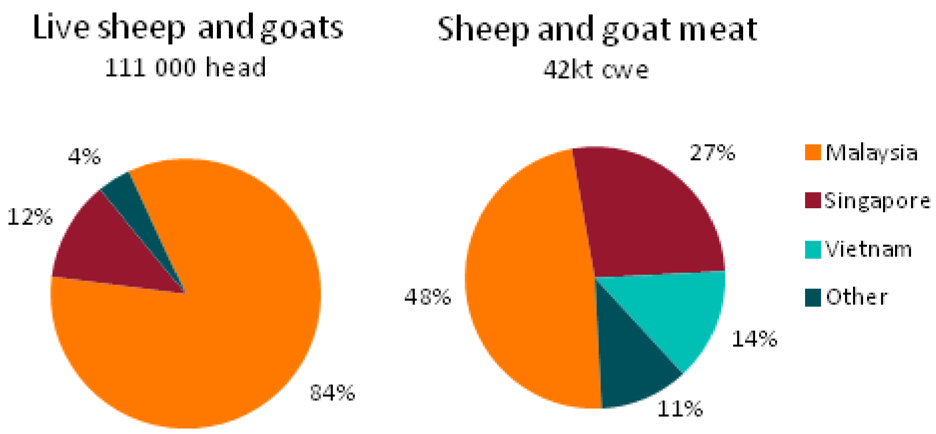
Over the two decades to 2009, sheep and goat meat consumption grew at an average rate of around 2.8 per cent a year. However, this is about half the rate of growth in total meat consumption over the same period (FAO 2013).

Trade

Sheep meat represents around 97 per cent of total sheep and goat meat imports by ASEAN member states. Malaysia is the single largest importer of sheep and goat meat, importing 20 000 and 560 tonnes (carcass weight equivalent), respectively in 2011 (Figure 185). Australia was the largest supplier of sheep meat to the region, accounting for around 56 per cent of shipments in 2011, followed by New Zealand (32 per cent) and the United Kingdom (6 per cent).

Live sheep and goat imports were around 32 500 and 78 000 head, respectively, in 2011. Live imports are largely sourced from Australia, with smaller numbers received through intraregional trade, particularly from Singapore and Indonesia (United Nations Statistics Division 2013).

Figure 185 Sheep and goat imports, ASEAN member states, 2011



*Note: **cwe** refers to carcass weight equivalent.*
Source: United Nations Statistics Division 2013

Policies

Applied ad valorem tariffs on sheep and goat meat exports to the region range from 0 per cent (Brunei Darussalam, Malaysia and Singapore) to 35 per cent (Cambodia and the Philippines) (WTO 2013).

The ASEAN Australia–New Zealand Free Trade Agreement is the agreement of most importance to sheep and goat meat imports within the region, reducing tariffs from between 0 and 25 per cent in 2013 to zero by 2021. The Philippines and Indonesia are the exceptions to this agreement, as they will levy a 5 per cent import tariff on live goats and goat meat and a 5 per cent tariff on selected sheep and goat meat cuts, respectively, after 2020 (NZMFAT 2010).

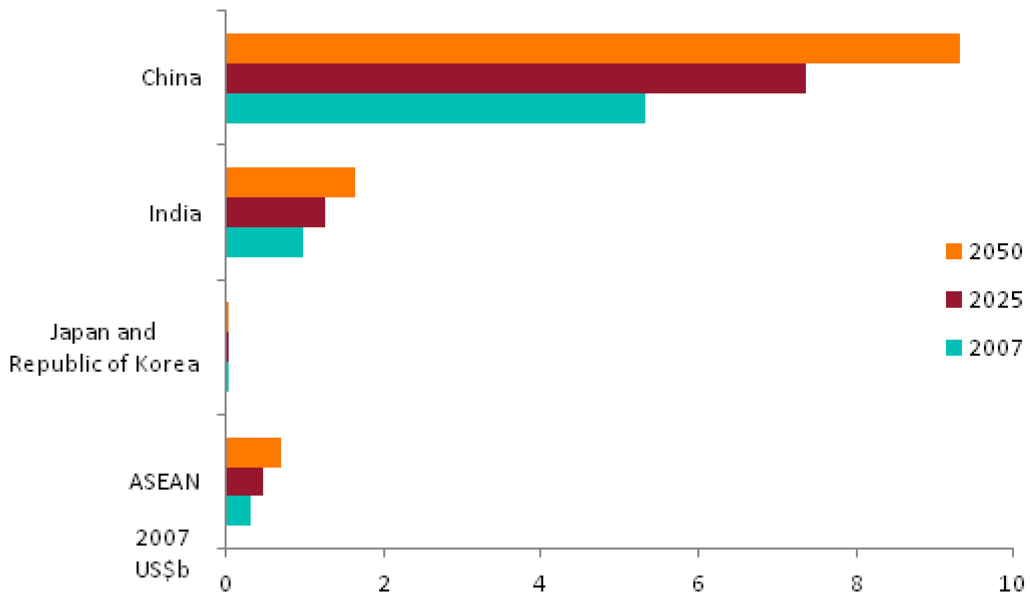
Long-term prospects

Consumption

China is projected to remain the principal consumer of sheep and goat meat in Asia by 2050, with the real value of consumption projected to be around US$9 billion (in 2007 dollars), 75 per cent higher than in 2007 (Figure 186). Consumption growth is projected to be higher between 2007 and 2025 because of higher projected population and income growth during this period than between 2025 and 2050. China is also projected to have the largest per person consumption of sheep and goat meat in Asia by 2050, at 5.2 kilograms, 78 per cent higher than in

2007. This increase reflects the effect of higher incomes on consumption of animal-based products, including sheep and goat meat.

Figure 186 Real value of Asia's sheep and goat meat consumption



Source: ABARES model output

The real value of India's sheep and goat meat consumption in 2050 is projected to be around US$2 billion, US$700 million higher than in 2007. Per person consumption of sheep and goat meat in India has historically been relatively small compared with other Asian countries, such as China, and this is not expected to change over the projection period. For example, on a per person basis, consumption is projected to be around 700 grams for India in 2050 (compared with 660 grams in 2009). This is markedly lower than the projected 5.2 kilograms for China.

The real value of Japan and the Republic of Korea's sheep and goat meat consumption in 2007 was around US$39 million (in 2007 US dollars). Japan and the Republic of Korea have not historically been significant consumers of sheep and goat meat. With an expectation of a smaller population and moderate income growth, and assuming unchanged consumer preferences, consumption is projected to remain around historical levels out to 2050.

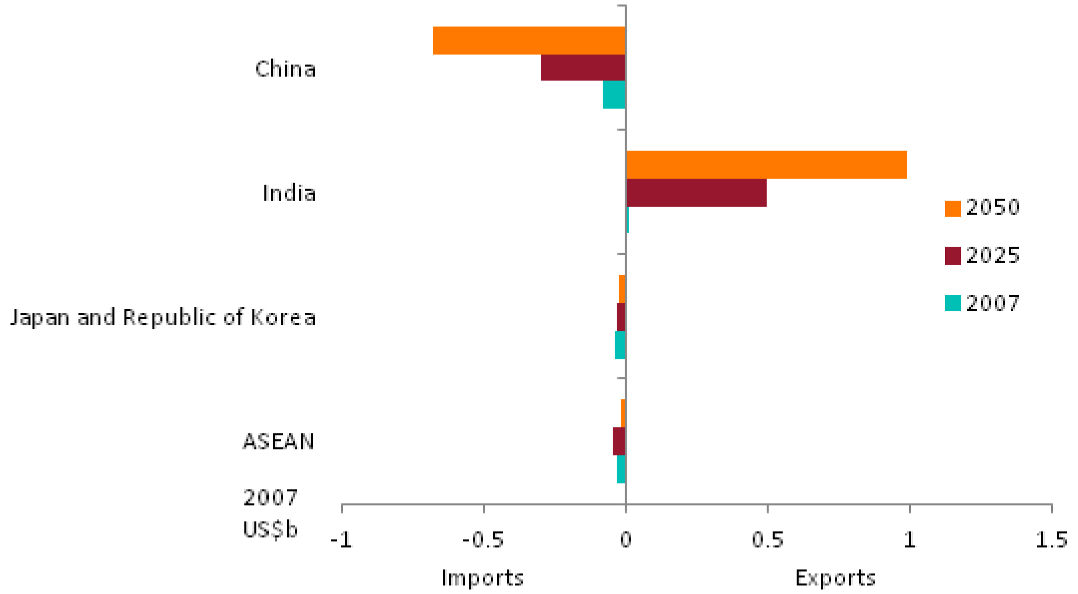
For ASEAN member states, the real value of sheep and goat meat consumption in 2050 is projected to be around US$400 million (in 2007 dollars) higher than in 2007, with Indonesia accounting for half of this increase. This limited consumption growth reflects existing and projected consumption patterns in the region. For example, traditional food staples, such as cereals, currently meet a high proportion of the dietary requirements of consumers in the ASEAN region. While an increase in meat consumption is projected as per person incomes increase, this growth is likely to be for other meat products, such as beef, pig meat and poultry meat.

Trade

Sheep and goat meat imports are projected to account for around 7 per cent of China's total sheep and goat meat consumption in 2050. The real net value of China's sheep and goat meat imports in 2050 is projected to be US$700 million (in 2007 dollars), an increase from US$100 million in 2007 (Figure 187). With the real value of China's consumption projected to increase to

US$9 billion by 2050, most of the increase in China's sheep and goat meat consumption is projected to be met by an increase in domestic production.

Figure 187 Real value of Asia's net trade in sheep and goat meat



Source: ABARES model output

In 2007 India was a small net exporter of sheep and goat meat. By 2050 the real net value of sheep and goat meat exports is projected to increase to around US$1 billion. This export growth is underpinned by the larger projected increase in sheep and goat meat production in India relative to consumption growth out to 2050.

The real net value of Japan and the Republic of Korea's sheep and goat meat imports is projected to remain small at around US$30 million in 2050. This relatively low import value reflects the weak consumption growth projected out to 2050.

The real net value of sheep and goat meat imports for ASEAN member states is projected to be unchanged at around US$20 million (in 2007 dollars) by 2050. This reflects the capacity of domestic production in ASEAN member states to meet most of the projected growth in consumption.

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14 Dairy

David Barrett and Andrew Haylen

Demand for dairy products in many developing countries of Asia has grown strongly over the past two decades. Rising incomes, growing populations and changing diets are important factors influencing this increase.

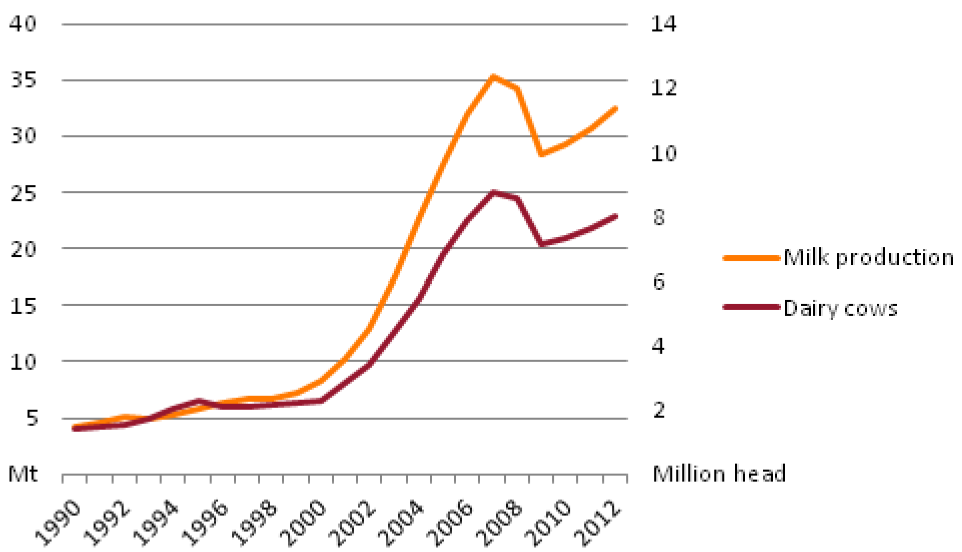
To meet demand many Asian countries have significantly increased their imports of milk and dairy products. The Asian region now accounts for around 57 per cent of the global trade in milk powders and 20 per cent of global cheese imports.

China

Production

China's milk production expanded rapidly during the 2000s, reaching 35 million tonnes in 2007 before declining sharply in 2008 and 2009 (Figure 186). The decline reflected an increased culling of dairy herds as a result of a fall in consumer demand for domestically produced dairy products, some of which had been contaminated by melamine. Following this contamination, the government introduced stricter regulations relating to dairy product safety. Despite this, consumer concerns about the safety of domestically produced product remain. Milk production has increased in the past two years, reaching 32.5 million tonnes in 2012, but still remains below the 2007 output.

Figure 188 Milk production, China



Source: USDA–FAS 2013

Until the early 2000s China's dairy industry was characterised by small-scale producers that typically ran two or three cows, the milk yields of which were relatively low. In 2010 there were 1.75 million farms with between one and four dairy cows (USDA–FAS 2012a). While national milk yields have increased, they are still well below the average yields recorded in developed countries such as New Zealand and Australia and in the European Union. This reflects the quality of available feed and the quality of breeding stock, which comprises a large proportion of crossbreeds.

In recent years, tighter regulations relating to producing and marketing milk resulted in many small dairy producers leaving the industry. At the same time, the number of larger farms has significantly increased. For example, the number of farms with between 500 and 999 cows increased from 768 in 2007 to 2061 in 2010, while farms with herds larger than 1000 cows increased from 339 to 898 over the same period. The larger operations use imported genetic material to improve their milk herd and apply modern management and feeding regimes (USDA–FAS 2012a).

The target for raw milk production set by China's 12th Five-Year Plan (2011–15) is 50 million tonnes in 2015. However, limited land resources, increasingly strict environmental protection and food safety requirements, and higher production costs, including higher wage rates, are likely to constrain production growth over the next few years (USDA–FAS 2012a).

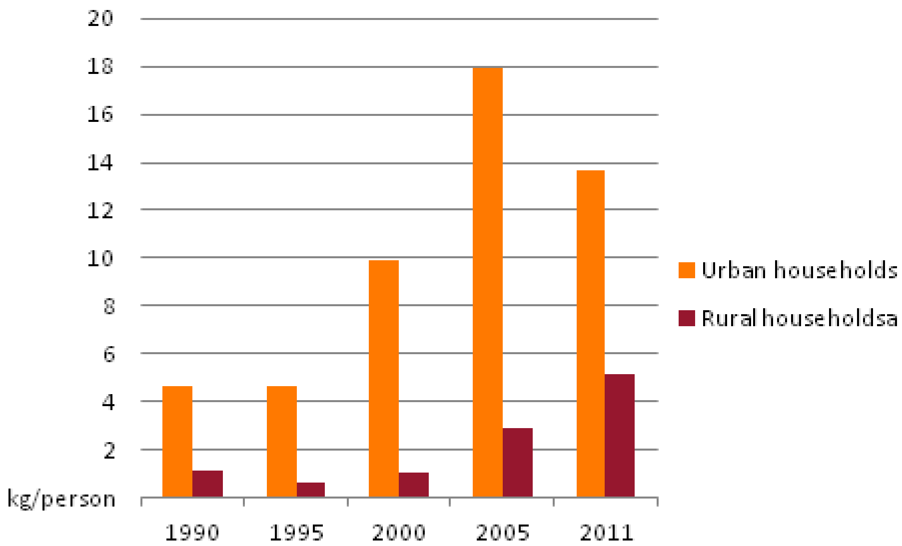
Consumption

Consumption of milk and dairy products in China has risen significantly over the past decade in response to higher household incomes, increased urbanisation and changes in diets to include more animal products. According to the Food and Agricultural Organization of the United Nations, per person consumption of milk and dairy products (except butter) rose from 9.5 kilograms in 2000 to 29.8 kilograms in 2009 (FAO 2013). However, Chinese consumption is well below that of developed Asian countries—such as Japan, where it was 73.9 kilograms in 2009 (FAO 2013).

China's economic growth is associated with development and expansion of urban regions and is an important driver of increased milk and dairy product consumption. Urban centres accounted for just over half of China's population in 2011 compared with 26 per cent in 1990. The pattern of China's consumption of milk and dairy products is largely concentrated in these areas because consumer incomes are typically higher and transport, storage and distribution infrastructure for dairy products are more developed. Consumers in urban areas tend to have more western style diets—with greater per person consumption of foods such as yoghurt, ice cream and pizzas.

Consumption of milk per person in urban areas increased from 4.6 kilograms in 1995 to 17.9 kilograms in 2005 before declining to 13.7 kilograms in 2011 because of consumer concerns about the safety of domestically produced dairy products (Figure 189). While the consumption of milk and dairy products by rural households also increased over the past decade, per person consumption was around 38 per cent of that of urban households in 2011 (National Bureau of Statistics of China 2012).

Figure 189 Milk consumption, China



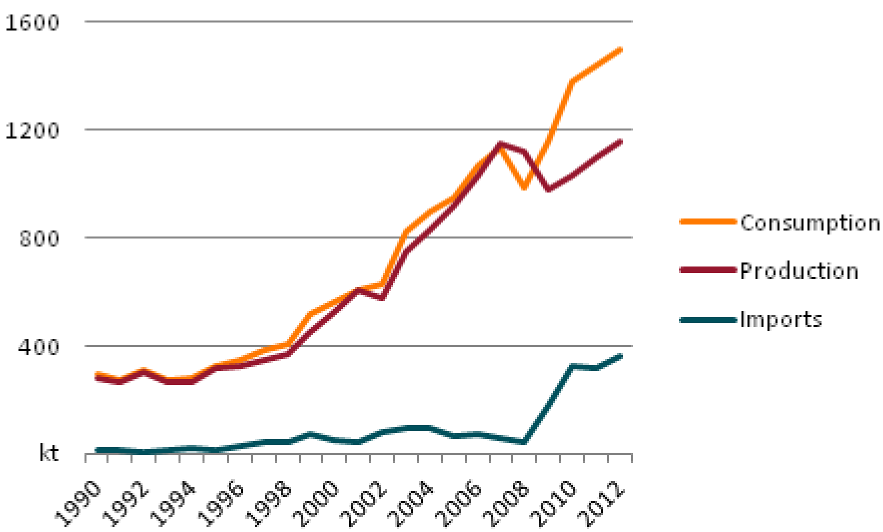
Note: ***a*** *Includes dairy products.*
Source: National Bureau of Statistics of China 2012

Trade

China has been at the centre of the growth in import demand for milk and dairy products in Asia, particularly over the past four years. Chinese imports of milk and dairy products increased nearly threefold to US$2.7 billion (2012 dollars) over the four years to 2011.

Since 2008 China has emerged as a large global importer of milk powders. Imports of whole milk powder increased more than sixfold to 325 000 tonnes in the three years to 2011 while imports of skim milk powder more than doubled to 130 000 tonnes over the same period (Figure 190). China also imports large quantities of whey products which increased by 60 per cent to 344 000 tonnes in the three years to 2011.

Figure 190 Whole milk powder, supply and consumption, China

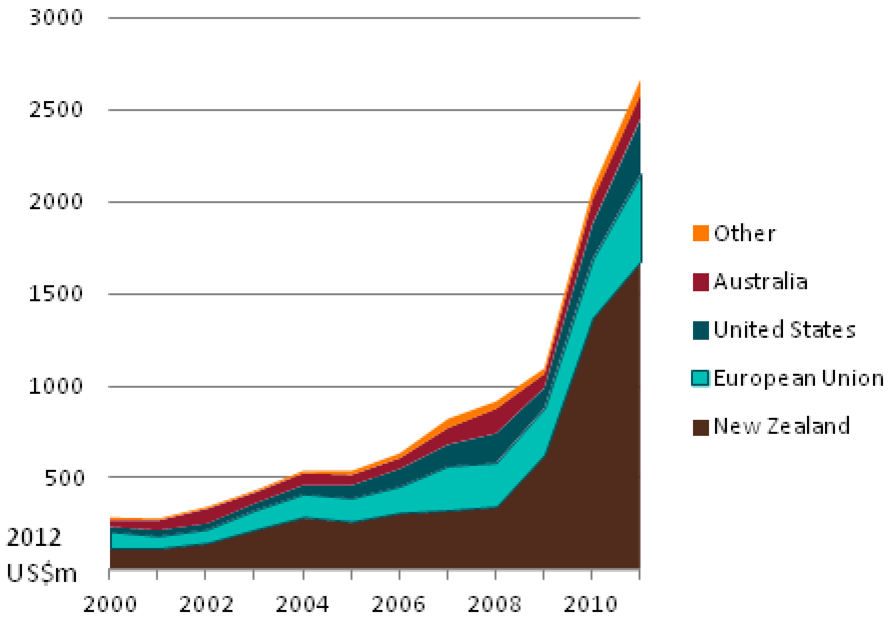


Source: USDA–FAS 2013

While China's imports of other dairy products, such as butter and cheese, are still low, import volumes of these products have been rising over the past few years. Butter imports increased by 164 per cent to 35 700 tonnes in the three years to 2011 and cheese imports more than doubled to 28 600 tonnes over the same period.

New Zealand is the major exporter of whole milk powder to China, accounting for around 90 per cent of the trade in 2011. Other significant exporters of dairy products include the European Union, the United States and Australia (Figure 191).

Figure 191 Imports of dairy products by source, China



Source: United Nations Statistics Division 2013

Policies

Under the World Trade Organization (WTO) accession agreement, China applies tariffs on imports of most dairy products on an ad valorem basis, ranging up to 20 per cent, depending on the product. The bound and applied tariff rates applying to milk powders are the same, and for butter they are 10 per cent, while whey products attract an applied tariff of 6 per cent. The tariff applied to cheeses varies from 12 per cent to 15 per cent.

The New Zealand–China Free Trade Agreement, which commenced in 2008, allows preferential access for New Zealand dairy products. Under the agreement, China's tariffs on imports of New Zealand dairy products are progressively lowered from base rates set under the WTO accession agreement. The tariff for whey products was reduced to zero by 2012. Tariffs on milk powders and most cheeses will be reduced to zero by 2019 and 2017, respectively. The tariff applied to milk powders and cheese products was 5 per cent and 4.8 per cent, respectively, in 2013.

India

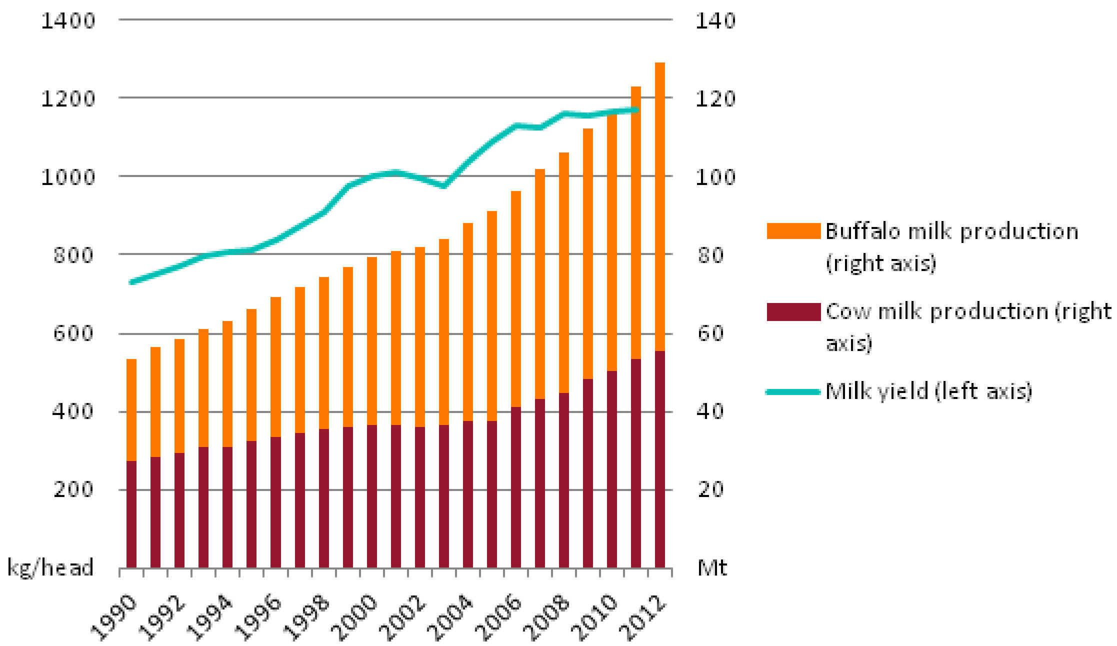
Government policies aimed at achieving and maintaining self-sufficiency underpin much of Indian agriculture. India has been self-sufficient in milk and dairy products, exporting small quantities of butter, skim milk powder and casein, since the early 2000s. Relatively high import tariffs on a range of dairy products have so far protected the domestic dairy industry. To maintain self-sufficiency in dairy products, milk production in India will need to keep pace with the growth in Indian demand.

Production

Indian milk production has been increasing by around 4 per cent a year since 2000 and is estimated to reach 123 million tonnes in 2012. Buffalo milk accounted for around 57 per cent of milk production in 2012, compared with 50 per cent in the early 1990s (Figure 192). Incentive to produce buffalo milk is based on consumer preference for its higher fat content and India's milk pricing, which is based on fat content. Buffalo milk, with an average of 6.9 per cent fat, receives a premium over cow milk, which has a fat content of 4.2 per cent. The preference for fluid milk, particularly buffalo milk, in India reflects its cultural significance as well as the tradition of vegetarianism.

Indian milk yields are well below those in developed economies and many developing countries. Production costs are also low because animal feeding in India typically relies on agricultural by-products rather than on high-energy inputs, such as grain. Use of capital-intensive feeds is increasing but still represents only a small share of total feeding (USDA–FAS 2012b).

Figure 192 Milk production, India



Source: FAO 2013; USDA–FAS 2013

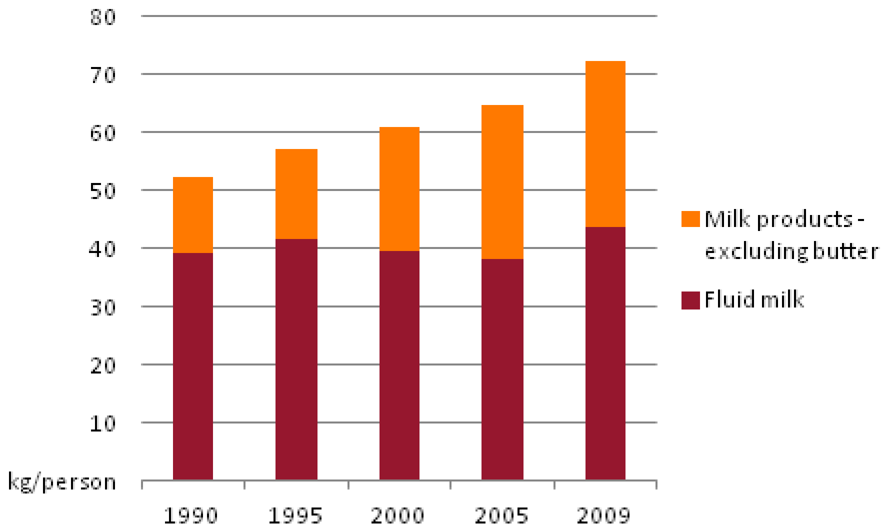
The Indian dairy industry is dominated by small producers that hold an average of two or three cows. The organised industry, which collects, processes and distributes milk and dairy products, accounts for around 15 per cent of milk production. The remaining milk (85 per cent) is consumed at farm level or sold as fresh, non-pasteurised milk through informal channels. However, with urbanisation the proportion of milk consumed on farm has declined (USDA–FAS 2012b).

The Indian Government is implementing a national dairy plan (April 2012 to March 2017), by which it intends doubling the country's milk production by 2020 (USDA–FAS 2012c). Such an outcome will depend on increasing dairy productivity through imported animal genetics to improve the dairy herd as well as on improving feed quality.

Consumption

Over the past two decades consumption of milk and dairy products in India has grown strongly in response to population growth, higher household incomes and a strong preference for fluid milk as a protein source (USDA–FAS 2012b). Indian consumption of whole milk (excluding butter) increased by 26 per cent to 72.2 kilograms per person from 1995 to 2009 while consumption of fluid milk rose by around 5 per cent to 43.6 kilograms per person (Figure 193).

Figure 193 Milk and dairy product consumption, India



Source: FAO 2013

Reflecting the importance of milk and dairy products in the Indian diet, consumption is relatively high compared with other Asian economies. For example, consumption of whole milk (excluding butter) in China and the Republic of Korea was 29.8 kilograms per person and 21.9 kilograms per person, respectively, in 2009. In Japan, consumption of whole milk (excluding butter) was 73.9 kilograms per person. Despite higher milk prices in recent years, per person consumption of milk in India has remained relatively stable.

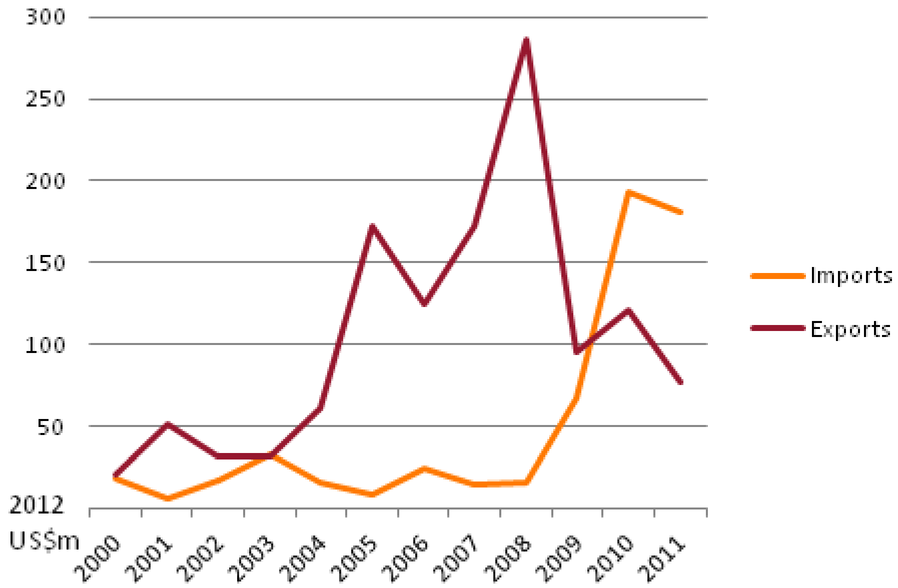
The Indian dairy processing sector is expanding as consumer demand for products such as yoghurts, ice creams, dairy drinks and western style cheeses increases (USDA–FAS 2012b). Much of this increase in demand is being driven by an expanding middle class that wants a greater diversity of foods.

Trade

Historically, India has been a relatively small and variable importer and exporter of dairy products. For example, the value of Indian dairy product imports averaged US$14 million (2012 dollars) during the eight years to 2008. However, imports rose sharply to around US$180 million (2012 dollars) in 2010 and 2011 (Figure 194).

The value of Indian exports of dairy products increased fivefold to US$268 million (2012 dollars) in the four years to 2008 then fell sharply in 2009 because of reduced export availability and lower world dairy prices. Indian exports of dairy products have consisted mainly of skim milk powder and butter.

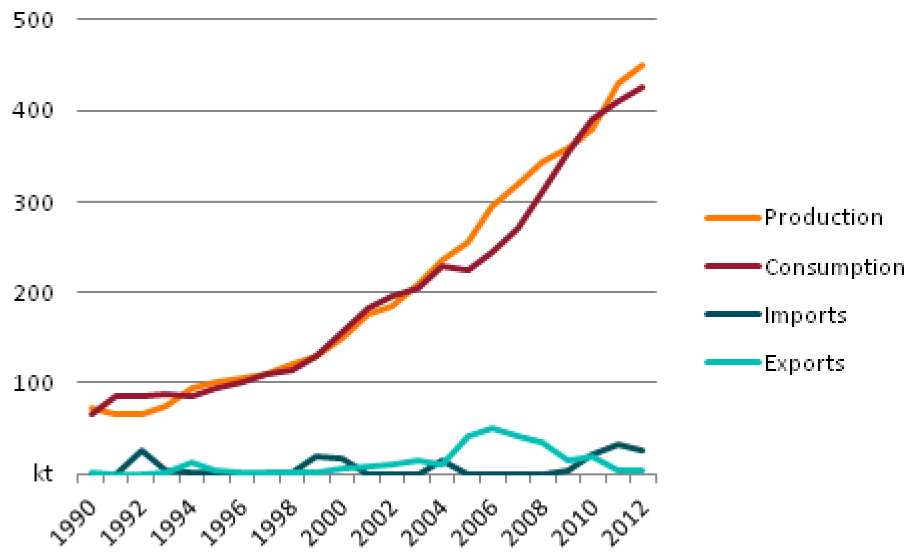
Figure 194 Trade in dairy products, India



Source: United Nations Statistics Division 2013

While India imported only a few hundred tonnes of skim milk powder in the middle to late 2000s, in 2010 and 2011 it imported 19 700 tonnes and 32 400 tonnes (Figure 195). Butter imports were relatively large in 2009 and 2010. Cheese imports have been growing steadily over the decade, reaching 1236 tonnes in 2010. Dairy products have traditionally been imported from New Zealand, Australia and the European Union.

Figure 195 Skim milk powder, production and consumption, India



Source: USDA–FAS 2013

Policies

India operates a tariff quota for milk powders, including skim milk powder and unsweetened whole milk powder. The combined quota volume is set at 10 000 tonnes. The in-quota tariff is 15 per cent and the out-of-quota tariff is 60 per cent.

Other dairy products are subject to tariff-only protection. The applied tariff for fresh milk and cream, butter, yoghurts, cheese and sweetened milk powders was 30 per cent in 2012. For dairy spreads and anhydrous milk fat the applied tariff was 40 per cent and 33.3 per cent, respectively. The bound tariffs vary between 40 per cent and 150 per cent. The bound tariff for butter, cheese and sweetened milk powders was 40 per cent (WTO 2013b).

At times the Indian Government has implemented trade measures to help manage the domestic dairy product market, particularly when domestic dairy prices have risen. In February 2011 the Indian Government prohibited the export of milk powders (skim milk powder, whole milk powder, casein, dairy whitener and infant formula dairy products) to control rising Indian dairy product prices. The ban on skim milk powder exports was lifted in June 2012 following higher than expected production in 2011 and 2012. Export of other dairy products (whole milk powder, casein, dairy whitener and infant formula dairy products) is still prohibited (USDA–FAS 2012c).

Furthermore, the Indian Government has periodically varied the tariff quota for skim milk powders. For 2010–11 (April to March) the skim milk powder quota was increased to 30 000 tonnes and increased again in 2011–12 to 50 000 tonnes when domestic skim milk powder production was lower than expected. For 2012–13 the Indian Government reduced the tariff quota volume for skim milk powder to 10 000 tonnes and set the in-quota tariff at 15 per cent. In March 2010 a tariff quota was established for butter, butter oil and anhydrous milk fat of 15 000 tonnes with an in-quota tariff of zero per cent and an out-of-quota tariff of 40 per cent.

Japan and the Republic of Korea

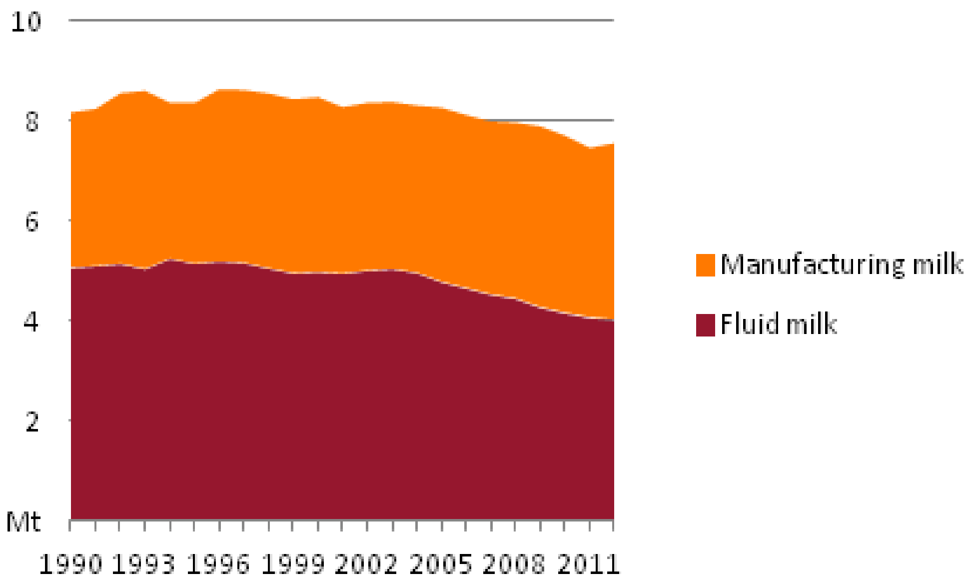
Production

Japanese milk production rose continuously from the 1960s to the early 1990s but since then declined by around 13 per cent to 7.5 million tonnes in 2011. This decline in production was driven by falling dairy cow numbers, despite a small increase in milk yield per cow over the period (Figure 196).

Around half of Japan's milk production comes from the Hokkaido prefecture, where around 75 per cent of output is used for manufactured dairy products, such as butter and cheese. Dairy farms in the Hokkaido prefecture tend to be larger than farms elsewhere in Japan and, in recent years, have been supplying a greater share of fluid milk to consumers in other prefectures. Nearly all the decrease in Japanese milk production since the mid 2000s has occurred in prefectures other than Hokkaido (Schluep Campo & Beghin 2005).

From the mid 2000s to 2012, fluid milk output declined by 20 per cent in response to lower per person consumption; it now accounts for around 55 per cent of total milk production.

Figure 196 Milk production, Japan



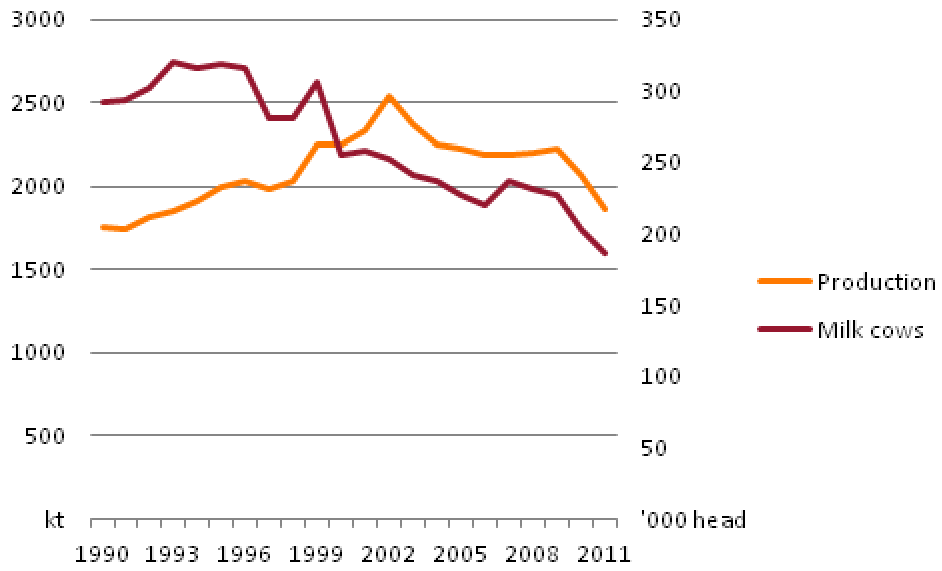
Source: USDA–FAS 2013

Despite falling fluid milk output in Japan, the volume of manufacturing milk has remained relatively stable. However, the mix of dairy products has changed to reflect an increase in production of cheese and a fall in production of butter and skim milk powder. Cheese production increased by 28 per cent to 50 000 tonnes between the mid 2000s and 2012, while butter and skim milk powder production fell by 20 per cent and 26 per cent, respectively, to 68 000 tonnes and 140 000 tonnes over the same period.

In the Republic of Korea milk production grew rapidly from the early 1970s to the early 2000s. However, milk production declined by around 26 per cent to 1.87 million tonnes between 2002 and 2011, largely as a result of a decline in dairy cow numbers (Figure 197) (FAO 2013). Milk yields remained relatively unchanged over this period following increases in yields during the 1990s. Average milk yield per cow in the Republic of Korea was around 10 000 kilograms in 2011, which is comparable to milk yields achieved in the United States.

In 2011 a foot-and-mouth disease outbreak resulted in the slaughter of 34 000 dairy cattle, equivalent to 8 per cent of the national herd. This led to milk production declining by 10 per cent in 2011.

Figure 197 Milk production, Republic of Korea



Source: FAO 2013

Livestock farming in the Republic of Korea has been changing from traditional family farms to large-scale commercial operations. The dairy sector has benefited from economies of scale and there has been a marked increase in the proportion of dairy cattle on larger farms (Kim et al. 2007). In 1996 the average herd size was 26 dairy cows and by 2010 this had risen to 67 cows per farm.

Over the past 10 years production of milk for fluid milk consumption has remained relatively stable at around 1.64 million tonnes. However, the proportion of milk produced and used in the fluid milk sector increased from 66 per cent in 2002 to a little less than 90 per cent in 2012. The dairy processing sector in the Republic of Korea is oriented toward providing products for the fresh and fermented (yoghurts) milk product markets.

Consumption

Compared with the developing countries of Asia, consumption of dairy products in Japan is relatively high. According to the Food and Agricultural Organization of the United Nations, per person consumption of milk (excluding butter) was 73.9 kilograms in 2009 (FAO 2013). By comparison, consumption of milk (excluding butter) in 2009 was 36.4 kilograms in Malaysia, 11.4 kilograms in Indonesia and 21.9 kilograms in the Republic of Korea. However, consumption of dairy products in Japan is low relative to that in developed economies such as the United States and Australia.

Changes in the pattern of Japanese diets from the 1960s to the 1980s reflected a shift to increased quantities of livestock products. These changes were a result of a number of factors including an increase in disposable incomes, exposure to western food products and opening of fast food restaurants.

Per person consumption of cheese grew strongly through to the early 2000s but has since remained relatively constant at around 2.6 kilograms (FAO 2013). The cheese market in Japan can be broadly divided into natural and processed cheeses. Natural cheeses include soft (camembert or mozzarella), semi-hard (gouda), hard (emmental and gruyere) and extra hard (parmesan) cheeses. Processed cheeses are made from natural cheeses and are sold as sliced and carton packaged cheese. Most Japanese imported cheese is natural; some is processed in Japan for use in pizzas and bakery products.

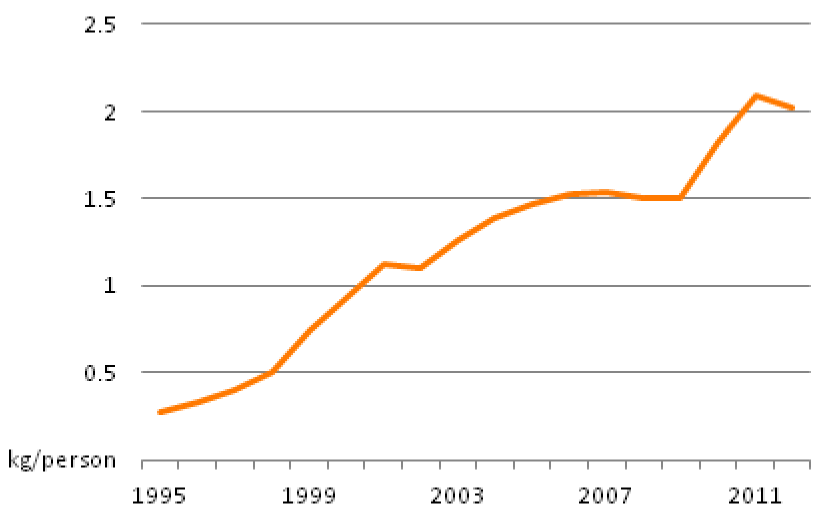
Despite fluid milk being a regular food staple in about 87 per cent of Japanese households, the ageing Japanese population has been a factor influencing milk consumption (Schluep Campo & Beghin 2005). Fluid milk consumption per person declined by around 20 per cent to 31.2 kilograms between 2000 and 2011 as a result of changing demographics of the Japanese population. Government provision of school milk means children's consumption is about double that of young adults.

Per person consumption of butter was relatively stable at around 0.7 kilograms over the two decades to 2010. However, in the two years to 2012 butter consumption declined to 0.6 kilograms, reflecting higher domestic butter prices (USDA–FAS 2012d).

Milk consumption in the Republic of Korea grew rapidly from the early 1970s to the late 1990s in response to rising disposable incomes and school milk programs. Between 2002 and 2012 milk consumption per person declined by around 12 per cent to 31.5 kilograms (USDA–FAS 2013). Consumer concerns about dairy product safety following the foot-and-mouth disease outbreak in 2011 led to a fall in consumption of fresh milk products in 2011 and 2012 (USDA–FAS 2012e).

Cheese consumption in the Republic of Korea has grown strongly over the past two decades; from 0.27 kilograms per person in 1995 to around 2 kilograms in 2012 (Figure 198). Processed cheese accounts for around two-thirds of the value of cheese sales and unprocessed cheese (soft cheese) accounts for one-third. Consumption of unprocessed cheese has grown strongly over the past few years, reflecting rapid growth in fast food and pizza restaurants. Unprocessed soft cheese, such as mozzarella, is the main cheese ingredient for pizzas. The market for dessert cheeses, such as camembert and feta, is also growing (USDA–FAS 2012e).

Figure 198 Cheese consumption, Republic of Korea



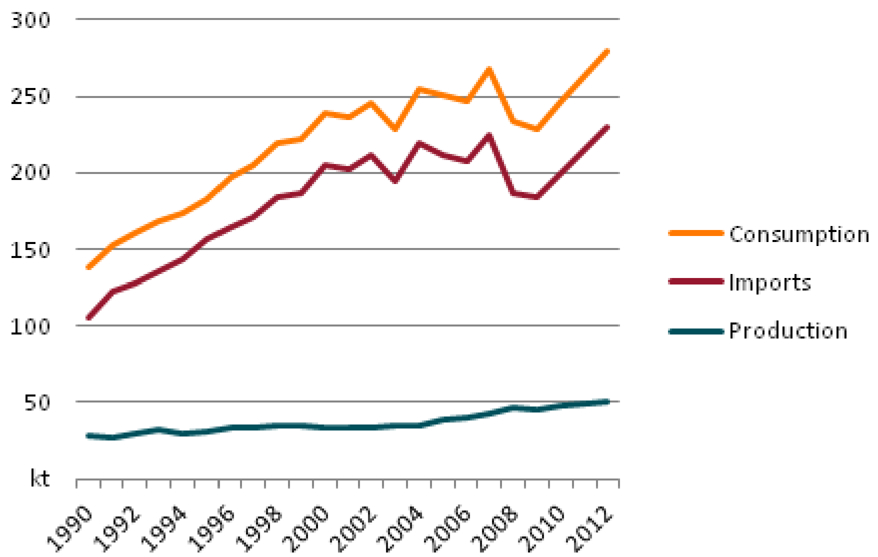
Source: USDA–FAS 2013

Trade

Since the early 2000s Japan has been a large and relatively stable importer of dairy products. In 2011 the value of dairy products Japan imported was US$1.44 billion (2012 dollars), of which cheese accounted for around 75 per cent. Japan also imports smaller quantities of skim milk powder and whey powder.

Japanese imports of cheese rose strongly during the 1990s reflecting substantial increases in aggregate demand. However, since 2000 growth in imports and total consumption has slowed. Japanese imports of cheese increased by 7 per cent in 2012 in response to strong demand for natural cheese, which is typically used in pizzas and bakery products (USDA–FAS 2012e) (Figure 199).

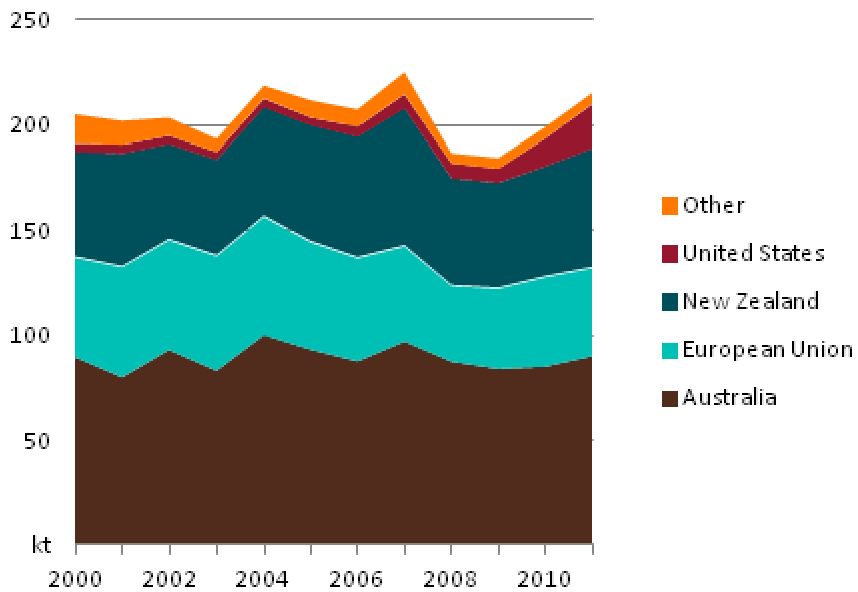
Figure 199 Cheese, supply and consumption, Japan



Source: USDA–FAS 2013

Australia, the European Union and New Zealand were Japan's largest sources of imported cheese in 2011, accounting for 56 per cent, 21 per cent and 14 per cent, respectively, of total cheese imports (Figure 200).

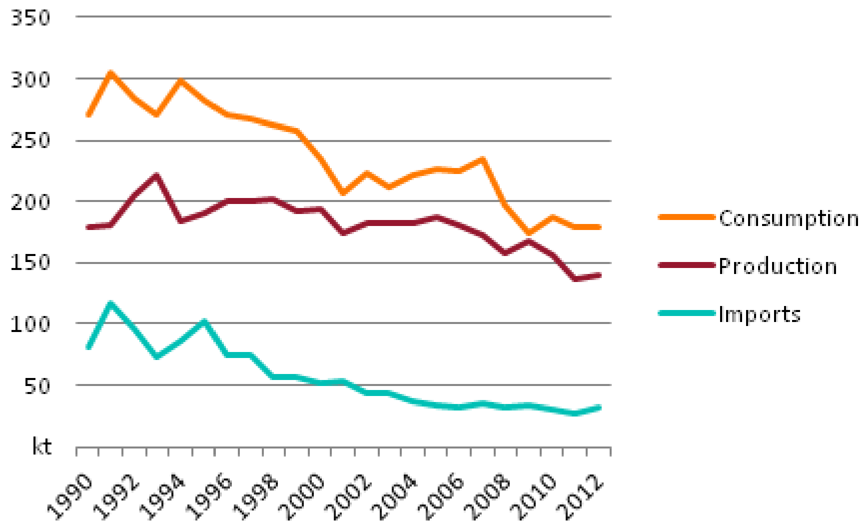
Figure 200 Cheese imports, Japan



Source: United Nations Statistics Division 2013

Japanese imports of skim milk powder have declined from around 100 000 tonnes in the early 1990s to 27 000 tonnes in 2011 (Figure 201). Most imports were used for stock feed. The static or declining demand from the livestock sector as well as the tight regulation of imports has contributed to the decline in skim milk powder imports.

Figure 201 Skim milk powder, supply and consumption, Japan

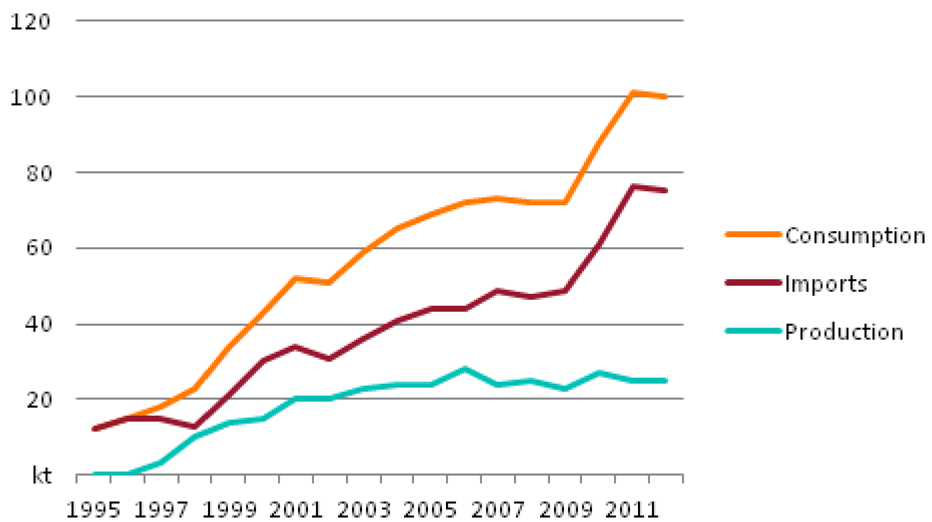


Source: USDA–FAS 2013

The Republic of Korea has recently emerged as a relatively large importer of dairy products. The value of dairy products the Republic of Korea imported increased nearly fourfold to US$746 million (2012 dollars) from 2000 to 2011. Cheese and whey were the principal imports over this period.

Imports of cheese, which is the Republic of Korea's predominant dairy product import, increased from 12 000 tonnes in 1995 to 75 000 tonnes in 2011 (Figure 202). This reflected strong growth in consumer demand for cheese and little or no increase in domestic cheese production since the mid 2000s.

Figure 202 Cheese, production and consumption, Republic of Korea



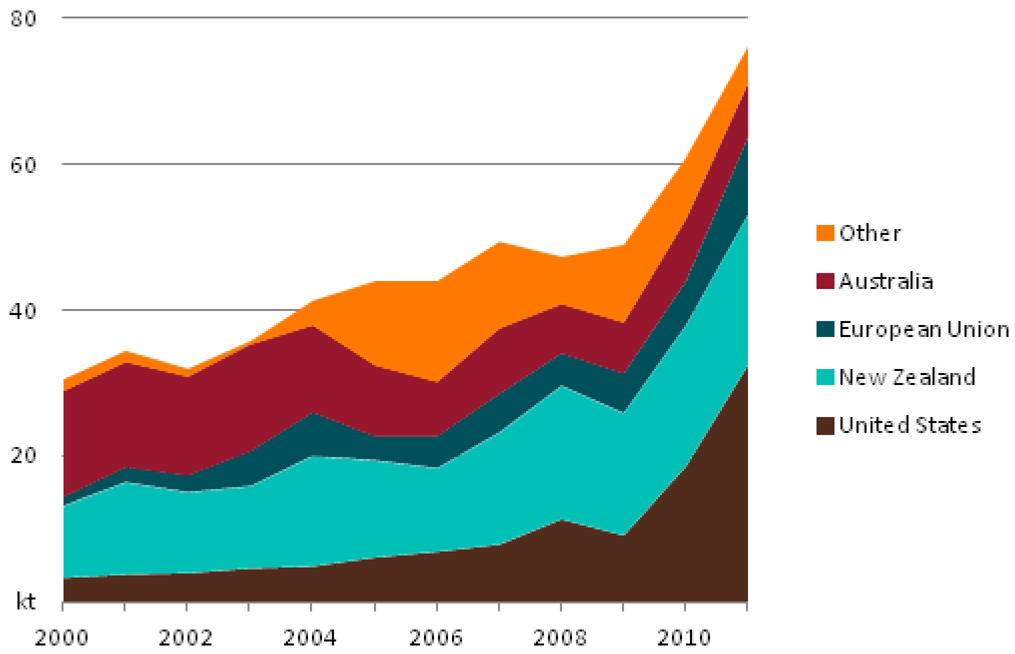
Source: USDA–FAS 2013

Skim milk powder imports by the Republic of Korea increased from 7900 tonnes in 2010 to 33 500 tonnes in 2011 as a result of lower domestic production. The Republic of Korea imports nearly all its skim milk powder requirements. Skim milk powder is used primarily in bakery products and as an ingredient in other dairy products.

The Republic of Korea imported 59 000 tonnes of whey powder in 2011. This was slightly lower than the average between 2006 and 2010 of 62 400 tonnes. Around two-thirds of imported whey powder is used for animal feed, with the remaining imported powder used in bakery and confectionary products.

The United States and New Zealand were the Republic of Korea's largest sources of imported cheese in 2011, accounting for 43 per cent and 27 per cent, respectively, of total cheese imports (Figure 203). The United States emerged as a significant source for cheese imports in 2010, following a decade of only gradual import growth from that country. Imports of cheese from Australia have declined by around 50 per cent since 2000 and were 7400 tonnes in 2011. This decline reflects lower cheese production in Australia and increased competition from other exporters, such as the United States.

Figure 203 Cheese imports, Republic of Korea



Source: United Nations Statistics Division 2013

Policies

Japanese dairy imports are regulated by the government through tariffs and tariff quotas. Japan imposes bound tariffs on imports of cheese on an ad valorem basis, ranging from 22.4 per cent for fresh cheese to 40 per cent on processed cheese. Tariffs are also applied to frozen yoghurt, ice cream and whipped cream in pressurised containers. No tariff is applied to casein imports.

The tariff quotas Japan applies for dairy products include some for specific purposes, such as skim milk powder for school lunches (7264 tonnes), individual products such as butter and butter oil (1873 tonnes) and mineral concentrated whey (14 000 tonnes) (Table 16). Other tariff quotas include products for particular uses (such as skim milk powder for other purposes, 85 878 tonnes) and some that cover a range of designated dairy products for general use

(133 940 tonnes). The largest quota allocation, amounting to 137 202 tonnes, is reserved for a state trading enterprise, the Agriculture & Livestock Industries Corporation (Roberts et al. 2006).

Table 16 Tariff quota quantities for dairy products, Japan

Product	Quantity (tonnes)
Skim milk powder for school lunches	7 264
Skim milk powder for other purposes	85 878
Evaporated milk	1 585
Whey and modified whey for feeding	45 000
Prepared whey for infant formula	25 000
Butter and butter oil	1 873
Mineral concentrated whey	14 000
Prepared edible fat	18 977
Other dairy products for general use	133 940
Designated dairy products for general use	137 202

Source: WTO 2013a

The Republic of Korea operates tariff quotas on milk powders, butter, condensed milk and whey powder. The tariff quota volumes for most dairy products are small, ranging from 130 tonnes for butter and condensed milk to 1034 tonnes for skim milk powder. The quota for whey powder is set at 54 233 tonnes. The in-quota tariff for skim milk powder and whey powder is set at 20 per cent while the in-quota tariff for butter, whole milk powder and condensed milk is set at 40 per cent. The out-of-quota tariffs are set significantly higher: milk powders are set at 176 per cent, butter and condensed milk at 89 per cent and whey at 49.5 per cent.

No tariff quota applies to cheese; rather, the bound and applied tariff rates for cheese are equal at 36 per cent.

Under the US–Korea Free Trade Agreement, which commenced on 15 March 2012, a tariff quota was established for cheese imported from the United States. The quota for US cheese will increase from 7000 tonnes in 2012 to 10 280 tonnes in 2025, with the out-of-quota tariff being progressively reduced from 36 per cent in 2011 to zero in 2026. Imports within the quota enter duty free. Cheddar cheese will not be subject to a tariff quota from 2021. From 2026 the Republic of Korea will not impose a tariff or tariff quota restrictions on cheese imported from the United States (USTR 2013).

ASEAN

ASEAN is a significant importer of dairy products, particularly milk powders and, to a lesser extent, fresh milk products, butter, cheese and whey. The ASEAN member states imported around 840 000 tonnes of milk powders in 2011; the key importing countries were Indonesia, Singapore, the Philippines, Malaysia and Thailand.

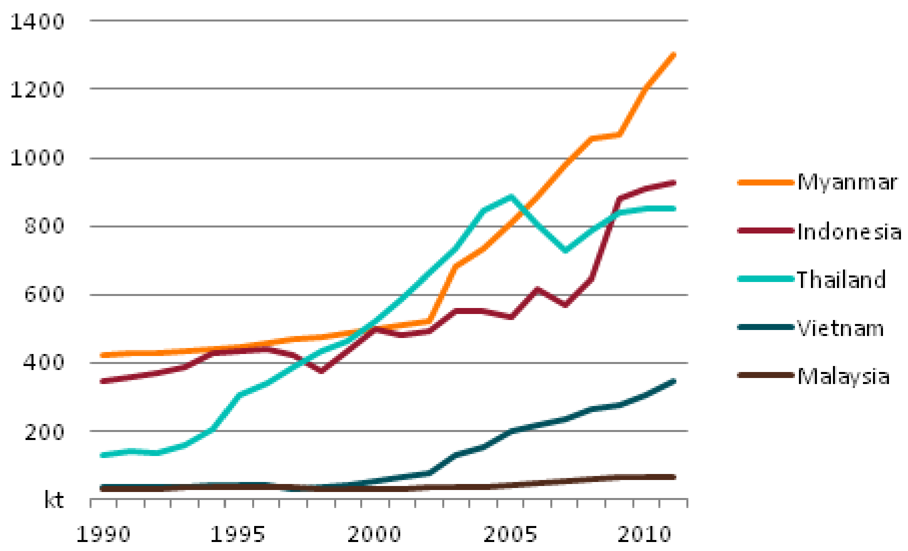
Production

The dairy industries in ASEAN member states are largely undeveloped and are typically characterised by small-scale farms, low productivity, rudimentary cattle feeding systems and inadequate herd improvement schemes (Dong 2005). In most ASEAN member states, except Indonesia and Vietnam, milk yield per cow has increased only slightly or remained relatively unchanged for a decade.

Milk production in Myanmar and Thailand increased over the past two decades largely as a result of expanding the dairy cow herd. However, milk production in Indonesia and Vietnam increased as a result of an increase in both dairy cow numbers and milk yields. Despite these increases in production, milk output in most ASEAN member states remains low (Figure 204). Milk production in Myanmar more than doubled to reach 1.3 million tonnes between 2000 and 2011, while Indonesian milk production increased by 85 per cent to 926 000 tonnes and Vietnamese production increased sixfold to 345 000 tonnes over the same period.

Milk production in other ASEAN member states is very small (the Philippines, Malaysia, Cambodia and Brunei Darussalam) or non-existent (Singapore).

Figure 204 Milk production, selected ASEAN member states



Source: FAO 2013

Consumption

Dairy consumption in ASEAN member states remains relatively low compared with major OECD countries and is constrained by limited domestic supply, lower incomes and dietary habits. Lactose intolerance in many Asian communities has also limited consumption growth of dairy products. Government support, through school milk programs and public awareness campaigns, has helped promote consumption of dairy products in the region in recent years. Imported skim milk powder is usually recombined with butterfat or palm oil for domestic consumption.

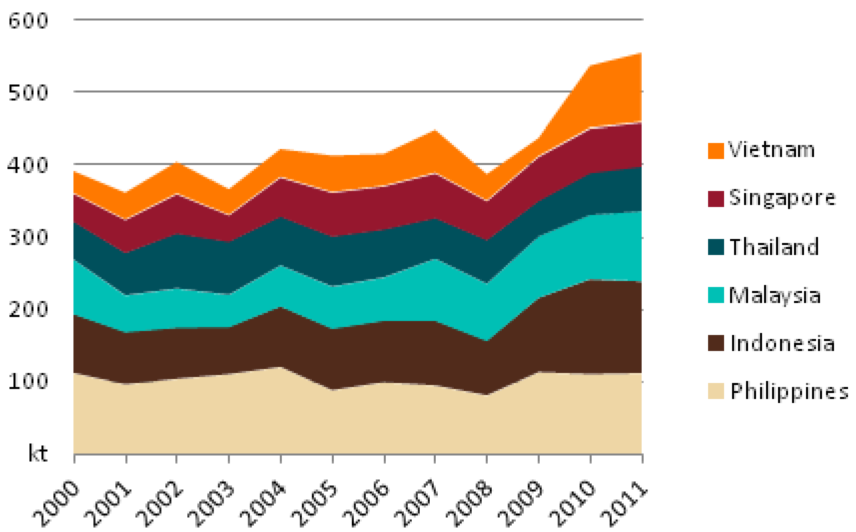
Consumption of dairy products tends to be higher in ASEAN member states where urbanisation and associated transport and refrigeration systems are more advanced. One such country is Malaysia, where consumption of milk powders in 2009 was estimated to be around 5.9 kilograms per person, compared with 1.1 kilograms in Indonesia and 1 kilogram per person in the Philippines. Consumption of fluid milk in Thailand was estimated to be 13.1 kilograms per person in 2009, reflecting its relatively large domestic milk output compared with other ASEAN member states. Fluid milk consumption averaged between 1 and 2 kilograms per person in other ASEAN member states. Consumption of butter and cheese in ASEAN member states is generally low, at around 0.1 to 0.3 kilograms per person (FAPRI 2013).

The Indonesian Government has promoted milk consumption through school milk programs and subsidised distribution of sweetened condensed milk. Three types of consumer products that now dominate the market are powdered milk (39 per cent market share), sweetened condensed milk (35 per cent market share) and ready-to-drink UHT milk (26 per cent market share). Consumer preference for fresh and natural products has led to an increase in consumption of ready-to-drink milk, which grew 17 per cent annually in the six years to 2011 (USDA–FAS 2012f).

Trade

ASEAN is a significant global importer of milk powders. ASEAN imports of skim milk powder increased by 40 per cent to 550 000 tonnes between 2000 and 2011; the Philippines and Indonesia each accounted for just over 20 per cent of total imports in 2011 (Figure 205). Imports of skim milk powder by Malaysia and Vietnam each accounted for 17 per cent of the total in 2011.

Figure 205 Imports of skim milk powder, ASEAN

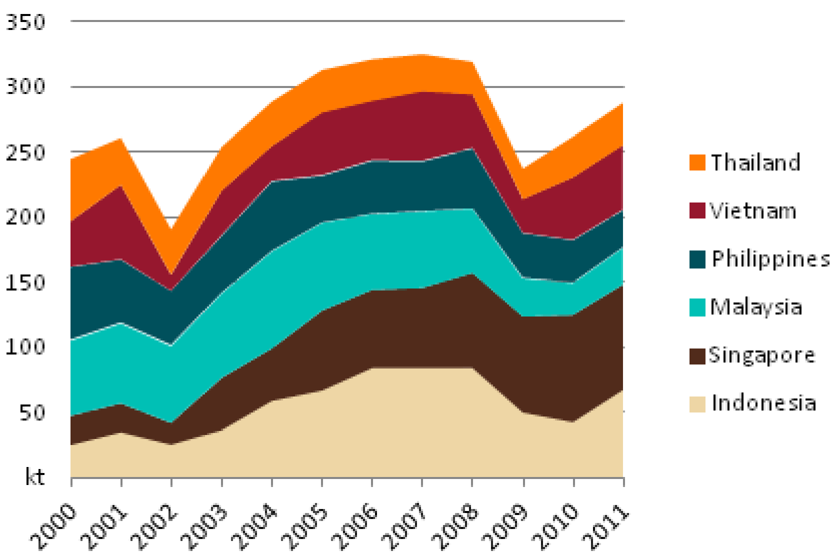


Note: Includes estimate of imports by Vietnam in 2011.
Source: United Nations Statistics Division 2013

ASEAN imports of whole milk powder increased by around one-third to 326 000 tonnes between 2000 and 2008 (Figure 206). Imports of whole milk powder fell sharply in Indonesia, Malaysia, Thailand and Vietnam in 2009 mainly as a result of slower economic growth in these economies; despite some recovery in trade in the following two years, overall imports of whole milk powder in 2011remained below the 2008 volume.

During the 2000s Singaporean imports of whole milk powder increased nearly fourfold to just over 80 000 tonnes in 2011. Singapore is a significant processing, blending and repackaging hub of milk powders for the rest of Asia. In 2011 Singapore exported 51 000 tonnes of whole milk powder, some of which was directed to other ASEAN member states.

Figure 206 Imports of whole milk powder, ASEAN



Note: Includes estimate of imports by Vietnam in 2011.
Source: United Nations Statistics Division 2013

Imports of other dairy products, such as butter and cheese, are growing but remain relatively small for most ASEAN member states. Singapore and the Philippines imported 24 000 tonnes and 22 000 tonnes of butter, respectively, in 2011; Indonesia, Malaysia and Thailand imported smaller quantities. Indonesia and the Philippines imported around 17 000 tonnes of cheese in 2011; Malaysia and Singapore imported around 11 000 tonnes.

Some ASEAN member states have increased their import levels of fluid milk products. For example, the Philippines and Singapore imported 51 000 tonnes and 63 000 tonnes, respectively, in 2011.

New Zealand, Australia, the United States and the European Union are the major sources of dairy product imports to ASEAN member states.

Increasing incomes, population growth and urbanisation are expected to drive higher consumption of animal products, including dairy foods, in ASEAN member states over the next few years. Because domestic supplies are unlikely to match expected increases in consumption, ASEAN member states are likely to continue to expand imports of dairy products.

Policies

ASEAN member states apply tariffs on imports of most dairy products on an ad valorem basis. The bound tariff rates for most ASEAN member states are high relative to the applied tariffs. The applied tariffs for dairy products are generally low. In Malaysia and Singapore the applied tariffs on milk powders, butter and cheese are zero per cent. In the Philippines the applied tariff on milk powders is 1 per cent, and on butter and cheese the applied tariffs vary between 1 per cent and 7 per cent. In Indonesia the applied tariff on milk powders is 5 per cent. In Vietnam the applied tariff on milk powders varies between 3 per cent and 5 per cent; and on cheese it is 10 per cent. In Thailand the applied tariff on whole milk powders ranges between 5 per cent and 18 per cent, the applied tariff on skim milk powder is 5 per cent and the applied tariffs on condensed milk and cheese are 30 per cent (WTO 2013b).

The ASEAN Free Trade Area allows for preferential trade between member states. For most countries the import tariff on dairy products is zero per cent. For Cambodia and Vietnam the tariff on dairy products is 5 per cent. For Laos the tariff on milk powders and fluid milk is 5 per cent, and the tariffs on butter and cheese are zero.

The Thailand–Australia Free Trade Agreement, which commenced on 1 January 2005, allows for a progressive reduction in tariffs to 2020. Thailand immediately eliminated the previous tariffs on infant formula (5 per cent), lactose (up to 20 per cent) and casein and milk albumin (10 per cent) and phased the tariffs on butter fat, yoghurt, dairy spreads and ice cream to zero by 2010. The agreement allows for phased reduction of the tariffs on butter and cheese, other milk powders and concentrates to zero by 2020.

The ASEAN–Australia–New Zealand Free Trade Agreement, which commenced on 1 January 2010, allows for preferential access for Australian and New Zealand dairy products. The agreement came into force for Thailand on 12 March 2010, for Laos and Cambodia in early January 2011 and for Indonesia on 10 January 2012. Under the agreement, tariffs on most dairy products are progressively lowered to zero from base rates through to 2020. In the case of Thailand, tariffs on many dairy products remain unchanged through the implementation period and are lowered to zero only in 2020.

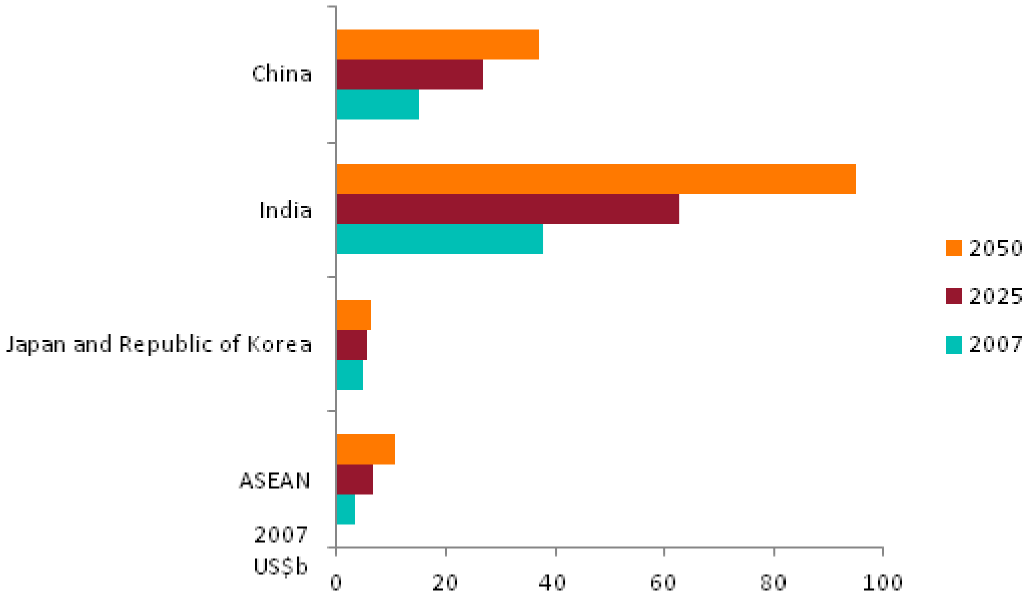
Long-term prospects

Consumption

The real value of China's dairy consumption in 2050 is projected to be US$37 billion (2007 dollars), US$22 billion higher than in 2007. At that time, China will still be the second largest consumer of dairy products in Asia. Most of this growth (US$12 billion) is projected to occur between 2007 and 2025 because of the higher projected population and income growth for this period than for between 2025 and 2050. The continued shift in dietary patterns toward animal products, combined with improvements in storage and distribution of perishable products, is likely to underpin growth in consumption.

India will remain the largest consumer of dairy products in Asia by 2050, with the real value of consumption projected to be US$95 billion, US$57 billion higher than in 2007 (Figure 207). Higher annual growth is projected for between 2007 and 2025 because of the higher projected annual population (United Nations Population Division 2011) and income growth rates during this period than for between 2025 and 2050. The expected growth of the Indian middle class is also likely to drive demand for dairy products, particularly fresh milk products, such as yoghurts, and cheeses over the projection period. While most of India's milk production is currently consumed on farm, economic development is expected to improve production (food safety and quality) and distribution systems and thereby enhance consumption in urban centres.

Figure 207 Real value of Asia's dairy consumption



Source: ABARES model output

Dairy consumption growth for Japan and the Republic of Korea is projected to be relatively modest, increasing to US$6 billion in 2050, 30 per cent higher than in 2007. The growth is expected to be driven by a projected increase in consumption in the Republic of Korea, stemming from changing consumer preferences and mild income growth. This will offset the negative effect on consumption of declining populations in both countries. Per person consumption of dairy is projected to remain relatively high for Japan in 2050 at 100 kilograms, while in the Republic of Korea it is projected to increase to 61 kilograms.

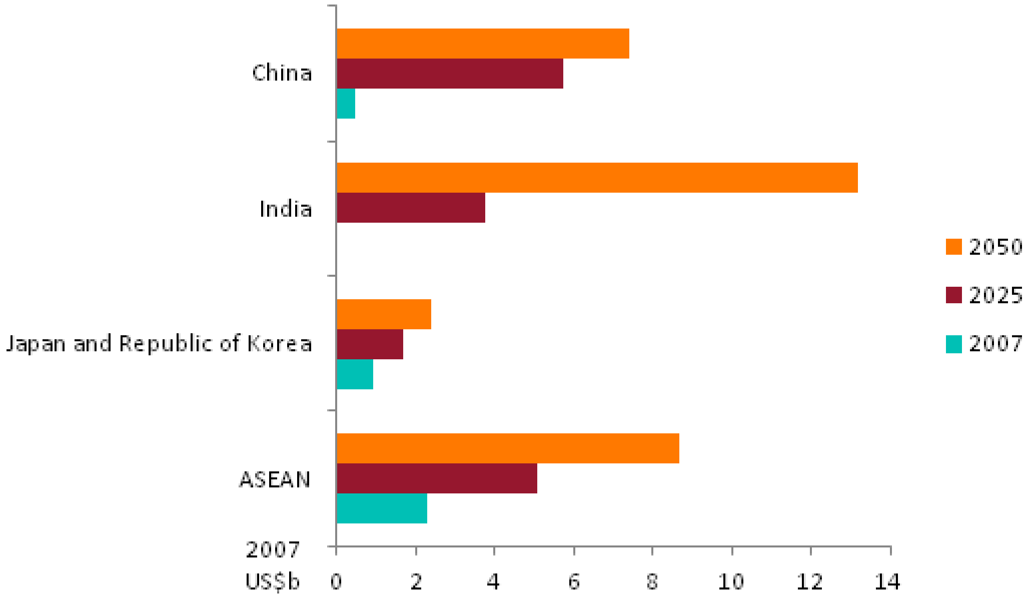
For the ASEAN member states, the real value of dairy consumption is projected to be US$11 billion, more than double that of 2007. Indonesia is projected to account for the highest proportion of consumption at around US$3 billion. Manufactured dairy products, such as yoghurts and cheeses, are likely to become more significant in the diets of ASEAN consumers as per person incomes increase. However, per person dairy consumption levels among the ASEAN member states are projected to remain relatively low compared with India and China. For example, per person, in 2050, Thailand, Vietnam and Indonesia are projected consume 45 kilograms, 34 kilograms and 30 kilograms of dairy products, respectively.

Trade

The real net value of China's dairy imports in 2050 is projected to be around US$7 billion (in 2007 dollars). Most of this import growth (US$5 billion) is also projected to occur between 2007 and 2025 because of consumption growth stemming from high income and mild population growth over this period. Imports are projected to account for 20 per cent of China's total dairy consumption in 2050, compared with only 3 per cent in 2007. This reflects the emerging role dairy imports will have in meeting China's consumption out to 2050.

In 2050 India is projected to remain a net importer of dairy products, with the real net value of imports projected at around US$13 billion (Figure 208). The growth in dairy imports corresponds to the high consumption growth relative to production out to 2050. For example, between 2007 and 2050 dairy consumption is projected to increase by 2.2 per cent a year, compared with dairy production at 1.8 per cent a year. Although dairy consumption in India will still largely be met by domestic production, imports will have an increasing role in meeting expanding dairy consumption out to 2050.

Figure 208 Real net value of Asia's dairy imports



Source: ABARES model output

Dairy imports for Japan and the Republic of Korea are projected to be a little more than US$2 billion by 2050, US$1 billion higher than in 2007. The projected consumption growth, particularly from the Republic of Korea, and stable production are responsible for this increase.

The real value of dairy imports from the ASEAN member states in 2050 is projected to be US$9 billion, US$6 billion higher than in 2007. There are likely to be opportunities to increase trade in milk powders and fresh milk products with the developing ASEAN member states. With further economic growth in the ASEAN member states, there is also the potential for cheese and other manufactured dairy product consumption, and consequently imports, to rise.

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15 Fisheries

Mary Stephan, Kasia Mazur and Robert Curtotti

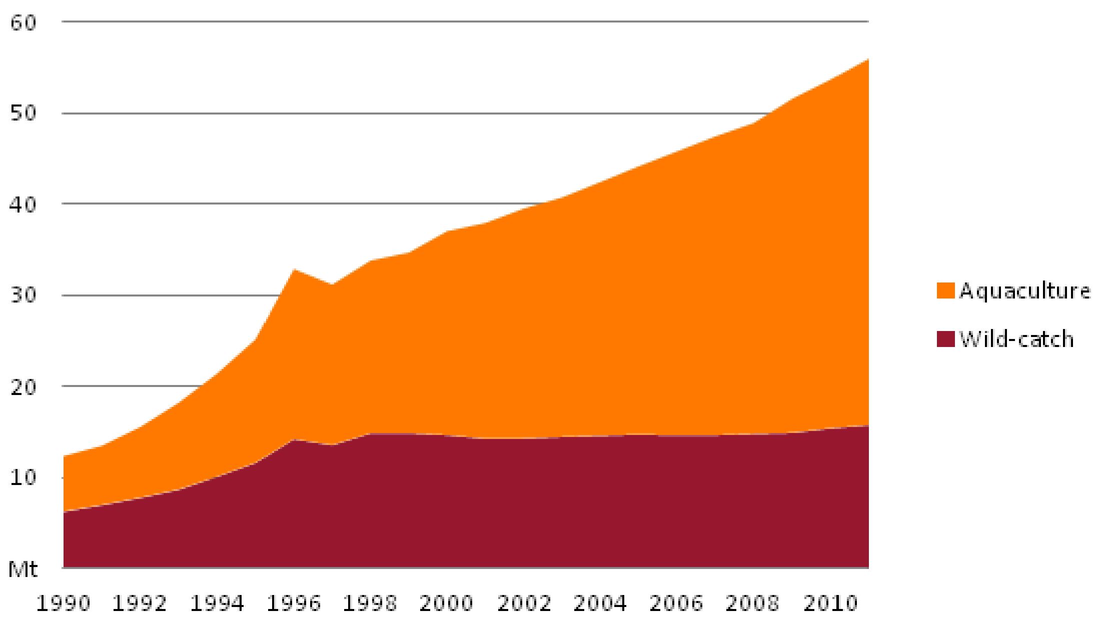
The Asian region is the largest producer of fisheries products by volume, at around 63 per cent of the global total. The region is also the largest producing area of aquaculture-based fisheries products (FAO 2012a). Together with rising incomes and a growing population, this makes the region the world's largest and fastest growing for consumption and trade of fisheries products. By 2009 the region accounted for 32 per cent of global imports and 42 per cent of global exports of fishery products (FAO 2012a).

China

Production

China is the world's largest producer of fisheries products. Its share of global production has grown from 13 per cent in 1990 (12.7 million tonnes) to 36 per cent in 2011 (56 million tonnes) (Figure 209) (National Bureau of Statistics of China 2012). Since 1998 China's wild-catch has remained relatively constant at around 15 million tonnes. By contrast, China's aquaculture production increased by an average of 6 per cent per year during this period, from 19 million tonnes in 1998 to 36.7 million tonnes in 2010 (FAO 2012a). The top five aquaculture species produced in 2010 were grass carp (4.2 million tonnes), oysters (3.6 million tonnes), silver carp (3.6 million tonnes), clams (3.5 million tonnes) and bighead carp (2.6 million tonnes). Together, these species accounted for 48 per cent of total aquaculture production in 2010. Through a well-developed fisheries processing sector, China is increasingly becoming a global hub for value adding to production. Fishing provides employment for 20.8 million people, of whom 7.5 million are traditional small-scale fishers and 14 million are employed directly in the fishing industry (China Agriculture Press 2011).

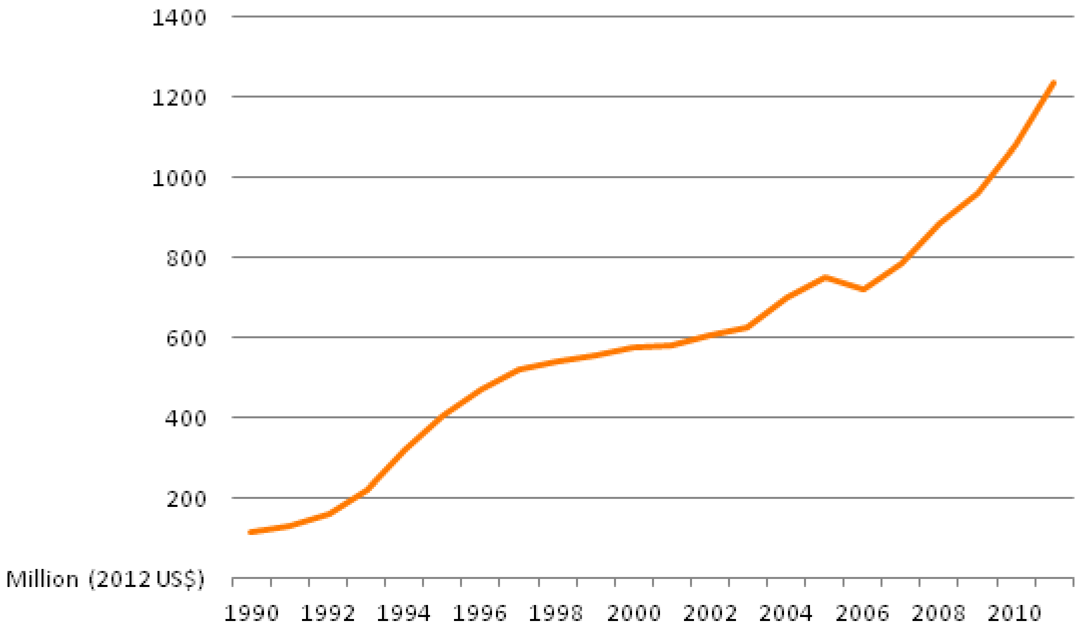
Figure 209 Production of wild-catch and aquaculture species, China



Source: *National Bureau of Statistics of China 2012*

In line with increasing production volume, the real value of China's total fisheries production grew by an average of 13 per cent per year between 1990 and 2011, from US$114 million in 1990 to US$1.2 billion in 2011 (2012 US dollars) (Figure 210) (National Bureau of Statistics of China 2012).

Figure 210 Real value of production of wild-catch and aquaculture species, China

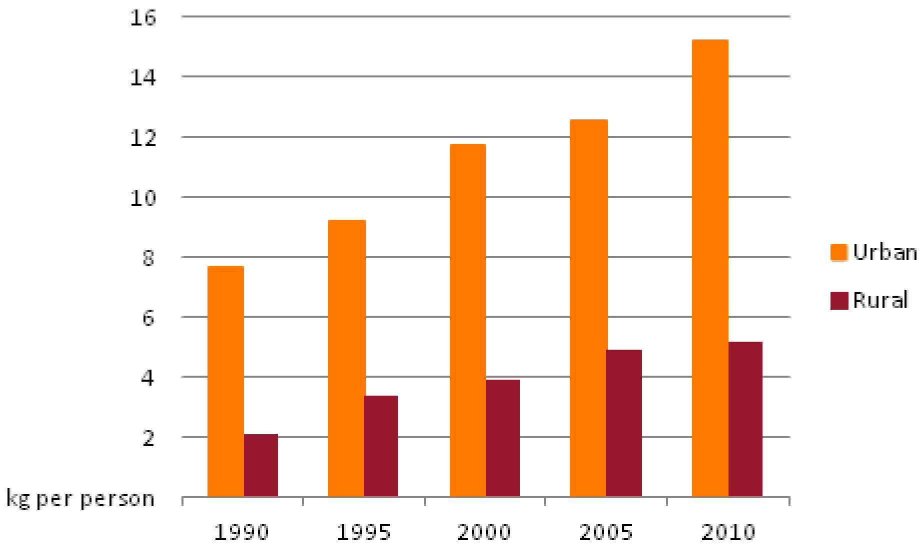


Source: *National Bureau of Statistics of China* 2012

Consumption

China's rapid economic development and rising per person income has contributed to an increase in its share of global fisheries product consumption, from 17 per cent in 1990 to 34 per cent in 2009 (FAO 2012a). Throughout this period China was the largest consumer of fisheries products, reflecting its population and contribution to global fisheries production. China's National Urban Survey (66 000 households) and Rural Household Survey (74 000 households), both conducted in 2011, found that between 1990 and 2010 per person fisheries products consumption grew by an annual average of 4.5 per cent for rural households and 3.5 per cent for urban households. However, per person consumption was higher in urban households, at around 15.2 kilograms per year in 2010 compared with 5.2 kilograms in rural households (National Bureau of Statistics of China 2012) (Figure 211).

Figure 211 Annual per person consumption of fisheries products, China



Source: National Bureau of Statistics of China 2012

Most of the consumption of fisheries products occurs in coastal areas in eastern China, particularly south-eastern China. For example, surveys show that per person consumption of fisheries products by rural households averaged 10.3 kilograms per year in eastern China in 2011. Rural households in Shanghai province had the highest level of per person consumption at 18.5 kilograms per year, followed by the provinces of Hainan (16.8 kilograms), Fujian (16.8 kilograms), Zhejiang (16 kilograms) and Jiangsu (10.6 kilograms) (National Bureau of Statistics of China 2012).

At a national level, household expenditure on fisheries products as a share of total expenditure on food was 6 per cent in 2011. However, this share was much higher in south-eastern coastal provinces, reaching 16 per cent in Fujian. The share of the household food budget spent on fisheries products was also high in the coastal provinces of Hainan (14 per cent), Zhejiang (11 per cent), Shanghai (10 per cent), Guangdong (9 per cent), Jiangsu (8 per cent) and Tianjin (7 per cent) (National Bureau of Statistics of China 2012).

Trade

China is the world's largest exporter of fisheries products by value, contributing 12.6 per cent of the world value of such products in 2010. In 2011 the value of China's exports of fisheries products was US$17.4 billion (2012 US dollars) (FAO 2012b).

In 2012 China's main export markets for fisheries products in volume terms were the United States and Japan. That year China exported 27 per cent (462 821 tonnes) of its total fisheries product exports to the United States. Tilapia products accounted for the largest volume (137 427 tonnes), nearly half of China's total tilapia exports. Japan was the second largest export destination for China's fisheries products, at 356 857 tonnes or 21 per cent of its total fisheries product exports. Crustaceans and molluscs accounted for the greatest volume of exports to Japan (158 084 tonnes), 39 per cent of China's total crustaceans and molluscs exports (USDA–FAS 2012a).

The United States (US$1.9 billion) and Japan (US$1.3 billion) are also the largest export destinations for China's fisheries products by value. Exports to Japan were higher in value (despite being lower in volume) than those to the United States because of the mix of higher valued species. Crustaceans and molluscs sent to Japan were valued at around US$6000 a tonne in 2012, while tilapia sent to the United States was worth US$3000 a tonne (USDA–FAS 2012a).

China's imports of fisheries products increased rapidly from 165 000 tonnes in 1990 to 2.8 million tonnes in 2009. By 2011 China was the third largest importer of fisheries products by value (FAO 2012a, b), importing around $5.7 billion of fisheries products (USDA–FAS 2012a). Most imports are marine fish, which in 2009 totalled 1.1 million tonnes or 40 per cent of China's total imports.

The increase in fisheries product imports since 2001 is mostly due to lower import duties following China's accession to the World Trade Organization (WTO) in 2001 and an increase in the outsourcing of fisheries product processing to China by major global seafood producers (FAO 2012b). Chinese processors are increasing their imports of fisheries products from all major producing regions (including South America, the United States and Europe) for processing, packaging and re-export. Countries with high levels of re-exports of fisheries products typically have a comparative advantage in the processing of fisheries products; that is, they re-export most of the imported fish products once local processing plants have value added (FAO 2012b). Increases in imports have also been driven, in part, by increased domestic demand for species not available locally.

In 2012 the top two import sources of fisheries products into China by volume were the Russian Federation (907 532 tonnes) and the United States (597 991 tonnes) (USDA–FAS 2012a). These imports mainly comprised frozen fish. In 2012 China imported 1.6 million tonnes of frozen fish, 45 per cent (747 574 tonnes) from the Russian Federation and almost 20 per cent (301 970 tonnes) from the United States. Herring is another major species group imported from the Russian Federation. In 2012 China imported 111 128 tonnes of herring from the Russian Federation, 85 per cent of total imported herring. Peru and Canada are also important sources of Chinese imports, particularly molluscs and crustaceans.

Policies

Domestic policies

Chinese domestic fishing policies aimed at the wild capture sector are designed to ensure sustainable fishing. China's zero growth policy for wild-catch places an upper limit on annual catch. In 2012 China continued to implement a two to three month summer fishing moratorium for many of its marine-based fisheries. Since 2004 the government has enforced an annual three-month ban on spring fishing in the Yangtze River. In 2011 China's Ministry of Agriculture instituted a two-month annual fishing ban in the Pearl River region (USDA–FAS 2012a). In an attempt to protect and restore ecological balance and increase wild stock, state and provincial fishery departments regularly release fingerlings in national waters (USDA–FAS 2012a).

In the 1990s China removed a disincentive to long-term investments in aquaculture ponds by renewing long-term land leases of 30 to 50 years. Combined with rising demand, this has fuelled expansion in the aquaculture sector (WorldFish 2008). China's Ministry of Agriculture now issues nationwide aquaculture licenses to thousands of small-scale aquaculture facilities. By the end of 2011, 79 per cent of aquaculture facilities had obtained production licenses (USDA–FAS 2012a).

Trade policies

Fisheries products imported into China are subject to tariffs under its accession agreement with the WTO. The highest tariff (around 17 per cent) is applied to live ornamental fish. Fresh or chilled fish, frozen fish and fish fillets of various fish species are subject to a tariff of 10 per cent to 12 per cent. A tariff of between 10 per cent and 16 per cent is imposed on fisheries products that are dried, salted or in brine. The applied tariffs for fisheries products are equal to the respective WTO bound tariffs. Fisheries products imported into China are also subject to a value added tax of 13 per cent on unprocessed and 17 per cent on processed and packaged fisheries products (WTO 2013).

The high costs of importing, including the import duty plus the value added tax (which amounts to approximately 25 per cent), are making fish product imports for domestic consumption expensive. Fish products imported for processing and re-export are not subject to tariffs or the value added tax. This concession, together with low labour costs, has contributed to China's rise as a world processing centre for mackerel, salmon, cod and herring (USDA–FAS 2012a).

The Chinese Government also requires an import license for live seafood. Full import licenses are available only to large state-owned and domestic private companies. These companies must meet criteria to obtain a live seafood import license. The licenses allow companies to sell fisheries products directly to the public, act as agents for smaller Chinese or foreign distributors of fisheries products who do not possess a license and import fisheries products for further processing. Import licenses are renewable and valid for 6 months from the date of issue. While applications are free, an annual fee is charged to approved companies (New Zealand Trade & Enterprise 2010).

India

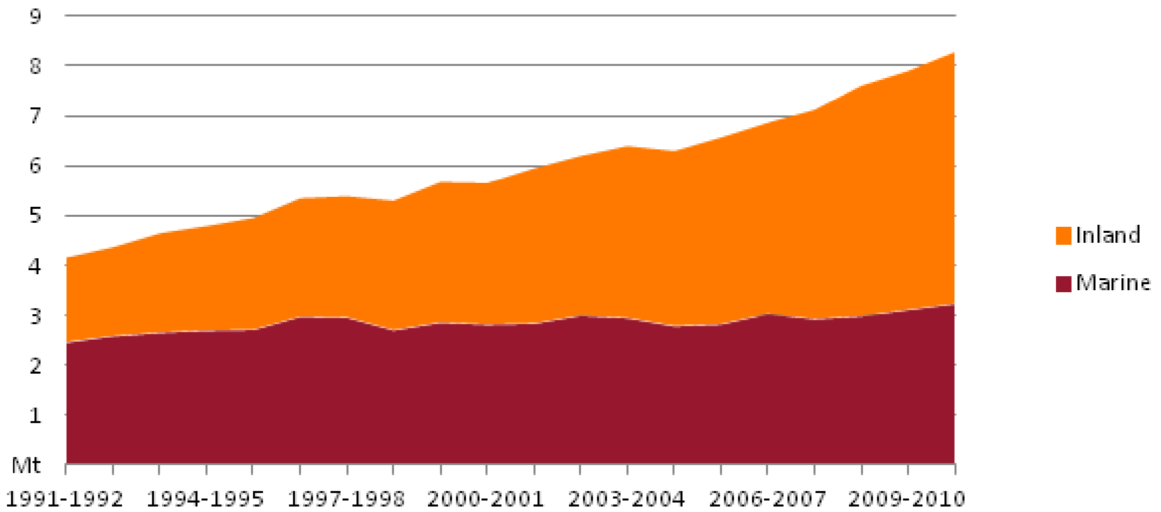
Production

India is a large global producer of fisheries products, producing around 8 million tonnes per year and accounting for around 5 per cent of global production (FAO 2012a). India's total fisheries production is split between marine and freshwater wild-catch production (4 million tonnes in 2009) and aquaculture production (3.8 million tonnes in 2009). These sectors comprise 4 per cent and 7 per cent of total global wild-catch and aquaculture production, respectively.

India has more than 3000 fishing villages along some 8000 kilometres of coastline, landing fish at over 1300 landing centres (Government of India 2012a). Fishing also occurs in India's extensive rivers and canals (over 195 000 kilometres) and in many aquaculture enterprises across 7.4 million hectares of inland waterways. These include reservoir lakes, tanks and ponds, flood plain lakes and brackish water. The fisheries sector contributes significantly to India's economy, employing approximately 14.5 million people. Around three-quarters of this labour force is engaged in the inland fisheries sector and the remainder in marine fisheries (Government of India 2012b).

The production of fisheries products has grown rapidly in the past two decades, at an average of 3.7 per cent per year. However, the pattern of growth between marine and inland-based species production has differed. Marine production grew by an average of 1.5 per cent per year between 1991–92 and 2011–12, while the quantity of fisheries products derived from inland water areas grew by an average of 5.9 per cent per year (Figure 212). In 2010–11 (April to March) India produced an estimated 3.2 million tonnes of marine-based fisheries products and 5.1 million tonnes of inland-based fisheries products (Government of India 2012a).

Figure 212 Fisheries production of inland and marine species, India



Source: Government of India 2012a

Production of fisheries products is reported for 35 regions in India, but 50 per cent of production occurs in just four regions and 87 per cent in 10 regions. The four most important areas for fisheries production in 2010–11 were West Bengal (1.6 million tonnes; 19 per cent of total fisheries production), Andhra Pradesh (1.3 million tonnes; 16 per cent), Gujarat (0.8 million tonnes; 9 per cent) and Kerala (0.7 million tonnes; 8 per cent). These coastal regions are in either the Bay of Bengal (West Bengal and Andhra Pradesh) or the west coast (Gujarat and Kerala). The remaining regions each produce less than 7 per cent of total production and those ranked between 11th to 35th produce very small amounts.

India's twelfth five-year plan (2012 to 2017) predicts that the stagnant growth in marine fisheries is set to continue, leaving inland fisheries as the sector's main growth area (Government of India 2012b). Most growth in inland fisheries is expected to be in prawn cultivation for the export market and freshwater fish cultivation to meet growing domestic demand (Government of India 2012b).

In the marine sector, a key longer term issue to address is impediments to private sector investment in marketing and distribution channels (Government of India 2012b). Such investment is required to reduce excessive post-harvest losses in the marine sector, ranging as high as 25 per cent. Investment is required in grading and standardisation, quality certification, warehouses, cold storage and other post-harvest management of produce. Incentives for private sector investment are lacking, owing to controls on sales and purchases of produce, its movement, storage and processing. Other needs for the marine sector include upgrading of the ageing fleet and port infrastructure, upgrading skills and capacities of fishers and improving distribution channels for landed fish to avoid excessive post-harvest loss. The monitoring, control and surveillance program, to be established under the five-year plan, is expected to better regulate activities in coastal areas and help achieve more sustainable marine fisheries.

The inland aquaculture sector is currently failing to take full advantage of the potential of inland freshwater fisheries (Government of India 2012b). Development of the sector has stalled in terms of new species introduced and yield gains from the mix of species currently farmed. The twelfth five-year plan attributes this to the reduced emphasis on sustainable development of the sector in previous plans. In past years excessive production pressure has been placed on resources, resulting in habitat degradation and conflicts with other uses of the waterways. The five-year plan states that yield rates, which currently average 1000 kilograms per hectare, are below the identified potential of up to 4000 kilograms per hectare (Government of India 2012b). However, the plan also notes that any efforts to increase yields must ensure that critical inputs used to achieve this aim are consistent with the principles of the FAO Code of Conduct for Responsible Fisheries (Government of India 2012b). Also restricting growth in the sector is availability of quality seed stock (for example, fertilised fish eggs), since India does not have organised seed stock production and management facilities. India also needs to enhance commercial fish feed capacity, disease diagnosis capacity and management capacity.

Consumption

Most production is consumed domestically, with only about 8 per cent of the volume of total fisheries products exported. India's imports of fisheries products make only a small contribution to overall consumption of fisheries products, reflecting a policy of self-sufficiency in food production.

Consumption of fisheries products varies greatly across India but is similar across rural and urban areas. India's national household consumption survey (July 2009 to June 2010) estimated annual consumption at 3.2 kilograms per person in rural areas and 2.9 kilograms per person in urban areas (Government of India 2012c). Annual per person consumption of fisheries products is greatest in coastal states, including Kerala (24 kilograms) and Goa (23 kilograms) on the west coast. High annual consumption also occurs across urban and rural households on the north-east coast, including Tripura (16 kilograms) and West Bengal (11 kilograms) per person. Most inland areas consume less than one kilogram per person in many areas. High-consuming inland areas include the states of Assam and Arunachal Pradesh, where annual consumption averaged 10 kilograms and 9 kilograms per person, respectively, across rural and urban households.

The combined population of these high-consuming regions is large, indicating that collectively they contribute significantly to India's total consumption of fisheries products. The combined population of Kerala, Goa, Tripura, West Bengal, Assam and Arunachal Pradesh is around 162 million people. Most reside in West Bengal (91 million), Kerala (33 million) and Assam (31 million). Pockets of high consumption are also found in less densely populated areas; between July 2009 and June 2010 residents in the Lakshadweep Islands consumed on average 51 kilograms per person and in the Andaman and Nicobar Islands 15 kilograms per person.

Trade

Between 1996–97 and 2008–09 the annual export volume of fisheries products remained relatively stable at around 430 000 tonnes. However, in the three years to 2011–12, exports grew by an average of 33 per cent per year, to 889 000 tonnes (Government of India 2013). In that year, export earnings from fisheries products reached US$3.3 billion, around 17 per cent of national agricultural product export earnings. The main fisheries products exported were shrimps and prawns, earning US$1.7 billion and accounting for 51 per cent of export earnings from fisheries products. Other important exports were finfish products (US$956 million; 29 per cent) and cuttlefish and squid (US$530 million; 16 per cent). The volume of imports has also grown rapidly in recent years (albeit from a low base of 4672 tonnes), at an average of 25 per cent per year from 2003–04 to 2011–12 to reach 27 502 tonnes.

Policies

Domestic policies

India has aimed at self-sufficiency in fisheries products. Since the 1960s the Indian Government has generally focused on enhancing production and productivity in the fisheries sector, with the aim of improving socio-economic conditions for fishers and fish farmers. Augmenting employment in the sector by increasing fish consumption, adopting integrated management and conserving aquatic resources and genetic diversity remain a priority. More recently, India has redirected its policy focus to increasing exports through technology enhancements, to more efficiently processing fisheries products and to increasing quality control in the post-harvest sector by adhering to international standards (WorldFish 2008).

Trade policies

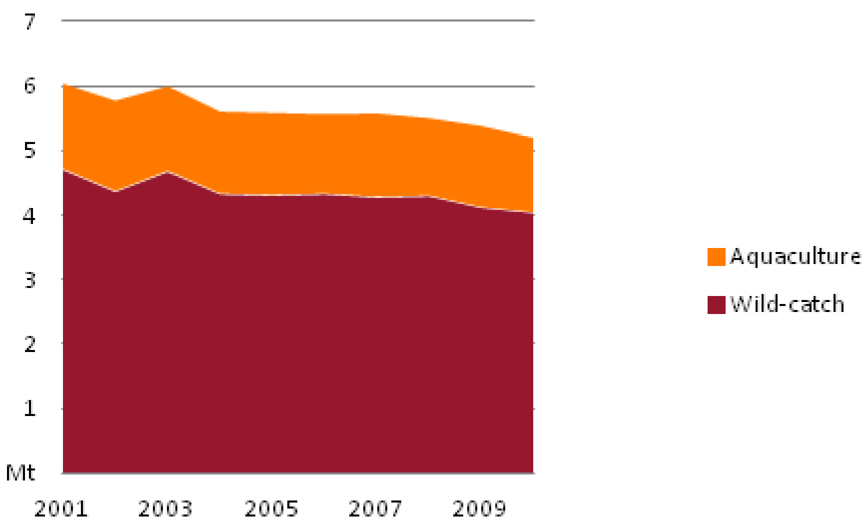
Tariff policy in India is restrictive for fishery products. Tariffs on fishery product imports are high by world standards and levied at an average rate of 30 per cent under the Customs Tariff Act of 1975. India has entered into several free trade agreements, including with Bangladesh, Bhutan, Malaysia, Pakistan, Republic of Korea, Singapore, and Sri Lanka. These agreements have lowered applied tariffs to levels ranging from zero to 23.75 per cent (WTO 2013). Tariffs for less developed countries are set at 12 per cent, providing them with preferential access to the Indian market.

Japan and the Republic of Korea

Production

Japan's fisheries production declined over the past decade, from 6.0 million tonnes in 2001 to 5.2 million tonnes in 2010 (FAO 2012a). Most of this decline was for wild-catch fisheries production, which fell from 4.7 million tonnes in 2001 to 4.0 million tonnes in 2010. There has also been a reduction in aquaculture production, from 800 000 tonnes in 2001 to 720 000 tonnes in 2010 (Figure 213) (FAO 2012a).

Figure 213 Wild-catch and aquaculture production, Japan



Source: FAO 2012a

Most (44 per cent, 2.3 million tonnes) of Japan's fisheries production comes from its far seas fishery. This fishery operates in the domestic Exclusive Economic Zones of other neighbouring countries, under bilateral agreements that allow Japanese fishing vessels access to its neighbours' fishing grounds (FAO 2005). Other fisheries include the marine distant-water fishery, a coastal fishery, an inland water fishery and the marine and inland water aquaculture sector. In 2010 the coastal fishery contributed 24 per cent (1.3 million tonnes) to the total volume of fisheries product production, aquaculture sectors 22 per cent (1.2 million) and distant-water fishery 9 per cent (0.5 million tonnes) (MAFF 2012a). In terms of volume produced, the main wild-caught species in Japan in 2009 were mackerel, tuna, cuttlefish, scallops and Alaska pollock.

The decline in wild-catch fisheries production between 2001 and 2010 was partly due to depletion of fish stocks, fewer fishing vessels and rising fuel costs (MAFF 2012a, b). For example, the number of registered fishing vessels declined from 330 807 in 2003 to 292 822 in 2010 (MAFF 2012 b). The workforce for the sector is also ageing with around 36 per cent of fishery workers aged 65 years and older in 2010(MAFF 2012a).

Aquaculture production in Japan was relatively stable over the past decade. The main species produced by aquaculture in 2010 were aquatic plants (430 000 tonnes), scallops (220 000 tonnes), oysters (200 000 tonnes) and sea bream (70 000 tonnes) (OECD 2012a). Japan is one of the world's leading countries in the aquaculture production, contributing 1 per cent to the total world aquaculture production, including mostly aquatic plants such as seaweed for food use, scallops and oysters (FAO 2012a).

The Republic of Korea produced 3.1 million tonnes of fisheries products in 2010, 2 per cent of global production (Figure 214) (FAO 2012a). In 2010 most fisheries production came from coastal fisheries within 200 nautical miles from shore (1.1 million tonnes), followed by aquaculture aquatic plants (902 000 tonnes), distant-water fisheries (600 000 tonnes), aquaculture excluding aquatic plants (480 000 tonnes) and inland waters (30 000 tonnes) (USDA–FAS 2012b). The main species caught in the coastal fisheries are anchovy, mackerel, hairtail, yellow corvina, squid, and blue crab (FAO 2013a).

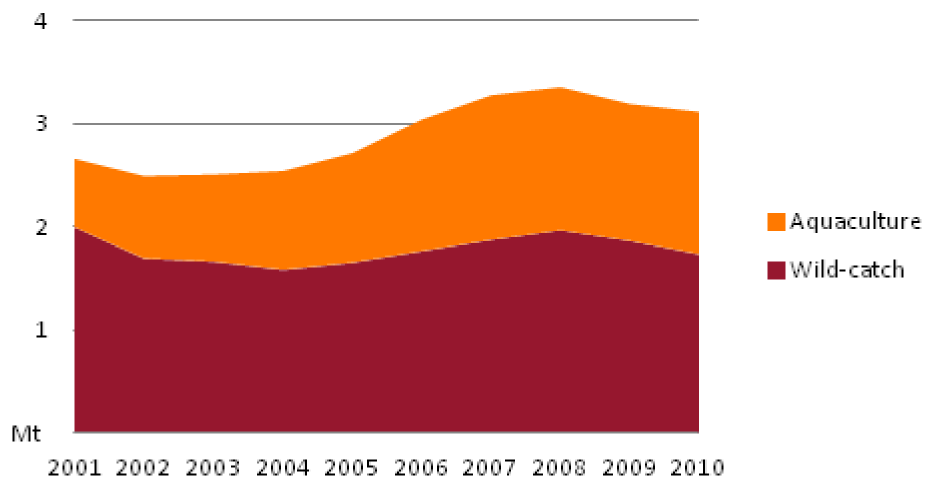
Wild-catch fisheries production in the Republic of Korea fell from 2 million tonnes in 2001 to 1.7 million tonnes in 2010 (Figure 214) (FAO 2012a). The decline has been attributed to strict regulations of fishing activities due to the United Nations Convention on the Law of the Sea, enforcement of the Exclusive Economic Zones by China and Japan, depletion of fishery resources and the consequent decline in the number of fishing vessels (OECD 2013). Reasons for the reduction in fish stocks include overfishing of juvenile fish due to mixed fishing, ineffective management of marine resources with adjacent nations, habitat destruction by contamination of the marine environment, climate change and ecological changes in fish species (OECD 2012b). The number of registered fishing vessels declined from 95 890 in 2000 to 76 974 in 2010 (OECD 2012c).

Aquaculture production in the Republic of Korea increased significantly between 2001 and 2010. This is mostly attributed to aquatic plant production more than doubling during the past decade, reaching 900 000 tonnes in 2010 (FAO 2012a). In that year, the Republic of Korea was the world's third largest aquaculture producer of aquatic plants of which the majority was seaweed for food use (FAO 2012a). In 2010 seaweed aquaculture accounted for 65 per cent in volume and 18 per cent in value terms of Korea's aquaculture production.

Aquaculture production of other species in the Republic of Korea almost doubled during the past decade, reaching 480 000 tonnes in 2010 (FAO 2012a). Most of this increase was attributed to an increase in shellfish production, mostly oysters and mussels. Production of aquaculture oysters increased by 12 per cent over the decade to 2010, to 267 776 tonnes, making the

Republic of Korea the second largest producer of aquaculture oysters in the world after China (FAO 2012a). Production of mussels more than doubled, from 15 785 tonnes in 2000 to 54 440 tonnes in 2010. In aggregate, shellfish production accounted for 26 per cent of aquaculture production in volume terms and 19 per cent in value terms. Fish production accounted for 7 per cent in volume terms and 39 per cent in value terms (OECD 2012c).

Figure 214 Wild-catch and aquaculture fisheries production, Republic of Korea



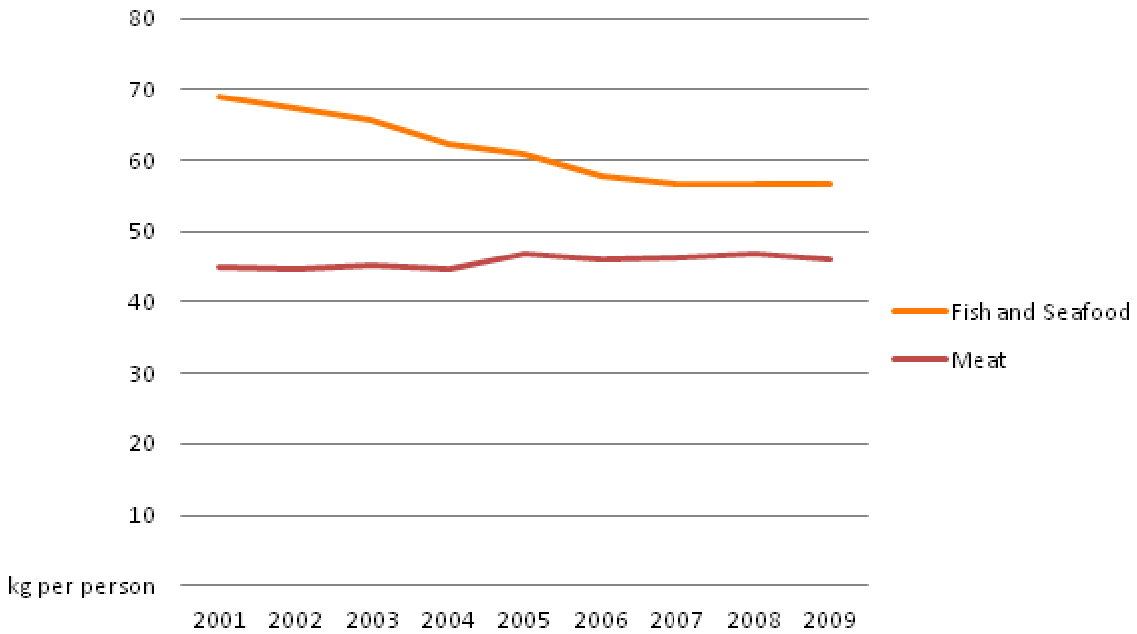
Source: FAO 2012a

Consumption

Japan is a large global consumer of fisheries products, accounting for about 5 per cent of global consumption in 2009 (FAO 2012a). While around three-quarters of Japan's production supplies the domestic market, imports account for around half of domestic consumption of fisheries products.

In 2009 Japan's annual fish consumption was 54.5 kilograms per person (FAO 2012a). Despite starting from a high level, domestic consumption of fisheries products declined over the past decade due to changes in lifestyle and changing food tastes, partly a result of an ageing population. Consumption of fish products also fell relative to meat products consumption (Figure 215).

Figure 215 Consumption of fisheries products and meat per year, Japan



Source: FAO 2013b

The most popular types of fisheries products consumed in Japan are tuna, salmon and shrimp. Most of this seafood is consumed in processed form, with dried-salted and smoked fish accounting for 56 per cent and canned product 5 per cent. Only 39 per cent of fisheries products are consumed fresh or frozen (MAFF 2012a).

In the Republic of Korea, fisheries products make a large contribution to the diet. In 2009 annual per person consumption in the Republic of Korea was 60.6 kilograms (FAO 2012a). The main species consumed in Korea are Alaska pollock, squid, mackerel, hairtail and yellow corvina. Koreans prefer live fish over fresh, chilled or frozen fish (USDA–FAS 2012b). Despite this preference, changes in lifestyle are leading to an increase in consumption of pre-cooked, prepared and preserved food. In the Republic of Korea, around half of fisheries product consumption is met by imports.

Trade

Japan is the second largest importer of fisheries products in the world, accounting for 13 per cent of the value of global imports. It is also a net importer of fisheries products, with over half of the total fisheries product supply imported. In 2010 Japanese imports of fishery products accounted for US$14.9 billion (FAO 2012a), with tuna, salmon and trout, shrimps, crabs, octopus, mackerel and hard roes of tara among the main imported products. Japan is also one of the world's largest markets for sashimi-grade tuna (FAO 2012b). In 2012 Japan imported 215 646 tonnes of tuna, much of which was bound for the sashimi market. These imports were sourced largely from Taiwan (64 542 tonnes), the Republic of Korea (27 046 tonnes), Indonesia (17 322 tonnes) and China (16 724 tonnes).

Thailand was Japan's largest import source of shrimps, prawns and lobsters in 2012, at 35 302 tonnes, followed by Vietnam (33 780 tonnes), Indonesia (31 599 tonnes), India (27 813 tonnes) and China (15 422). About 69 per cent of Japan's crab imports are from Russia (43 416 tonnes), about 45 per cent of octopus is from Mauritania (21 402 tonnes) and about 71 per cent of salmon is from Chile (MOF 2013).

In 2010 the value of Japanese exports of fishery products was US$1.9 billion (FAO 2012a). Its main fishery product exports in value terms include pearls, scallops, mackerel, salmon, yellowtail and cuttlefish (MAFF 2012b). Its main export destinations are Hong Kong, the United States, China, Thailand, Vietnam, the Republic of Korea and Taiwan (MOF 2013).

Until the early 2000s the Republic of Korea was a net exporter of fisheries products. By 2011 growing domestic demand, a reduction in fish resources and a decline in the number of fishing vessels led to the Republic of Korea becoming a strong net importer of fisheries products. In 2011 it imported US$3.8 billion worth of fisheries products (USDA–FAS 2012b).

In 2011 the Republic of Korea imported 60 per cent of its fisheries products from China (US$1.2 billion), the Russian Federation (US$661 million) and Vietnam (US$447 million). Frozen tuna and skipjack, shrimps and prawns are the main fisheries products imported by the Republic of Korea (OECD 2012c).

The Republic of Korea exported US$2 billion in fisheries products in 2011 (USDA–FAS 2012b). The largest three export markets were Japan (US$835 million), China (US$433 million) and Thailand (US$151 million). These countries accounted for 71 per cent of Korea's total fisheries products exports in 2011 (USDA-FAS 2012b). Frozen fish products, tuna, molluscs (mostly oysters), squid and seaweed are the principal fisheries product exports (OECD 2012c).

Policies

Domestic policies

Management of fisheries in Japan varies between fishery types. For example, coastal fisheries are managed through the fisheries rights system, while offshore and distant-water fisheries are regulated through the fisheries licensing system. These management systems are based on input controls, such as control of the number of vessels or fishers, regulation of fishing gear, areas and seasons. Far seas fisheries are also regulated through a total allowable catch system introduced in 1997. The total allowable catch system includes seven major species: sardine, mackerel, jack mackerel, saury, Alaska pollock, common squid and snow crab (FAO 2009).

In the longer term, Japanese fisheries are faced with falling production levels stemming from current low levels of fishery resources—about half of the stocks of species assessed are at low levels and require rebuilding to higher sustainable levels, vessel numbers are also decreasing and fishers are ageing (FAO 2009; OECD 2012a). The Japanese Government is taking measures to recover and enhance fisheries resources and conservation of natural environments (FAO 2009). These include implementation of recovery plans and management schemes, including total allowable catch and total allowable effort systems and promotion of environmentally sustainable aquaculture (OECD 2012a).

The Great East Japan Earthquake on March 2011 and the subsequent tsunami caused significant damage to the fishing industry. The Japanese Government responded in March 2012 with a new long-term plan to develop fishing ports and fishing grounds, and promote a safe region resistant to disasters (MAFF 2012a). Japan is also focusing on cost, energy and labour efficient fishing operations and value adding to fisheries products. These actions provide potential for the expansion of exports and exemplify the value of the fisheries industry in Japan (OECD 2012a).

Over the past decade the Government of the Republic of Korea has undertaken fisheries reforms to achieve sustainable fishing (OECD 2011). These reforms have been driven by the continuous decline of inshore and offshore fisheries catches stemming from the depletion of fishing stocks and the poor economic performance of the Republic of Korea's fishing industry (OECD 2011). To enhance the sustainable management of fishery resources, the government has developed policy instruments such as a permit system, area and time closures, limitations on mesh size, gear restrictions and total allowable catch systems (OECD 2011).

In 2009 the Government of the Republic of Korea established the Fisheries Resources Management Act. The objective of the Act was to strengthen research and assessment of fisheries, to establish and implement fish stock rebuilding plans and to arrange for the continuous implementation of resource management schemes, including fisheries resource fish stock enhancement (OECD 2012c).

Another objective of the Republic of Korea is to protect and recover fish stocks to improve welfare of both fishers and consumers. This has been undertaken through a vessel buy-back program, introduction and expansion of the application of the total allowable catch system, the Fish Stock Recovery Program, the Community Based Fisheries Management scheme and strengthening law enforcement to reduce illegal fishing. Korea is also addressing the impact of climate change on the fishery sector. These actions, with emphasis on the quality of fisheries products, enforcement of rules and regulations for seafood sanitation and planned improvements to fisheries communities, show that Korea is adapting to the changing environment (OECD 2011). However, it is expected that wild-catch fish production in Korea will continue to decline while sea aquaculture increases to deal with the shortage of fishery resources in the coastal fisheries and with restrictions in neighbouring countries' waters (USDA–FAS 2012b).

Trade policies

Import tariffs for fishery products in Japan vary from 1 per cent for frozen lobster, shrimp and prawns to 15 per cent for salted or dried cod, herring and anchovies (WTO 2013).

In Japan, imports of fishery products are subject to import quotas, import approvals and import acknowledgements (JETRO 2011). Imported products must comply with standards set by the Food Sanitation Act and other laws and regulations, including the Act for Standardisation and Proper Labelling of Agricultural and Forestry Products, the Measurement Act, the Health Promotion Act, the Act on the Promotion of Effective Utilisation of Resources, the Act Against Unjustifiable Premiums and Misleading Representations, and intellectual asset-related laws. Imported fishery products, whether fresh or processed, must also be appropriately labelled, including information about product name, country of origin, content, name and address of importer, ingredients and expiration date (JETRO 2011). Imported aquaculture seafood also has a restriction on synthetic antibiotics.

In the Republic of Korea most fisheries products are imported free of import quotas or licensing restrictions. However, import tariffs are imposed on most fisheries products. These tariffs mostly range from 10 per cent to 20 per cent (WTO 2013). The Republic of Korea also applies adjustment duties to protect domestic industries from import surges and reduce the shock from trade liberalisation (MOSF 2010). The Ministry of Strategy and Finance sets the adjustment duties annually at from 22 per cent to 50 per cent for fisheries products, such as eels, sea bream, Alaska pollock, shrimps and prawns, squid and some croakers (MOSF 2010).

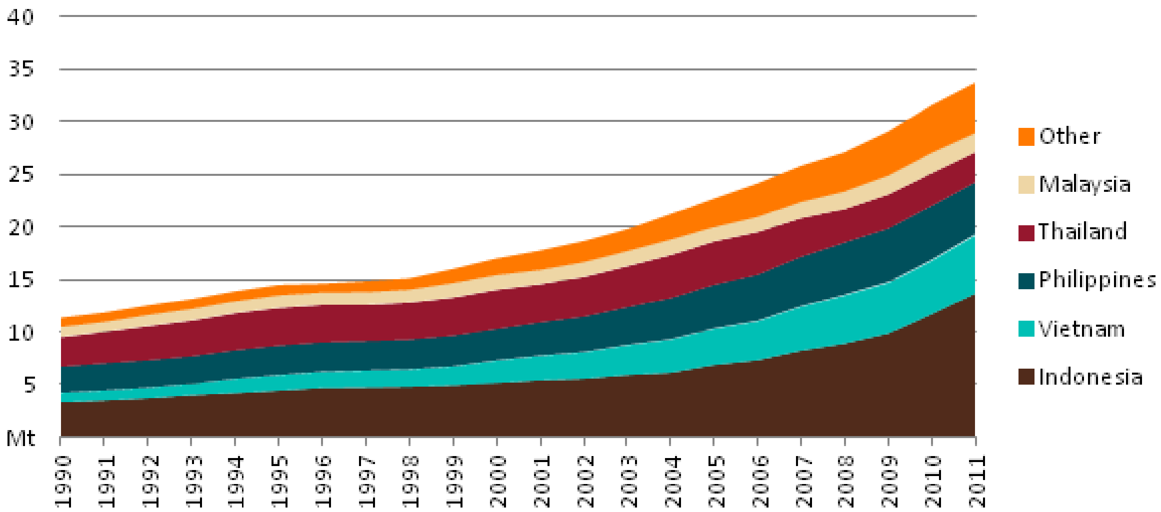
In recent years the Republic of Korea signed free trade agreements with the Association of Southeast Asian Nations (ASEAN), Chile, the European Free Trade Association (EFTA), the European Union, Singapore and the United States. These agreements have lowered the customs duties for many fisheries products (MOSF 2010). For example, following implementation in 2012 of the US–Korea Free Trade Agreement, customs duties for fishery products imported from the United States are planned to drop to zero within three to 10 years, with tariffs eliminated for frozen sockeye salmon in 2012 and for frozen flatfish, Alaska pollock and croakers in 2013 (USDA–FAS 2013).

ASEAN

Production

Production of fisheries products in the ASEAN region more than doubled between 1990 and 2011, increasing from 11.4 million tonnes in 1990 to 33.8 million tonnes in 2011 (FAO 2012a). The ASEAN member states together accounted for 22 per cent of global production of fisheries products in 2011, increasing from 12 per cent in 1990 (FAO 2012a). Indonesia accounted for most of this increase, with its share of the region's production rising from 28 per cent in 1990 to 41 per cent by 2011. This growth is attributed to the significant rise in Indonesia's production, from 3.2 million tonnes in 1990 to 13.7 million tonnes in 2011 (Figure 216).

Figure 216 Production of fisheries products by ASEAN member states

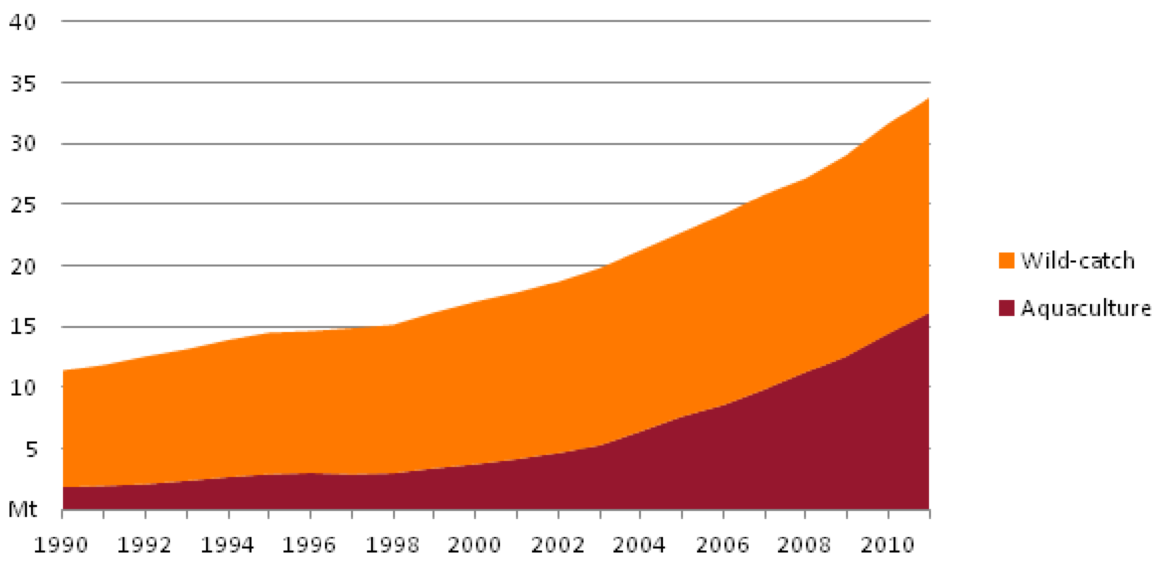


Source: FAO 2012a

Fisheries wild-catch production in the ASEAN member states has grown by 9 per cent per year, from 9.6 million tonnes in 1990 to 17.7 million tonnes in 2011 (Figure 217). Indonesia was the largest contributor to this increase, with production rising from 2.6 million tonnes in 1990 to 5.7 million tonnes in 2011. In 2010 Indonesia was the second largest global producer of wild-catch fisheries products, behind China.

Aquaculture production accounted for most of the increase in ASEAN's total production of fisheries products between 1990 and 2011, rising from 1.8 million tonnes in 1990 to 16.1 million tonnes in 2011. As a result, ASEAN member states accounted for a quarter of global aquaculture production in 2011, almost double that of 1990. The main contributor to this growth was Indonesia, where aquaculture production increased from 600 000 tonnes in 1990 to 7.9 million tonnes in 2011.

Figure 217 Aquaculture and wild-catch fisheries production, ASEAN

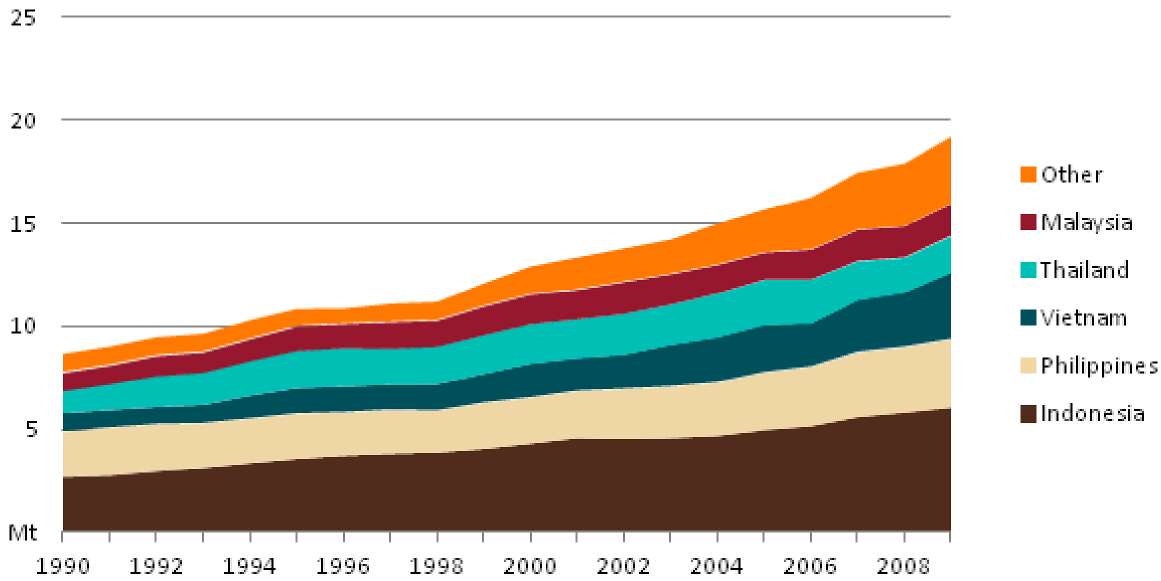


Source: FAO 2012a

Consumption

In line with the increase in production, consumption of fisheries products in the region has also increased since 1990, from 12 per cent of global consumption to 15 per cent by 2009. Total fish consumption among the ASEAN member states has increased from 8.6 million tonnes in 1990 to 19.2 million tonnes in 2009 (Figure 218) (FAO 2012a). Indonesia is the main contributor to this increase, accounting for a third of total ASEAN consumption in this period. Between 1990 and 2009 Indonesia's fish consumption increased by 4 per cent per year, from 2.7 million tonnes to 6 million tonnes. While Indonesia's per person consumption of fisheries products is low relative to some other ASEAN member states at 25.4 kilograms, the size of its population makes it the largest consumer of fisheries products in total in the region. In 2009 the largest consumers of fisheries products per person among the ASEAN member states were Malaysia (53.3 kilograms) and Myanmar (51.4 kilograms) (FAO 2012a).

Figure 218 Total fishery product consumption in ASEAN member states

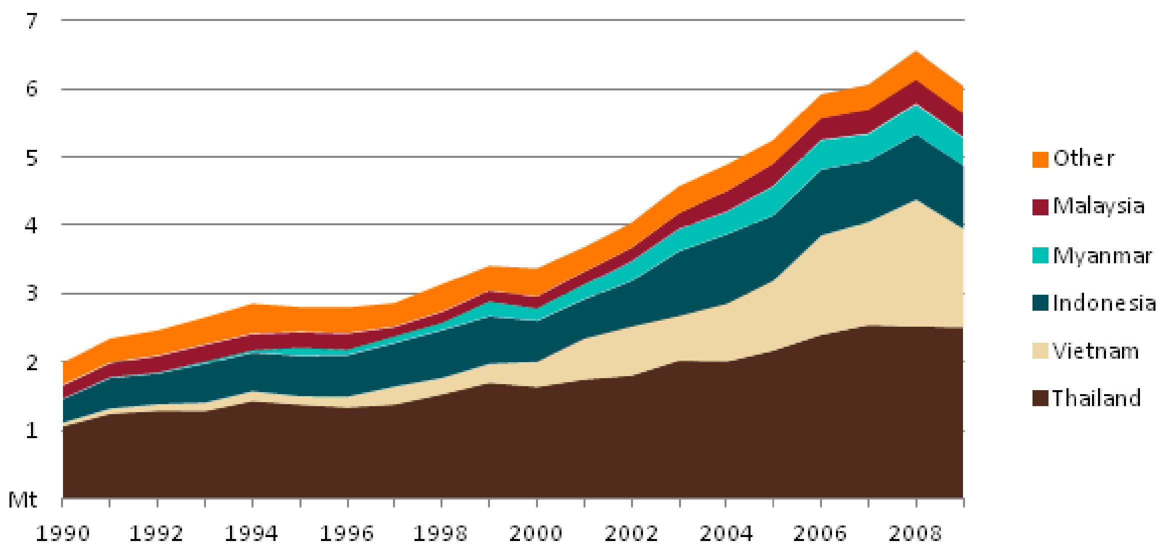


Source: FAO 2012a

Trade

ASEAN's contribution to global fisheries product exports increased from 12 per cent in 1990 to 16 per cent by 2009. Total exports from ASEAN member states as a whole increased from 2 million tonnes in 1990 to 6 million tonnes in 2009 (Figure 219) (FAO 2012a). The main contributor to this increase was Thailand. Over this period, Thailand's exports increased from 1.1 million tonnes to 2.5 million tonnes, most of which was canned tuna, frozen fish and frozen shrimp. However, in terms of value the most valuable export products were frozen shrimp, preserved (boiled) shrimp, canned tuna and frozen fish (Government of Thailand 2010).

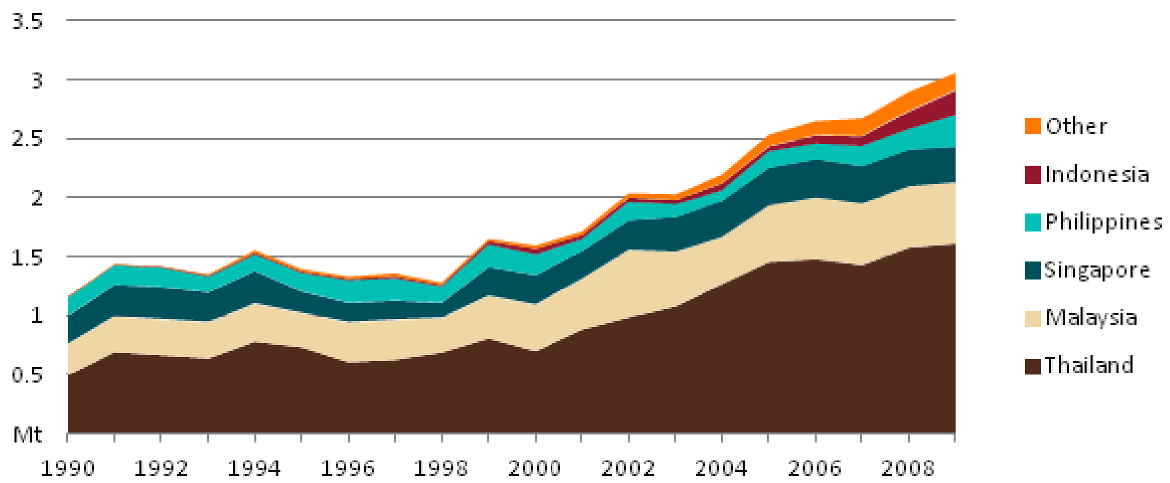
Figure 219 Total fishery product exports by ASEAN member states



Source: FAO 2012a

The ASEAN region's share of global imports of fishery products remained unchanged at 8 per cent between 1990 and 2009. Total imports of fish products by ASEAN increased from 1.6 million tonnes in 1990 to 3.1 million tonnes in 2009 (Figure 220). This increase was mainly the result of an increase in imports of fish products in Thailand, from 500 000 tonnes in 1990 to 1.6 million tonnes in 2009. This increase was due to growing demand by the processing sector for value adding and re-exporting. The main import commodities are fresh and frozen tuna and fresh and frozen fish. Tuna products are mainly canned, while other fish are processed into fish fillets (Government of Thailand 2010).

Figure 220 Total fishery product imports by ASEAN member states



Source: FAO 2012a

Policies

Domestic policies

Domestic fisheries policies vary among the ASEAN member states. Indonesia has created integrated aquaculture zones for freshwater and brackish water. Indonesia has implemented a strategic aquaculture development program to supply high quality fish seed (fertilised fish eggs). The program aims to do this by developing private hatcheries, creating seed distribution and marketing channels, providing training to fish seed farmers and creating a network of seed information systems (WorldFish 2008).

The Philippines facilitates access to credit for producing, processing and trading fisheries products. This is achieved by making commercial fishers eligible for subsidised long-term loans, and exempting them from taxes and duties to purchase or improve fishing vessels and equipment. Duty and tax rebates also apply on fuel for commercial fisheries (WorldFish 2008).

In Thailand, the fishing industry depends on private sector investment, with the government actively facilitating raw material acquisition, product certification, product regulation to maintain global standards and international trade promotion (WorldFish 2008).

Vietnam's government recently approved a fisheries development strategy to further develop the sector by 2020 (Government of Vietnam 2010). The strategy aims to boost the sector's production capacity through modernisation and industrialisation and to improve the competitiveness of Vietnam's fisheries sector in international markets. Government supported programs established under this strategy include programs to boost marine aquaculture production, tilapia culture production, shipbuilding and repairing and fisheries human resource training. The strategy also includes a program on population relocation and building of fishing villages along coasts and islands in accordance with new rural development criteria.

Trade policies

The applied tariff for fisheries products is zero for most ASEAN member states (WTO 2013). However, Indonesia's applied tariff for frozen species ranges between 2.5 per cent and 10 per cent. Tariffs applied to fisheries products in the Philippines range between 5 per cent and 10 per cent. In Vietnam, they range between 13 per cent and 22 per cent.

Bound tariffs imposed by ASEAN range between zero per cent and 40 per cent, depending on the member state. Products attracting the highest bound tariff are live fish, with tariffs of between 20 per cent and 30 per cent. The bound tariff for all Indonesian fisheries products is 40 per cent.

ASEAN has free trade agreements with China, India, Japan, the Republic of Korea, Australia and New Zealand. ASEAN member states also have trade agreements with the European Union and preferential trading agreements between themselves. Under the Common Effective Preferential Tariff agreement for the ASEAN free trade area, tariffs levied on a range of fisheries products traded within the region have been reduced to between zero per cent and 5 per cent. Quantitative restrictions and other non-tariff barriers will also be eliminated over time (ASEANSEC 2012).

Individual ASEAN member states have imposed trade restrictions on biosecurity and product quality grounds. For example, in 2010 Indonesia placed bans on importing specific shrimp species because of identified viruses. This was an effort to prevent the spread of disease and to provide a control for avoiding human health issues (Government of Indonesia 2010).

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Glossary

ad valorem tariff	A tariff rate charged as a percentage of the price.
ad valorem equivalent (AVE)	A tariff that is not a percentage (for example, dollars per tonne) can be estimated as a percentage of the price. This is the ad valorem equivalent.
anti-dumping duty	Duty imposed on imports that are considered to be dumped (sold in the import market below the cost of production) and causing injury to producers of competing goods in the importing country.
applied tariff	The actual tariff rate applied to imports at a particular time. This can be below the bound tariff.
ASEAN	The Association of Southeast Asian Nations, comprising Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam.
bound tariff	The maximum tariff rate that a World Trade Organization (WTO) member undertakes to apply for an individual tariff line. Once a tariff is bound, it may not be raised without compensating the affected parties.
carcass weight equivalent (cwe)	Weight of slaughtered beast minus hide, blood and some bone, such as hoofs and horns.
countervailing duty	Duty imposed by an importing country to offset subsidies given to producers or exporters in the exporting country.
domestic supply	Defined as production plus imports minus exports plus changes in stocks. Domestic supply may be taken as a proxy for consumption for all uses, and includes waste.
foods	Food and Agriculture Organization of the United Nations (FAO) data refer to the total amount of the commodity available as human food. Data include the commodity in question and any commodity derived from that commodity as a result of further processing. For example, food from maize comprises the amount of maize, maize meal and any other products derived from maize available for human consumption. Food from milk relates to the amount of milk, as well as the fresh milk equivalent of dairy products.
generalised system of preferences	Developed countries offer preferential trade treatment to imports originating from developing countries.
milled equivalent	Rough rice volume adjusted for hull and bran removal in the milling process.

most favoured nation (MFN)	The principle of not discriminating between one's trading partners. All WTO members grant each other treatment that is as favourable as they grant to any other WTO member in the application and administration of customs regulations, tariffs and related charges.
purchasing power parity	An exchange rate that makes the cost of an item the same across countries.
rough basis	Rice as harvested from the field with kernels still encased in an inedible hull. Also known as paddy rice.
shipped weight	Actual weight of product (both bone-in and boneless) when it leaves the exporting country. Ratio to carcass weight equivalent will vary depending on the mix of bone-in and boneless product. With no bone-in product, shipped weight will equal boneless (product) weight.
special safeguard duty	Temporary increase of the duty on imports to offset price falls or import surges under provisions that are special to the WTO Agreement on Agriculture.
tariff quota	The use of a reduced tariff rate for a specified volume of imports, while imports beyond these volumes face a higher tariff rate. Also known as a tariff rate quota. in-quota tariff—the reduced tariff rate for the specified volume of imports that enters within a tariff rate quota. out-of-quota tariff—the tariff rate for quantities imported in excess of the tariff quota volume.