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Asia-Pacific: agricultural perspectives

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- **The Asia region is a decisive component in the global food chain, accounting for 19% of total global food and agriculture exports and 31% of total food and agriculture imports**
- **Asia's large and growing population, coupled with rising incomes and a burgeoning middle class, will continue to drive demand for food & agricultural commodities and resources**
- **On the other hand, Asia cannot produce enough to support itself. Limited arable land, inadequate water and poor resource management, low farm yields, environmental and soil degradation and infrastructure inadequacy are limiting production. Consequently, Asia and especially China's need for imports and investment locally and abroad is likely to increase**
- **Asia agribusiness and food & agriculture companies are likely to grow in size and scope to meet the increasing demand, national policies, rising organisational capabilities, and integration and consolidation throughout the value and supply chains**

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Asia's position in the global food market tilts heavily towards demand due to its huge population and limited agricultural resources. With only one-fifth of the world's agricultural land, the region hosts more than half of the global population. Asia has achieved significant production improvements over the last 50 years but produces lower yields compared to most other regions, with depleting resources including water, deteriorating soil quality, inadequate logistics and inefficient farming practices and land usage. These issues are beginning to be challenged and addressed through market-oriented approaches and corporate farming to satisfy a growing population featuring rising income levels, urbanisation, demand for higher food quality and environmental concerns.

Asia, a consumption magnet

Whilst North America and Europe are likely to see negligible population growth, Asia's population is expected to increase from 4.3 billion in 2015 to 5.1 billion by 2050. Specifically, Asia's two giant economies – the People's Republic of China and India – are already enormous players within the global food system. For example, China and India together account for 28% of world cereal consumption and nearly 40% of palm oil consumption. China alone accounts for 25% and 27% respectively of world soy and meat consumption. Asia's importance for food markets is becoming amplified by higher economic growth in Asian economies, which will

have an impact on both the composition and the level of food consumption. Emerging Asia's total GDP (including India and China but excluding Japan) nearly equalled the European Union's (EU) GDP in 2015 and is predicted to overtake the EU in 2016. Over the next five years, the IMF is forecasting that emerging Asia's GDP will grow by about 6.5% per year compared to 2.5% and 1.9% respectively for the US and the EU.

Table 1: Asia Imports

Grains + Sugar + Veg	2014/2015 estimated net imports (millions of tonnes)	Share of Asia net imports to total global production (%)
Wheat	58.7	8.0
Maize (corn)	55.7	5.4
Barley	19.8	13.8
Soybeans	(2013) 77.33	27.3
Sugar	(2013/14 estimated raw value) 18.7	10.4
Meat + Seafood	2014 estimated net imports (millions of tonnes Carcass-Weight Equivalent)	Share of Asia net imports to total global production (%)
Bovine meat	2.43	3.6
Pig meat	3.45	2.9
Poultry meat	4.83	4.4
Fish & fishery products	(2014 estimated net import value, billions of USD) 12.4	N.A
Dairy	2014 estimated net imports (millions of tonnes milk equivalent)	Share of Asia net imports to total global production (%)
Milk & milk products	34.34	4.4
Product Fertiliser	2013 net import quantity in nutrients (millions of tonnes)	Share of Asia net imports to total global production (%)
Nitrogen, Phosphate, Potash	4.65	

Source: FAO

... but the consumption pattern is in transition ...

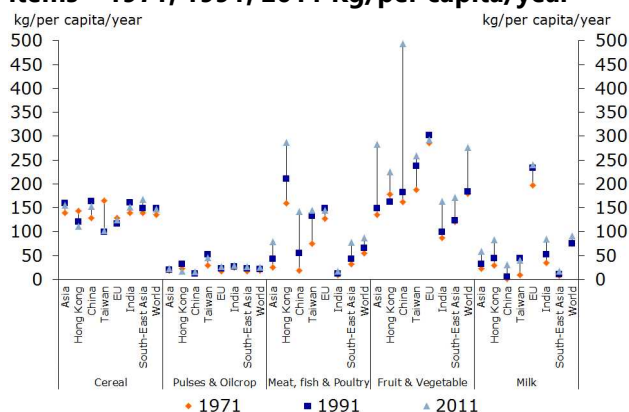
As often observed, during the initial stages of economic growth an improvement in average income leads to an increase in cereal consumption. However as income continues to rise, food consumption gradually shifts from staples to protein and other high value food items like dairy and fruit and vegetables. With economic prosperity likely to continue to improve in the region, we can expect dramatic shifts in both the shape and the composition of the Asian food basket. China is a prime example of this shift in consumption habits. As average income started to improve in the early 1980s for Chinese consumers, consumption of cereals increased. However since the late 1990s the shift to protein foods and fruit & vegetables has become more pronounced. Nowhere is this phenomenon more apparent than in China's position in the global pork industry, where it produces 49% of global production and accounts for 52% of global consumption [2014]. In emerging Asia as a whole, between 1991 and 2011, the share of fruit, vegetables, meat and fish in the consumption basket grew faster than the share of staple foods. Total demand for grains is on the rise, as the increasing share of meat intake is leading to strong growth in demand for animal feed.

Furthermore, as the modern trade share of overall groceries increases, consumption will shift from unprocessed and unbranded to branded and packaged food. This presents an interesting dichotomy in that

whilst overall cereal consumption growth in Asia will mirror steady growth in population, the branded cereals category may continue to see robust growth for several years. For instance, whilst overall rice consumption in India per capita is lagging population growth, the organised, branded rice market is growing at 15% per annum.

... as Asian consumer aspiration adapts to an improving economic position

Figure 1: Per capita consumption of major food items – 1971, 1991, 2011 Kg/per capita/year



Source: FAOSTAT, Rabobank Analysis

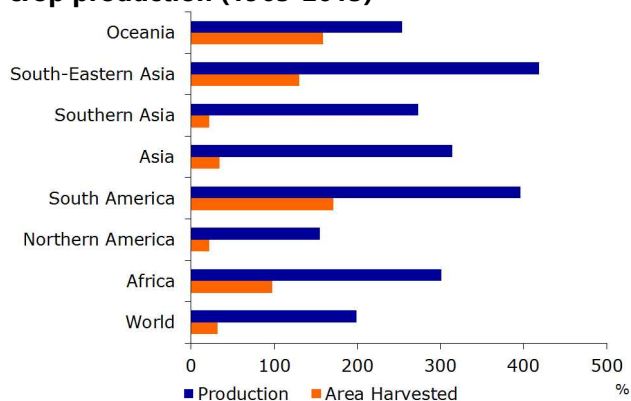
Consumer behaviour and aspiration in Asia is also becoming directly influenced by rapid economic growth and the growth of the middle class population. This emerging Asian consumer is characterised by adoption of a western lifestyle, a high level of familiarity with the latest consumer technology and increased awareness of health and wellness issues and brand consciousness. This is exhibited nowhere more clearly than in China, which has seen the emergence of a new, young middle class with attitudes and aspiration akin to western consumers. Other countries in the region are no exception to this pattern, with the trend towards westernisation and modernisation of lifestyles.

Therefore, as the rest of Asia develops further, it will follow the route taken by China and South Korea, with a consequent impact on consumption and purchasing behaviour.

Asia is a production giant as well, just not big enough

Global production rankings for agricultural commodities find China and India leading the league tables for many soft commodities of significance. Indonesia and Malaysia head the list of the world's palm oil producers (87% of world total). In cereals, China and India rank number 1 and 2 respectively for wheat and rice; for maize, China is the second largest producer. Asian countries are also leading producers of cash crops, with China and India taking the top two slots in that order for cotton and tea. India is second only to Brazil amongst the top sugar producers in the world. Vietnam holds the second spot among global coffee producers, with Indonesia and India also in the top five. Natural rubber is also dominated by Asian countries, led by Thailand, Indonesia, Vietnam and India in that order. India continues to be the world's largest spice producer.

Figure 2: Absolute growth in area harvested and crop production (1963-2013)



Source: FAOSTAT, Rabobank Analysis

Over the last 50 years, world agriculture production has nearly doubled but the total area harvested has increased by a mere 32%. The implication clearly is that expansion of arable land area has played a less important part in increasing output than crop intensification and yield enhancement. However, these trends are not uniform across the regions. For instance, Asia only marginally increased its share of world area harvested but increased its share of world agriculture output from 34% in 1963 to 47% in 2013. Thus, most of the production growth in land-scarce regions of Asia is due to yield gains and crop intensification. Within Asia, East Asia, where output has tripled with a mere 11% increase in area harvested is at the forefront of this trend.

A brief history of the rapid growth in Asian agriculture

Asian economies emerged from the post-war, post-colonial period with poverty alleviation as the immediate priority. With over four-fifths of the population living in rural areas, agriculture naturally received the main thrust of poverty alleviation programmes. Underpinning this initiative was a basket of agricultural practices – high-yielding seed varieties, access to irrigation, fertilisers, and pesticides – that together dramatically increased crop production between 1970 and 1990. Meanwhile, with the introduction of agricultural reforms in 1978, China began its rebuilding from the disastrous ‘Great Leap Forward’ agricultural collectivisation program. Consequently, wheat and rice yields have dramatically increased in Asia, which has led to a decrease of rural poverty and a build-up of a food surplus in the region within 25 years, despite minimal increases in land acreage.

Table 2: Indicators of success of agricultural improvements

Indicators	Year	India	Other S. Asia	China	Southeast Asia
Fertiliser (Kg/Ha)	1970	14.1	9.6	44.4	19.2
	1990	73.5	61	220.3	89.3
Irrigated land (% of agriculture land)	1970	17.7	14.8	12.3	16.4
	1990	27.3	19.6	9.8	23.8
Growth in cereal production (%)	1970-90	2.7	2.3	3.6	3.0
		0.925	1.197	1.769	1.352
Cereal yield (t/ha)	1970	1.743	1.846	4.007	2.237
		2083	2184	2019	1945
Calorie consumption (Kilocalories/person/day)	1970	2083	2184	2019	1945
	1990	2388	2274	2697	2596
Poverty (per cent of population)	1975	59.1	n.a.	59.5	52.9
	1990s	43.1	n.a.	22.2	11.5
Government expenditure on agriculture (US\$ mn)	1972	15,491	3,832	11,595	3,374
	1995	39,109	3,449	28,229	12,882

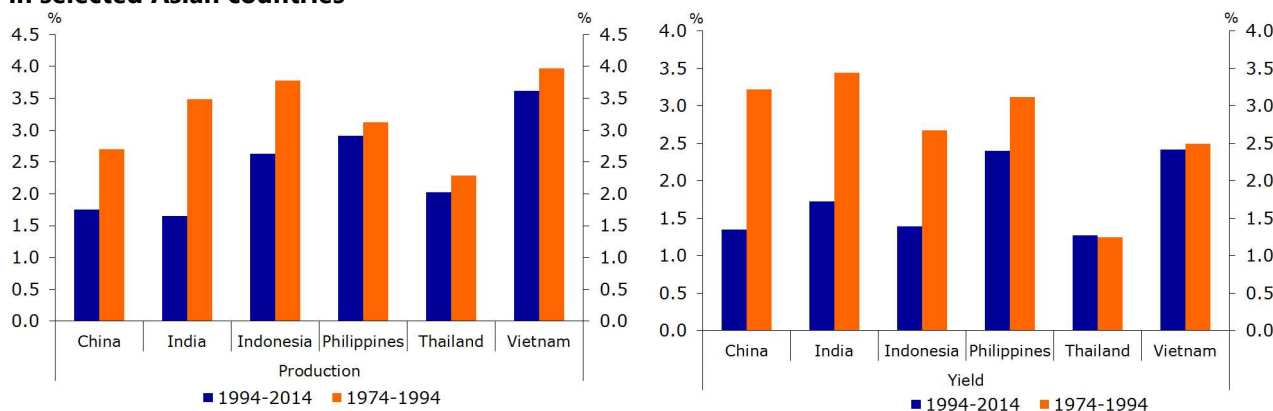
Source: FAOSTAT, Asia Development Bank, Rosegrant and Hazell, Rabobank analysis

Several factors are limiting the agricultural production potential of the region

Limited arable land and inadequate water resources in Asia form a natural ceiling to agricultural supply. Consolidation of farmland and better water management have the potential to boost production. At the same time, conflicting demands in land usage and water pollution act as constraints. Given a growing population and increasing demand for cereals for both food and feed, sustained increases in yields are required in Asia.

However, factors such as changes in cropping patterns and diminishing returns on modern seed varieties have led to a stagnation of production growth in the last two decades. Increased use of fertilisers as farmers try to maintain productivity is also progressively degrading soil quality in many places. Increased usage of chemical pesticides has further compounded the issue of soil quality and environmental pollution.

Figure 3: Growth in cereal production and yield in selected Asian countries



Source: FAOSTAT, Rabobank Analysis

Small and fragmented holding size

The region has the smallest land holdings in the world, with an average holding size of 1 hectare, based on the World Program of Census of Agriculture data 2000. This is further accentuated by the degree of fragmentation of holdings, averaging 3.2 parcels per holding based on data for the period 1995-2005. For most of Asia, the total land cultivated by smallholders comprises a sizeable portion of total agricultural land, rising to as much as 90% in some cases. Given the large incidence of low productivity and low value-added subsistence farming, primary agricultural production in large parts of Asia is well below its inherent potential. (Ref: Asia and Pacific Commission on Agricultural Statistics, April 2010). Land reform that would facilitate farm land consolidation to achieve economies of scale, mechanization and technology adoption has only been incremental due to political and social sensitivities, and archaic laws and restrictive regulations.

Water will be a key limiting factor

In China, water resources per hectare of cultivated land are just two-thirds of the world average level, while water resources are also geographically imbalanced with North China having 60% of cultivated land but only 20% of water resources. Underground water has been heavily relied on, which has resulted in a severe decline in water levels while the efficiency of irrigation is also low. Industrialisation and over-fertilisation have also heavily polluted water sources. In 2013, the government in China's Guangdong province reported that 44% of rice samples had excessive levels of cadmium. Likewise in India, the water table has been depleted due to excess consumption for food production. The agri sector, which currently accounts for 80% of India's water consumption by way of irrigation, is highly inefficient in its water usage pattern, and yet 65% of cultivable land has no irrigation facilities. According to IFC estimates, India is likely to have a 50% water deficit by the year 2030. Most water sources have also been contaminated by sewage and agricultural run-off.

Self-sufficiency policy

With the aim of improving living conditions for the rural poor – which accounted for the vast majority of Asia's population in the 1960s – governments in the region adopted self-sufficiency in food production as the key policy objective. This was also necessitated by the nature of consumption (with rice and pulses dominating the food basket). A self-sufficiency policy aims to have all food consumed domestically produced and controls

trade as a mechanism to achieve this goal. Farming improvements that followed substantially improved rural living conditions and also impacted food consumption patterns. Regional governments however continue to desire food security and support food self-sufficiency policies. Many of these programmes, which consist of either minimum purchase price floors or import quotas, have distorted local markets and caused overcapacities and distress and strained national budgets. Examples range from Thailand's rice programme to the Indian sugar market, and possibly also Indonesia's recent biofuel programme.

Rising rural wages

Most Asian countries are in transition in terms of the contribution of agriculture to GDP. On average, this has fallen from 30% in the early 1980s to between 10% and 15% today, with the contribution falling below 10% in China, Thailand and Malaysia. Commensurate to this transition was the acceleration in urbanisation led by China, Indonesia and Malaysia. The rapid growth of manufacturing growth across the region since the mid-1990s drew workers away from rural areas, resulting in a dwindling rural work force, except in a few economies. The resultant increase in rural wages is pushing up the cost of production in agriculture in Asian economies. The higher food prices that have resulted could undermine food security plans in the region, forcing governments to seek alternative origins for sourcing. This could also be an impetus to increase the degree and scope of/mechanisation of agricultural operations. (Ref: ODI, October 2014; Rural Wages in Asia; Steve Wiggins & Sharad Keats).

Impact of climate change

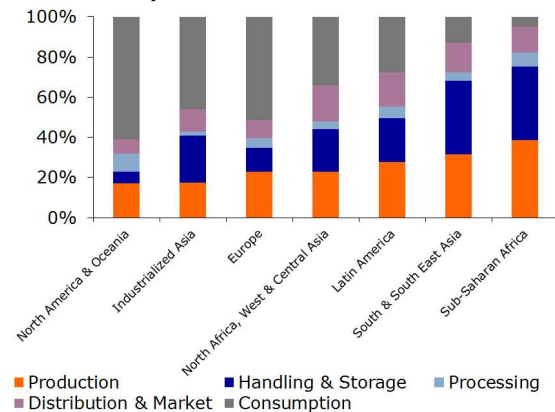
The threat of climate change, which is happening mainly in the tropical regions, is looming large over agricultural production in Asia. One study (Piao et al. 2010) estimates that the yield potential in China for major crops—rice, wheat, and maize—could fall from the 2000 baseline by 15% to 25% by 2050. Yields are expected to decline in tropical regions such as South and Southeast Asia through at least 2100. According to one estimate, relative to 1990, rice yields in Southeast Asia are projected to fall some 50% by 2100 (ADB, 2009). Climate factors would accentuate the already declining growth in cereal production.

The region lags in R&D spend in agriculture

Relative to the world as a whole, Asia's commitment to agricultural research as measured by public agricultural research and development (R&D) intensity—the ratio of public agricultural R&D spending to agricultural GDP—has been low. However, the region's spending on R&D has increased rapidly since the 1990s. This is reflected in Asia and the Pacific's growing share in global public agricultural R&D spending, which has contributed to Asia's agricultural productivity growth. Maintaining this commitment is essential, especially in light of the growing pressure on resources and the population and economic transformations taking place across Asia and the Pacific.

Is food production or the food supply system the real issue in Asia?

Figure 4: Food Lost or Wasted By Region and Stage in Value Chain, 2009 (per cent of kcal lost and wasted)



The World Resources Institute (WRI) estimates that Asia, with 17% of food produced subject to losses, compares well with developed economies of North America & Oceania (42%), industrialised Asia (24%) and Europe (22%). While the developed world incurs losses largely at the (downstream) consumption level, losses in South and South East Asia are mainly at the (upstream) production, handling and storage levels.

Investment in physical infrastructure (roads, ports, railway terminals)

Whilst agricultural production has increased, in general the market supply network remains a laggard. Recent investment has however been targeting supply chain and logistics systems and addressing the shift in consumption towards high value foods and increasing consumption of proteins. Regional disparities in physical infrastructure are critical barriers to higher efficiencies in the regional agriculture value chain. Whilst countries such as China and Malaysia have made tremendous improvements in intra-country transport facilities, regional transport infrastructure is patchy, inefficient, or non-existent. On the one hand, this increases the costs of logistics and on the other, it is an important cause of higher transit loss in agriculture output, and thus reduces supply to the market. There is an acute need for investment in improving transport infrastructure. Initiatives such as the New Silk Road and ASEAN Economic Community plan could, if properly executed, give a massive boost to regional agribusiness.

Storage and cold chain logistics

Improving storage and supply chain logistics can boost Asia's agribusiness in two ways. Firstly, they can reduce food loss and wastage in the upstream value chain. For example, grain storage in India is under severe pressure owing to the fact that buffer stocks with Food Corporation of India (FCI) have been, on average, double the national stocking norms. Consequently, the increasing amount of grain placed in open storage is prone to quality and quantity deterioration from pest and weather damage, underlining the urgent need for improvement in India's storage infrastructure. In China meanwhile, cold chain networks are suffering from poor operational control and unsophisticated technology, leading to frequent food safety incidents. Secondly, the currently inefficient food trade distribution could be standardised and streamlined by reducing the numerous layers of wholesalers and suppliers in Asia. The requirements for warehouses and temperature-controlled logistics will increase as Asian retail trade transitions from a 'wet market' to a modern retail format.

Technology investment to improve farm productivity and farm-business connectivity

Another important way of bolstering existing food supply is by increasing technological intervention at farm level. Whilst enhancing yield rates via conventional options such as hybrid seeds, integrated pest management programmes or better farming practices remain the primary drivers in this regard, other interventions like mechanisation adapted for small holding sizes, efficient water management systems and data management could increasingly find a place in Asian farms. High penetration levels of mobile communication technology could help the dissemination of frequent information on weather conditions, dedicated advice on nutrient and water management and the sharing of best practices in farming via mobile apps entrenching agribusiness connectivity. Rural e-commerce platforms like Alibaba's Taobao village, which connects farmers to consumers across China and promotes farm development through cloud computing, big data and rural finance could become the blueprint for similar developments in other Asian markets.

Emerging Asian companies leading Asia's integration into world agri-trade flows

In a world order of agricultural trade flows mostly originating from the Americas (grains, sugar, coffee, soya), Asia rules the global palm oil trade, with Indonesia and Malaysia as key origins. After India and the EU, China is the largest importer of palm oil sourced from Southeast Asia. Another prominent intra-Asian flow is that of aquaculture products from China and Thailand to the mature market of Japan. China's growing need for protein from animal origin makes it dependent on the US and Latin America (Argentina and Brazil for soybeans (animal feed) and Australia/New Zealand for meat (beef & lamb)). China is also the largest importer of milk powder (primarily from New Zealand) and now has an influential role in global dairy, with significant impact on the milk supplying regions. Increasing evidence of Asia's external dependence for food is also shown in the form of investment in production assets beyond trade, often driven by sovereign-backed businesses, as is the case in China. The rise of Asian commodity traders and fast-moving consumer group companies with regional and global ambitions in the last couple of decades, with these players joining the ranks of incumbent global players, has further boosted Asia's integration into the global soft commodity trade.

Asia agriculture 2.0: from farming to agribusiness

Asian agriculture policy has hitherto focused on creating self-sufficiency in food production. As food consumption continues to evolve and Asian countries become better integrated in global agri-trade, the agribusiness approach is likely to become more dominant in the Asian farm landscape, with leading farms becoming more integrated into the food value chain instead of subsistence and low value supply points.

From a market perspective, the direction of growth in Asian agriculture towards an agribusiness approach is almost inevitable. Firstly, limitations in increasing land for farming and stagnating yield growth potential from existing farmland are natural barriers to any substantial increase in agriculture production and creating the pull towards greater integration in world trade flows. Secondly, emerging Asian businesses and food demand from urbanised Asians are also pushing the regional agriculture practice in this direction. Emerging concerns regarding food safety and quality are pushing the sector towards full traceability in the food chain and thus also pushing the market towards the integrated agribusiness approach and supply chain alignments. This trend is most visible among Asian producers catering to some of the niche developed markets.

Annex 1: Country Profiles

China

The share of China's agricultural sector in its GDP has been consistently declining over the last decade,

declining to 9.2% in 2014 from 11.7% in 2005. During the same period, the proportion of the labour force employed by the agricultural sector has fallen from 45% in 2005 to 30% in 2014.

The declining share of agriculture in China's economy does not mean that agriculture is any less important than in the past. After all, rural China is still where 45% of its population (or 619 million people, almost double the population of the USA) lives, and a still sizeable number of 228 million people were employed in agriculture in 2014.

More importantly, despite limited resources and relatively high production costs, the government's strategic consideration is to ensure that China strives to maintain self-sufficiency in food grains and varying degrees of sufficiency for other agricultural products, such as feed grains, animal protein, dairy, oilseeds and sugar. Along with the urbanisation process, soaring labour costs owing to the increasing shortage of labour in the agricultural sector, environmental degradation and growing concern over food safety, Chinese agriculture is on the way to a transition which will involve rationalisation of the use of agrochemicals and fertilisers and increased mechanisation in production and harvesting.

An immediately related issue is the system of land ownership in China. Farmland is owned collectively by the village, but individual farmers are entitled to use small patches of land. This makes it difficult to engage modern farming machinery. Consequently, China will have to deepen its reform of the land system and allow consolidation of land by large operators to facilitate the modernisation of agricultural production.

China ranks among the world's largest producers of several agricultural products. For example, China is the world's largest producer of pork, aqua products, rice, many fruits (apples, grapes, tangerines, pears etc.), and the second largest producer of poultry, wheat and corn. And yet China only has 6% of the world's water resources and 7% of the world's arable land, with the task of feeding 22% of the global population.

Domestic demand for agricultural products and quality processed food products is growing, driven by income growth and urbanisation. However, limited land and water resources, a large population base, relatively low production efficiency, high production costs and consumer concerns over food safety have prompted China to further increase the share of imports in total food in recent years. China has been a net importer of food-related agricultural and processed products over the past five years. In 2014, China recorded an international trade deficit of USD 38 billion in primary and processed food products, almost a four-fold increase on the USD 8 billion deficit back in 2009. Oilseeds is by far the largest import item, accounting for 43% of China's total imports of primary and processed food products, making it the largest importer globally. In the meantime, China has become the world's largest importer of animal protein and dairy in recent years. In terms of trade flows, Brazil and the US jointly account for about 85% of China's soybean imports, Canada for 90% of China's rapeseed imports, EU and the US for over 82% of China's pork imports, Oceania and South America for over 95% of China's beef imports, and New Zealand alone contributes 83% of China's milk powder imports.

The self-sufficiency agenda and limited domestic resources, combined with the aspirations of domestic consumers to improve their living standards, are driving China's imports of agricultural and food products as well as its outbound M&A activities to secure offshore assets and supply. While the trend is unlikely to reverse, a slower growing China in its New Normal will nevertheless have a profound impact on global agricultural commodities markets. As suggested by evidence over the last few years, small changes in China's production, demand and inventory levels are increasing the volatility of global commodity prices markets and in turn, impacting domestic market prices. With its rising dependency on imports for agricultural and food products, it is becoming ever more challenging for the government to cope with food price inflation against the backdrop of a more volatile currency.

India

India's economic dependence on agriculture has consistently declined over several years. Provisional estimates for 2014-15 indicate that agriculture's share of national gross value added declined to 16.1% in 2014-15 from 17.2% in the previous year. On the other hand, the share of employment in agriculture was just under 55% in 2011-12, the last year for which data are available. This implies that gross value added per agriculture worker at current exchange rates was USD 940 compared with USD 5,024 for non-agricultural workers. This low gross value added in agriculture is a reflection of low average farm size (1.16 hectares in 2010-11) owing to the large rural population base and the predominance of small and marginal farm holdings (80% of the total below 2 Ha). With the average farmer earning just above the poverty line, this underlines the story of farming in India and underpins government policy in agriculture. Despite these challenges, India is among the world's top 10 producers for several agri-commodities like spices, milk, tea, coffee, sugar cane, amongst others. At USD 26 billion, agriculture constitutes about 8.3% of total annual exports in 2013-14 and is the fourth largest principal commodity exported. However, agricultural yields in several crops is lagging behind the world average despite growing farm input usage. High farming fragmentation, low use of technology and high dependence on the monsoon for irrigation continue to inhibit India's yield potential. With consumption patterns changing from mainly cereal to pulses and other high value items, India may need to depend on imports to serve domestic demand going forward.

On a positive note, emerging trends portend an evolving situation on the ground. Firstly, rural income is growing faster than urban income. Secondly, farmers are diversifying out of cereal production into high value and high yielding varieties of crops. Thirdly, as evidenced by the increasing share of agri-trade (the sum of exports and imports) in gross value added of agriculture from about 5% in 1990-91 to about 18% in 2013-14, domestic agriculture is becoming more integrated in the world market. The direct consequence is an improvement in farm income but more importantly, this is expected to introduce global best practices to an antiquated domestic farming system.

Post-harvest linkages remain an ongoing constraint on India's food & agriculture value chain. On average, goods pass through six or seven middlemen before reaching the ultimate consumer, resulting in large mark-ups and poor quality. The inevitable consequence is wide variation between retail and farm gate prices, creating opportunities for hoarding. To avoid transit and storage loss, farmers focus on immediate market needs and regulation via the Agricultural Produce Market Committee Act continues to encourage this practice rather than support growth of an optimised supply chain network. The emerging modern trade and online food retail channel could become the harbinger of change in India's agriculture value chain.

Indonesia

Indonesia's agricultural sector accounted for 13.4% of GDP and employed 34.3% of the population in 2014. Agri exports account for 25% of total exports. Indonesia is a net exporter of agricultural products. Total agricultural exports have averaged USD 85 billion per year in the past three years, and imports USD 24 billion. Indonesia is the world's largest producer and exporter of palm oil, as well as a leading player in other high value commodities such as cocoa, rubber and coffee. Indonesia is the second largest rubber producer accounting for almost 25% of global production. It remains the third largest cocoa producer and the fourth largest coffee producer accounting for 6-7% of global production.

Similar to Malaysia, palm oil is the most important commodity for the Indonesian agricultural sector, representing 21% of total exports. Rubber is another key agricultural export, which in 2011 generated earnings of USD 11 billion. With the decline in rubber prices however, export income has also declined to around USD 3 billion in 2015. On the import side, Indonesia is still heavily reliant on imports for staple food items such as wheat, soybeans/meal, corn, sugar and beef to fulfil the demand of its growing population. Although Indonesia imports rice, its import dependence is much lower at less than 10% of total demand. Indonesia fully

depends on imports for its wheat and soymeal requirement, whereas sugar imports account for almost 50% of domestic needs. For soybeans, corn and beef, 20-30% of domestic demand is met by imports. Indonesia is growing as a key livestock consuming nation with a self-sufficient poultry industry, though relying heavily on Australian imports for beef.

The livestock sector is limping back to normality with the recovery of the poultry industry. High cattle prices in global markets and supply constraints domestically nevertheless continue to challenge the domestic supply chain. After steps taken under the direction of the Indonesian government to cut breeder supply, the market is reaching a more balanced state. Demand for livestock products will continue to expand, though at a slower pace due to economic uncertainties and the impact of the weaker currency. The long term prospects for the sector continue to drive investment. Imports of feed commodities and soymeal are thus expected to increase in 2015/16 in line with growth of the livestock farming sector in 2016.

The palm industry will see better prospects driven by improved prices in 2016, though production growth will be marginal due to unfavourable weather. In the long term, the industry continues to face challenges on the sustainability front. The local biodiesel mandate remains a key driver for palm oil price movement. The productivity of cocoa and coffee plantations will also continue to be uncertain due to El Niño. Rubber producers will continue to feel pressure from low prices (in fact the lowest since the global financial crisis).

Over the past five years, the Indonesian agricultural sector has experienced a period of strong growth, with total value added growing at an average of 4% per year. The government has set the target for agricultural growth at 3.8% per annum for 2015-2019. However, despite these growth rates, Indonesia's agricultural sector continues to face challenges, notably in the form of poor infrastructure leading to multiple inefficiencies and increased costs. Furthermore, small-scale agricultural businesses are still finding it difficult to obtain finance for investment. Going forward, a key agenda item for the Indonesian government will be to improve self-sufficiency in rice, corn, sugar and beef.

Myanmar

Fishing and agriculture constitute 40% of GDP and employ 70% of the workforce. Myanmar's agricultural export values have remained roughly flat at USD 2.7 billion. Given its ample land and water resources in the most populous parts of the nation, agricultural production is mostly focused on producing row crops. Agricultural exports account for about one fourth of total exports.

Rice is the most important crop with an export value of USD 613 million, representing 23% of agricultural exports; expanding at a high pace of 25% per annum between 2004/05 and 2014/15. Other key agricultural products include corn, pulses, oilseed and animal protein. Myanmar is the leading producer globally of sesame seeds and the third largest producer of peanut oil, by volume. Myanmar is now the third largest fishery in South East Asia with an average annual production growth rate of 11.8% over the past decade, while export volumes have tripled to reach 450,000 metric tonnes (MT), mainly to Thailand and China. Myanmar is mostly self-sufficient in livestock and continues to develop rapidly driven by growing domestic demand. According to the Food and Agriculture Organisation (FAO), the livestock industry grew at high single-digit rates between 2007 and 2012. In 2015, Myanmar opened its doors to imports of high quality beef and pork from Japan, the US and Brazil to cater to growing domestic demand for meat with the opening up of the economy and concomitant influx of immigrants.

Going forward, agricultural growth will be led by grains and oilseeds and animal proteins development. Rice exports may continue to face headwinds given the importance of rice in the local diet. Recently, the government responded to the flooding in the country by halting rice exports to stabilise domestic prices. With sanctions now lifted, Myanmar is seen as an attractive destination for investment in agribusiness. Many

multinational and regional companies are looking to invest in Myanmar to leverage domestic consumption and low labour costs. Rubber, sugar and palm are seen as key plantation crops for investment and will continue to attract capital. Growth of livestock is driving investment in feed and animal nutrition industries. The market for pulses will continue to remain strong, with the continuous widening of the Indian deficit supporting pulse prices in 2016. According to the US Department of Agriculture (USDA), pulses production is expected to marginally increase in 2015/16.

Malaysia

Malaysia's agricultural sector remains important for its economy. In 2014, the sector contributed 6.9% to GDP and constituted 12.2% of total employment. Malaysia is a net exporter of agricultural products and agriculture makes up about 9% of total exports. Total agricultural exports have averaged USD 32 billion per year in the past three years, while imports averaged USD 23 billion per year

Palm oil, where Malaysia is the second largest producer and exporter globally, is the largest contributor to the Malaysian agricultural sector, representing close to half of total export earnings. Rubber, where Malaysia is the fourth largest producer globally, is another key contributor, though its share in exports shrank in 2014 given the protracted decline in rubber prices. Besides palm and rubber, Malaysia is a key processing base for cocoa in Asia. Malaysia depends on imports of key commodities like rice, sugar, corn, soymeal and corn. Malaysia more or less completely depends on imports to meet demand for sugar, corn and soymeal, whilst for rice the dependence on imports stands at around 35%.

Over the past decade, Malaysia's agricultural sector has benefited greatly from the palm oil sector, where production and export volumes have grown at average annual rates of 4% and 5% respectively. However, growth has slowed to 2-3% more recently (2009/10-2014/15) due to the fact that there was virtually no room for plantation expansion. Production declined by 1% in 2014/15 and is expected to decline by another 2% in 2015/16 to 19.4 million tonnes. Furthermore, labour shortages have been an obstacle to growth in recent years, as the agricultural sector found it difficult to attract local labour when competing with services and manufacturing sector. The palm industry witnessed record low prices in 2015 (the lowest since the global financial crisis), though palm oil producers are likely to benefit in 2016 given Rabobank's view that palm oil prices will rise due to supply constraints caused by El Niño.

For agro-food trade (barring palm and rubber), Malaysia is likely to remain a net importer as the path to food self-sufficiency continues to be challenging. The weak Malaysian ringgit, which softened by 19% in 2015, remains the key risk for the country's imports of commodities.

Malaysia is largely self-sufficient in poultry and has very high per capita consumption at 50kg per annum, on a par with developed markets. The industry nevertheless is expected to continue to expand. The lower commodity price outlook would further support the livestock sector and consumption of grain-based products. Limitations on incremental cultivable land, shortage of labour, increasing import dependence and weakening revenues from agricultural exports would appear to be the structural challenges for the Malaysian agricultural economy. Overall, the projected agriculture sector growth is pegged at a moderate 1.3% growth in 2016 given the challenging economic environment.

The Philippines

The Philippines' agricultural sector accounted for 11.3% of GDP and employed 30.4% of the population in 2014. Agri-exports account for about 6% of total exports and agricultural GDP has expanded at an average annual rate of 2% in the last 5 years.

The Philippines is a net importer of agricultural products. Total agricultural exports have averaged USD 6 billion per year over the past 3 years, while imports averaged USD 8.6 billion per year. However, exports were down 25% till November 2015, largely driven by lower commodity prices and declining export volumes. Coconut oil, where Philippines is the largest producer and exporter globally, represents 15% of agricultural exports. The Philippines is also the second largest exporter of bananas, with exports worth USD 1.1 billion in 2014 and constituting 14% of total agricultural exports. On the import side, wheat is the main agricultural import at 7.2% of total imports, with the majority coming from the US. For wheat and soymeal, the Philippines is completely dependent on imports, whereas the country maintains healthy self-sufficiency of close to 90% and above for rice, corn and pork. The beef and poultry sectors meet 20-25% of domestic requirements through imports.

Over the past decade, the Philippines' agricultural sector has experienced a period of moderate growth, with total value added for the sector growing at an annual average of 3.6%. However, the sector continues to be challenged by low productivity, outdated transportation infrastructure and vulnerability to weather. Going forward, government and private sector investments are expected to partially resolve these challenges as initiatives such as farm mechanisation seek to enhance productivity by increasing the use of technology.

In terms of agricultural exports, one key growth area is meat products. The Philippines' status of being free from avian flu and FMD places it in a unique position to export in the evolving ASEAN Economic Community (AEC), provided it can improve its production efficiencies and become more competitive. The coconut and banana sectors will continue to face headwinds in the near term due to supply constraints caused by El Niño in 2016. The livestock sector is expected to witness positive growth driven by the pork industry (given lower feed prices) and should also drive growth in feed demand. Rice imports are expected to rise in order to meet any shortfall in domestic production due to El Niño for the harvesting year 2015/16. The government intends to achieve growth of 3-4% for the agricultural sector in 2016. However considering weather disruption and subdued economic conditions at the global level, this growth target appears to be challenging.

Thailand

According to World Bank estimates, agriculture alone currently makes up for about 9% of Thailand's total GDP. Agricultural GDP has been growing at 2-3% per annum over the last five years. However growth has remained sluggish in 2013-14. Thailand has strong production in rice, sugar, cassava, rubber and seafood. Thailand is the largest producer of rubber (representing one-third of global production), the second largest in cassava, and the fourth largest in sugar production. Its strong agricultural industry makes Thailand a key global exporter. In 2014, agricultural exports amounted to USD 50 billion and accounted for 17% of total Thai exports. Thailand is the global leader in production and exports of natural rubber and cassava, the top exporter of rice (24% of global exports), the second largest exporter of sugar (15% of global exports), and the third largest exporter of palm oil. As for animal protein, Thailand is a leading exporter of poultry in Asia and used to be the top exporter of shrimps worldwide before the EMS disease struck the country in 2012. Thailand is also one of the world's top ten producers and exporters of processed food products, leading the beer export market in Asia and canned pineapple exports worldwide.

Despite declining production due to acreage shifts away from rice after the collapse of the populist rice buying programme, Thailand is likely to maintain its number one position as rice exporter in 2016 by exporting 10 million tonnes of rice. Sugar production is expected to decline due to unfavourable weather caused by El Niño, however exports will remain strong due to large carryover of stocks. The fate of the rubber industry also remains in doubt due to global over-supply, slow economic growth and lower crude prices despite the government's attempt to withdraw inventory from the market. The seafood sector, recovering from the impact of the EMS disease, continues to face uncertainty and volatility due to lower shrimp prices and further disease outbreaks. Shrimp production is expected to grow by 10% in 2016. Unlike seafood, the poultry industry may face challenging times due to reduced availability of breeder stocks on the back of a ban imposed by the

government on imports of birds from the US due to bird flu. Poultry exports will continue to face competition from other suppliers due to the relative strength of the Thai baht. Thailand is placed strongly and is expected to benefit from integration of the ASEAN economic community in rice, sugar and livestock industries driven by its competitiveness.

Vietnam

Vietnam has a broad agricultural base accounting for 18% of GDP and close to 70% of employment in agriculture. Agricultural GDP has grown by 3% per annum during the past 5 years (2011-2015). Vietnam is a strong producer of rubber, coffee, rice, cassava and seafood and has a significant position in the export markets for these products. Vietnam is the second largest producer of coffee (17% of the global market), the third largest producer of rubber (9% of the global market), the fifth largest producer of rice (6% of the global market) and has the world's fifth largest pig herd. As an exporter, Vietnam is the second largest in rice and coffee, the third largest in rubber and a significant exporter of seafood.

Vietnam exported USD 22 billion worth of agricultural products in 2014, up 11% from 2013. Seafood exports remains the most valuable component of agricultural exports at about USD 8.0 billion, representing 36% of total agricultural exports. Coffee follows with an export value of about USD 3.5 billion, translating to 15.7% of total agricultural exports. Rice exports bring in a value of about USD 3.0 billion, representing 13.5% of total agricultural exports. Major import items include feed commodities (especially soymeal), wheat, and dairy products.

Looking ahead, the agricultural sector holds promising prospects in 2016, with strong growth opportunities in livestock and the seafood sector. Coffee production is expected to grow despite lower rainfall but will face headwinds due to lower prices. Rice will maintain production in 2015/16 at the previous year's level and exports are likely to remain flat. Feed industry growth will be supported by growth of the livestock sector and will lead to stronger demand for feed commodities. According to the Vietnam Statistics Office, pork herd expansion is expected to lift production by 4% in 2016. The poultry industry will go through demand-supply discipline due to slight oversupply caused in 2015. Rubber also continues to face challenging times with low prices and the slowdown in China. The dairy industry is undergoing strong growth and transition with large investments in milk production systems.

The Vietnamese agri-industry is perceived to benefit further from economic and financial integration in South East Asia (the ASEAN Economic Community) with investments happening in the agricultural supply chain. Vietnam has also concluded a free trade agreement with the EU which is likely to boost trade in coffee, rice and seafood. Vietnam is part of the Trans Pacific Partnership (TPP), which is largely perceived to be beneficial for the country but could have an unfavourable impact on the livestock industry due to domestic inefficiencies and lower competitiveness. Although TPP ratification is pending and the full implications will take time to become clear, the focus of domestic industry has to shift towards improving the efficiency of production systems. The government has kept a growth target of 3-3.5% for 2016 and defined a 5-year plan, in which growth will be driven by modernisation, added value and large scale farming.

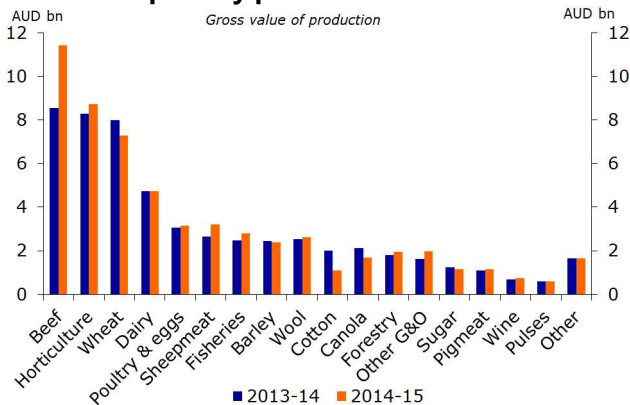
Australia

The Australian food and agricultural (F&A) sector is a relatively small but important contributor to the Australian economy, which these days is predominantly a services-based economy. Overall, the agricultural and food and beverage manufacturing sectors represented roughly 4% of total Australian industry gross value added in 2014-15.

Despite the gross value of agricultural production having expanded by nearly 50% over the past decade to

AUD 53.5 billion in 2014-15, the sector's relative contribution to the economy has declined somewhat over the period, largely owing to the rapid expansion of the mining and services sectors (ABARES, 2016). Nevertheless, strong demand for Australia's food and agricultural exports in the Asian region and a relatively robust domestic economy are expected to underpin a stabilisation in the relative economic contribution of the sector moving forward. Aside from primary production, food manufacturing is one of Australia's few remaining competitive manufacturing industries, and Australia's largest manufacturing sub-sector.

Figure 5: Gross value of Australian farm, forestry & fisheries primary production

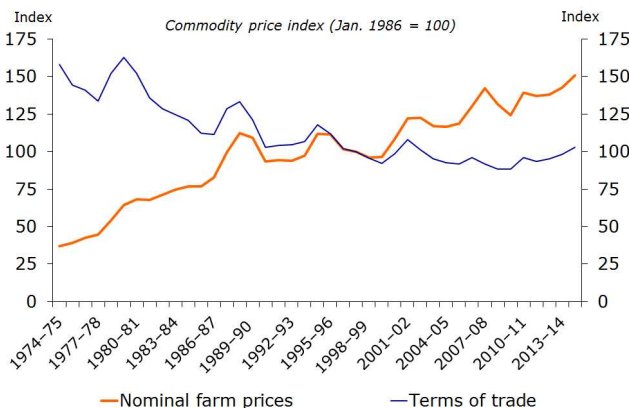


Source: ABARES, Rabobank, 2016

The four largest sub-sectors in Australia's agricultural sector are beef, grains and oilseeds, dairy and horticulture, but Australian farm, forestry and fisheries production is also very diverse (figure 5). While Australia's variable climate is a key systematic risk that all sub-sectors must manage, the sector's diversity gives it the capacity to diversify other more sub-sector idiosyncratic production and market risks. A snapshot of the gross value of production across the last two years reveals the sort of variation across sectors and seasons that is inherent in the Australian agricultural sector.

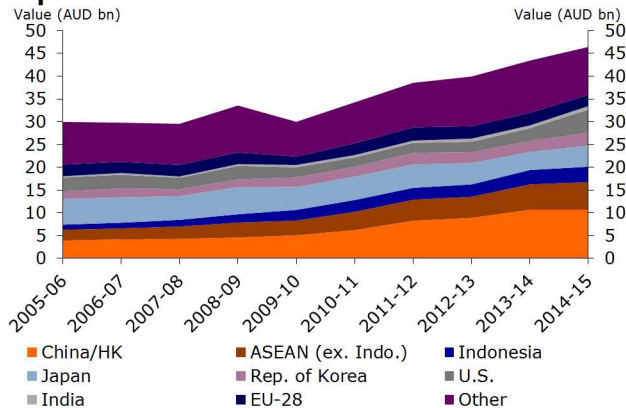
Until only recently, real prices received by Australian farmers for their agricultural products have been declining over a long period. The deflation experienced in farm prices has largely been a consequence of major agricultural producing countries around the world driving strong productivity gains through increased scale and production technologies, as well as the gradual deregulation of agricultural product markets and trade both at home and abroad. More recently, this trend has been reversed as new developing markets, particularly those in East Asia, have injected added demand for many of Australia's food and agricultural products.

Figure 6: Average prices received by Australian farmers



Source: ABARES, Rabobank, 2016

Figure 7: Value of Australian food & agricultural exports



Source: DFAT, Rabobank, 2016

Food and agricultural products contributed almost 15% of the value of Australia's exports in 2014-15 (ABARES, 2016). Australia's relatively small domestic market means that it plays a disproportionately large role in the global trade of wheat (world's fourth largest exporter by volume), dairy (fourth), beef (third), wool (first), cotton (third), sugar (third) and wine (fifth). Australia's exports of food and agricultural products have been steadily rising and increasingly destined for Asian markets over the past decade (figure 7).

To remain globally competitive, over recent decades Australian agriculture has had to embrace deregulation and the need to consolidate production and adopt greater scale economies. A natural consequence of this process has been a gradual fall in the number of agricultural businesses over recent decades but a commensurate increase in their average size. Debt levels have also increased significantly to enable farm aggregation (see also [Weernink & Kalf, 2016](#)), but from a low base relative to businesses in many other sectors of the economy.

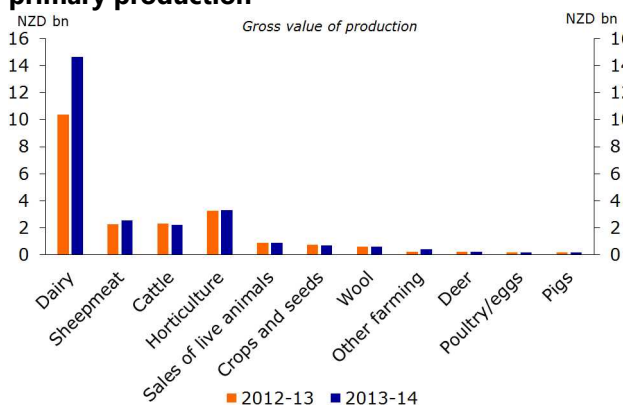
Average equity levels are generally still positioned at manageable levels in the Australian agricultural sector to account for the variability in income that farmers must contend with on an annual basis. At the same time, there is a growing need to maintain access to adequate streams of equity capital as the sector confronts the need for farm succession planning as owner-operators of family farms become older. Planning for this transition is increasingly becoming a priority, while new investment structures are likely to emerge to facilitate it. Corporate and institutional investment in Australian agriculture, from both domestic and foreign sources, is beginning to play an increasing role in this respect alongside the traditional family farming structure.

The influential role of Australian agriculture in global trade, as well as the developed and high income nature of Australia’s consumer market and stable geopolitical environment, has meant that foreign investment in the Australian food and agricultural sector has been a feature for some time. While the usual political sensitivities surrounding offshore investment in the sector have driven some recent changes in the approval and monitoring of foreign investment flows, it will remain an important source of capital for the sector into the foreseeable future that will see it become even further integrated into the global economy.

New Zealand

Many of the same characteristics and dynamics that describe the Australian food and agriculture sector are also typical of New Zealand’s food and agriculture sector, although the sector is a more significant contributor to the New Zealand economy. Primary agriculture, forestry and fishing represents roughly 6% of total New Zealand industry gross value added, while the food and beverage manufacturing sector contributes a further 3.5% to the economy. This relative contribution has declined by a little over one percentage point over the course of the last decade as the economy continued its transition to a services base, but has since stabilised.

Figure 8: Gross value of New Zealand farm primary production*



*NB: Equivalent data for the Forestry and Fisheries sub-sectors not available

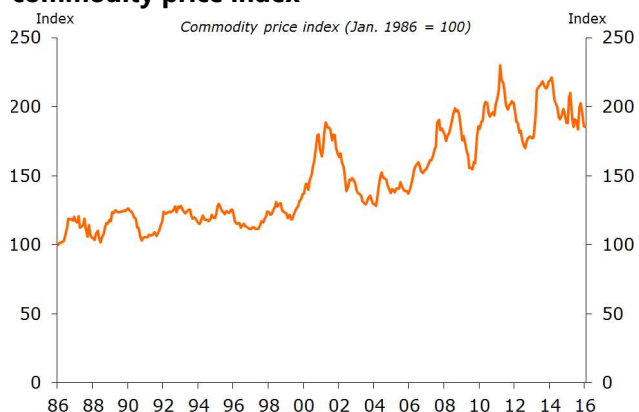
Source: NZ Treasury, Rabobank, 2016

The dairy sector is New Zealand’s largest agricultural sub-sector by some margin, while the sheep and beef, and horticulture sub-sectors are also major contributors (figure 8). While estimates of the gross value of production are not yet available beyond 2013-14, the more recent decline in global dairy prices and New Zealand dairy production is likely to weigh on the sector’s economic contribution in 2014-15, and particularly in 2015-16. At the same time, the other major sub-sectors have experienced buoyant trading conditions in recent times, helping to cushion this impact on the overall performance of the sector.

Prices received by New Zealand farmers have risen strongly over the past 10 years but displayed significant volatility over that period, largely stemming from the volatility in global dairy markets (figure 9). Dairy prices

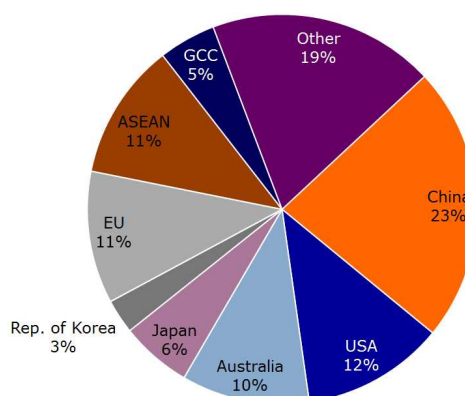
continue to trade at a significant discount to their 2013-14 highs, pulling down New Zealand's broader terms of trade despite some relief from the depreciating New Zealand dollar.

Figure 9: New Zealand dollar-denominated commodity price index



Source: ANZ, Rabobank, 2016

Figure 10: Value of New Zealand agriculture, forestry and fisheries exports by country, 2014-15



Source: Statistics NZ, Rabobank, 2016

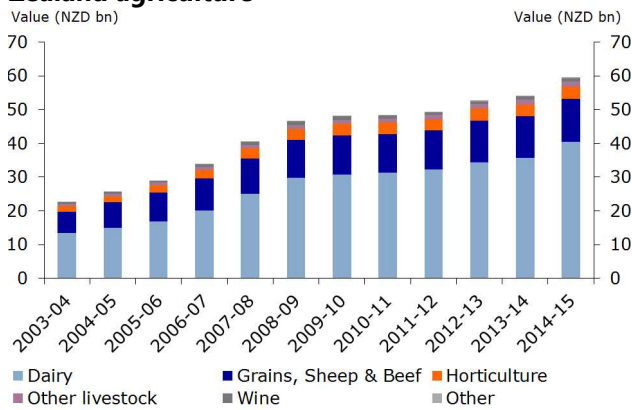
Agriculture, forestry and fisheries products contributed three-quarters of New Zealand's NZD 48.4 billion of merchandise trade in 2014-15. Dairy products alone represent roughly 30% of this figure. Exports have increased in value by almost 80% over the past ten years, with East Asian destinations (especially China) dramatically rising in share.

Much akin to its Australian counterpart, the New Zealand food and agricultural sector has had to embrace deregulation and open up to global competition over recent decades. As a consequence, the same use of leverage to pursue economies of scale and adoption of modern farming practices have been key to underpinning productivity gains that maintain the sector's global competitiveness.

On a somewhat less tangible level, New Zealand's global competitiveness and positioning in global markets is also underpinned by its 'clean, green' brand based on the integrity of its natural environment and its primary producers' strong record in environmental sustainability. However, in more recent times the rapid growth of the country's agricultural sector, especially the dairy sector, has posed growing risks to this well-founded reputation. As a consequence, increasing environmental regulation is being imposed on primary producers in order to protect this reputation. While this entails higher costs for the industry, over time the sector appears well placed to adapt its practices and better leverage this reputation in global markets.

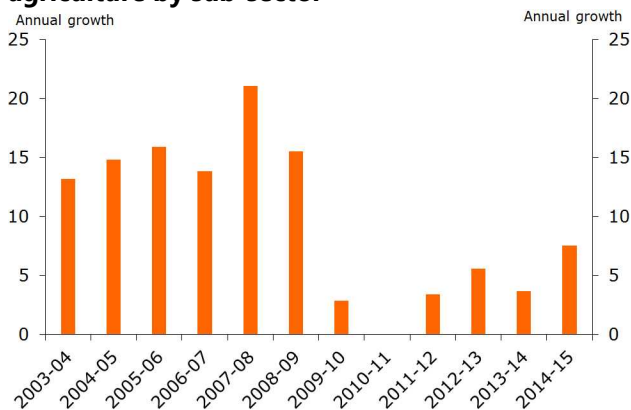
As farms have consolidated, less labour and increased capital inputs have been employed to make the remaining workforce more productive. Following a period of rapid growth, bank lending to the sector has slowed over recent years, notwithstanding the rise in 2014-15 in response to declining profitability in the dairy sector (figure 11).

Figure 11: Growth in total bank lending to New Zealand agriculture



Source: Reserve Bank of NZ, Rabobank, 2016

Figure 12: Value of bank lending to New Zealand agriculture by sub-sector



Source: Reserve Bank of NZ, Rabobank, 2016

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