Regional Outlook: Developed and East Asia

The *Outlook's* regional briefs highlight broad trends for the regions defined by the FAO in the implementation of its global work plan. Recognising the regional diversity, the intention is not to compare results across regions. Instead, these briefs illustrate some of the latest regional developments, highlighting responses to global challenges and emerging trends within them and relating these to the main messages of the *Outlook*. The assessments generally compare the end point of the *Outlook's* projection (2031) to the base period of 2019-21. This year, the large and diverse Asia Pacific region has been disaggregated into two separate briefs: Developed and East Asia, and South and Southeast Asia.

The impact of the COVID-19 pandemic, which is still playing out globally, and the response to it, differs across regions. While the briefs do not contain a specific quantitative assessment of the pandemic's impact, they reflect the latest available macro-economic projections and the extent to which the actions imposed to curb the spread of COVID-19 influenced this environment. Similarly, the impact of Russia's war against Ukraine may affect the various regions in the short term, but the briefs do not provide any quantitative analysis as to this impact. Consequently, the trends and issues presented in this chapter are those which are expected to underpin the *Outlook* as economies re-emerge from these recent unexpected shocks and assume that the effects on food, feed and fuel production, consumption and trade will gradually moderate.

Background

Urbanisation a key driver in an economically diverse region

The Developed and East Asia region[1] comprises a diverse range of countries with central roles in global markets. This includes The People's Republic of China (hereafter "China") and Japan, the world's second and third largest economies. With its 1.6 billion people, the region is the second most populous of those covered in this chapter, but its population growth of 0.1% p.a. is amongst the slowest over the coming decade. On a per capita basis, income levels range from USD 8 340 in China to USD 61 653 in Australia. Urbanisation has advanced rapidly across the region and by 2031, it is estimated that 74% of people will reside in urban settings, up from just 42% in 2000. Such urbanisation contributes to dietary change, underpinning rising consumption of higher value, as well as more processed and conveniently packaged food, and consequently rapid transformation of food systems. The region's agricultural resource base is severely constrained in China, Korea and Japan but abundant in both Australia and New Zealand.

At the regional level, per capita GDP declined by 0.7% in 2020, with decreases in the developed countries offset by continued growth in China of 1.9%. From an economic perspective, this makes it one of the

regions least affected by COVID-19. Its recovery was also one of the fastest. Regional growth rebounded by 5.4% in 2021, with broad recovery amongst all countries of the region – to the extent that average per capita income in 2021 was already 4.7% higher than in 2019. Over the next decade, per capita incomes are projected to grow by 3.4% per year implying incomes in 2031 that are 45% higher than the average of the base period. Rising income will be a key driver of demand in China, while consumer preferences may be more important in the high-income developed nations.

The share of primary agriculture and fish value added in the economy has declined to about 5.5% and is expected to fall to 4.5% by 2031. As economies have grown, the average share of food in total household expenditures were around 13% in the base period, but it ranged in the region from 17% in China to just 8% in Australia. Where the shares of food expenditures are high, price and income shocks may have a notable impact on food security within the region, but global shocks may be muted to some degree by domestic protection in some countries.[2]

The region encompasses a range of important exporters and importers of agricultural and food products. China and Japan are the world's largest and second largest net food commodity importers, and Korea is the sixth largest.[3] All these countries have a notable impact on global agricultural markets and value chains. Conversely, New Zealand and Australia are among the top 10 global net exporters of food commodities in value terms, particularly for livestock and dairy products. On the basis of specialisation in the region, there is extensive and growing interregional trade.

The region faces numerous and diverse challenges. Natural resources are constrained in China, Korea and Japan, and consequently, purchased inputs are often applied too intensively, raising issues of sustainability. Water resources in some areas have reached critically low levels. In Australia, droughts have become more frequent and severe, a phenomenon that is likely to continue in the face of climate change. In these contexts, continued investments in productivity growth in the region will be critical to future sustainability. Total factor productivity growth in the region in the last decade is estimated at 1.6% p.a., down from 2% p.a. in the preceding decade.[4] While output grew by 19% from 2010 to 2019, quality adjusted inputs grew by just 3%, as a labour input decline of 28% was more than offset by a substantial increase of 62% in capital, and 5% and 2% gains in materials and land use, respectively.

Animal diseases such as ASF and Avian Influenza continue as ongoing threats to meat production in the region and improved measures are required to manage these threats. With the exceptions of Australia and New Zealand, interventionist government policies play a critical role in domestic markets and given the significance of these countries in global markets, changes in their domestic policies have the potential for considerable impact on the world market.

Production

China's dominance in the region will continue to grow

Comprising just five countries, the region is the largest global producer of agriculture and fish commodities and, by 2031, is expected to account for 27% of the value of global output. China accounts for the bulk of this value – on average over the 2019-21 base period, its share in total agriculture and fish production in the Developed and East Asia region approached 90%. China is the only major driver of growth in the region, with its agriculture and fish output expected to expand by 20%, while in the rest of the region, modest gains in Australia and New Zealand are offset by reductions in Japan and Korea. Aside from recovery in the livestock sector following African Swine Fever (ASF), growth in the region as a whole has slowed with maturing domestic markets, evolving policies, open markets, and strengthened trade competition.

Given resource constraints, productivity gains are critical and the expected growth in agriculture and fish production value of 17.7% over the coming decade comes despite a 1% reduction in land used for

agriculture. An expected reduction of 1.8% in pastureland, across most of the region, is not fully offset by a 2.2% increase in land used for crops, mainly in Australia and New Zealand. The value generated per hectare of cropland is already higher in the Developed and East Asia region than any other region, but further gains of 1.3% p.a. are expected, due to shifts in the crop mix and yield gains attributed to progress in new seed varieties, improved production practices and expanded irrigation. The value of crop production is expected to rise by 1.6% p.a., increasing its share in total agriculture and fish production value from 61% currently to 63% by 2031. However, with water scarcity, and synthetic fertiliser use being the highest amongst all regions on a per hectare basis, there are mounting environmental and food safety concerns.

The region is a notable contributor to global output for several crops, including rice, maize and wheat. It also contributes a substantial share of protein meal and vegetable oil produced in the world, largely as a result of processing imported oilseeds. China is almost exclusively responsible for the region's maize production and further contributes more than 90% of its rice and 80% of its wheat output. China is expected to expand its area under maize production by 5% over the coming decade which, combined with yield gains of almost 7% by 2031, leads to production growth of 12%. Conversely, the area cultivated to rice and wheat is expected to contract by 2.5% and 2.4%, respectively. In the case of rice, yield gains of almost 9% and production growth of 6%, is sufficient to raise its share in the region's total production to 94% by 2031. Wheat yields are also expected to improve, but a 3.6% yield gain supports production growth of only 1.1%, resulting in a minor decline in China's share of regional production. Australia, where yield gains in excess of 11% on a fairly stable area contribute to an 8% increase in production by 2031, is expected to account for almost 60% of additional wheat produced in the region.

Livestock production only accounts for 21% of total agricultural and fish value in the region in the 2019-21 base period and this share is expected to decline further due to growth of only 14% by 2031, well below the 20% observed in crop production on a contracting land base. China is the largest contributor to livestock production, mainly from pork and poultry, which constitutes 56% and 28% of its total meat production, respectively. The Chinese pig meat sector accounts for 77% of the countries meat production growth in the coming decade. Having been severely affected by the African Swine Fever (ASF) outbreak, which reduced its pig inventory by 21% in 2019 and a further 3.3% in 2020, this growth occurs from a much-reduced base and largely reflects a recovery. China's pig herd is only expected to exceed 2018 levels by 2025. Nevertheless, production by2031 will be 5% above that of 2018. This is due to large-scale intensification in the sector as it recovered from ASF, with large numbers of smaller producers replaced by large, commercial production units that prioritise biosecurity. With its short production cycle, poultry production in China expanded rapidly from 2019-21, as the deficit in pork production left meat prices in the region at record highs. While this growth rate consolidates over the medium term, the region as a whole is set to increase production by 14% over the ten-year projection period. Despite its much smaller share in total meat production from the Developed and East Asian region, Australia's resource base is more conducive to bovines, which account for almost half of its total meat production. In turn, Australia contributes almost a quarter of bovine meat production from the region as a whole and, at 1.5% per annum, is the major driver of expanding bovine meat production in the region.

Nearly 40% of global fish production occurs in the region – 90% of which is sourced from China. Measured in real terms, the value of fish production from the region is projected to be 16% above current levels by 2031, constrained by the efficiency and sustainability changes set out in China's 14th Five Year Plan. At the regional level, a minor decline of -0.1% p.a. in captured fisheries contrasts to growth of 1.8% p.a. in aquaculture, which could account for more than three quarters of total fish production from the region by 2031.

Total agricultural GHG emissions by the region are projected to increase by 4.0% by 2031. Emissions from animal sources are projected to rise by 7.8%, reflecting a 5% and 8% rise in bovine herds and sheep flocks, respectively. However, emissions from crops are expected to fall by -0.2% over the ten-year period. Nevertheless, when considered relative to the value generated from agriculture and fisheries, the historic decline in GHG emissions per unit value produced is expected to continue, albeit at a slower rate.

Consumption

Notable shift to livestock products in diets

The modest decline in per capita GDP, combined with income support measures in developed countries implies that the impacts of COVID-19 on food security in 2020 were smaller than in most other regions. While the pandemic undoubtedly influenced consumer behaviour and agriculture supply chains, the prevalence of moderate to severe food insecurity increased only marginally in East Asia but declined in Oceania. Total calorie availability in the region declined by only 0.14%. By 2031, total calorie availability in the region is expected to increase by about 200 kcal/person/day to exceed 3460 kcal, 13% above the world average and the second highest amongst all regions.

Populations in many parts of the region are aging, with dependency ratios[5] in Japan and Korea set to increase to 53.2% and 38.2% by 2030, respectively. It is generally assumed that the aging population trend will have a dampening effect on growth rates of overall food consumption in these countries. Within the broader region, and China in particular, urbanised lifestyles will lead to growth in consumption of meats, fats and sugars, which will outpace most other food groups. Vegetable oil consumption is set to surpass 29kg per capita by 2031, exceeding the global average by more than 50%. Given the level of development and maturity in most countries in the region, the greatest dietary shift will occur in China, where consumption of animal products is expected to rise at the expense of basic cereals, such as rice.

Protein availability in the region is expected to rise by almost 9g/person/year by 2031, to exceed 115g/person/year by 2031. The major driver underpinning this gain is growth of 16% in average meat consumption in the region, adding 8kg/capita to current levels by 2031. This growth in meat consumption ranges from 18% in China, to less than 3% in higher income countries such as Japan, Australia and New Zealand. At regional level, fish consumption is also expected to grow by 13% or 5kg per capita by 2031 relative to the base period, which includes strong growth of 15% in China, along with an offsetting decline of 7% in Japan and 2% in New Zealand.

The region accounts for roughly a quarter of animal feed used globally and this share is expected to remain almost unchanged by 2031. Feed use is determined by a number of factors, including intensity of feed use in various production systems, and efficiency of feed conversion amongst different species. By 2031, feed use in the region is expected to expand by 14%, which includes a 16% increase in China due to rising demand from increasingly intensive pork and poultry operations. While these large scale, fully commercial systems use feed more intensively than smaller, more traditional producers, the combination of controlled environment and improved genetics also yields much improved feed conversion. Taking all these factors into account, total animal feed use in China is expected to grow marginally slower than animal feed production. In Australia and New Zealand, where production systems for dairy, beef and sheep are more flexible in terms of feed use intensity and more reliant on pasture, growth in feed use is lower, at 9% in New Zealand and 5% in Australia. In feed-intensive production systems, maize and protein meal remain the core ingredients in most pre-mixed feed rations and their use in animal feed across the region is expected to grow by 13% and 16%, respectively, over the coming decade.

This *Outlook* assumes that China does not fully implement the ambitious nationwide E10 mandate by 2031. Initially announced in 2017 with targeted implementation across most of the country by 2020, the mandate was aimed at eliminating excessive maize stocks. Stocks have declined and on average at the base period were around 20% below the 2015 peak. By 2031, stocks are only projected to rise by 2%, compared to a 15% rise in feed use and a 6% increase in total use. This provides limited incentive to expand ethanol production, hence the blend rate is maintained at 2% over the projection period. China produces almost all the ethanol in the region and, by 2031, is expected to account for around 8% of global ethanol production.

Trade

The region will remain the largest net importer of food

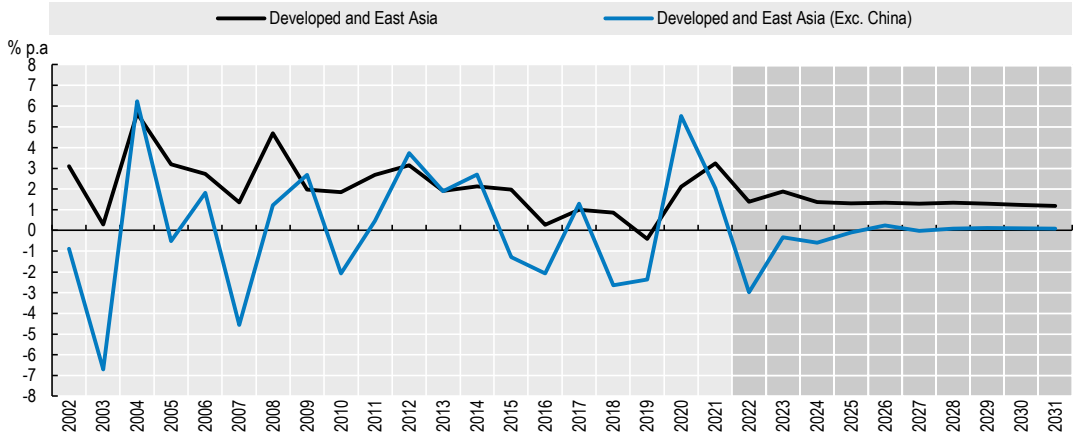
The region is the biggest net importer amongst those covered in the Outlook and its deficit is expected to grow by a further 9% by 2031. This position mainly emanates from imports into East Asia, particularly China and Japan, and masks net exports from the Oceanic region. The East Asian region is a major net importer of soybeans, maize, wheat, and livestock products, whereas the Oceanic region is a significant net exporter of wheat, barley, canola, sugar, meat and dairy products.

The net value of imports into the region is expected to rise 13% by 2031 relative to the 2019-21 base period. More than 80% of the additional imports accrue to China, the largest soybean importer in the world. Having declined in 2018 and 2019, due to a combination of trade actions and reduced demand from its diminished pig herd, Chinese soybean imports recovered to record levels in 2020, despite the logistical challenges and constraints associated with the ongoing COVID-19 pandemic. Core drivers were the rapid expansion of its poultry sector, as well as the recovery of its pig herd. These demand factors are expected to persist and with the trading environment generally less restrictive, soybean imports into China are set to rise by a further 16% by 2031. Consequently, China will account for 63% of global soybean trade. The animal feed sector is also driving additional demand for maize, but here China is less reliant on imports and accounts for only 11% of the world's imports. On the back of strong domestic production growth, maize imports are set to decline by 2031, bringing China's share of its global trade below 5%.

At the height of China's ASF outbreak, meat imports increased sharply, but these are set to decline by 25% over the coming decade as its own production continues to expand. Despite rising import demand into Korea over the same period, meat imports into the region are set to decline by 14%. A significant share of imports into East Asia will likely be met by rising exports from Oceania, where Australia's meat exports are set to rise by 27% – a gain of 516Kt. Around 80% of this rise is attributed to bovine meat.

The Oceanic region is a major exporter of numerous other products and most of these are expected to expand over the coming decade. By 2031, Australia's wheat exports are set to expand by 8%. This implies that its share in global wheat exports will decline to just below 10%, but in the short term, it may be an important supplier should exports from the Black Sea region be constrained by the war. Despite its small land area, New Zealand accounts for more than 30% of global sheep meat exports and for 23% of the world's dairy exports. With land used for pasture increasingly constrained and set to decline further by 2031, export growth is projected to slow for both dairy and sheep meat over the coming decade but remain sufficient to sustain New Zealand's share in global export at near current levels.

Figure 1. China a major driver of growth in agriculture and fish output in the Developed and East Asia region



Note: Estimates are based on historical time series from the FAOSTAT Value of Agricultural Production domain, which are extended with the *Outlook* database. Remaining products are trend-extended. The Net Value of Production uses own estimates for internal seed and feed use. Values are measured in constant 2014-2016 USD.

Source: FAO (2022). FAOSTAT Value of Agricultural Production Database, http://www.fao.org/faostat/en/#data/QV; OECD/FAO (2022), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en

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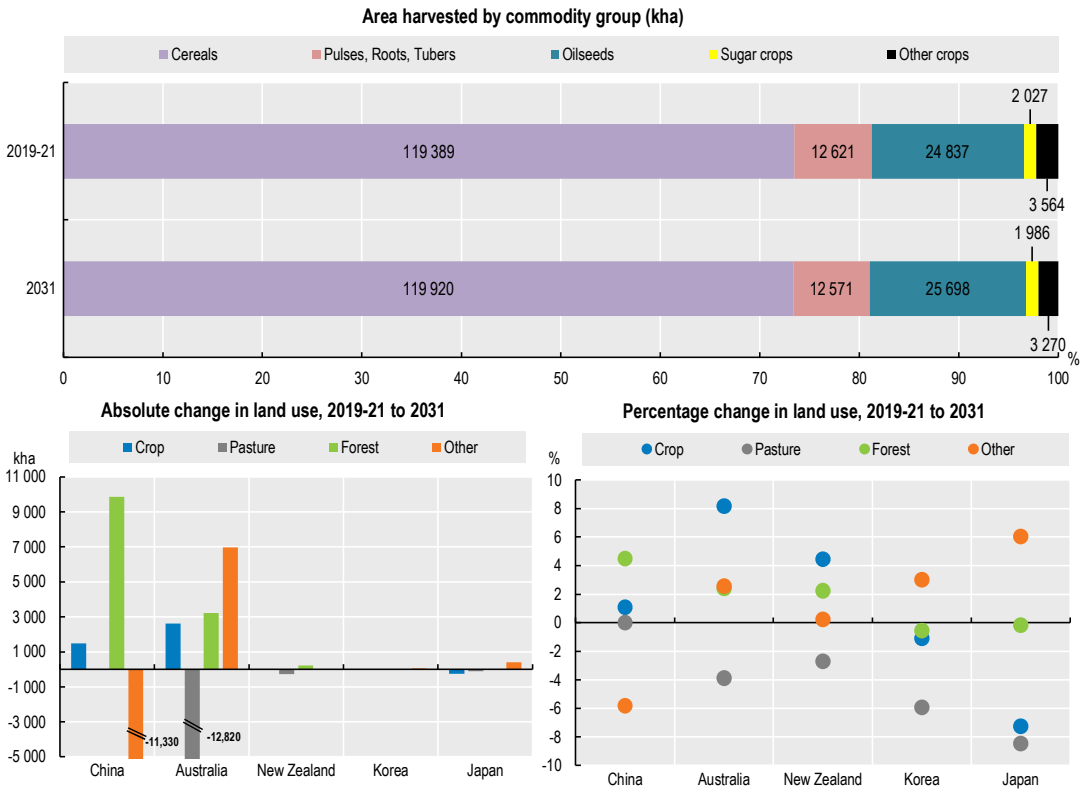
Figure 2. Change in area harvested and land use in Developed and East Asia



Source: OECD/FAO (2022), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en

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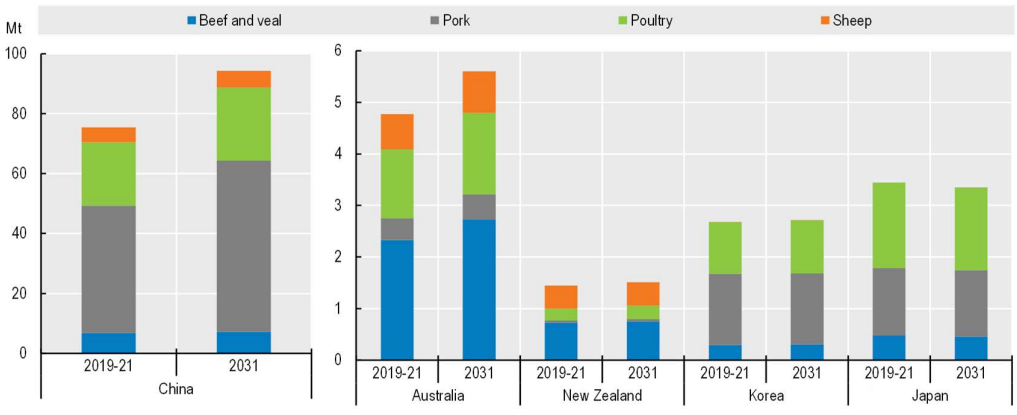
Figure 3. Livestock production in Developed and East Asia



Source: OECD/FAO (2022), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en

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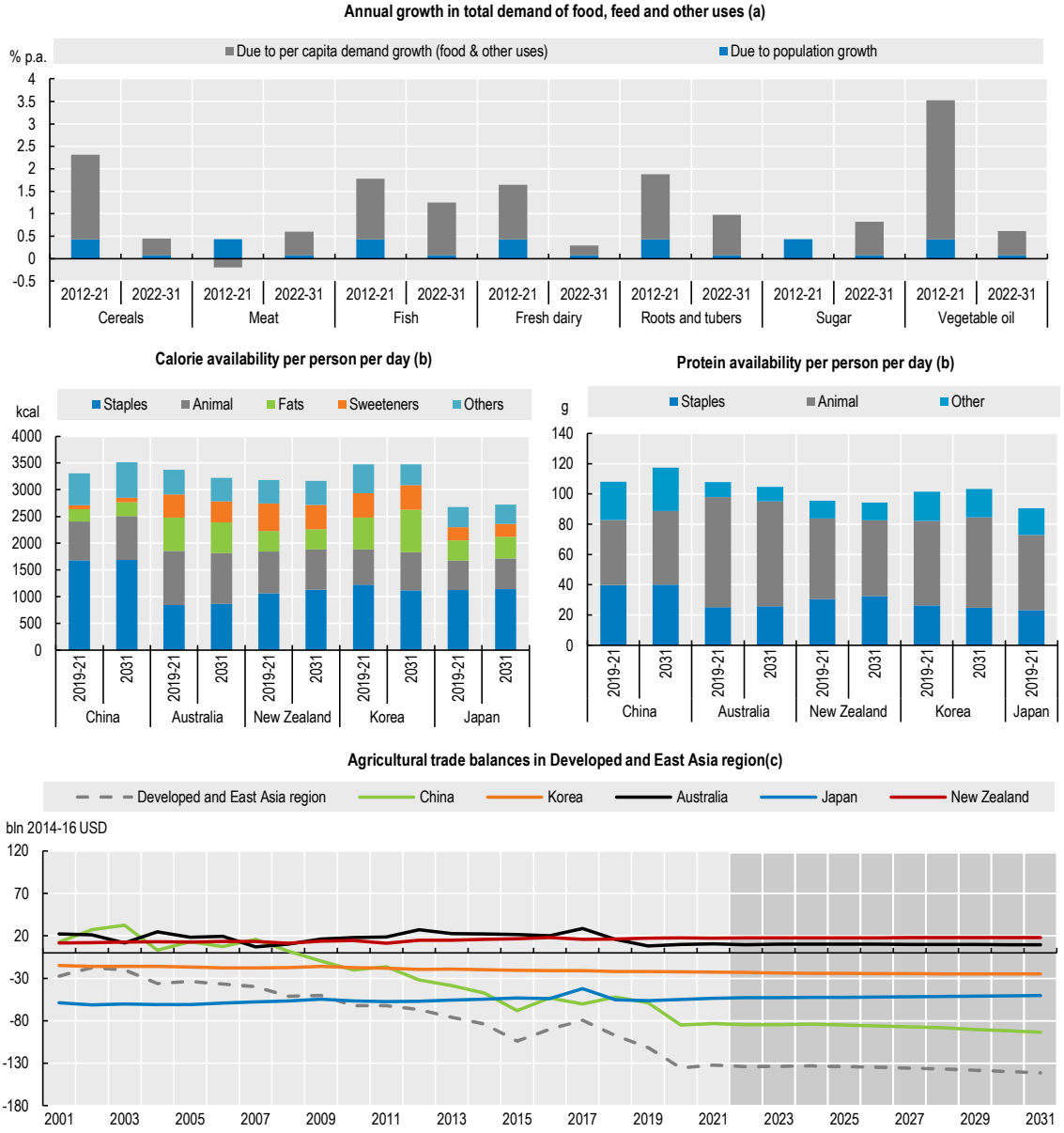
Figure 4. Demand for key commodities, food availability and agricultural trade balances in Developed and East Asia



Notes: Estimates are based on historical time series from the FAOSTAT Food Balance Sheets and trade indices databases and include products not covered by the *Outlook*. a) Population growth is calculated by assuming per capita demand constant at the level of the year preceding the decade. b) Fats: butter and oils; Animal: egg, fish, meat and dairy except for butter; Staples: cereals, oilseeds, pulses and roots. c) Include processed products, fisheries (not covered in the FAOSTAT trade index) based on outlook data.

Source: FAO (2022). FAOSTAT Food Balance Sheets and trade indices databases, http://www.fao.org/faostat/en/#data ; OECD/FAO (2022), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en

StatLink 2 https://stat.link/5yuf3l

Table 1. Regional Indicators: Developed and East Asia

	Average			%	Growth[2]	
	2009-11	2019-21 (base)	2031	Base to 2031	2012-21	2022-31
Macro assumptions						
Population ('000)	1 573 436	1 647 156	1 669 198	1.34	0.43	0.08
Per capita GDP[1] (kUSD)	9.09	12.97	18.85	45.31	3.37	3.44
Production (bln 2014-16 USD)						
Net value of agricultural and fisheries[3]	948.9	1109.4	1306.2	17.74	1.21	1.34
Net value of crop production[3]	540.8	681.2	816.1	19.80	2.07	1.63
Net value of livestock production[3]	244.7	233.3	265.0	13.57	-1.14	0.48
Net value of fish production[3]	163.4	194.9	225.1	15.52	1.39	1.34
Quantity produced (kt)						
Cereals	506 675	612 650	655 650	7.02	0.99	0.65
Pulses	6 782	8 363	9 809	17.28	3.04	0.91
Roots and tubers	38 912	45 614	49 031	7.49	1.59	0.56
Oilseeds[4]	28 019	33 622	35 634	5.98	1.17	0.49
Meat	88 091	87 759	107 469	22.46	-0.98	0.86
Dairy[5]	9 244	10 156	10 633	4.69	0.57	0.32
Fish	58 066	69 322	80 084	15.52	1.40	1.34
Sugar	15 355	15 033	15 605	3.80	-2.10	0.26
Vegetable oil	21 363	30 297	35 645	17.65	3.23	1.15
Biofuel production (mln L)						
Biodiesel	1 046	2 141	1 880	-12.20	4.01	-4.07
Ethanol	8 606	10 971	11 540	5.19	2.02	0.24
Land use (kha)						
Total agricultural land use	932 744	908 435	899 087	-1.03	-0.20	-0.10
Total land use for crop production6	171 872	173 481	177 333	2.22	-0.14	0.37
Total pasture land use[7]	760 872	734 954	721 754	-1.80	-0.21	-0.21
GHG Emissions (Mt CO2-eq)						
Total	936	886	922	4.04	-0.88	0.15
Crop	423	398	398	-0.15	-1.46	0.00
Animal	496	472	509	7.80	-0.35	0.29
Demand and food security						
Daily per capita caloric availability[8] (kcal)	3 045	3 259	3 464	6.27	0.63	0.39
Daily per capita protein availability[8](g)	94.0	106.4	115.3	8.34	0.94	0.52
Per capita food availability (kg/year)						
Staples[9]	162.2	164.0	164.8	0.47	0.11	0.03
Meat	46.4	47.4	55.1	16.20	0.16	0.48
Dairy[5]	4.8	5.4	5.5	3.37	1.34	0.25
Fish	30.7	35.9	40.5	12.69	1.13	1.20
Sugar	11.9	12.5	13.6	8.99	-0.07	0.73
Vegetable oil	20.3	26.5	29.1	9.78	2.99	0.54
Trade (bln 2014-16 USD)						
Net trade[3]	- 58	- 126	- 141	11.79	..	..
Value of exports[3]	102	118	134	13.26	0.37	1.20
Value of imports[3]	161	245	275	12.50	3.37	0.91
Self-sufficiency ratio10						
Cereals	96.2	91.3	93.3	2.27	-0.51	0.12
Meat	98.9	90.3	93.8	3.90	-1.22	0.27
Sugar	86.3	73.9	68.8	-6.94	-0.83	-0.81
Vegetable oil	66.9	69.3	72.6	4.82	0.12	0.53

Notes: 1 Per capita GDP in constant 2010 US dollars. 2. Least square growth rates (see glossary). 3. Net value of agricultural and fisheries data follows FAOSTAT methodology, based on the set of commodities represented in the Aglink-Cosimo model valued at average international reference prices for 2014-16. Projections for not included crops have been made on the basis of longer-term trends. 4. Oilseeds represent soybeans and other oilseeds. 5. Dairy includes butter, cheese, milk powders and fresh dairy products, expressed in milk solid equivalent units. 6. Crop Land use area accounts for multiple harvests of arable crops. 7. Pasture land use represents land available for grazing by ruminant animals. 8. Daily per capita calories/protein represent availability per capita per day, not intake. 9. Staples represent cereals, oilseeds, pulses, roots and tubers. 10. Self-sufficiency ratio calculated as Production / (Production + Imports - Exports)*100.
Sources: FAO (2022). FAOSTAT Food Balance Sheets and trade indices databases, http://www.fao.org/faostat/en/#data ; OECD/FAO (2022), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en

[1] Australia, China, Japan, Korea, New Zealand.

[2] Source OECD-FAO interpolated for 2019-21 from the database of the Global Trade Analysis Project (GTAP) 2011, using food expenditure and GDP data used in this *Outlook*.

[3] This analysis assumes the EU-27 as one integral region.

[4] (Fuglie, 2015[12]). Estimates are based on the International Agricultural Productivity dataset produced by the USDA. See https://www.ers.usda.gov/data-products/international-agricultural-productivity.

[5] The old age dependency ratio is calculated that the over 65 population divided by 15-64 population.