

2 Regional briefs

This chapter describes key trends and emerging issues facing the agricultural sector in the six FAO regions, i.e. Asia Pacific, which is split into Developed and East Asia and South and Southeast Asia, Sub-Saharan Africa, Near East and North Africa, Europe and Central Asia, North America, and Latin America and the Caribbean. It highlights the regional aspects of production, consumption, and trade projections for the period 2022-31 and provides background information on key regional issues.

2.1. Introduction

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.

This chapter is presented in seven sections, with text, tabular and graphic information for each region following a similar template. A background section provides the key regional characteristics and provides the setting from which the projection is described in the subsequent sections for production, consumption, and trade. Each regional brief contains an annex providing common charts and tables outlining the key aspects of the projection for the region.¹

2.2. Regional Outlook: Developed and East Asia

2.2.1. Background

Urbanisation a key driver in an economically diverse region

The Developed and East Asia region² 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.³

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.⁴ 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.⁵ 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.

2.2.2. 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 by 2031 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.

2.2.3. 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 ratios⁶ 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.

2.2.4. Trade

The region will remain the largest net importer of food

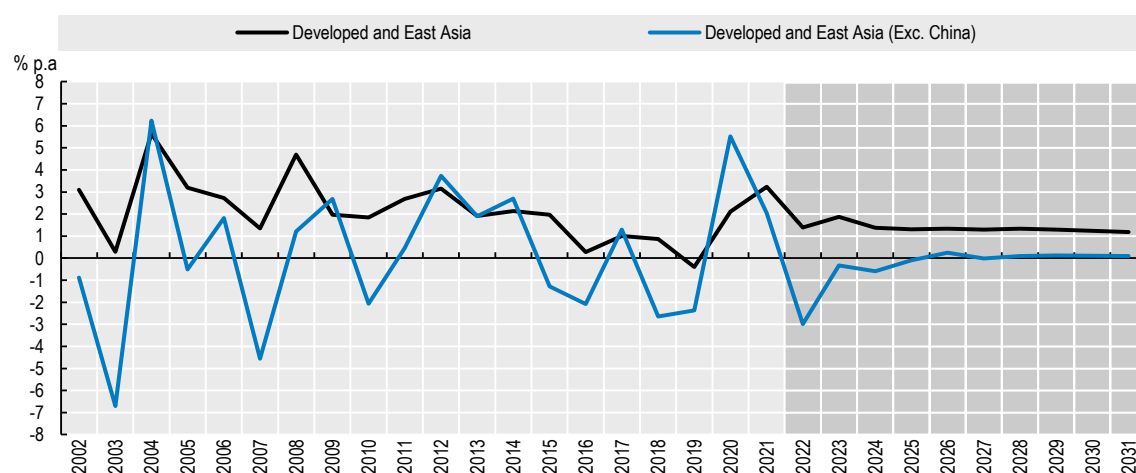
The region is the biggest net importer amongst those covered in the Outlook and its deficit is expected to grow by a further 9% by 2031. This position mainly emanates from imports into East Asia, particularly China and Japan, and masks net exports from the Oceanic region. The East Asian region is a major 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 2.1. China a major driver of growth in agriculture and fish output in the Developed and East Asia region

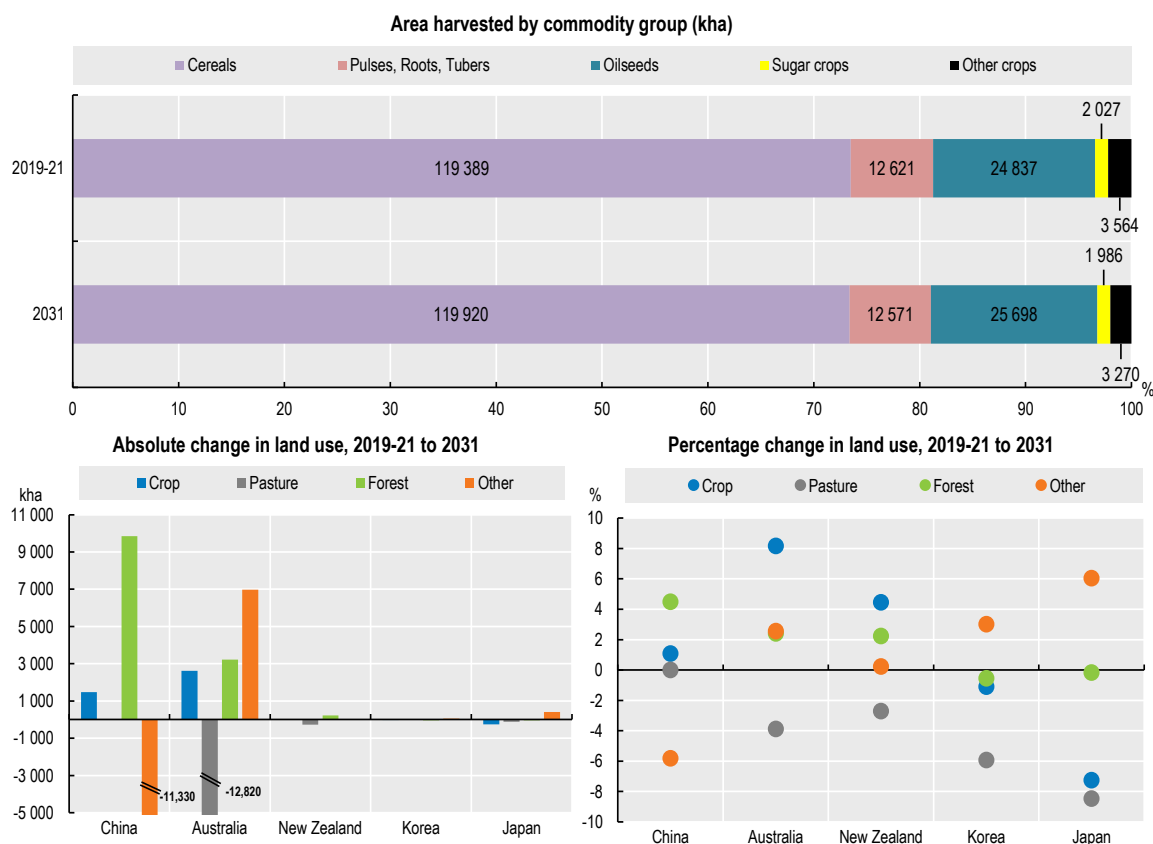


Note: Estimates are based on historical time series from the FAOSTAT Value of Agricultural Production domain, which are extended with the *Outlook* database. Remaining products are trend-extended. The Net Value of Production uses own estimates for internal seed and feed use. Values are measured in constant 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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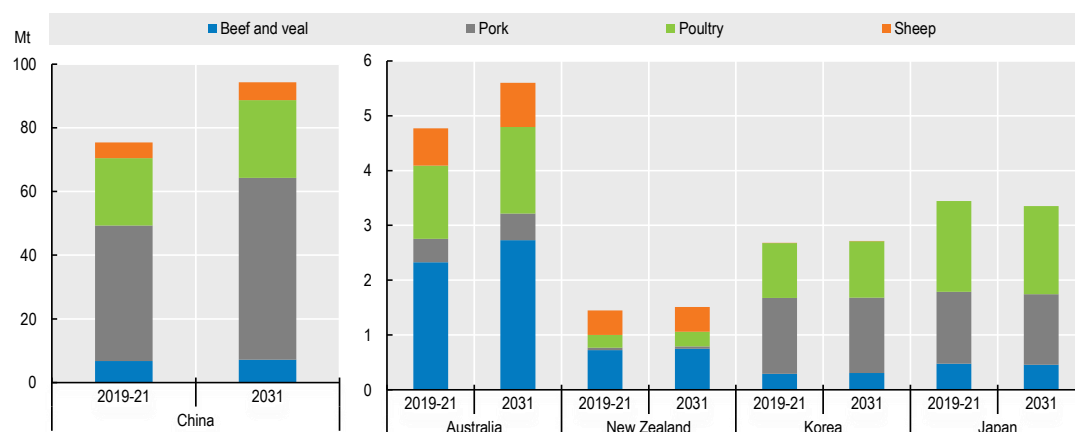
Figure 2.2. Change in area harvested and land use in Developed and East Asia



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 2.3. 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>


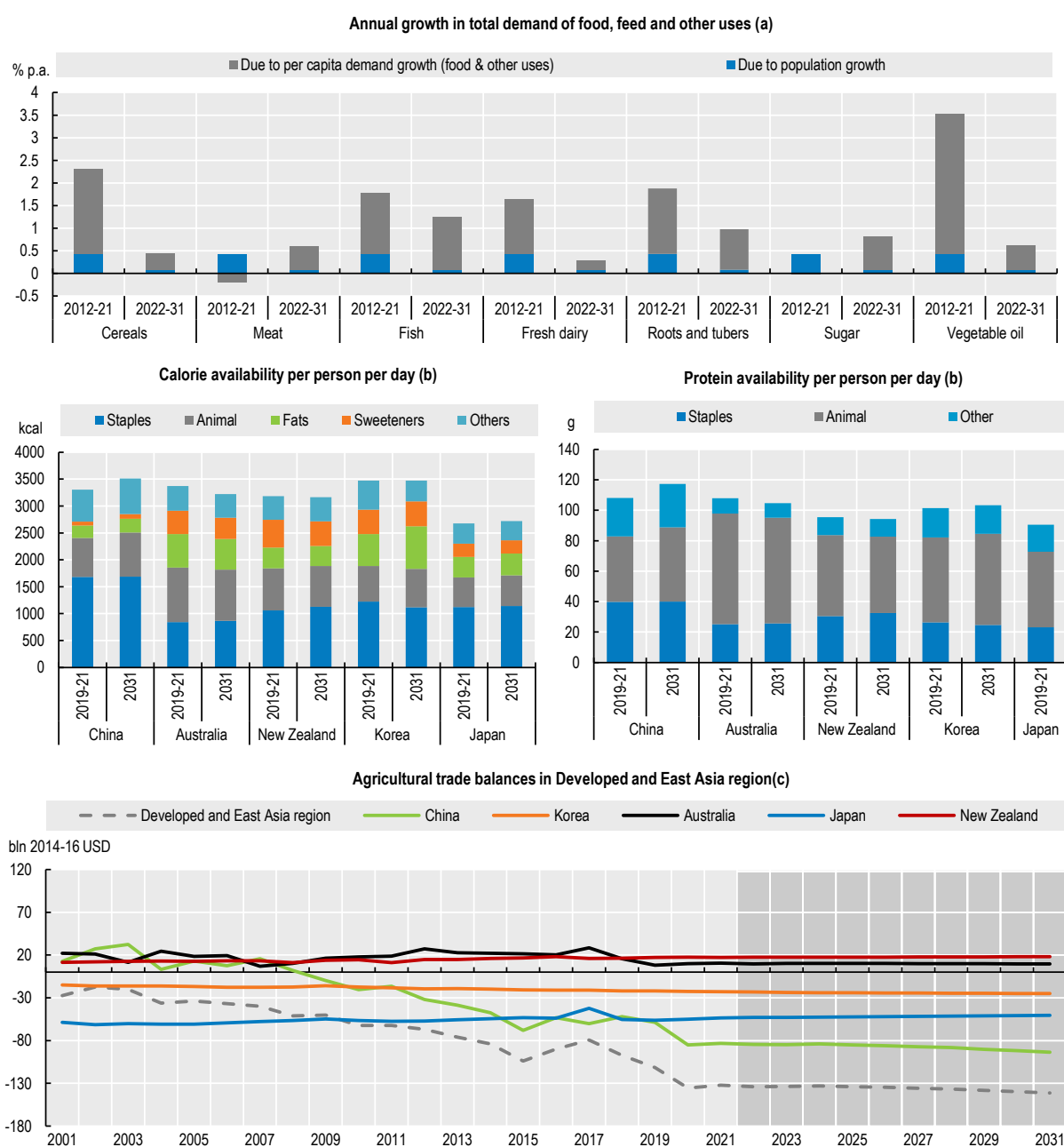
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Figure 2.4. Demand for key commodities, food availability and agricultural trade balances in Developed and East Asia



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>

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Table 2.1. 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 production ⁶	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 CO ₂ -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 ratio ¹⁰						
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 $\text{Production} / (\text{Production} + \text{Imports} - \text{Exports}) \times 100$.

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>

2.3. Regional outlook: South and Southeast Asia

2.3.1. Background

The South and Southeast Asia region⁷ comprises the largest population of those covered in this chapter. Of its 2.7 billion people, 34% of the global population, almost half live in India. Economically, there has been a wide range of performance within the region over the last several decades. Income per capita ranges from 1 157 USD in the least developed countries of Asia, to 56 900 USD in Singapore, but the overall average is just over 3 000 USD per capita.

Economic activity rebounded in 2021, with per capita GDP rising 4.5% after its COVID induced decline in 2020 of 5.2%. India was hardest hit with a decline of over 8% in 2020 but will recover above pre-pandemic levels in 2022. Economic growth is projected to be the strongest of any region over the next decade, but growth rates have mostly been marked down given weaker global economic prospects. Exceptions from this trend relate to countries endowed with energy or commodity reserves, which will benefit from high primary commodity prices. With such growth, the share of primary agriculture, fish and forestry is anticipated to continue its longer-term decline from a share of about 14%, in the base period to around 10% by 2031.

With economic growth the average share of food in household expenditures in the region has fallen to below 17%. However, for least developed countries this share is 30%⁸ and consequently the rise in food prices will have considerable impact on the food security of many in these countries in the early years of the Outlook period. With some 580 Mil ha of agricultural land, resources are relatively stretched with just 0.2ha/person compared to the world average of around 0.6ha/person. Nevertheless, the region has maintained a positive trade surplus in agricultural goods.

Resource pressures will intensify as population growth remains near 1% p.a. Total factor productivity growth, at 2% p.a., exceeded the global average of 1.4% p.a. in the last decade, which has facilitated economic growth.⁹ In the decade to 2019, output growth of near 3% p.a. was achieved by only 0.5% p.a. growth in inputs, primarily materials such as fertilisers, and to a lesser extent capital, as labour declined. But domestic demand for agricultural commodities is mounting. Urbanisation is rising across the region, the share of population residing in urban areas is expected to surpass 45% by 2031, from an average of 40% from 2019-21. With large parts of the region either vegetarian, averse to pig meat consumption or lactose intolerant, the evolution of consumer preferences as incomes grow, particularly with respect to animal product consumption, remains somewhat uncertain.

The region encompasses a range of important exporters and importers of various agricultural and food products. Historically, the region has a relatively small positive trade balance. Almost a quarter of the total value of agriculture and fish production has been exported in recent years. Exports are dominated by plant-based products, particularly rice and vegetable oil, where the region has a 79% and 61% share in global exports, respectively. The Southeast Asia region is considered a major player in Global Value Chains, specifically those involving vegetable oils and their further processed products.¹⁰

The main challenges facing the region relate to its ability to increase productivity and innovation, particularly in the face of climate change risks and the need to address food insecurity. Food insecurity remains high, with the region accounting for about one-third of the world's undernourished population. Achieving continued economic growth in a time of global uncertainty with respect to international markets is critical. Significant pressure has been exerted on its natural resource base – its natural capital – during periods of past development, particularly in countries of Southeast Asia, and innovative solutions are required. Key policy challenges concern the nature and extent of market intervention schemes and how they affect interactions with global markets.

2.3.2. Production

The South and Southeast Asian region is the second largest contributor to the total global output in value terms from agriculture and fisheries. Crop production accounts for the largest share, but livestock production is growing faster. An expansion of 25% in agricultural production projected by 2031 exceeds population growth, implying that agricultural output is set to rise in per capita terms.

Relative to 2019-21, crop production is expected to expand by 22%, accounting for 62% of total agricultural and fish output by 2031. Productivity gains are key to this expansion, as land used for crop production is only expected to increase by 1.3% over the ten-year period. In fact, growth in value per hectare of cropland accelerates over the projection period, to 1.6% p.a., reflecting intensification and enhanced productivity. The region counts amongst the leading contributors to global output for several products, including rice, vegetable oil, pulses and sugar. Apart from vegetable oil, where it remains stable, the regions share in global production is expected to rise for all the aforementioned products.

Cereal production is concentrated in India, Indonesia, Pakistan and LDC's such as Bangladesh, Cambodia and Myanmar. India alone accounts for around 70% of wheat and 40% of rice production and is expected to contribute 48% of additional rice production by 2031. Growth in rice production stems from productivity gains, with area expansion of around 2.5% in India and Least Developed Asia by 2031, compared to yield gains of 16.5%.

The region is the leading contributor to vegetable oil production globally, attributed to palm oil output in Malaysia and Indonesia. Particularly in Malaysia, this sector relies strongly on foreign labour and over the past two years, it has been challenged by the spread of COVID-19 and the associated restrictions on movement of people, exacerbating structural constraints that had already limited supply prior to the pandemic. While some recovery was evident in Indonesia, weather conditions in Malaysia further contributed to a 15-year low in production in 2021. Despite some recovery in 2022, the slowdown in the expansion of the mature oil palm area implies that production growth in both Indonesia and Malaysia will remain slower in the coming decade, but will still retain a combined share of 33% in global vegetable oil production.

Livestock products currently account for 22% of the value of agriculture and fish output and growth of 2.9% p.a. will lead to an expansion of this share to 25% by 2031. India and Pakistan are the biggest contributors to this growth, which emanates mainly from dairy products. Milk production growth of 41% by 2031 stems from a 21% expansion in the cow herd, despite a minor contraction in pastureland use, and a 17% improvement in milk yield per cow. Meat production is dominated by poultry, which will also account for more than 60% of additional meat production by 2031. Growth in this sector is largely a result of increased feed intensity and breeding improvements. Pork production in the region is limited and concentrated mainly in Viet Nam and Thailand. Following sharp reductions in 2019 and 2020 because of African Swine Fever (ASF), pork production in Viet Nam rebounded and increased by 5% in 2021. As production is dominated by small-scale producers, the recovery will take many years, such that production is not expected to surpass 2018 levels until 2024.

Fish production is an important contributor to agricultural production in the region at 15% of total value. However, growth of 15% by 2031 is the slowest amongst the three subsectors, eroding its contribution over time. Whilst captured fisheries is expected to remain stable, reflecting resource limitations, growth of 2.1% p.a. in aquaculture implies that it will surpass captured fisheries by 2027, accounting for 52% of total production by 2031.

Total direct GHG emissions from agriculture are set to rise by 8.8% by 2031 relative to 2019-21, driven predominantly by the livestock sector. While crop related emissions will remain stable, livestock related emissions, which reflect ruminant herd expansion, will increase at a rate consistent with the past decade at 1.1% p.a. By 2031, 29% of agriculture related GHG emissions globally will be attributable to the region.

2.3.3. Consumption

Years of positive progress in reducing food insecurity and undernourishment in the South and Southeast Asian region halted in 2020, largely due to the impact of the COVID-19 pandemic on income and food affordability. Particularly in Southern Asia, the prevalence of undernourishment rose above 15% for the first time in a decade and the number of undernourished people exceeded 300 million in 2020. The strong economic recovery in the Southern and Southeast Asia region, with income growth of 4.5% in 2021 and a further 4.7% expected in 2022 should help in overcoming short-term food insecurity, but the current spike in commodity prices may forestall much improvement. In the medium term, the combination of modest declines in population growth, accelerated income growth and consistent, albeit slow urbanisation, will support the continued evolution of dietary patterns, thus supporting demand for calorie and nutrient dense foods (Kelly, 2016^[1]) (Reardon et al., 2014^[2]). By 2031, average calorie availability in the region is projected to increase by almost 200 kcal/person/day to average just over 2 850 kcal, just 6.5% below the world average. Gains will be mainly driven by increased consumption of dairy products, meat and vegetable oils.

Cereals, particularly rice, remain the major source of calorie availability in the region. By 2031, 53% of total calories will come from cereals (of which almost 30% from rice). This compares to 55% from cereals and 31% from rice in 2019-21 and follows a modest expansion of 3.5% in per capita consumption of rice over the 10-year period, mainly in India. In Viet Nam and Indonesia, rice consumption is expected to decline, replaced with wheat.

Average protein intake remains well below the global average but will rise by 7 g/person/day to 75 g/person/day by 2031. This is underpinned by growing consumption of meat and dairy products. Meat consumption will grow from a small base to reach 15.5kg per capita by 2031 – still more than 20kg below the global average, reflecting limited meat consumption in India in particular. Poultry will account for more than half of additional consumption. Dairy product consumption is already well above the world level and growth of almost 30% in per capita consumption by 2031 will see it rise to 32% above the world average level. Fresh dairy consumption is expected to grow fastest, reflecting considerable growth in both India and Pakistan.

As livestock and dairy production grow, the combination of herd expansion, rising feed use intensity and efficiency gains will support growth of 26% in feed use by 2031. Maize constitutes the bulk of animal feed, but its share is smaller than in many other regions, with a further significant contribution from protein meal. Maize and protein meal used in animal feed are both expected to rise by 2.2% p.a., sufficient to keep the share of both products in total feed use fairly stable.

Increasing mandates, mainly in India, sees the region almost double its share in global ethanol use from 6.5% in 2019-21 to 11% by 2031. The region's share in global biodiesel use is currently much larger at 21% but is also expected to rise to 30% by 2031 – mainly as a result of gains in Indonesia and to a much lesser extent Malaysia and Thailand.

In Indonesia, the blending mandate is expected to direct domestic palm oil supplies to the biodiesel market. Together with strong short term price support for vegetable oil on the back of current supply limitations, this could help catalyse investment in the sector. However, land availability remains a constraint and a key contributing factor to the replanting delays in oil palm in recent years. This also underpins slower growth in the region's vegetable oil production over the outlook period, with production set to expand 17% by 2031, compared to 43% over the last decade.

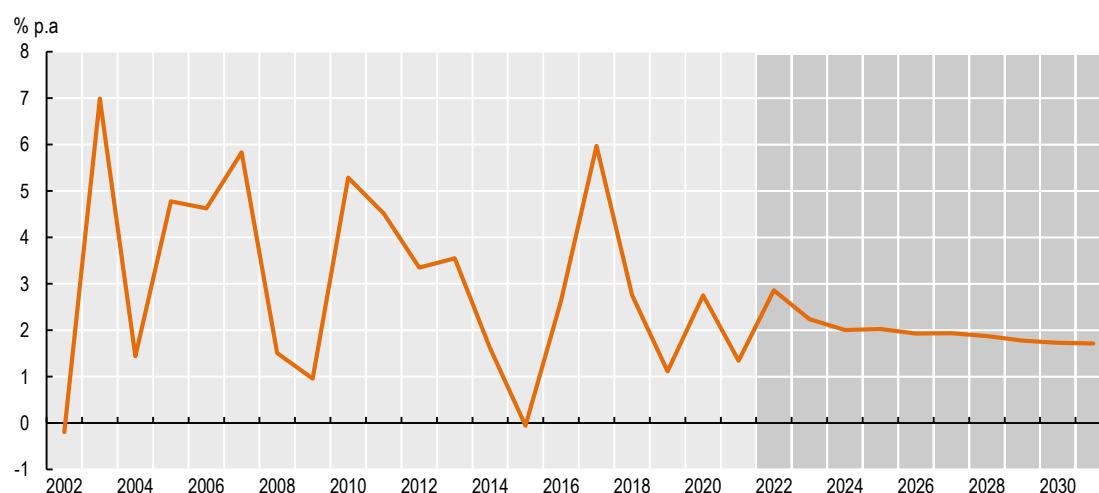
2.3.4. Trade

The region is currently still a small net exporter of agricultural commodities but is expected to record a minor deficit by 2031. This aggregate figure masks vast differences within the region. Both India and Southeast Asia are expected to remain net exporters, although India's trade surplus is expected to decline. By contrast, net imports from the LDC's and other developing countries of the region continue to rise.

The region is a major net exporter of rice, vegetable oil, fish and fresh fruit. Rice exports are expected to grow substantially, by an annual average of 3%, thereby increasing the region's share in global exports to 86% by 2031. This largely arises from India, accounting for 51% of additional exports, but strong growth is also projected in Thailand, Viet Nam and LDC's such as Myanmar. While Indonesia and Malaysia will remain leading vegetable oil exporters, the region's share in global exports will continue to decline. This is mainly the result of declining market share in Malaysia, whose palm oil exports are projected to rise by merely 0.6% p.a. Fish exports from the region are expected to decline over the next ten years, as consumption growth in the region outpaces production. A significant share of fish trade will occur within the region.

The region's dependence on imports of wheat, maize, oilseeds, protein meal and sugar are all set to rise by 2031. However, the share of total meat consumption supplied through imports is set to decline, with livestock production increasingly dependent on imported feed products. Viet Nam is the major driver of this trend, as pork imports fall precipitously from base period levels, which had increased sharply as a result of the ASF outbreak.

Figure 2.5. Slowing growth of agriculture and fish output in South and Southeast Asia region

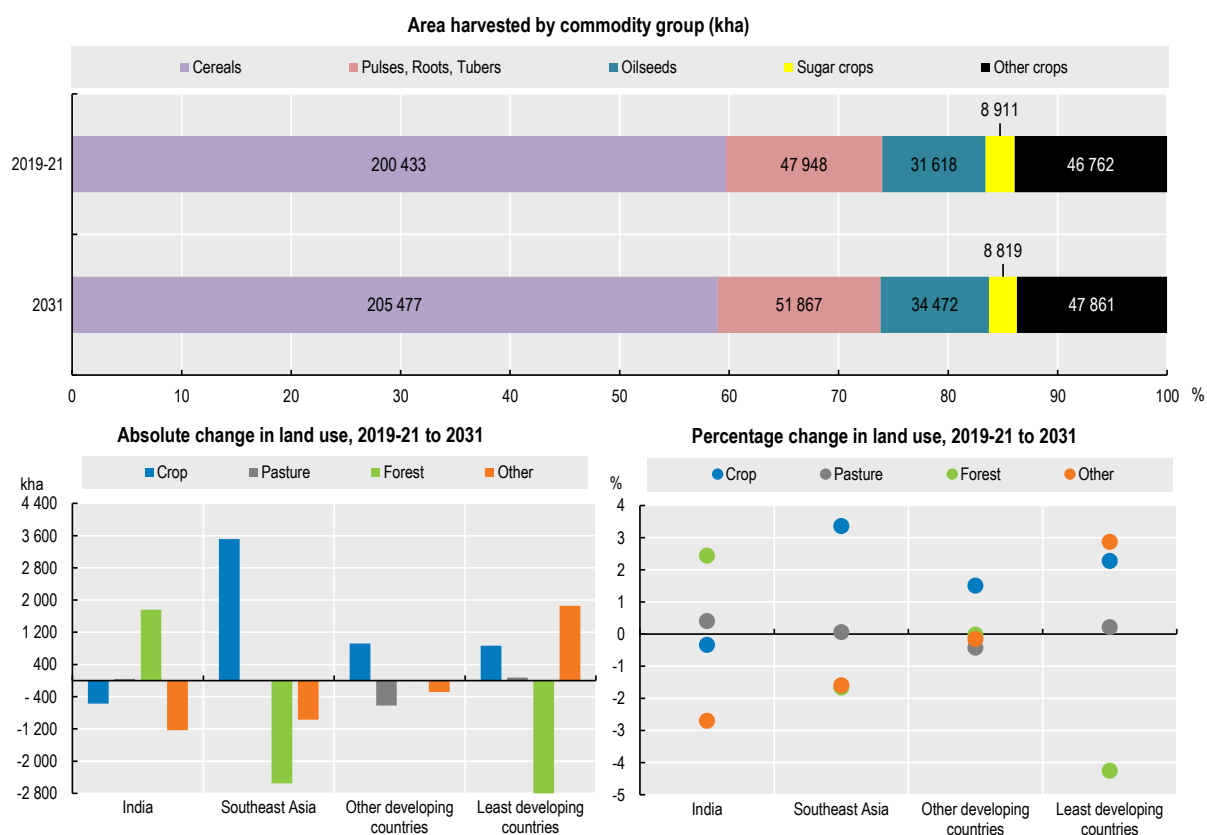


Note: Estimates are based on historical time series from the FAOSTAT Value of Agricultural Production domain, which are extended with the Outlook database. Remaining products are trend-extended. The Net Value of Production uses own estimates for internal seed and feed use. Values are measured in constant 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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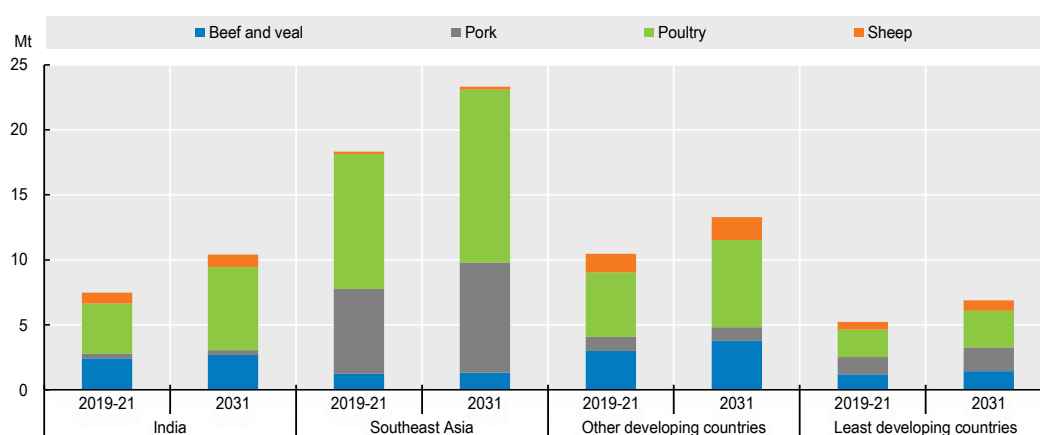
Figure 2.6. Change in area harvested and land use in South and Southeast Asia



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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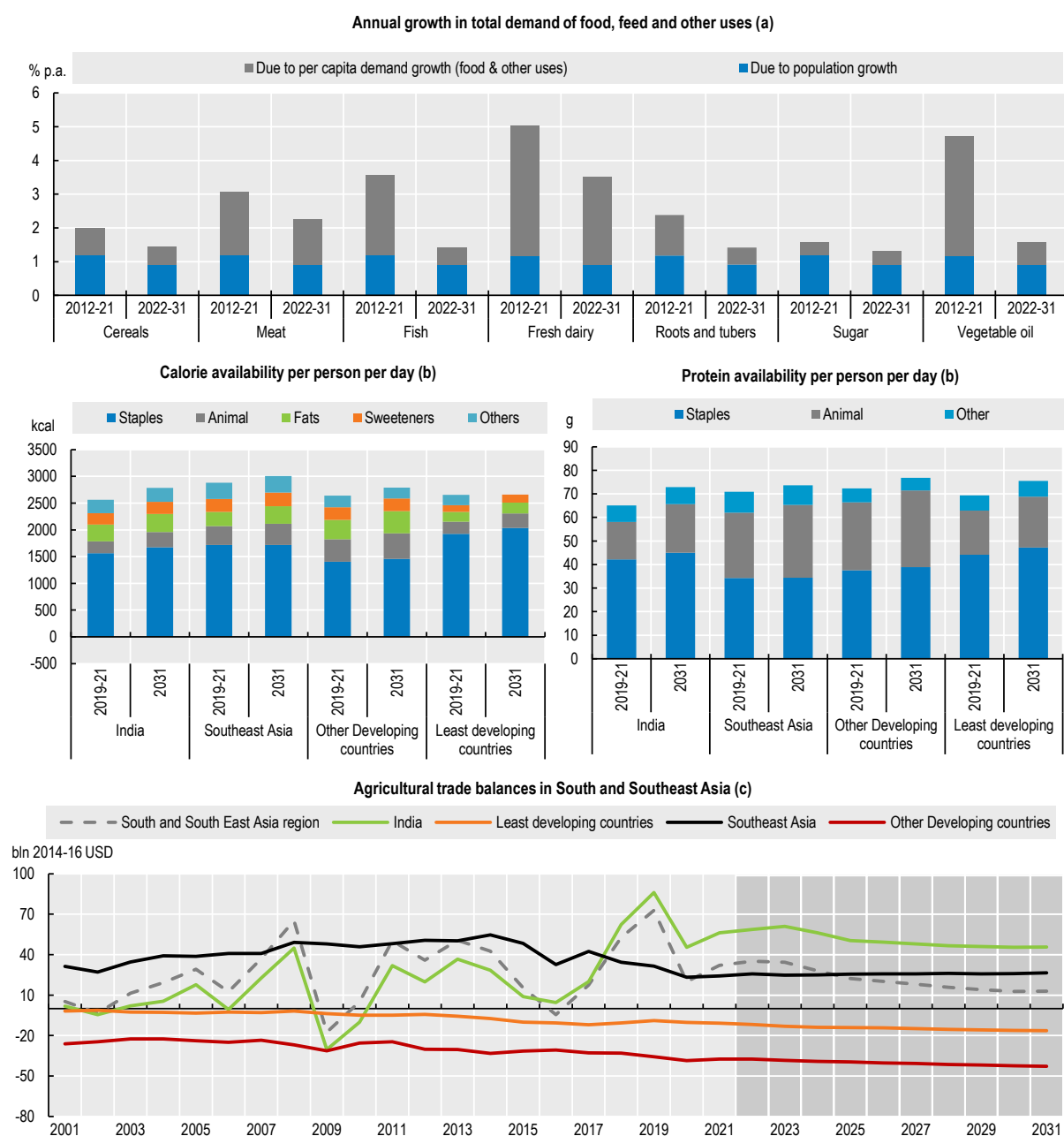
Figure 2.7. Livestock production in South and Southeast Asia



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

StatLink <https://stat.link/95l0tg>

Figure 2.8. Demand for key commodities, food availability and agricultural trade balances in South and Southeast 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>.


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Table 2.2. Regional Indicators: South and Southeast Asia

	Average			%	Growth ²	
	2009-11	2019-21 (base)	2031	Base to 2031	2012-21	2022-31
Macro assumptions						
Population ('000)	2 352 335	2 655 571	2 943 680	10.85	1.18	0.91
Per capita GDP ¹ (kUSD)	2.25	3.06	4.60	50.19	2.90	3.98
Production (bln 2014-16 USD)						
Net value of agricultural and fisheries ³	798.0	1049.6	1303.5	24.19	2.50	1.91
Net value of crop production ³	527.4	659.4	803.6	21.88	1.85	1.70
Net value of livestock production ³	159.9	233.1	318.8	36.76	3.91	2.87
Net value of fish production ³	110.6	157.1	181.0	15.25	3.32	1.24
Quantity produced (kt)						
Cereals	489 824	574 421	677 519	17.95	1.42	1.41
Pulses	24 831	36 298	45 798	26.17	4.47	1.77
Roots and tubers	36 890	51 325	62 559	21.89	2.87	1.70
Oilseeds ⁴	15 655	19 277	22 945	19.03	3.23	1.28
Meat	30 084	41 478	53 873	29.88	3.01	2.36
Dairy ⁵	27 913	42 951	60 829	41.62	4.66	3.28
Fish	39 278	55 184	63 596	15.24	3.19	1.24
Sugar	43 487	51 836	60 341	16.41	1.12	0.71
Vegetable oil	65 796	94 119	109 679	16.53	3.39	1.05
Biofuel production (mln L)						
Biodiesel	1926.03	12652.03	16824.01	32.97	15.04	1.31
Ethanol	3 644	7 456	15 977	114.29	6.17	5.87
Land use (kha)						
Total agricultural land use	566 906	579 933	584 168	0.73	0.25	0.05
Total land use for crop production ⁶	358 290	372 427	377 151	1.27	0.42	0.08
Total pasture land use ⁷	208 616	207 506	207 016	-0.24	-0.05	-0.02
GHG Emissions (Mt CO2-eq)						
Total	1 576	1 680	1 828	8.81	0.70	0.67
Crop	693	720	720	0.07	0.42	0.02
Animal	869	944	1 090	15.49	0.91	1.12
Demand and food security						
Daily per capita caloric availability ⁸ (kcal)	2 497	2 653	2 857	7.71	0.68	0.70
Daily per capita protein availability ⁸ (g)	61.6	67.9	74.5	9.74	0.9	0.9
Per capita food availability (kg/year)						
Staples ⁹	176.8	181.6	190.1	4.68	0.34	0.32
Meat	11.3	13.3	15.5	16.60	1.70	1.29
Dairy ⁵	12.7	16.7	21.3	27.21	3.11	2.29
Fish	12.4	15.0	16.1	7.48	1.69	0.60
Sugar	19.3	20.9	21.9	4.65	0.17	0.40
Vegetable oil	10.4	12.9	14.6	12.66	2.05	0.97
Trade (bln 2014-16 USD)						
Net trade ³	13	42	13	-69.01	..	..
Value of exports ³	165	239	259	8.48	3.10	0.65
Value of imports ³	153	197	246	24.81	3.76	1.92
Self-sufficiency ratio ¹⁰						
Cereals	96.1	92.2	92.6	0.37	-0.67	-0.04
Meat	93.6	96.5	97.4	0.97	-0.05	0.10
Sugar	94.9	96.4	93.4	-3.15	0.37	-0.62
Vegetable oil	146.5	131.3	123.5	-5.94	-1.27	-0.50

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. Oilseed represents 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 $\text{Production} / (\text{Production} + \text{Imports} - \text{Exports}) * 100$.
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>.

2.4. Regional outlook: Sub Saharan Africa

2.4.1. Background

Raising agricultural productivity is a major challenge

Sub-Saharan Africa is large and diverse, home to 14% of the world's population. Among the seven regions¹¹ in this chapter, its economic growth trends and demographic profile are striking. Population growth is the highest amongst the regions and despite rapid progress, urbanisation remains by far the slowest. By 2031, it is expected that the region will add some 334 million people compared to 2019-21, a growth rate of 2.5% p.a. The share of global population living in the region will increase to 16.5%. Although almost two thirds of the additional people in SSA will reside in urban areas, 52% of the population will still live in rural areas by 2031. This makes it the only region with more than half of the population residing in rural areas by 2031 and one of only two (along with Near East and North Africa) where the absolute size of the rural population is still expected to increase over the coming decade.

Economies in the region typically have a high dependency on resource-based commodities, such as agriculture, oil and metals. Agriculture, fish and forestry account for about 17% of GDP, and this is expected to decline to 15% by 2031. Economic growth, in per capita terms, is expected to be less robust than other emerging developing regions, rising by 1.3% p.a. Having contracted by 5% in 2020 during the COVID-19 pandemic, per capita GDP rebounded by only 1.1% in 2021, with a further 1% expected in 2022. The limited recovery, despite support from strong commodity prices globally, reflects the prolonged impact of economic restrictions to curb the spread of the pandemic, limited resources to support a recovery and persistent travel constraints that reduced the contribution from the tourism sector. At the projected rate of recovery, per capita GDP will only exceed pre-pandemic levels by 2025. Economic performance varies considerably within the region, with least developed economies growing faster, albeit from a lower base level. Average per capita incomes in the region are the lowest globally, at USD 1 719, and are projected to rise to USD 1 920 by 2031 in 2010 dollars. In least developed countries (LDC) in the region, average per capita incomes are only expected to reach USD 1 000 p.a.

Households in the region spend on average about 23% of their incomes on food, the highest amongst all regions. This share varies considerably by country, with the LDCs in the region spending on average 33%.¹² The high share of total income spent on food makes the region particularly vulnerable to the high food prices projected in the short term and this will have a significant impact on economic welfare, food security and nutritional diversity. Per capita calorie availability is already significantly lower than most other regions, which further magnifies the impact of the COVID-19 pandemic on food affordability and food security. The FAO's State of Food Security and Nutrition (2021) notes that the prevalence of undernourishment increased from 20.6% in 2019 to 24.1% in a single year in 2020, while the number of undernourished people in the region increased by 44 million. While the prevalence of undernourishment in the region had been increasing since 2018, the pandemic induced a rapid acceleration and the current high food price environment could slow progress further.

Sub Saharan Africa is an agro-ecologically diverse, land abundant region that accounts for 15% of global cropland and 20% of pasture. In many countries however, high population density in rural areas has resulted in the agricultural sector facing pressure from land shortages and declining plot sizes. Much of the land still available in the region is concentrated in few countries and/or is largely under forest cover. As a result, the region produced only 7% of the global value of agricultural and fish production in 2019-21. By contrast, the large population with its high consumption requirement and unique, staple dependant dietary composition resulted in the region accounting for 41% of the consumption of global roots and tuber and 13% of cereals, compared to only 7% of global sugar, and 6% of global vegetable oil and fish. The comparatively small share in global meat (4%) and fresh dairy (5%) consumption further reflects weaker purchasing power and low protein inclusion in diets across most of the region. Overall, Sub-Saharan Africa's self-sufficiency for major food commodities is decreasing, as the region's population is expanding beyond the pace of domestic supply growth.

Improving food security and reducing hunger in a low-income environment will remain one of the greatest challenges facing the region over the coming decade. Despite improvements and success stories in selected countries, productivity in most of the region remains low. Estimates indicate that total factor productivity in the region fell 2% over the decade to 2019, as extensive growth in inputs, primarily capital (including livestock) were not matched by growth in output¹³. Concentration of land abundance in a few countries implies that significant opportunities may arise to expand intra-regional trade, but costs need to be reduced to improve trade competitiveness. Over the outlook period, imports into the region are therefore expected to rise further. In an increasingly volatile global market, reducing the costs of trade and closing the productivity gap provides a significant opportunity for the region to supply more affordable food products to its growing population.

2.4.2. Production

Increased productivity is the key to growth

In net value-added terms, agricultural and fish production in SSA is expected to grow by an annual average of 2%. Given rapid population growth, this means that per capita production will continue to decline, a trend that has been evident since 2015 (Figure 2.9). Crop production is projected to account for 75% of total output by 2031, while the share of livestock products will remain fairly constant at 18%, and the share of fish production will decline marginally to 7%. Food and feed staples, such as cereals, pulses, roots, and tubers, will be the main sources of growth. In the case of cereals and roots and tubers, the region's global market share will rise over the outlook period. By 2031, the region may account for more than 40% of global roots and tubers output, 21% of pulses and 6.5% of cereals. Cotton production is set to expand by 1.5% p.a., increasing its share in the global market to 8% by 2031. About 70% of the region's cotton will be produced by LDCs of which a substantial share will come from West Africa where Burkina Faso and Benin are major contributors.

Growth of 25% in crop production over the coming decade will be underpinned by a combination of area expansion, changing crop mix and productivity gains. Expressed per unit of land used in agriculture, the real value of crop production will continue to grow by 1.9% p.a., reflecting some crop intensification. Intercropping with beans and cereals and occurs in many countries. Double cropping is also prevalent in tropical regions with bi-modal rainfall, as well as irrigated systems in Southern Africa, where soybeans and wheat are often produced consecutively in a single year. The expansion of rice cultivation in the region, notably in Nigeria, is also expected to be based upon multiple annual harvests.

While the region is considered land abundant, this is concentrated in a few countries, with Sudan, Madagascar, DRC, Mozambique, Angola, Congo Republic, CAR, Ethiopia and Zambia accounting for around 65% of land available for expansion (Chamberlain et al., 2014). Elsewhere, the ongoing expansion of agricultural land use is constrained by land fragmentation, conflict in some land abundant countries, and

the presence of other competing uses such as mining and urban sprawl. This accentuates the heightened importance of achieving productivity gains in the region.

Average cereal yields are projected to grow 22% over the outlook period, a similar rate to the past decade. Continued yields gains for most major crops stem from investments in locally adapted, improved crop varieties, and better management practices. While yield growth for most crops exceeds the rates projected at a global level, this occurs from a base which is often less than half the global average. Consequently, although the region's substantial gap relative to yields achieved in the rest of the world will narrow it will still remain substantial by 2031. Efforts to fully close the yield gap are constrained by the limited use of inputs, irrigation and infrastructure. Despite widespread implementation of fertiliser subsidy programs in many countries, fertiliser use is the lowest of all regions and, as a net importer of fertilisers, sharp cost increases in the short term could dampen purchases and use even further (Figure 2.10). With a strong reliance on dryland production and in the face of mounting ecological challenges, the region could be one of the most severely affected by climate change, suggesting that yield growth will have to be achieved in an increasingly volatile environment.

The net value of livestock production is projected to expand by 28% over the next ten years, with the fastest increases coming from milk and poultry. The region will add 10.5 Mt of milk and 2.9 Mt of meat by 2031, comprising 1.0 Mt of poultry, 894 Kt of bovine meat, 629 Kt of ovine meat and 362 Kt of pig meat.

Bovine and ovine production systems in the region are typically extensive and growth in the coming decade is fuelled by herd expansion more than productivity gains. In 2019-2021, the region accounted for only 7% of global bovine meat output yet almost 17% of the global bovine herd. The region's share in the global bovine herd is projected to expand to more than 19% by 2031, yet its share in global beef production will only increase by half a percent. Similarly, the region constitutes 14% of global ovine meat output, with 25% of the global ovine flock. Ovine meat production is expected to increase by 29% in the coming decade, with the region increasing its global share to 15%, but the region will still graze 28% of the global flock. However, the expansion of herds by 2031 will occur on an area of almost unchanged pastureland.

While extensive poultry production systems are still common in the region, a greater degree of intensification has been evident, particularly in countries such as South Africa that produce surplus feed grains. Albeit from a small base, feed intensity is expected to continue increasing in the region as supply chains modernise in countries such as Zambia and Tanzania, but many smaller producers continue to use non-grain, often informally procured feed inputs. In countries that already use feed more intensively, genetic improvements and better feed conversion over time will reduce the amount of feed required per animal. Overall in the region, the net effect results in feed use growing at a marginally faster rate than meat production. Some feed is used in fish production, which is expected to increase 14% by 2031. An expansion of 32% in the aquaculture sector compared to 13% for captured fisheries is from a small base and by 2031 aquaculture will still represent only 9% of the fish production, compared to 8% in the base period.

Based on these production projections, the region's direct greenhouse gas (GHG) emissions from agriculture are expected to grow by 14% by 2031 compared to the base period. Sub-Saharan Africa will account for 40% of the global increase in direct emissions from agriculture and as a result will account for 16% of global direct agriculture emissions by 2031. However, agricultural emissions per US\$ value of production in the region are expected to continue a declining trend.

2.4.3. Consumption

Slow but insufficient improvement in nutritional status

Most of the world's poor are concentrated in the region. The prevalence of undernourished individuals in the region is also the highest in the world. Poor food security was further exacerbated by the ongoing

COVID-19 pandemic. Supply chain disruptions, particularly in informal sectors, curbed accessibility, while income and employment shocks weakened affordability. The slow economic recovery will prolong affordability constraints, particularly in the high price environment projected in the short term. Food security and undernourishment will likely remain a challenge and even as income levels start to recover, a sustained recovery will require improvements in the availability, accessibility, affordability and utilisation of food supplies in the future.

The slow recovery in average income levels following the economic contraction in 2020 suggests that population growth remains the biggest driver of rising food consumption (Figure 2.13). This combination of rapid population growth and potential gains in per capita calorie availability, make the region one of the largest sources of additional demand for the global agricultural sector in the coming decade. The region's share in global food calorie consumption is anticipated to rise from 11.5% in the base period to 13.5% by 2031.

The contribution of staples to total calorie availability is higher in SSA than any other region. While per capita consumption of food staples is set to increase further by 2031, the share of food staples in total calorie availability remains fairly constant. For most other commodity groups, including meat, dairy, fish, sugar and vegetable oils, per capita consumption levels are currently the lowest in the world. While per capita consumption of dairy and vegetable oils is set to increase over the coming decade, for meat, fish and sugar it is set to decline due to the slow post pandemic recovery in income growth. This implies that dietary diversification will remain slow, but total food consumption will increase substantially for all commodities, due to rapid population growth.

Gains of 79 kcal/day over the outlook period will enable average calorie availability in the region to exceed 2 500 kcal/capita per day by 2031. This is well below the global average of 3 040 kcal/day and calorie intake in the region will still be the lowest in the world by 2031. Protein consumption is only expected to increase by 1.2g per person per day, predominantly from plant-based sources. While dairy consumption is expected to increase, this is more than offset by the decline in per capita meat and fish consumption over the next decade, limiting improvements in intake of vital nutrients and micronutrients.

Cereals are set to overtake roots and tubers over the coming decade as the main source of feed to the livestock sector. However, total feed use in the region is low, and will account for less than 4% of total animal feed consumed in the world by 2031, despite being home to 16% of the world's population.

2.4.4. Trade

Increasingly import dependant with slow progress in regional trade agreements

The region is expected to become increasingly reliant on imports to close the gap between domestic production and consumption. With few exceptions, most basic food commodities in the region are produced for domestic consumption rather than exports. However, many countries benefit from counter seasonality in the northern hemisphere and competitive labour costs, enabling net exports of high value fresh produce.

The trade deficit in major food items is anticipated to widen over the coming decade. Evaluated at constant (2014-16) global reference prices, the deficit is projected to grow significantly from about USD 9 billion to USD 26 billion by 2031.

Amidst the pandemic related challenges in 2020, cereal imports increased, while they decreased for meat, fish, vegetable oil and sugar. At the height of the pandemic's first wave, intraregional trade faced many logistical challenges, causing long delays at land border posts (Njiwa and Marwusi, 2020^[3]). With restrictions easing through latter waves of the pandemic as strategies adapted, imports also increased for meat, fish and cereals, but significant price increases dampened sugar and vegetable oil imports into the region. The region also continues to be affected by global problems such as container shortages, high

freight rates and rising local fuel costs, adding to the cost of trade in a region which already scores poorly in trade efficiency indicators such as the World Bank's logistics performance index.

Over the course of the next decade, imports of cereals, meat, fish, sugar and oils will rise substantially, at a faster rate than production. Wheat comprises almost half of the region's cereal imports and historically the Russian Federation (hereafter "Russia") has been the biggest supplier, with notable volumes also from Ukraine. Consequently, the evolution of Russia's war against Ukraine will heighten concerns on the availability and costs of imported wheat. Across most major commodities, exports will tend to decrease over time. The region is not self-sufficient in basic food staples and its import dependence is expected to deepen over the next decade. However, in the case of fresh fruit and vegetables, the real value of exports is expected to expand by 31% and 48%, respectively, by 2031. Consequently, the total value of agricultural exports in real (2014-16) terms could increase 23% by 2031.

In contrast to basic food crops, the bulk of cotton production is sold on global markets and more than 90% of cotton from the region will be exported by 2031. Most of this comes from the least-developed countries and the region's share in global exports is expected to increase marginally over the outlook period.

It has been a little more than a year since trading under the preferential arrangements of the African Continental Free Trade Area (AfCFTA) started. Its goal of improving internal trade is critical for the region's economic development, particularly in light of rising global uncertainties. The COVID-19 pandemic has resulted in delayed implementation and in 2020 intra-Africa trade declined to 16%, compared to a five-year average of 18%. Agricultural products constitute about a quarter of intra-Africa trade and supply chain disruptions because of the pandemic clearly diminished trade.

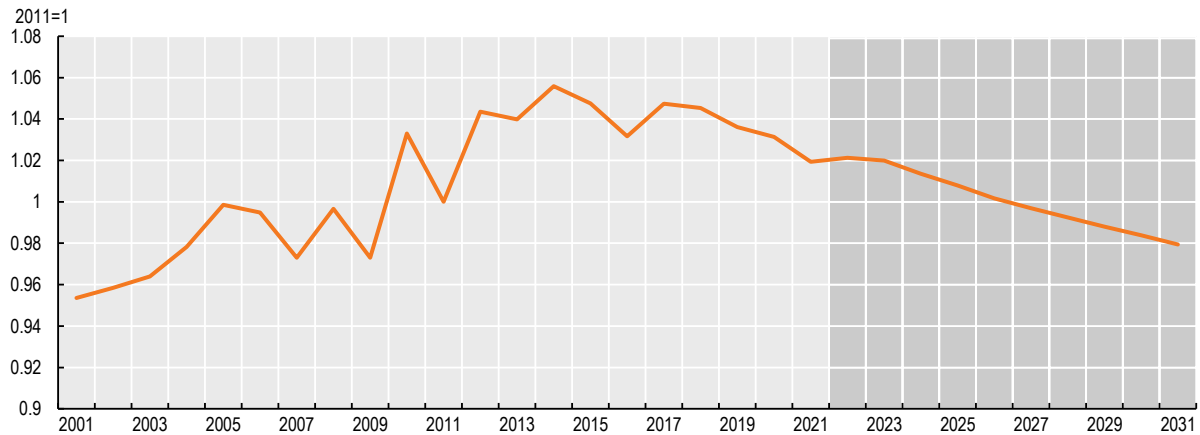
The ambition of the AfCFTA is to achieve a zero tariff rate on 90% of tariff lines, through a phased approach over a period of ten years for LDC's and five years for others. However, by January 2022, rules of origin agreements had only been reached on 88% of tariff lines. Other delays in progress emanate from some customs union members not ratifying the agreement. Botswana, South Sudan, Benin, Guinea-Bissau and Liberia have not yet ratified, which prevents several regional trade unions from fully trading under preferential terms, unless concessions can be made to allow the agreement to be implemented on an individual basis. Despite the slow start, some progress has been made and as many as 76% of the countries have deposited instruments of ratification. This essentially represents commitment to implement the agreement. While further engagements regarding rules of origin need to be concluded, the agreement will ultimately only exclude 3% of tariff lines and therefore has significant potential to increase intra-Africa trade in the medium term.

Over 50 countries have made market access commitments on trade in services that often complement and support trade in goods, while negotiations on the protocols covering investment, competition policy, intellectual property rights, digital trade and women and youth in trade are still ongoing to maximise the gains of the AfCFTA.¹⁴ A key enabling initiative is the recently launched Pan-African Payment and Settlement System (PAPSS) by the African Export-Import Bank (Afreximbank) and the AfCFTA Secretariat. PAPSS enables instant cross-border payments in respective local African currencies and effectively eliminates Africa's financial borders and formalises and integrates Africa's payment systems.

Apart from tariffs, a major factor constraining trade within the region is high non-tariff barriers. Although the agreement includes a mutual recognition of standards and licences, as well as the harmonisation of sanitary and phytosanitary (SPS) measures, many non-tariff barriers are more difficult to remove or reduce. The non-tariff costs of trade on the continent, as estimated from the ESCAP-World Bank trade cost data, are estimated at an *ad valorem* equivalent of around 283%. Moreover, these are over 300% for agricultural products¹⁵ and more than 100% higher compared to non-agricultural manufacturing. A major contributor in this regard is the high cost of road transportation, which emanates from poor infrastructure, as well as inefficiencies at border posts. This is supported by the presence of only six SSA countries in the top half of the World Bank's logistical performance index ranking, which covers 160 countries in total. Based on

the regulations implemented to date, and the need to finalise tariff reduction schedules and sensitive product lists, no discernible impact was included in the baseline projection this year.

Figure 2.9. Per capita net value of agriculture and fish production in Sub Saharan Africa

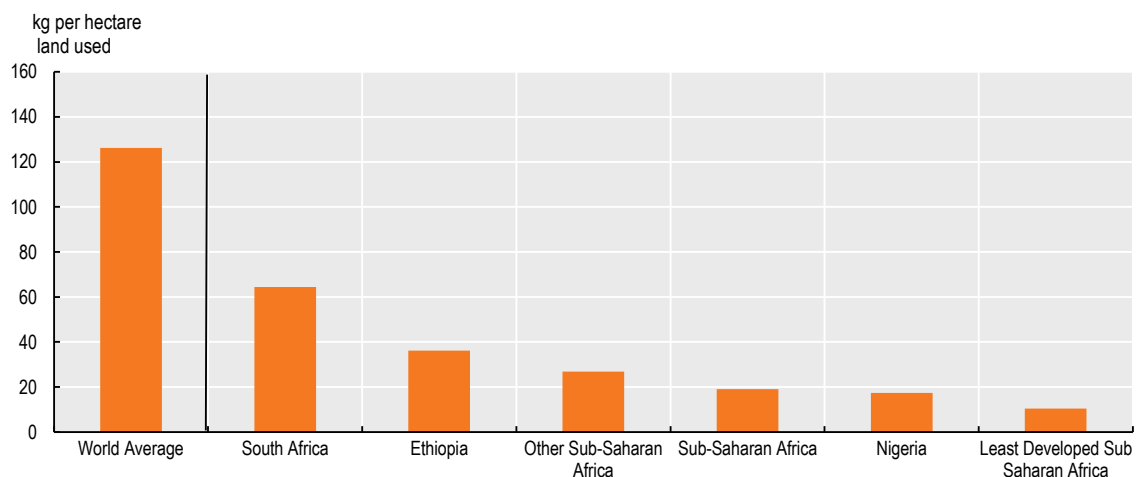


Note: Estimates are based on historical time series from the FAOSTAT Value of Agricultural Production domain, which are extended with the *Outlook* database. Remaining products are trend-extended. The Net Value of Production uses own estimates for internal seed and feed use. Values are measured in constant 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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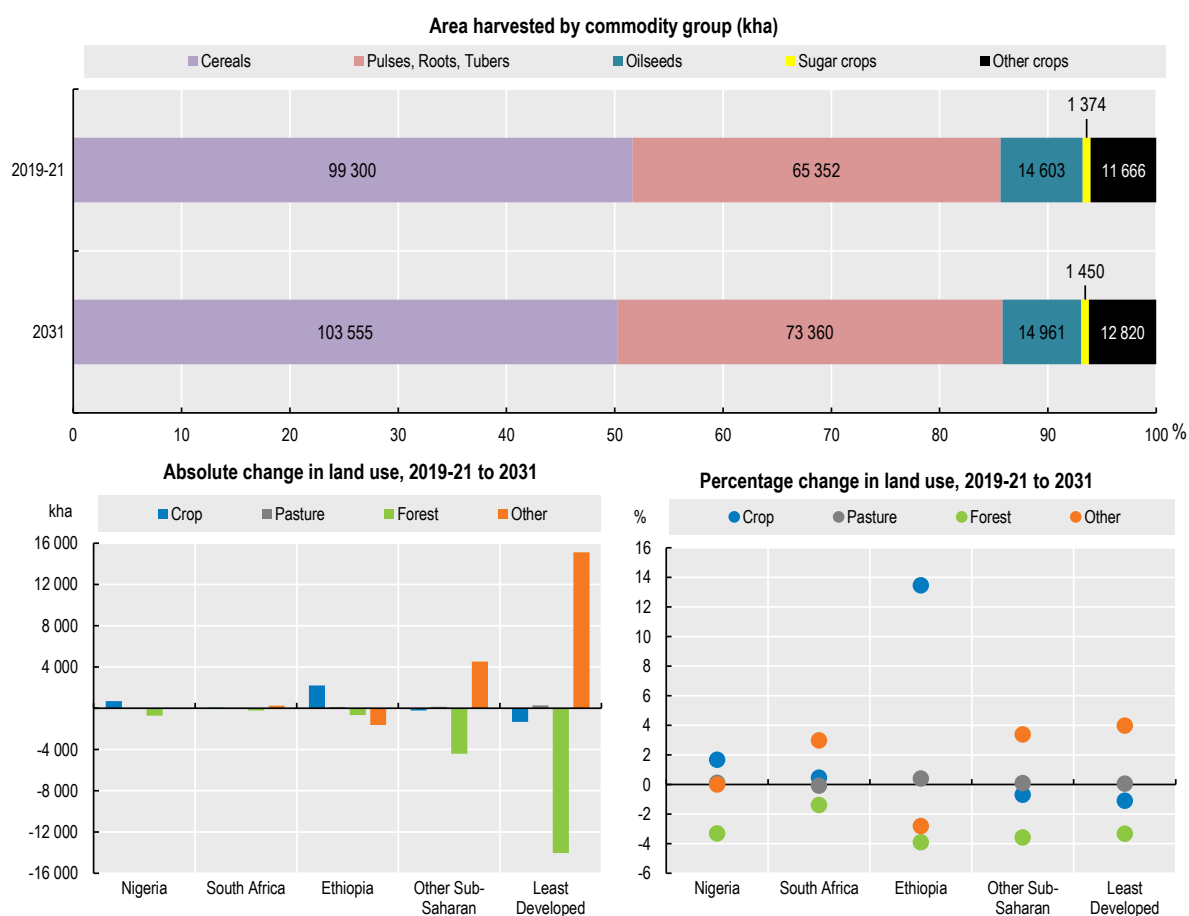
Figure 2.10. Fertiliser application per hectare of land used for crop production is low in Sub Saharan Africa, 2017-19 average



Source: FAOSTAT.

StatLink  <https://stat.link/zk4vwm>

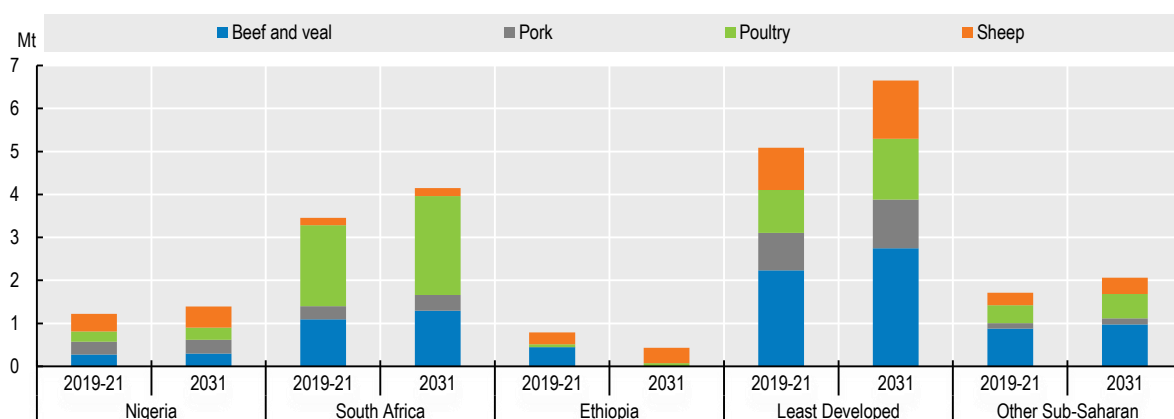
Figure 2.11. Change in area harvested and land use in Sub Saharan Africa



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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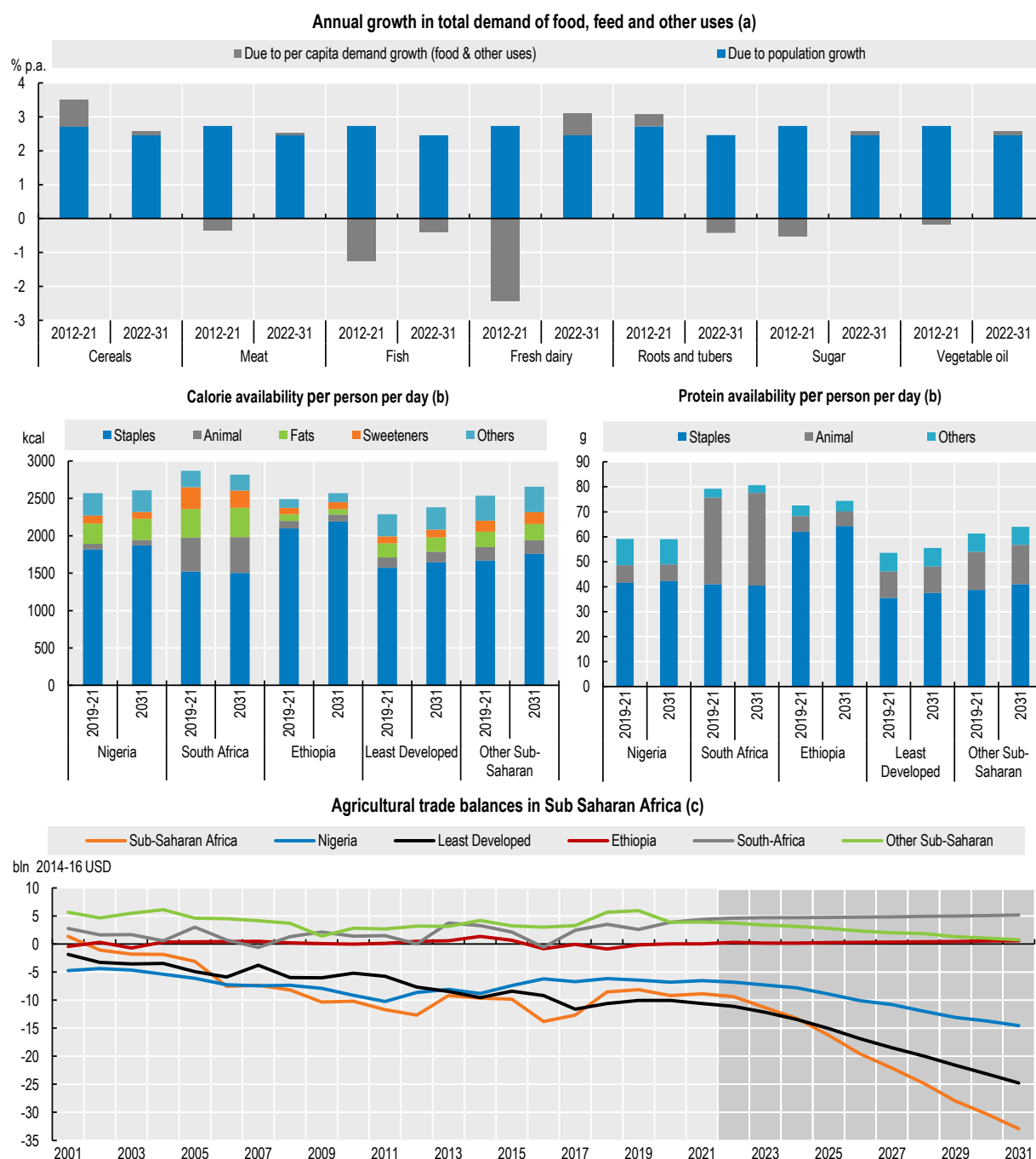
Figure 2.12. Livestock production in Sub Saharan Africa



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

StatLink <https://stat.link/raqy5w>

Figure 2.13. Demand for key commodities, food availability and agricultural trade balance in Sub Saharan Africa



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 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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Table 2.3. Regional indicators: Sub Saharan Africa

	Average		2031	%	Growth ²	
	2009-11	2019-21 (base)			2012-21	2022-31
Macro assumptions						
Population ('000)	823 015	1 078 061	1 412 143	30.99	2.72	2.46
Per capita GDP ¹ (kUSD)	1.67	1.72	1.92	11.49	-0.43	1.26
Production (bln 2014-16 USD)						
Net value of agricultural and fisheries ³	213	286	357	24.71	2.50	1.96
Net value of crop production ³	151	213	267	24.92	2.89	1.92
Net value of livestock production ³	44	50	65	28.46	1.14	2.47
Net value of fish production ³	17	22	25	14.03	2.08	1.12
Quantity produced (kt)						
Cereals	116 434	160 064	202 852	26.73	3.38	2.07
Pulses	13 634	20 468	25 909	26.58	3.77	1.86
Roots and tubers	61 857	94 412	117 858	24.83	2.92	1.94
Oilseeds ⁴	7 325	8 474	9 687	14.31	1.02	1.13
Meat	9 423	12 268	15 194	23.85	2.59	2.13
Dairy ⁵	3 392	3 619	5 015	38.61	0.47	3.27
Fish	5 980	7 803	8 903	14.09	2.08	1.12
Sugar	6 556	7 600	8 898	17.08	1.00	0.89
Vegetable oil	5 328	7 513	8 958	19.23	3.03	1.24
Biofuel production (mln L)						
Biodiesel	0	0	0	148.75	0.00	2.25
Ethanol	732	994	970	-2.44	4.83	2.72
Land use (kha)						
Total agricultural land use	860 717	883 817	885 653	0.21	0.14	0.01
Total land use for crop production ⁶	207 172	223 930	225 314	0.62	0.23	0.00
Total pasture land use ⁷	653 545	659 887	660 339	0.07	0.11	0.01
GHG Emissions (Mt CO ₂ -eq)						
Total	709	842	988	17.28	1.68	1.42
Crop	215	196	198	0.75	-0.86	0.04
Animal	493	645	789	22.33	2.57	1.80
Demand and food security						
Daily per capita caloric availability ⁸ (kcal)	2 433	2 433	2 512	3.25	0.01	0.38
Daily per capita protein availability ⁸ (g)	61.7	59.3	60.5	2.02	-0.32	0.27
Per capita food availability (kg/year)						
Staples ⁹	178.1	196.4	203.7	3.71	0.38	0.24
Meat	10.3	10.7	10.9	1.94	-0.07	0.07
Dairy ⁵	4.5	3.7	4.0	6.65	-1.70	0.82
Fish	8.2	7.7	7.5	-3.24	-1.23	-0.34
Sugar	10.4	10.5	10.7	1.84	-0.36	0.30
Vegetable oil	7.7	8.4	9.1	8.49	-0.67	0.87
Trade (bln 2014-16 USD)						
Net trade ³	-11	-9	-26	199.51	..	..
Value of exports ³	30	48	59	22.88	3.91	1.65
Value of imports ³	41	57	86	50.13	2.58	3.87
Self-sufficiency ratio ¹⁰						
Cereals	84.2	82.3	78.1	-5.03	0.11	-0.45
Meat	88.7	85.3	79.4	-6.89	-0.35	-0.37
Sugar	75.8	66.3	58.4	-11.85	-0.61	-1.98
Vegetable oil	58.9	57.4	50.4	-12.25	1.13	-1.52

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 $\text{Production} / (\text{Production} + \text{Imports} - \text{Exports}) * 100$.

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>.

2.5. Regional outlook: Near East and North Africa

2.5.1. Background

Rising demand amid supply constraints drives rising import dependence

The Near East and North Africa¹⁶ region encompasses a range of countries with diverse income profiles that often face similar challenges related to the agricultural production environment. Land and water resource endowments are limited and less than 5% of total land in the region is classed as arable. All countries in the region, except for Iraq and Mauritania, face water scarcity, and for some countries this is extreme, at less than one quarter of sustainable levels on a per capita basis. Its already limited water resources make it particularly vulnerable to climate change.

Across the spectrum of least developed, middle- and high-income economies, the region includes many oil exporting nations in the Gulf. With oil as a major source of revenue, energy markets are highly important to economic activity and can impact significantly on demand prospects. In this respect, volatility in energy markets over the past two years, as well as the high oil prices projected in the short term, if sustained, will affect income levels more than any other region covered in this Outlook.

The challenging agricultural production environment has made the region one of the largest net food importing regions and self-sufficiency rates for most commodities are low, particularly so for cereals, vegetable oils and sugar (Figure 2.15). Its dependence on imports makes it particularly vulnerable to trade-related uncertainties, such as those exposed in the global trade system by the COVID-19 pandemic, persistent logistical challenges as the pandemic continues to evolve and possible supply constraints from the Black Sea region where the ongoing war may affect export supplies of major commodities including wheat, maize and oilseed products. Russia and Ukraine have traditionally been the two biggest suppliers of wheat to the region, but even when sourced elsewhere, the sharp increase in imported cereal prices raises concern on affordability of basic foods in lower income regions. With average food expenditures around 15% of total household expenditures, and least developed countries at 33%, income and price shocks can have a significant impact on welfare.¹⁷

Historically, the region's limited resources have been stretched by policies that sought to stimulate production and reduce the reliance on trade in basic cereals. Such actions are designed to reduce trade dependence but may constrain growth as these cereals compete with higher value crops for limited water resources and result in reduced availability of fresh produce that could otherwise aid in improving dietary diversity. Geopolitical conflict in the region has further reduced investment and displaced populations, further hindering production.

Gross domestic product in the agriculture, forestry and fishery sector is currently about 5% of total GDP in the region, which is expected to decline to 4% by 2031. Egypt produces almost 30% of the net value of agriculture and fish production in the region, with a further 48% attributed to the rest of North Africa (14% from LDC's and 34% from other North African countries). These shares are expected to increase in the

coming decade, such that North Africa will constitute almost 80% of net agricultural output value in the region by 2031.

Population growth is an important factor determining demand and is expected to slow only marginally from almost 23% over the past decade to 20% over the next ten years. This growth rate is second only to the SSA region and will see the region's population exceed 500 million people by 2031. Almost two thirds of the population is expected to reside in urban areas, which may encourage consumption of higher value products, including meat and dairy products, but also convenience products that often contain vegetable oil and sugar. Affordability will also be important, however, and the strong reliance on export revenue implies that economies in the region were amongst the worst affected by the COVID-19 pandemic in 2020, with per capita income contracting by over 7% and rebounding only modestly in 2021 by 1.3%. Even amid rising oil prices, economic activity is only expected to increase to 3.3% in 2022 and in the medium term will average 1.6% p.a. Consequently, it is unlikely to constitute a major driver of demand over the next decade. This is a concern in a region where healthy diets are unaffordable to more than half of the population (FAO et al., 2021^[4]).

Some of the greatest challenges for the region over the *Outlook* period relate to ensuring access to affordable food products to a growing population in a low-income growth environment. Import dependence is inevitable given limitations to production and natural resource endowment, but in an increasingly volatile global market, nimble policies and procurement practices will be required to ensure food security as during the coming decade, self-sufficiency rates for most major commodities are expected to decline further.

2.5.2. Production

Higher productivity needed to confront severe resource constraints

Agricultural and fish production in the region is projected to expand by 1.6% p.a. over the next ten years, similar to that of population growth. The region's dependence on global markets will continue to increase (Figure 2.14). Crop production constitutes the bulk of total value and average growth of 1.4% p.a. is sufficient to sustain its share in total value at 60% by 2031. Livestock production growth is stronger at 2.1% p.a., with its share in total net value increasing to 28% by 2031.

Fish production is an important contributor to total production value, but growth of just under 1% p.a. will see its share decline marginally to 11.2% by 2031. In the recent past, growth has been driven by capture in coastal areas, but fish stocks are under pressure, resulting in a significant slowdown over the Outlook period. The contribution of aquaculture to total fish production is growing, with Egypt the major contributor.

Total agricultural land use is expected to remain fairly stable, but a small decline is expected in cropland use by 2031. This occurs mainly in Saudi Arabia, where conditions are not conducive to large scale cropping, and the least developed countries of North Africa. By 2031, almost 38% of total cropland may be allocated to cereal production, up from 34% in the base period. This increase comes primarily from coarse grains and wheat, which is expected to contribute 59% and 38%, respectively, to total land used for cereals by 2031.

Productivity gains are imperative in a region constrained by arable land and water availability. Total factor productivity grew by a modest 1.2% p.a. in the decade to 2019, driven largely by increased capital inputs.¹⁸ The value generated per hectare land used for crop production has increased consistently by 1.4% p.a. over the past decade and this is expected to accelerate over the next ten years to 1.6% p.a. This trend encapsulates multiple factors, including higher crop intensity, as reflected in the maintenance of crop area harvested, despite a reduction of 2.8 Mha in cropland use, together with considerable yield gains. Yield improvements are expected across all major crops, with wheat rising by 0.8% p.a., maize 0.5% p.a., other coarse grains 1.5% p.a., rice 1.5% p.a. and pulses 1.0% p.a. on average over the next ten years. This will

leave wheat yields at roughly 78% of the global average, while other coarse grains will only reach 47% of the global average.

Growth in meat production will largely be derived from poultry, which far outpaces all other meat types with growth of 3.1% p.a. over the coming decade, but significantly slower compared to the past. Some progress is also expected in bovine meat production, with growth of 1.6% p.a., following a contraction in the past. Ovine meat production will remain largely unchanged by 2031.

Direct GHG emissions from livestock activities in the region will expand by 3.8% by 2031 compared to 2019-21, which contrasts with the growth of 28.6% and 24.2% for meat and dairy production, respectively, reflecting the importance of productivity gains in containing emissions. With crop emissions expected to rise by 2.2%, total direct emissions from agriculture are projected to expand 3.4% by 2031. The historic decline in emissions produced per unit value of agricultural output is set to continue.

2.5.3. Consumption

Achieving a shift to healthier and more diverse diets is a challenge

Food policies in the region have traditionally focused on food security by supporting consumption of basic foodstuffs, primarily cereals, thus entrenching staple-based diets. In recent years, policies have been expanded to include animal products. Nevertheless, the prevalence of malnourishment and the absolute number of undernourished people has increased in recent years, even prior to the COVID-19 pandemic, which accelerated this trend in 2020. Total calorie availability in the region is expected to increase somewhat to 3020 kcal/person/day by 2031- slightly below the global average. This reflects both the prolonged nature of the economic recovery, which only foresees per capita income exceeding pre-pandemic levels by 2025, and increasing awareness of healthy eating, underscored by reduced calories from products like vegetable oil and sweeteners. There is, however, great diversity within the region – for instance calorie availability in LDCs remains low and will only reach 2 594 kcal/person/day, roughly 15% below the global average.

The projections for the average diet in the region indicate about 54% of calories will come from cereals by 2031, well above the global average of 44%. A similar phenomenon applies to sugar, where the region's share of total calorie consumption derived from sugar will be 9% compared to a global average of 7%. The diet, which relies on starchy foods and sugar, is calorie dense but nutrient poor and often associated with a rising incidence of over-weight and obesity, and various chronic diseases such as diabetes. At the same time, the prevalence of undernourishment, as well as stunting and wasting in young children is high in some countries, particularly those affected by conflict. This suggests that the “triple burden” of malnutrition will be a policy challenge that will need to be addressed over the medium term. However, affordability remains a major constraint to the adoption of healthier diets.

The average level of protein availability in the region is projected to reach 85 g/day in 2031, barely higher than the base period. A fall in protein from plant-based foods is expected to be more than offset by higher quality meat and fish protein sources.

The growth of the livestock sector, particularly poultry, will increase feed use by 20% over the coming decade. Commodities such as maize, barley and protein meals are expected to account for over 75% of the total feed use. The bulk of feed materials will continue to be imported, with maize imports, for example, reaching 34 Mt by 2031 compared to 27 Mt in the base period. This trend reflects policies that prioritise the production of food crops over feed crops in an environment that has very limited production potential.

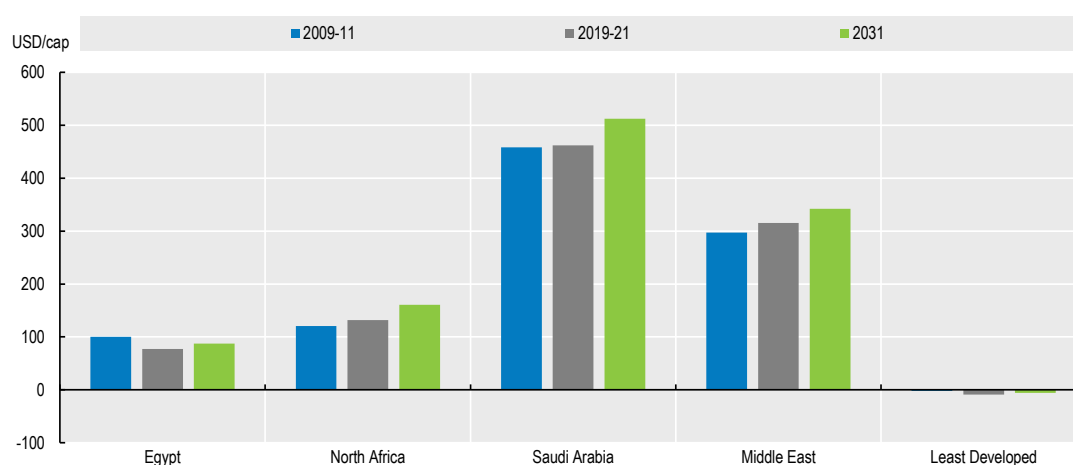
2.5.4. Trade

Food and feed imports will continue to rise

The region's strong population growth together with limited production capacity will continue to drive higher food imports over the next decade. The region is expected to be the second largest net importer of food by 2031, following the Developed and East Asia region, but on a per capita basis will be the largest. Within the region, food imports per person are highest in Saudi Arabia and the Other Near East area which include the Gulf States (Figure 2.14).

Amidst the logistical and economic challenges of the pandemic, the region's total import bill, expressed in real terms, declined in 2020 relative to 2019. Following a modest increase in 2021, it is expected to rise sharply in 2022 in line with economic recovery. By 2031, the region's import bill is expected to increase by 29% relative to the base period. Imports are expected to rise for almost all commodities, albeit at a slower rate relative to the past decade. Imports by the region will maintain high shares of global markets for many commodities by 2031, including wheat (26%), sugar (22%) and maize (17%). The region will also account for high shares in global trade for sheep meat (33%), cheese (19%) and poultry (18%) by 2031. In most instances, these shares are unchanged at their current high levels. Given the region's important role in global markets, and the important role of imports in domestic markets, developments in either markets have broad food security implications.

Figure 2.14. Value of net food imports per capita in Near East and North Africa (including processed products)

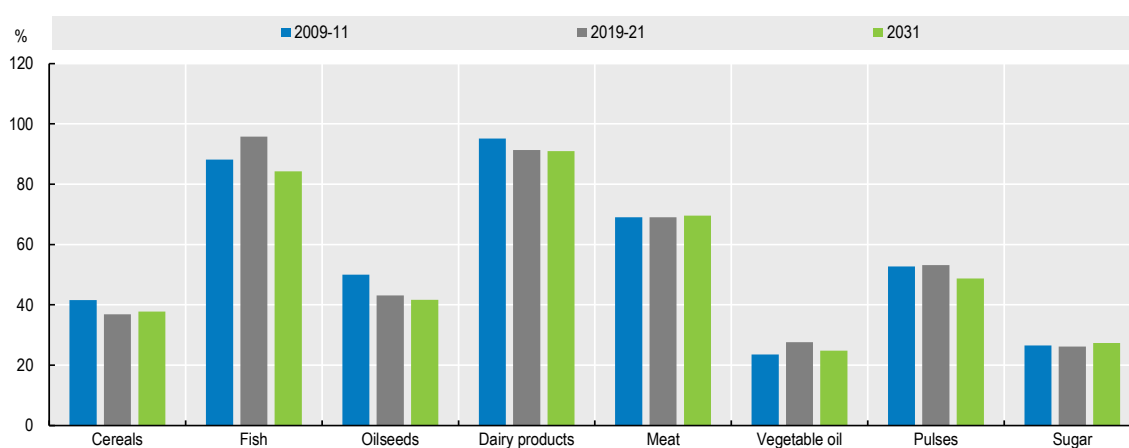


Note: Estimates are based on historical time series from the FAOSTAT Trade indices domain, which are extended with the *Outlook* database. Products not covered by the *Outlook* are extended by trends. Total trade values include also processed products, usually not covered by the Outlook variables. Trade values are measured in constant 2014-2016 USD and trade values for fisheries (not available in the FAOSTAT trade index) have been added based on Outlook data.

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 2.15. Self-sufficiency ratios for selected commodities in Near East and North Africa



Note: Self-sufficiency ratio calculated as $(\text{Production} / (\text{Production} + \text{Imports} - \text{Exports})) * 100$

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


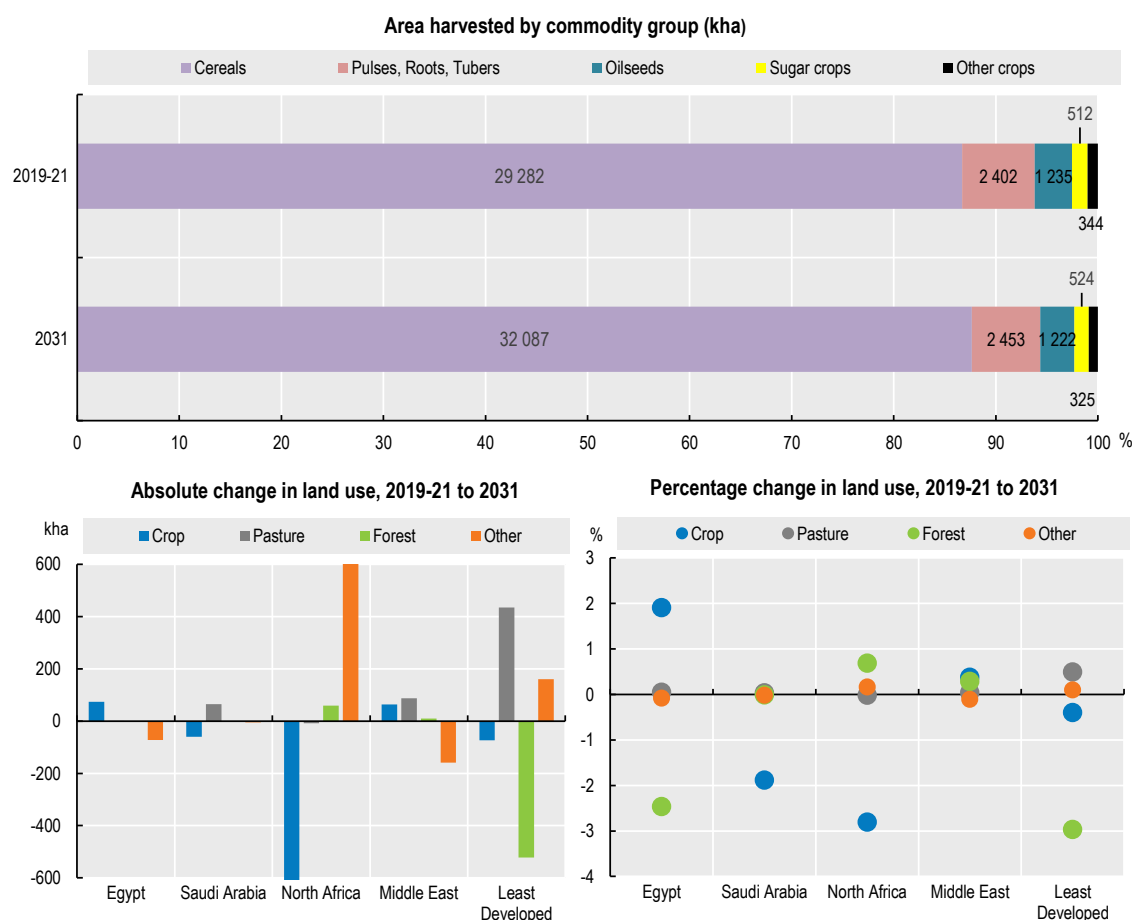
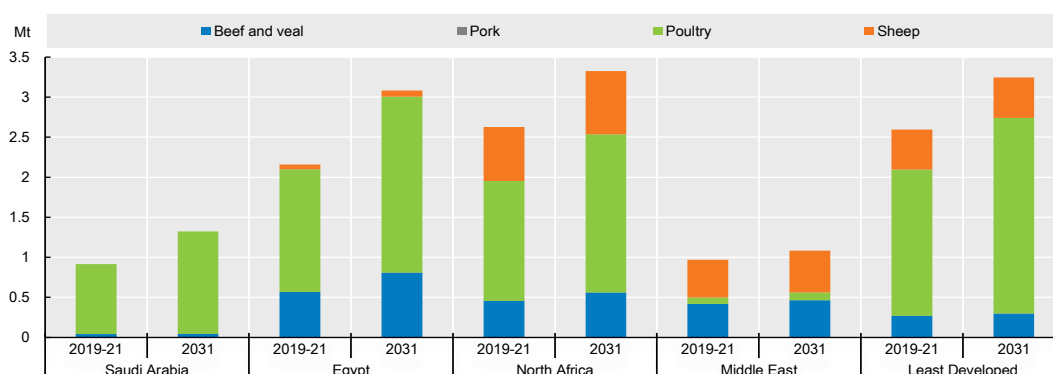
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Figure 2.16. Change in area harvested and land use in Near East and North Africa


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

StatLink <https://stat.link/m0bnaw>

Figure 2.17. Livestock production in Near East and North Africa


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 2.18. Demand for key commodities, food availability and agricultural trade balance in Near East and North Africa



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 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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Table 2.4. Regional indicators: Near East and Northern Africa

	Average		2031	%	Growth ²	
	2009-11	2019-21 (base)			2012-21	2022-31
Macro assumptions						
Population ('000)	341 456	418 698	503 315	20.21	1.97	1.64
Per capita GDP ¹ (kUSD)	6.16	6.27	7.36	17.40	-0.39	1.64
Production (bln 2014-16 USD)						
Net value of agricultural and fisheries ³	107.8	132.4	157.1	18.71	1.89	1.56
Net value of crop production ³	66.7	80.7	95.0	17.77	1.93	1.44
Net value of livestock production ³	31.0	35.7	44.5	24.75	0.65	2.07
Net value of fish production ³	10.0	16.0	17.6	9.96	4.86	0.95
Quantity produced (kt)						
Cereals	50 494	52 882	66 234	25.25	-0.39	1.09
Pulses	1 520	1 804	2 116	17.33	2.32	1.25
Roots and tubers	2 723	3 902	4 857	24.47	2.62	2.09
Oilseeds ⁴	1 011	1 046	1 136	8.63	-0.36	1.14
Meat	6 755	8 350	10 740	28.61	2.40	2.38
Dairy ⁵	3 550	3 232	4 017	24.29	-0.63	2.13
Fish	3 544	5 655	6 219	9.98	4.86	0.95
Sugar	2 970	3 540	4 439	25.41	1.10	1.59
Vegetable oil	1 467	2 377	2 621	10.25	6.50	1.05
Biofuel production (mln L)						
Biodiesel	0.02	0.02	0.04	115.85	0.00	0.69
Ethanol	626	614	771	25.47	1.92	1.87
Land use (kha)						
Total agricultural land use	461 914	430 551	430 464	-0.02	0.00	0.00
Total land use for crop production ⁶	59 411	62 799	62 199	-0.96	0.03	-0.11
Total pasture land use ⁷	402 503	367 752	368 266	0.14	-0.01	0.02
GHG Emissions (Mt CO ₂ -eq)						
Total	217	242	250	3.44	0.80	0.42
Crop	47	57	58	2.15	2.55	0.12
Animal	171	185	192	3.84	0.31	0.52
Demand and food security						
Daily per capita caloric availability ⁸ (kcal)	2 988	3 005	3 020	0.50	-0.29	0.18
Daily per capita protein availability ⁸ (g)	84.3	84.7	85.3	0.72	0.0	0.0
Per capita food availability (kg/year)						
Staples ⁹	220.4	218.6	219.5	0.44	-0.25	0.06
Meat	24.1	24.2	25.7	6.08	-0.31	0.51
Dairy ⁵	12.8	10.8	11.4	5.44	-2.07	0.53
Fish	9.7	10.7	11.8	10.46	0.43	0.84
Sugar	32.6	32.1	32.1	-0.07	-0.35	0.06
Vegetable oil	11.7	12.5	13.7	9.20	-0.51	0.85
Trade (bln 2014-16 USD)						
Net trade ³	-59	-74	-99	34.01	..	..
Value of exports ³	22	33	39	17.12	5.54	1.26
Value of imports ³	81	107	138	28.76	1.55	2.35
Self-sufficiency ratio ¹⁰						
Cereals	40.6	38.2	37.7	-1.29	-1.34	-0.67
Meat	68.0	68.8	69.6	1.18	0.76	0.21
Sugar	26.6	27.6	27.3	-0.80	-0.15	-0.08
Vegetable oil	23.2	27.6	24.8	-10.01	3.8	-1.0

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. Oilseed represents 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 $\text{Production} / (\text{Production} + \text{Imports} - \text{Exports}) \times 100$.

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>

2.6. Regional outlook: Europe and Central Asia

2.6.1. Background

A highly diverse region where Russia's war against Ukraine will dominate developments

The Europe and Central Asian¹⁹ region spans two continents and includes a range of countries at various stages of development, which exhibit significant differences in terms of demographics, agricultural resources and public policies. Major agricultural producers in the region include the European Union, United Kingdom, Russia, Ukraine, Turkey and Kazakhstan. The region is home to 12% of the world's population, but the evolution of population dynamics differs across the spectrum of countries. Overall, the region's population is expected to remain fairly stable, only increasing by 1% over the next decade. This reflects stability in Western Europe, a decline in Eastern Europe and growth of 1% p.a. in Central Asia. The region is highly urbanised and by 2031 75% of its population will live in urban environments.

Average income in the region is over USD 26 000 per capita per year, but there are substantial differences across countries. Income levels range from just over USD 38 000 per capita per year in the highly developed economies of Western Europe to USD 12 250 per capita in the resource dependant eastern regions to merely 5000 USD per capita per year in central Asia. In 2020, the COVID-19 pandemic and the restrictions imposed to curb its spread led to an average decline of 5.6% in real per capita GDP in the region, though some countries were affected more than others due to differences in approaches to managing the virus. After a firm rebound in 2021, which saw growth of 5%, the region is facing a renewed slowdown in 2022 as the ongoing war continues to unfold. While the magnitude and reach of the impact will depend on its duration and the outcome of the war, it has already unleashed a humanitarian crisis and will certainly influence growth prospects within and beyond the region. Apart from direct impacts of the war, the region's dependence on Russia for energy, fertilisers and cereals will increase its vulnerability to disruptions. Remittances from Russia to Central Asia may also be affected. The ongoing war will dampen the medium term projections that, under baseline assumptions, could expect to record growth in real per capita income in the region of 1.8% p.a.

At the height of the COVID-19 pandemic, agriculture in the region already faced many challenges, including logistical bottlenecks, workforce shortages and changes to the quantity and composition of demand. Having successfully navigated many of them, the war adds another layer of complexity and significant uncertainty in 2022 and beyond. Russia is a major supplier of inputs to agricultural production to the rest of Europe and Central Asia, and to many other countries outside the region. Both Russia and Ukraine are also significant contributors to agricultural exports and prolonged constraints to production and exports will have a substantial impact on the sector. At the same time, the two countries are also key importers of several agri-food products from other countries in the region which will find it difficult to locate alternative markets at short notice.

The share of primary agriculture, forestry and fish production in total GDP ranges from just 1.6% in the European Union, to 12% in Ukraine. It is estimated that the share of food in household expenditures averaged about 10% in the region in 2019-2021, from around 6% for United Kingdom to around 17% in

Ukraine.²⁰ A wide disparity is also present in terms of growth in total factor productivity within the region: in Western Europe TFP growth was just 6% in the decade up to 2019, while it was almost 50% in Eastern Europe, marked by a large increase in the productivity of labour.

The region produces 16% of the global value of agricultural and fish production, a share which could decline to 15% by 2031, largely due to stagnation in Western Europe. Crop production averages around 56% of the net value of total production, fish 8% and livestock 36%. Whereas the region accounted for 11% of the total growth in the global net value of agriculture and fish in the last decade, it constituted 38% of growth in global exports. This growing export orientation was largely driven by Eastern Europe, where productivity levels in both the crop and livestock sectors have improved, but with a fairly static population and relatively mature consumption levels demand growth has been weak. At least in the short term, the war will likely reverse this trend, as doubts are already apparent on the ability to plant, harvest and process agricultural products in Ukraine in 2022. Infrastructure destroyed as a result of the war may take years to rebuild, raising challenges with market connectivity and doubts as to when full productive capacity would be restored. The extent to which such changes may persist in the medium term remains unclear and will ultimately depend on what resolution emerges from the war. The duration of sanctions imposed on Russia will be an important factor affecting trade in the region – as will Russian embargoes on imports from the European Union, which have been renewed constantly since 2014 as well as the future trade arrangements between the United Kingdom and the European Union

Relative to other regions, livestock and animal products contribute significantly, both from production and consumption perspectives. They constitute more than one third of the net value of agriculture and fish production and comprise 26% and 53%, respectively, of total calorie and protein availability. The European Union is a major producer, consumer and trader of milk and dairy products, and while its share of global milk production continues to decline, production and trade of high value products such as cheese and butter are growing. Per capita cheese and butter consumption is six times and three times higher than the world average, respectively.

Within the European Union, environmental sustainability is increasingly prioritised, both from a consumer and policy perspective. For instance, the Farm to Fork Strategy, as part of the European Green Deal, is an inclusive growth strategy seeking to promote fair, healthy, environmentally friendly and sustainable food systems. In future, this may influence demand, trade flows, as well as the rate of productivity and production growth in the region. Technological progress and its adoption, including digital technology, will be critical to achieve this aim.

Amongst the regions included in this *Outlook*, Europe and Central Asia faces the most uncertainty because of the ongoing war. The magnitude and duration of the impact will only become clear in due course. The *Outlook* assumes implicitly that productive capacity is fully restored in the medium term, resulting in further growth of the region's positive trade balance by 2031. However, prolonged war in the Black Sea region could result in a very different outcome, given its contribution to production and exports within Europe and Central Asia. Moreover, the extensive destruction of infrastructure, the loss of lives and displacement of labour, will require considerable investments to restore agro-food chain capacity. This could take many years, perhaps even decades, to return to normality and might well result in a marked change in the structure of the sector.

2.6.2. Production

Productivity the key to growth in the medium term

The net value of agriculture and fish production (net of feed and seed inputs) is projected to grow 8% by 2031 compared to the average for 2019-21, with Western Europe remaining largely unchanged, growth in Eastern Europe of 13% and Central Asia of almost 28%. Eastern Europe's strong growth, which is highly

uncertain given that it does not fully account for a prolonged impact from the current war, will be led by Ukraine, Turkey and Russia at 5%, 20% and 11%, respectively. In both Ukraine and Russia, growth is led by the crop sectors. In Turkey however, both crop and animal production growth are strong, but the value of animal production is expected to grow faster than that of crops (24% and 20%, respectively) by 2031.

The long-term reduction in agricultural land use is expected to continue in the future, albeit slowly, suggesting that further growth in the sector will be underpinned by productivity gains. While total land use is trending downward, some reallocation is expected between pasture and crop land. Land used as pasture is expected to contract by 0.8% by 2031, double the rate of contraction expected for land used for crop production.

The value of crop production in the region is expected to expand by 10% over the next ten years, accounting for more than 71% of the region's growth in agricultural and fish production. While additional land will be used for crop production, productivity gains will also contribute significantly to this growth. The net value of production per hectare of cropland is expected to rise by an annual average of 1.1%, reflecting a combination of land intensification and yield gains. The crop area harvested is expected to expand by nearly 8.8 Mha, compared to a reduction of 1.5Mha in cropland use. Intensification results in additional area harvested across Western and Eastern Europe. Yield gains are also expected for all major crops, ranging from 3% for wheat, to around 5.9% for maize and oilseeds.

The bulk of crop production growth from the region is underpinned by rising cereal and oilseed output in the Black Sea region. Given the *Outlook's* assumption that productive capacity is restored in the medium term, Russia and Ukraine are projected to sustain robust growth in maize, wheat, soybean and other oilseeds, increasing their combined share to 41% for maize, 39% for wheat and 54% for all oilseeds. Maize production will grow most among all crops in both Russia and Ukraine, with significant expansion also expected in wheat and other oilseeds. Despite area expansion in both countries, yield improvements will drive the bulk of production gains by 2031. Their combined share of 82% in additional production of both maize and wheat projected for the total region by 2031 underscores the extent of risk and uncertainty associated with a prolonged war.

Livestock production is projected to grow at a slower rate than crops, at only 0.4% p.a. over the next decade. Western Europe still accounts for the bulk of livestock in the region, but as the transition to environmental sustainability continues, a modest contraction over the coming decade will see its share diminish from 62% in 2019-21, to 60% by 2031. Stronger growth in the rest of the region will lead to an expansion in the total value of livestock production by 3% over the next decade, with Eastern Europe's contribution growing to 29% and central Asia's to 12% of the region's total. With the exception of central Asia, where livestock inventories are still expanding, animal production growth will be based predominantly on intensification resulting in higher carcass weights. Growth in the total volume of poultry production is expected to be robust across the region, increasing by 6% by 2031. Fish production is expected to grow by 7% over the coming decade. Growth of 12% in aquaculture production, compared to 6% for capture fisheries, will result in the share of aquaculture in total fish production in the region rising to 21% by 2031.

Production of dairy products is expected to remain strong. Growth from Central Asia and Eastern Europe is expected to accelerate to 39% and 12%, respectively, by 2031. By contrast, production of dairy products in Western Europe is expected to expand by only 3%. However, expansion in dairy output will increasingly feed international demand, as an increasing share of the region's butter, cheese and milk powders is expected to be exported over the next decade. The region will account for 43% of global dairy product exports by 2031. The bulk of exports will be from the European Union, with its share in total regional exports of dairy products rising to 71% by 2031. Shaped by the transition towards environmental sustainability, the European Union's share of global milk production will, however, decline from 18% in 2019-21 to 15% by 2031.

Direct agricultural GHG emissions are projected to decline modestly by 1.3% by 2031. However, due to increased productivity, GHG emissions expressed relative to agricultural production is projected to decline by 8.3% compared to its level in the 2019-2021 base period. The decline in emissions relative to output is higher in Central and Eastern Asia at 12% and 14%, respectively, while in Western Europe the decline is just 5%.

2.6.3. Consumption

Slow growth in animal sourced foods in Western Europe, but better prospects in Central Asia

Most of the region constitutes a fairly mature market, but consumers were not spared the impact of the COVID-19 pandemic (De Vet et al., 2021^[5]) (FAO, 2020^[6]) (OECD, 2020^[7]). Effects on food consumption were most severe in 2020 and mainly driven by short term affordability constraints, particularly in countries where consumers spend a larger share of total income on food and where income support measures were less comprehensive. In addition, changes to product mix and procurement channels related to COVID-19 impacts affected overall consumption. Retail sales increased and more food was consumed at home, while consumers tended towards online shopping, more local products, as well as products with a longer shelf life. The pandemic further accentuated consumer trends that had been evident earlier, such as rising awareness of healthy eating habits, which will continue to influence demand in the medium term. While many of the effects of the pandemic have eased, new food security concerns have arisen in Eastern Europe, as a result of the ongoing war, which as of mid-April, 2022, has seen almost 5 million refugees flee from and over 7 million people displaced within Ukraine since Russia's invasion began in February 2022.

Average daily calorie availability per capita in the region is well above the global average and is projected to increase by a further 35 kcal/day to exceed 3 440 kcal/day. The increase is concentrated in Eastern Europe and Central Asia and is mainly attributed to increased consumption of dairy products, cereals, and pulses. Though sugar consumption in Central Asia continues to rise, demand for sugar in the region as a whole is projected to continue to contract due to heightened health consciousness of European consumers. Sugar consumption per capita in Western Europe is projected to fall by 1.3 kg per year by 2031, but will remain almost 60% higher than the world average.

Protein availability per capita in the region is projected to increase by 2 g/day to 105 g/day by 2031, which is roughly 20% higher than the world average of 87 g/day. Protein availability from plant-based sources is growing, with per capita consumption of pulses rising by 20% thanks to its association with positive health outcomes, to exceed 5kg per capita per year by 2031. However, the biggest gain in protein availability will still be sourced from animal products, in particular rising dairy consumption. Across the region, domestic food demand for dairy products will remain strong, contributing 12% of daily calorie intake by 2031 and 20% towards daily protein availability. Consumption trends mirror those of production, with a reduction in per capita consumption in Western Europe, contrasting sharp gains in Eastern Europe and Central Asia. Meat consumption is growing at a slower rate but is still expected to approach 59kg per capita per year by 2031, being 2.2% above the base period level. The bulk of this growth will be from poultry, where consumption rises by 1.4kg to an average consumption of 24 kg/capita per year. By contrast, pork and bovine meat consumption is anticipated to each decrease by an annual average of 0.1% per annum over the coming decade. Fish consumption is also expected to decline slightly by 2031, but in Western Europe, per capita consumption levels will remain 1kg per capita above the global average of 18.8 kg by 2031. By contrast, fish consumption in central Asia will only reach 3kg per capita or roughly 16% of the global average level.

Owing largely to the importance of animal products, the region consumes almost a quarter of global protein feed. Slower growth in the livestock sector, along with improvements in feed use efficiency will result in slower growth of 3%, compared to 10% over the past decade. By 2031, the region's share in global feed use could decline to almost 22%. Like livestock production, the bulk of growth in feed use is in Eastern Europe and Central Asia, which contrasts a minor reduction in Western Europe. Maize feed use is expected to expand faster than wheat, reflecting stronger meat production growth in Eastern Europe and a small decline in Western Europe.

2.6.4. Trade

Russia's war against Ukraine constraints growth in crop exports

Trade patterns within the European and Central Asian region have shifted substantially over the past decade. Traditionally one of the biggest net importers, its trade deficit in agricultural products has shrunk to less than half the level of a decade ago. The change has been driven by rising exports from Eastern Europe, which has transitioned to become a net exporter. (Figure 2.19). The shift was underpinned by Ukraine and Russia, where the combination of rising productivity and slow domestic demand growth has resulted in an ever-increasing exportable surplus, but where the current war will also affect prospects significantly. With a large land base, both Eastern Europe and Central Asia have a comparative advantage in cereal and oilseed production. In conjunction with already high consumption levels and limited population growth, this should enable export growth to further improve the region's net trade balance, assuming that the following the war productive capacity is restored. Under baseline assumptions, the region is expected to be the second largest net exporter behind Latin America and the Caribbean by 2031, but prolonged war may prevent this from materialising.

The total volume of exports from the region may expand 23% by 2031 relative to the base period, underpinned by a 28% expansion in crop exports, but a more subdued 10% expansion in livestock sourced exports. The region's cereal exports are projected to grow from 161 Mt in the base period to 190 Mt in 2031, an increase of 18%, with the Near East and North Africa region as a major importer. This will see its global market share increase to 36% by 2031. While wheat remains the major contributor to cereal exports from the region, the importance of maize is growing. Wheat exports are expected to rise by 18%, accounting for 55% of global exports, while maize exports are expected to grow by 17%, to constitute 22% of the global market by 2031.

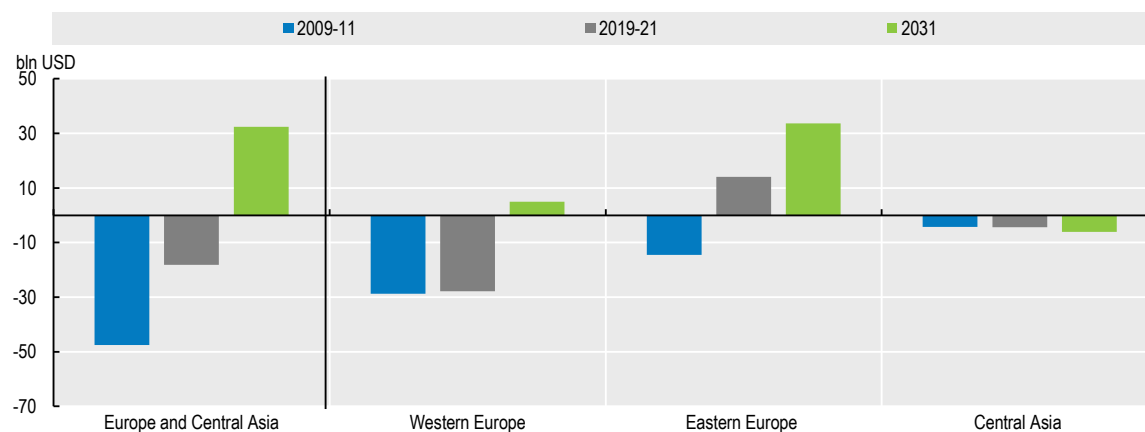
The region is a major exporter of meat and dairy products, but growth in meat and dairy exports is slower than that of crop products. The region accounts for 44% of global pig meat and 29% of global poultry export. This comes mainly from the European Union, which constitutes 90% of pig meat, 59% of bovine meat and 53% of poultry exports from the region. The EU contribution makes the region the most important dairy product exporter in the world. The region provides 41% of global dairy exports, of which 70% comes from the European Union. For cheese, the region constitutes 59% of the global market, of which the European Union contributes 40%. For all dairy products, both the European Union's and the region's share in global trade is set to rise. By 2031, the European Union will contribute 44%, 31%, 34% and 11%, respectively, of global exports for cheese, butter, SMP and WMP.

Led by Russia and Norway, the region is also one of the most important exporters of fish. Russian exports could rise by 31% over the ten-year projection period, supporting growth of 14% in the Europe and Central Asian region.

Despite slower growth, the region remains a major importer. Much of this trade occurs within the region, with Central Asia being a net importer of livestock products. Considering the importance of intra-regional trade, the future status of the Russia's import embargo and the war will affect trade within and outside the region. Apart from livestock, the Europe and Central Asia region is a major importer of protein meal, where

its share in global imports is expected to decline from 34% in the base period to 29% by 2031. The region also imports significant amounts of sugar and ethanol, but this is projected to decline over the projection period and may be affected by sanctions in the energy sector as a result of the war.

Figure 2.19. Net exports of agriculture and fish products from Europe and Central Asia (including processed products)

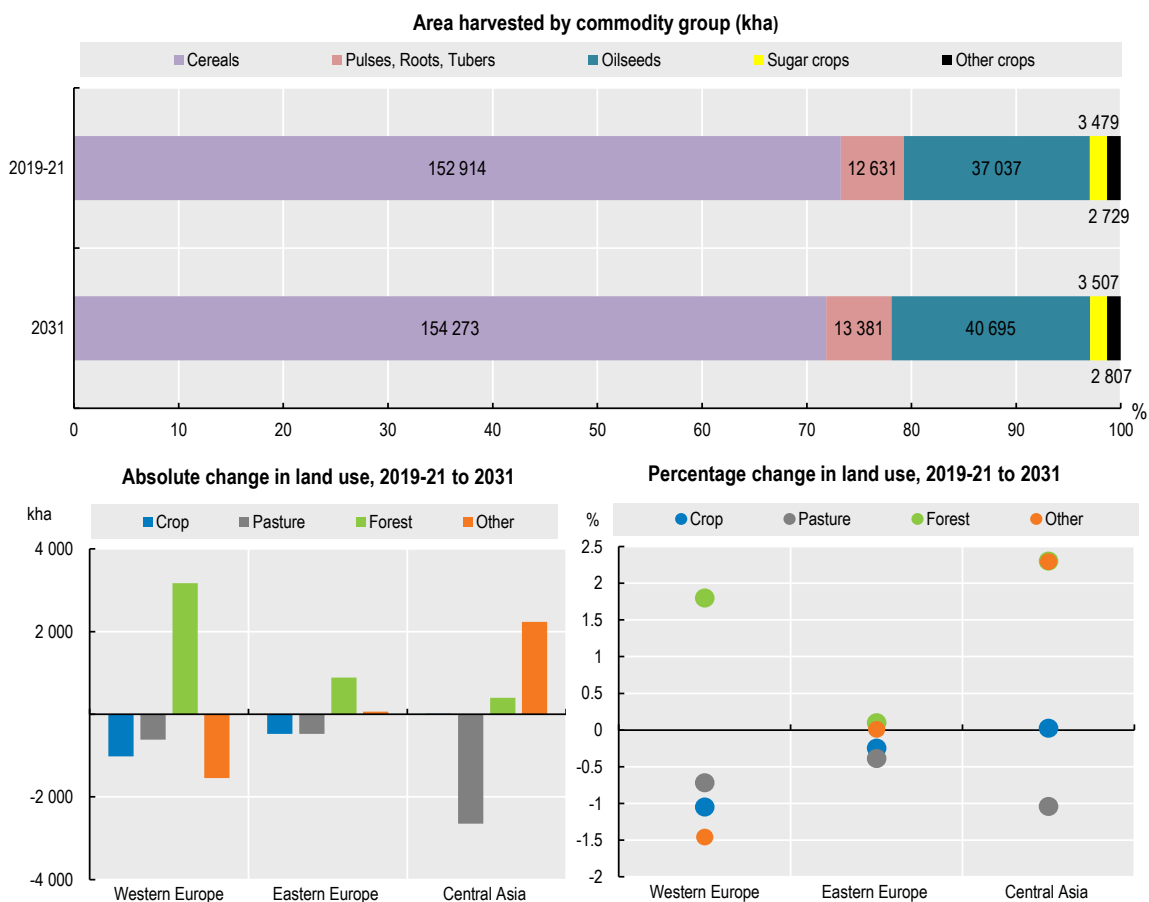


Note: Estimates are based on historical time series from the FAOSTAT Trade indices domain, which are extended with the *Outlook* database. Products not covered by the *Outlook* are extended by trends. Total trade values include also processed products, usually not covered by the *Outlook* variables. Trade values are measured in constant 2014-2016 USD.

Source: FAO (2022). FAOSTAT Trade Indices Database, <http://www.fao.org/faostat/en/#data/TI> ; OECD/FAO (2022), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>

StatLink  <https://stat.link/7yrjob>

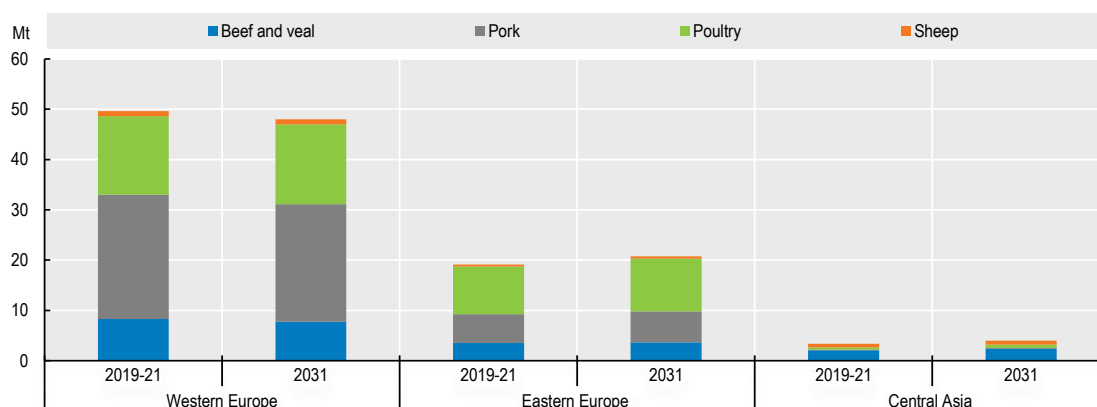
Figure 2.20. Change in area harvested and land use in Europe and Central Asia



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

StatLink <https://stat.link/4nip8j>

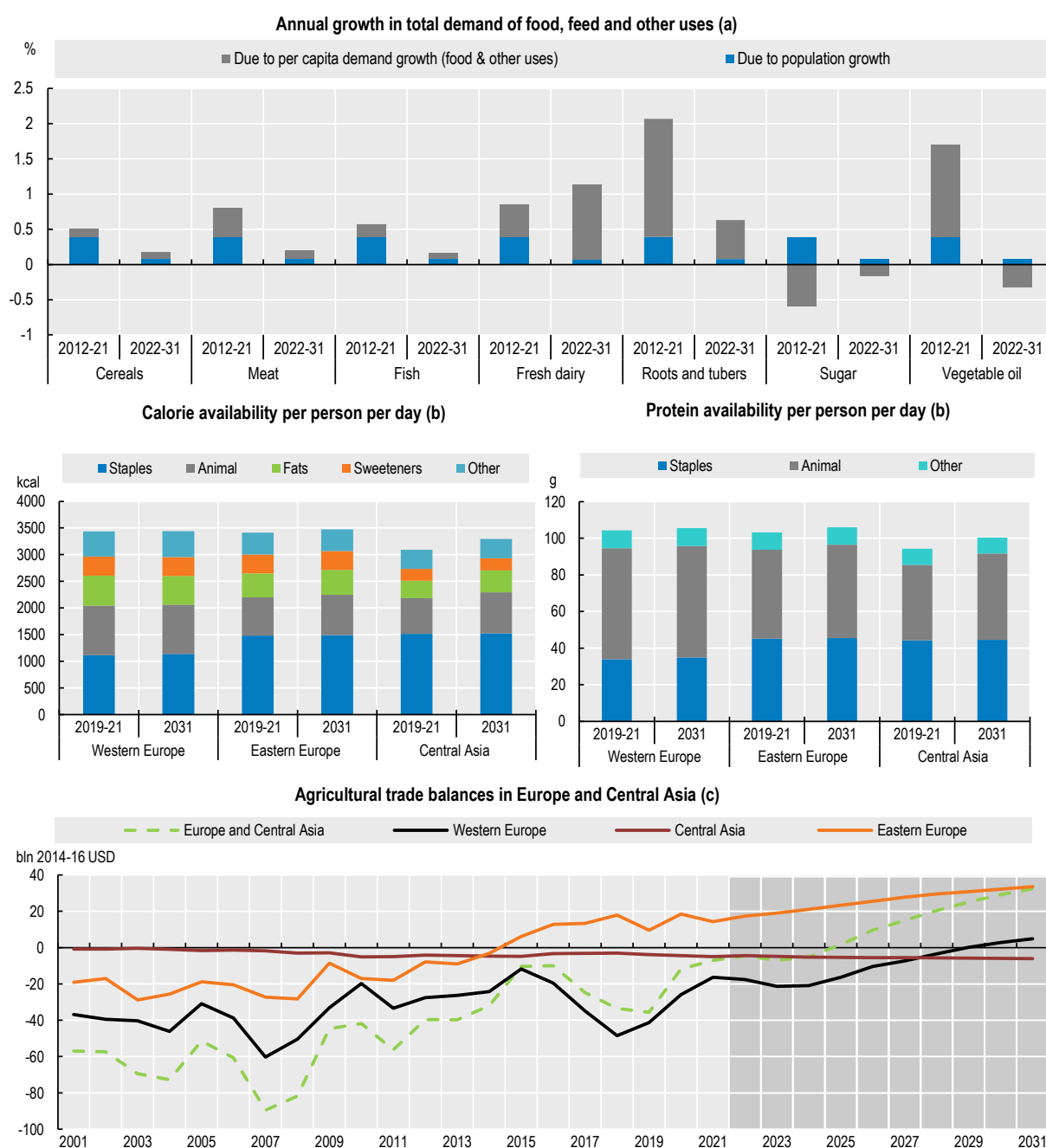
Figure 2.21. Livestock production in Europe and Central Asia



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

StatLink <https://stat.link/c5y7r0>

Figure 2.22. Demand for key commodities, food availability and agricultural trade balance in Europe and Central 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 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>

StatLink  <https://stat.link/alm0yg>

Table 2.5. Regional indicators: Europe and Central Asia

	Average			%	Growth ²	
	2009-11	2019-21 (base)	2031	Base to 2031	2012-21	2022-31
Macro assumptions						
Population ('000)	895 571	932 572	943 026	1.12	0.39	0.08
Per capita GDP ¹ (kUSD)	23.79	26.40	31.94	20.99	1.10	1.76
Production (bln 2014-16 USD)						
Net value of agricultural and fisheries ³	584.4	664.8	715.7	7.65	1.32	0.77
Net value of crop production ³	330.1	372.4	408.5	9.70	1.28	1.01
Net value of livestock production ³	206.3	240.3	251.1	4.50	1.44	0.38
Net value of fish production ³	48.1	52.2	56.1	7.51	1.12	0.80
Quantity produced (kt)						
Cereals	508 768	601 972	628 511	4.41	1.75	0.95
Pulses	8 194	13 082	16 498	26.11	6.58	2.41
Roots and tubers	28 715	31 843	33 047	3.78	2.00	0.75
Oilseeds ⁴	49 054	69 654	84 094	20.73	3.29	1.51
Meat	60 224	72 098	72 725	0.87	1.87	0.00
Dairy ⁵	24 902	29 365	32 698	11.35	1.61	1.09
Fish	17 150	18 720	20 088	7.31	1.20	0.79
Sugar	26 628	27 456	28 522	3.88	0.66	0.33
Vegetable oil	24 019	34 441	40 669	18.08	3.30	1.22
Biofuel production (mln L)						
Biodiesel	10600.38	15449.29	16220.30	4.99	2.81	-0.98
Ethanol	6 792	7 842	8 517	8.60	1.10	0.81
Land use (kha)						
Total agricultural land use	802 188	796 355	791 139	-0.65	-0.09	-0.05
Total land use for crop production ⁶	335 722	333 679	332 198	-0.44	-0.09	-0.07
Total pasture land use ⁷	466 467	462 675	458 942	-0.81	-0.10	-0.04
GHG Emissions (Mt CO ₂ -eq)						
Total	719	745	735	-1.28	0.30	-0.11
Crop	172	188	187	-0.72	0.77	0.06
Animal	528	538	531	-1.28	0.15	-0.16
Demand and food security						
Daily per capita caloric availability ⁸ (kcal)	3 344	3 394	3 443	1.46	0.13	0.26
Daily per capita protein availability ⁸ (g)	100.9	103.0	105.4	2.4	0.2	0.3
Per capita food availability (kg/year)						
Staples ⁹	167.2	167.8	171.2	2.03	0.02	0.19
Meat	55.1	57.5	58.8	2.23	0.43	0.15
Dairy ⁵	26.7	29.4	31.8	8.14	0.89	0.90
Fish	16.3	15.7	15.6	-0.80	-0.23	0.06
Sugar	36.6	34.6	33.8	-2.29	-0.48	-0.13
Vegetable oil	18.9	22.4	23.9	6.90	0.87	0.34
Trade (bln 2014-16 USD)						
Net trade ³	- 48	- 18	32	-278.84	..	..
Value of exports ³	421	561	693	23.37	2.72	1.84
Value of imports ³	468	580	660	13.91	2.14	1.09
Self-sufficiency ratio ¹⁰						
Cereals	109.4	119.2	125.0	4.84	0.65	0.56
Meat	99.0	108.4	105.5	-2.67	1.06	-0.20
Sugar	79.8	84.4	89.7	6.23	1.00	0.55
Vegetable oil	81.8	95.7	110.3	15.22	1.6	1.4

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 2004-06. 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 $\text{Production} / (\text{Production} + \text{Imports} - \text{Exports}) \times 100$.

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>

2.7. Regional outlook: North America

2.7.1. Background

High performing and resilient agro-food sector

North America is more homogeneous than other regions covered in this chapter. The United States and Canada are two highly developed countries with mature and diverse economies. Its 369 million people comprises less than 5% of the global population, a share that is expected to decline over the coming decade with population growth of only 0.6%. The share of agriculture, forestry and fisheries in total regional GDP is only 1.1%, but the region is a major contributor to global agriculture.

Comprising 10% of the land used for agriculture globally, the region has the most agricultural land per person. It contributes 9% of global agriculture and fish output and provides the highest value of agricultural and fish production per capita. Over the 2019-21 period, the region had the third largest trade surplus for agricultural commodities (after Latin America and South and Southeast Asia) and accounts for 13% of global exports. Nevertheless, the share of North America in global agriculture is slowly diminishing over time, as the output and exports from other regions are growing faster. By 2031, North America is expected to constitute 12% of global agriculture and fish exports. While it is still expected to have the third largest trade surplus by 2031, this will be less than 60% of the base period value by 2031.

Agriculture in North America is characterised by high input intensity, but in the decade up to 2019, estimated total factor productivity actually declined by 1%, after strong growth in the preceding decade due largely to capital investments.²¹ Fertiliser use is high compared to most other regions, suggesting that rising fertiliser costs in the short term will reduce margins substantially. Production also tends to be capital intensive, as it occurs predominantly on large commercial units. Accordingly, the region records very high productivity of land and livestock, as measured by crop yields, milk yields and livestock/meat off-take ratios. The long-term decline in agricultural land use and land in crop production has slowed in recent years, reflecting only a modest contraction over the past decade. Yields have improved to the extent that crop production increased by 12% over the same period. This trend is expected to continue, with a 13% gain in crop production despite a projected 2% decline in cropland use by 2031. Livestock production is a significant contributor with its share in the total value of agricultural output rising over the past decade to an average of 36% between 2019 and 2021. This compares to the global average share of livestock of 30%. However, the livestock inventory is proportionately lower given its high productivity. For example, bovine meat production per animal is triple the global average level. The region is a small producer of fish compared to other regions, and its share in global production is set to decline further to 3% by 2031.

Food consumption per capita in the region is the highest of all. This is enabled by the highest per capita income (USD 54 588) and the highest urbanisation rate (83%), which affects both the level and composition of food intake. The COVID-19 pandemic and the measures imposed to curb its spread reduced per capita GDP in the region by 4.2% in 2020. Despite the first year-on-year increase in 2020 in the prevalence of food insecurity since 2014, the mature consumer base, combined with income support measures and subsequent stimulus packages meant the shock from the pandemic had a greater influence

on the composition and distribution of food sales than on quantity consumed. With restaurant closures and reduced hospitality, food eaten away from home declined, while retail grocery sales increased, driving significant changes in the food supply chain. Pre-pandemic, half of American and 35% of Canadian food dollars were spent on food away from home (Saksena et al., 2018^[8]) (Canning, Weersink and Kelly, 2016^[9]). The shift in retail sales also included changes to the type of food and packaging sizes demanded. Adaptations to the food supply chain took time, resulting in increased waste in the short term, but it was able to return to near normal levels within a few months and is likely to be more resilient to future shocks as a result of this adaptation (Weersink et al., 2021^[10]).

The recovery from the pandemic induced recession in 2020 was strong and per capita GDP increased by almost 5% 2021, sufficient for absolute levels to exceed that of 2019. After a further 3% growth in 2022, real per capita income is projected to grow at an average of 1.1% p.a. over the coming decade. With income levels already high and population growth at 0.6% p.a., possible changes in dietary preferences could be important in influencing food demand over the outlook period. Further to its influence on spending power, the pandemic may also have lasting impacts on such preferences, providing a renewed focus on the benefits of healthy diets.

While estimates include considerable food waste, calorie and protein availabilities in the region already averaged 3 808 kcal/capita per day and 114 g/capita per day in 2019-21, these are some 29% and 36% higher, respectively, than the global average. Food consumption is proportionately high in animal products, with calorie and protein shares of 29% and 64%, respectively, compared to global averages of 18% and 40%. North American diets are also high in vegetable oil and sweeteners, with caloric shares of 19% and 15% compared to the global averages of 10% and 8%, respectively. The diets and lifestyles have led to a higher incidence of obesity and food related chronic diseases such as diabetes. However, despite this level of aggregate consumption, food insecurity was estimated to be experienced by 10-13% of the region's population prior to pandemic related impacts given the wide disparity of incomes (Tarasuk and Mitchell, 2020^[11]).

North America (specifically the United States) is the largest biofuel producing region, with a production share of global output and exports exceeding 40% and 35%, respectively. It comprises primarily ethanol derived from maize feedstocks and, to a lesser extent, biodiesel derived from soybean oil. Production has been mainly policy driven, with mandates largely filled at blending rates near the blend wall for transportation fuels, but persistence of high crude oil prices may provide renewed impetus. Trade within the region is important, with Canada relying strongly on ethanol imports from the United States to fulfil its own blending mandate.

The North American region is a major producer and exporter of agricultural products and if current high prices persist as a result of supply constraints from the Black Sea region due to the war, its ability to respond with increased supply will be critical to the availability and affordability of food globally. Declining cropland use in the past suggests that some expansion would be possible. However, some evidence suggests that productivity growth slowed in the last decade (Fuglie, 2015^[12]) and, with rising environmental costs, competitiveness may be eroded in the future.

2.7.2. Production

Rising productivity driving higher output, on less land

Agricultural and fish production in North America is projected to continue expanding, albeit at a slower rate of 11% over the coming decade, relative to the past. Although prices are high in the short term, stable and in some cases declining real prices in the medium term, together with a strong US dollar, remain core drivers of slower expansion. Contrary to the past decade, growth is expected to be stronger in crop sectors,

which will grow 13% by 2031 relative to 2019-21, whereas livestock and fish production are both projected to expand by only 7%.

Growth in crop output, despite a continuation of the historic decline in cropland use, which declines by a further 2% by 2031, implies that crop production per hectare will continue to rise. Land use in cereals is projected to increase by 3.6%, thereby increasing its share in total cropland to 42% by 2031. Oilseed area is expected rise by 7% over the next ten years, supported by high prices in the beginning of the outlook period, feed demand from livestock production growth and rising biofuel production. The share of oilseeds in total crop area will thus rise to 29% by 2031. From a much smaller base, the land used for pulses will also expand by 9% over the next ten years, while land for roots and tubers continues to decline. Total area harvested in the region is expected to contract by only 1.5% – less than the total land use due to some intensification. This entails a decline of 2% in the United States of America, while the area harvested in Canada may grow by almost 1%. In the United States, total crop output is set to rise by 12% relative to the base period, whereas in Canada this growth will be much stronger at 21%. In the case of Canada, this growth is influenced to some degree by a weak base period, due to sharply reduced crop output in 2021, when cereals and oilseed production declined by 29% and 25%, respectively. Over the medium term, production growth in both countries emanate mostly from yield gains ranging from 8% for cereals and 12% for oilseeds.

The impact of the pandemic related recession resulted in downward pressure on meat prices in 2020, because of reduced consumer spending power, as well as the influence of COVID-19 and the measures imposed to contain its spread on processing facility capacity. The combination of demand recovery, and supply constraints due to high feed costs will drive a short-term recovery, after which real prices trend downwards. Consequently, meat production growth in North America is expected to slow, but production in the region is still expected to rise to 56 Mt by 2031, a 6% increase relative to the base period. Of the 3.1 Mt gain, 2.8 Mt (90%), is sourced in the United States. Poultry meat production is expected to grow fastest amongst the major meats, at 0.7% p.a. and will account for 59% of additional meat produced by 2031. Consequently, its share in total meat output rises to 47% by 2031. Pig meat production growth is only slightly slower than that of poultry, whereas bovine meat production is expected to increase at a slower annual rate of just 0.3%.

Improvements in dairy cow milk yields is the main contributor to milk production expanding by 13%. By 2031, the dairy cow herd is expected to expand by 3% from the base period, while milk yields rise by 9%. Given consumer preferences, an increasing share of milk will go for processed dairy products and a decreasing share to fluid milk.

Fish production in North America remains dominated by capture fisheries, which contribute 89% of total production. Total fish production is expected to rise to 6.4 Mt by 2031, adding 7% to the 6 Mt produced in the base period. More than 65% of the additional production will come from the United States. Aquaculture continues to develop, albeit from a lower base, and is expected to contribute 12.4% of total production by 2031.

The increase total GHG emissions from agriculture is expected to slow relative to the past decade and expressed on a per capita basis, will decline. Total emissions from agriculture will be 1.4% higher in 2031 than in the base period. Emissions from livestock activities are the major contributor, growing by 1.5% linked to minor ruminant stock expansion. Emissions from the crop sector, however, are projected to decline by 0.5%.

2.7.3. Consumption

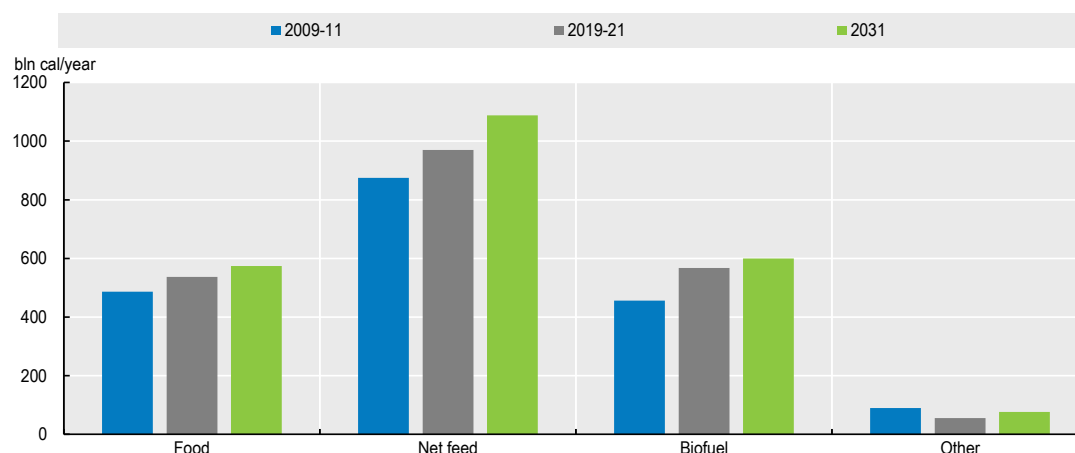
Consumer preferences likely to drive demand in the coming decade

In the developed economies of Canada and the United States, changes in per capita food consumption are largely determined by changes in preferences, but these are projected to be minor. The effects of the pandemic may have induced a greater focus on healthy diets, which would have a marked influence on fresh produce but these products are not directly covered in this *Outlook*. For some individual product categories such as sweeteners and vegetable oils, a downward trend appears to be emerging. As measured by caloric availability, food consumption in North America is set to rise marginally by 14 kcal/capita/day by 2031; it will remain 25% above the global average and still the highest of any region covered in the *Outlook*. Regionally, the greatest decline is expected to come from sweeteners (-55 kcal) and cereals (-13 kcal). These trends are partly offset by rising consumption of animal products, including meat (+8 kcal) and dairy (+19 kcal). The rise in total caloric availability will be greater in Canada (24 kcal) than in the United States (13 kcal), but the absolute levels of caloric availability will still be much higher in the United States than in Canada by 2031.

Protein intake in the region will increase only marginally from 114 g/day in the base period, to 116g/day by 2031. The split between animal and plant based sources is expected to remain fairly constant, with the share of protein obtained from animals rising by less than 1% to 65% of total protein availability by 2031. An increase is expected in the consumption of meat (0.7 kg/capita), with poultry and pig meat increasing by 1.3 and 0.3 kg/capita, respectively, while a 0.9 kg/capita decrease is anticipated for bovine meat. On a dry matter basis, consumption of dairy products is projected to decline 4% by 2031. However, protein availability from dairy products is expected to rise, largely due to growth in cheese consumption of 1.3 kg/capita per year. Fish consumption is projected to increase 5% by 2031 relative to the base period. Due to the long-term decline in cereal consumption, protein availability from plant-based sources is set to decline marginally, despite a 14% increase in pulse consumption by 2031.

Feed use in the region is significant, consuming more energy/calories than final food use (Figure 2.23). Following increased livestock production, total feed use is projected to rise by 12% to 304 Mt by 2031, with the feed use share from maize (including distiller dried grains) rising slowly over time to 69%, while protein meal falls to 16%.

Biofuel production is an important market for feed grains in the region. Ethanol production is projected to rise by 5.9% to almost 64 billion litres by 2031, supported by decarbonisation programmes. Amid ever-increasing emphasis on sustainability, biodiesel production is expected to expand by 4% over the coming decade. The outlook for biofuel is heavily contingent on developments in the energy sector and biofuel policies. The United States has indicated that it may approve the use of 15% ethanol blends for use in the summer of 2022. If such approval were granted, and particularly if such a blend were extended, the impacts on global markets could be significant.

Figure 2.23. Calories used in food, feed and other use in North America

Note: Estimates are based on historical time series from the FAOSTAT Food Balance Sheets database, which are extended with the *Outlook* database. Products not covered in the *Outlook* are extended by trends.

Source: FAO (2022). FAOSTAT Food Balances Database, <http://www.fao.org/faostat/en/#data/FBS>; OECD/FAO (2022), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>

2.7.4. Trade

Both exports and imports are set to increase

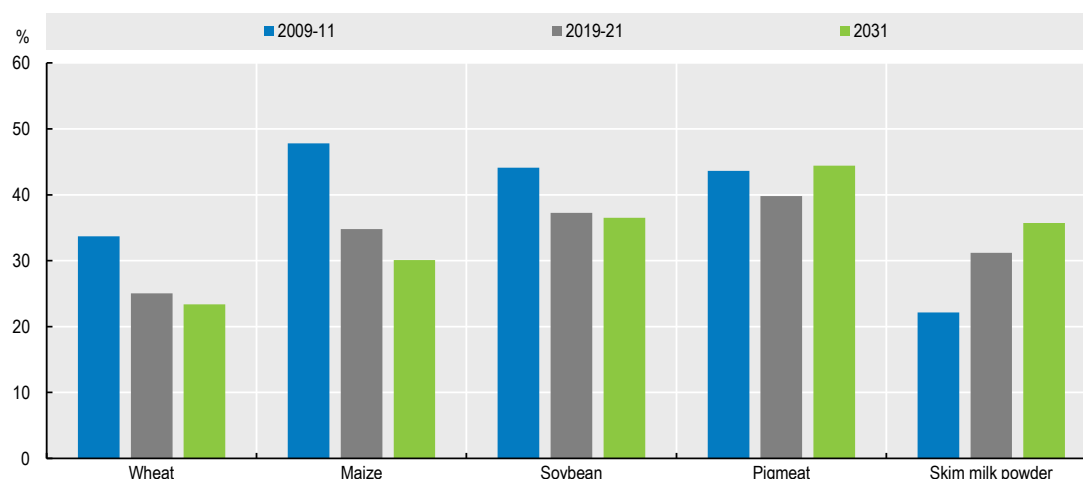
North America's agricultural trade surplus has declined by 27% over the past decade. This trend is set to prevail over the outlook period, with net imports into the region growing faster, at 1.6% p.a., than that of exports (1.0% p.a.). Both growth in imports and export are set to decelerate, reflecting weakening domestic and foreign demand, and the subsequent slowdown in production growth. Trade relations, particularly between the United States and China, have been an important factor affecting the region, due to significant volumes of bilateral trade. After a turbulent period, these relations have improved and in 2021 China was the top market for US agricultural exports. This points to resumed and potentially expanded trade opportunities and reflects additional demand for feed products from China following expansions in poultry production and rapid rebuilding of its pig herd post ASF. The United States-Mexico-Canada (USMCA) Agreement, which was implemented on 1 July 2020 to replace the North American Free Trade Agreement (NAFTA), has also influenced intra-regional trade, with significant additional exports from the United States to both Canada and Mexico in 2021.

The value of exports, measured at international commodity prices in 2014-16, is, projected to rise 12% by 2031 relative to the 2019-21 base period. This compares to an increase of 20% the past decade. The slower growth relates largely to decreasing soybean exports (despite improvements in trade relations with China), maize and ethanol exports.

The region has lost considerable trade share in recent times for maize, wheat and soybeans. In the case of maize, this trend is expected to continue, albeit at a slower rate, due to growing competition from Latin America and prior to the war, the Black Sea region. North America's share in global soybean exports is set to stabilise over the latter half of the outlook at around 37%. North America's share in the global ethanol trade is expected to stabilise at around 50%, whereas its share of global trade of both pig meat and Skim Milk Powder is set to rise (Figure 2.24).

Although recording a trade surplus, the region is also a major importer of agricultural produce. The net value of imports, measured in constant 2014-16 prices, is expected to increase 20% by 2031. The region was previously a large net importer of bovine meat, and while it still has a large share of world imports (18%), domestic exports have increased to the extent that it has become a net exporter in the last decade. This trend is expected to persist, with the region's share in global bovine meat exports expected to remain around 18% in 2031, while its share of global imports continues to decline. The region remains a relatively large importer of fish, with a 15% share of global markets and imports are set to grow by 11% by 2031. The region is also a major importer of fresh fruit and vegetables, which is expected to continue over the outlook period.

Figure 2.24. Trends in export market shares of selected commodities of North America



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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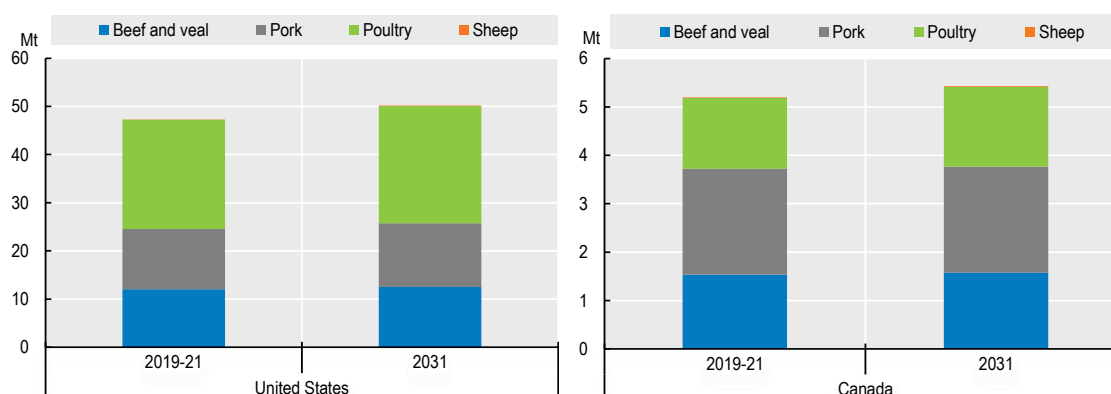
Figure 2.25. Change in area harvested and land use in North America



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

StatLink  <https://stat.link/8v4mcg>

Figure 2.26. Livestock production in North America



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


StatLink  <https://stat.link/2bfg34>

Figure 2.27. Demand for key commodities, food availability and agricultural trade balances in North America



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 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>


StatLink  <https://stat.link/tdp1y2>

Table 2.6. Regional indicators: North America

	Average		2031	%	Growth ²	
	2009-11	2019-21 (base)			2012-21	2022-31
Macro assumptions						
Population ('000)	343 112	368 735	392 615	6.48	0.68	0.56
Per capita GDP ¹ (kUSD)	48.41	54.59	63.54	16.40	1.18	1.13
Production (bln 2014-16 USD)						
Net value of agricultural and fisheries ³	339.9	385.4	426.3	10.61	1.35	0.71
Net value of crop production ³	204.8	228.5	258.6	13.17	0.96	0.72
Net value of livestock production ³	117.9	140.2	149.9	6.89	2.38	0.73
Net value of fish production ³	17.2	16.7	17.8	6.82	-1.23	0.52
Quantity produced (kt)						
Cereals	447 068	489 441	545 459	11.45	1.01	0.53
Pulses	7 415	9 620	11 491	19.45	1.40	1.52
Roots and tubers	4 995	5 636	5 897	4.65	0.88	0.28
Oilseeds ⁴	16 806	21 508	27 191	26.42	0.47	0.99
Meat	45 565	52 514	55 591	5.86	1.99	0.65
Dairy ⁵	11 859	14 227	16 108	13.23	1.80	1.14
Fish	6 139	5 961	6 362	6.73	-1.16	0.51
Sugar	6 950	7 609	8 616	13.23	0.89	0.44
Vegetable oil	13 564	18 243	19 959	9.41	3.10	1.11
Biofuel production (mln L)						
Biodiesel	2469.68	9283.36	9631.41	3.75	9.40	-1.28
Ethanol	50 338	60 172	63 721	5.90	1.34	0.21
Land use (kha)						
Total agricultural land use	465 270	463 768	463 304	-0.10	0.07	-0.01
Total land use for crop production ⁶	174 130	172 362	168 694	-2.13	0.13	-0.19
Total pasture land use ⁷	291 140	291 407	294 610	1.10	0.03	0.10
GHG Emissions (Mt CO ₂ -eq)						
Total	426	440	446	1.37	0.50	0.19
Crop	123	128	128	-0.53	-0.02	-0.09
Animal	278	280	285	1.51	0.57	0.29
Demand and food security						
Daily per capita caloric availability ⁸ (kcal)	3 680	3 808	3 822	0.35	0.55	0.07
Daily per capita protein availability ⁸ (g)	112.0	114.1	115.8	1.5	0.7	0.2
Per capita food availability (kg/year)						
Staples ⁹	134.5	133.4	132.1	-0.99	0.09	-0.07
Meat	92.5	98.5	99.2	0.71	1.23	0.12
Dairy ⁵	32.1	34.9	36.3	3.94	0.92	0.45
Fish	19.2	19.7	20.7	5.00	0.55	0.12
Sugar	31.9	30.6	30.0	-1.97	0.31	-0.31
Vegetable oil	35.4	39.4	41.6	5.63	1.14	0.63
Trade (bln 2014-16 USD)						
Net trade ³	33	24	14	-41.41	..	..
Value of exports ³	148	177	198	12.06	1.81	0.97
Value of imports ³	115	153	184	20.44	2.05	1.63
Self-sufficiency ratio ¹⁰						
Cereals	125.3	130.6	126.5	-3.15	0.22	-0.07
Meat	115.8	115.9	114.8	-0.93	0.11	0.01
Sugar	62.1	68.5	71.5	4.29	0.83	0.01
Vegetable oil	102.1	94.9	97.1	2.41	-0.40	0.42

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. Oilseed represents 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 $\text{Production} / (\text{Production} + \text{Imports} - \text{Exports}) \times 100$.

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>

2.8. Regional outlook: Latin America and the Caribbean

2.8.1. Background

Strong potential to expand production but poverty is a brake on food consumption

The Latin America and Caribbean²² region is home to about 8.5% of the global population, growing at 0.7% p.a., which will add another 57 million people by 2031. As the most urbanised amongst developing regions, 84% of the population is expected to reside in urban settings by 2031. While this also implies that most of the region's poor dwell in urban locations, the incidence of poverty in rural areas remains persistently high. Highly diverse farm structures range from large, commercial export-oriented farms dominating agriculture in the Southern Cone, particularly in Argentina and Brazil, to some 15 million smallholder and family farms responsible for much of the region's food production (OECD/FAO, 2019^[13]).

For some time the region has been affected by considerable economic uncertainty, which has been heightened further by the COVID-19 pandemic.²³ On a per capita basis, incomes contracted by 1.8% per annum over the past decade. Given pre-existing structural challenges, the effects of COVID-19 were particularly severe in the region and per capita GDP declined by 7.3% in 2020. Despite a strong rebound of 5.3% in 2021, absolute income per capita is only projected to surpass pre-pandemic levels by 2023. Given the extent of differing pre-existing challenges within the region, the pandemic induced recession was also greater in some countries. For instance, in Argentina, the exchange rate had already been on a steep depreciating trend prior to 2020, but the depreciation accelerated through the pandemic and real GDP per capita contracted by almost 11%. The recovery in Argentina is also more prolonged, and while per capita income will surpass 2019 levels by 2022, it remains lower than that of a decade earlier.

Following good initial progress to reduce it, the prevalence of undernourishment in the region started to increase again post 2014. The combined impact of economic recession, deteriorating financial conditions and value chain disruptions accelerated this trend and 2020 represented the biggest year-on-year increase in undernourishment and food insecurity since the initiation of the upward trend. Between 2014 and 2020, the number of hungry people increased by 79%, and in 2020 those in moderate or severe food insecurity constituted 41% of the population. The Economic Commission for Latin America and the Caribbean suggests that the pandemic pushed the extreme poverty rate in the region to 13.8% in 2021, having increased to 13.1% in 2020. Compared to 2019, this has left 13 million additional people in extreme poverty over a two-year period, significantly exacerbating food insecurity.

In the medium term, per capita GDP in the region is expected to rise by an annual average of 1.6% to reach USD 10 190 per capita by 2031, which is 23% below the global average and only 3% higher than its level in 2014. The share of food in household expenditures is estimated to be around 14% on average for 2019-2021. Macroeconomic instability and food prices may have considerable impact on food security in the region in the coming decade.²⁴

Abundant in land and water, the region accounts for 13% of the global production of agricultural and fish commodities and 17% of the net export value of these products. This share is set to increase further over the coming decade, underscoring the importance to the region of trade openness at a global level. Export

demand will be the critical source of growth over the medium term. Export growth has been aided by increased competitiveness, with total factor productivity growing by 40% from 2000 to 2019.²⁵ Despite falling labour input, output growth has been underpinned by rising material inputs, notably fertiliser which doubled over the period 2000 to 2019. These inputs will face challenges of higher costs early in the *Outlook* period, and may constrain growth. Despite the region's significant export orientation, intra-regional trade is low and there are some countries in the region such as Panama and El Salvador which are net importers

Despite the importance of exports, the agriculture and fish sectors account for about 10% of GDP. This share increased in 2020 due to agriculture's resilience and exemption from lockdown restrictions. It could rise further in the short-term if supply constraints from Russia's war against Ukraine result in prolonged higher prices in export markets, which would induce higher production. However, this share of agriculture and fish in GDP is anticipated to decline marginally in Latin America and Caribbean over the medium term. The agricultural and fish sectors also face some challenges, having been increasingly affected by adverse climate events and recently high transport, energy and fertiliser costs.

Despite being the biggest net exporter amongst the regions in the *Outlook*, the Latin America and Caribbean region still faces major challenges in reducing food insecurity. Much of this emanates from income distributional issues and resultant affordability constraints, and not the availability of food in the region. Export led growth has made the sector less vulnerable to macro-economic instability within the region, but implies that volatility in the global market and a renewed focus on domestic supply chains in many parts of the world following the pandemic could affect its growth prospects. Export growth from the region is projected to slow relative to the recent past, in line with slower production growth, but also weakening global import demand. The region also faces challenges associated with increased concentration of exports by destination, exposing export demand to higher market risks.

2.8.2. Production

Good prospects for higher productivity for crops and livestock

Agricultural and fish production in the region is projected to expand by 14% over the next ten years. Around 64% of this growth emanates from crop production, about 28% from the livestock sector and the remaining 8% originates from fish.

Intensification is expected to play an important role in expanded crop production, despite the region's land abundance. With more double cropping, the harvested area is set to expand by 6.7%, with a concomitant increase in cropland use of only 3.4% by 2031. Among the 12.4 Mha growth in harvested area by 2031, nearly 3.2 Mt and 2.6 Mt, respectively, are attributable to additional cultivation of soybeans and maize. The region will remain the largest producer of soybeans in the world, accounting for 53% of global production by 2031. This implies that any weather related supply reductions from the region, can impact significantly on world prices. Assuming more favourable weather conditions, the region has ample potential to increase production to fill possible supply constraints with a prolonged war. The region's contribution to global cereal production is smaller, but its share of maize production is set to rise to almost 18% by 2031.

Productivity gains have contributed greatly to crop production growth in the past. For major crops such as maize and soybeans, yields improved by 23% and 13%, respectively, over the past decade. This trend is expected to continue, with average yield gains of around 10% projected by 2031 for most major crop commodities. This enables continued improvement in the net value of crop production per hectare of land, which is already the second highest amongst the regions in this *Outlook* and set to rise by a further 1.2% p.a. over the coming decade. The region is an intensive user of fertiliser, second only to the Developed and East Asia region, and imports large quantities, suggesting that sharp increases in fertiliser costs, exacerbated by the war could potentially constrain yield growth and output in the short term.

Livestock production growth will also benefit from productivity gains and further intensification, with increased use of feed grains. Poultry production will account for more than 55% of growth in meat production by 2031, with bovine and pork production accounting for 29% and 16%, respectively. Despite short-term pressure in the early years of the *Outlook*, meat to feed grain price ratios will be favourable over the medium-term, boosting the expansion of poultry and pork production, both of which rely on intensive use of feed in production. Bovine meat expansion will result from productivity gains, increased carcass weights, and 3% expansion of herd numbers by 2031 to yield growth of 10.8%.

Fish production will recover from a modest contraction over the past ten years to register growth of 12% by 2031. The development of aquaculture in several countries across the region is the predominant driver of fish output, contributing more than 60% of additional production by 2031. Captured fisheries are expected to be volatile over the projection period, influenced by *El Niño* effects, which tend to affect fish (mainly anchoveta) used for the production fishmeal and fish oil.

GHG emissions are projected to grow marginally by 0.1% p.a. over the next decade. The bulk of this increase accrues from crop production, where emissions will increase by 3.2% over the ten-year period, compared to an increase of 2.3% from livestock production. However, relative to the net value of agricultural production, emissions per unit value of output are set to decline albeit at a slower rate than in the past.

2.8.3. Consumption

Consumers are slowly changing dietary patterns

Following a short-term decline, influenced by the impact of the pandemic on purchasing power and the prolonged recovery, average per capita calorie intake is projected to rise in the medium term to reach 3077 kcal/day by 2031. This means an increase of 60 kcal/day from 2019-21 levels and is mainly attributed to animal products. The rise in calories obtained from plant-based foods is limited by a large decline of sweeteners (-28kcal) and possibly pointing to increasing health awareness amongst consumers. Despite the decline, Latin America and the Caribbean will remain the largest sugar-consuming region in the world on a per capita basis. Initiatives such as improved school feeding programs and front-of-package labelling legislation have been imposed across the region in an effort to address the double challenge of rising prevalence of overweight and obesity, but also persistent challenges of food insecurity and nutritional quality. Food quality amongst low-income segments of the population tends to be affected by persistent poverty challenges.

Per capita protein intake is expected to rise to 89 g/day by 2031, an increase over the period of 3.1g/day. Animal products will contribute the bulk of the increase at over 70%, with higher consumption of dairy products contributing the majority. For its middle-income demographic profile, the region's meat consumption is already high at almost 61 kg/year, almost double the average world level. However, per capita meat consumption is projected to rise by only 3.3% over the next decade, as consumers increase their intake of protein from other sources. Consumption of fish, which on a per capita basis is only about half the world average, will rise by only 1 kg/capita to 10kg, comparable to the past decade.

Increasing intensification of the livestock sector is expected to support a 15% increase in feed use by 2031. Two thirds of that increase will come from maize, whose feed use will expand by 18%, but protein meal is also projected to expand by 13%, which will account for 19% of additional feed use by 2031. As such, maize and protein meal together will contribute over 75% of additional feed use.

Despite a fairly constant share of sugarcane use, ethanol production from the region is set to increase 6% by 2031 relative to the base period, contributing 15% of global growth in ethanol production. Brazil, with its Renovabio programme, is the biggest ethanol producer in the region and will remain an important supplier to the global market. While high crude oil prices should boost demand for biofuels in the short-term, the

evolution of global energy and transportation sectors in the medium-term will remain a major uncertainty facing the region's biofuel sector.

2.8.4. Trade

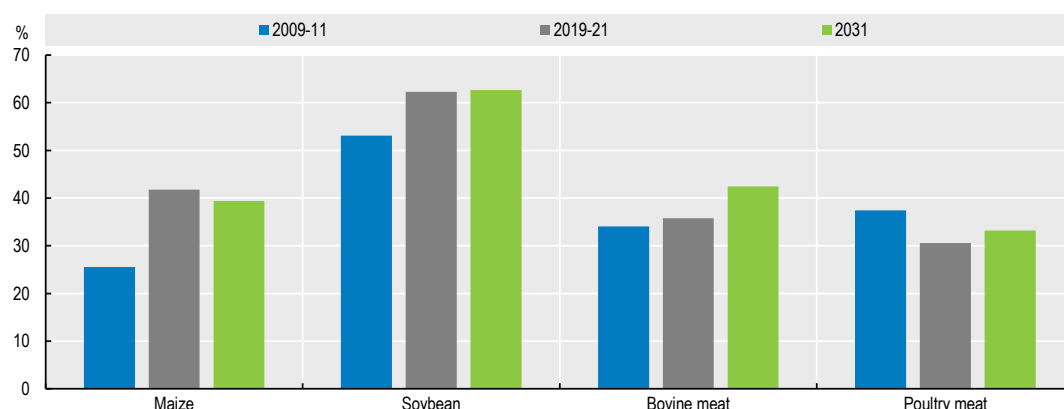
Open trade orientation is crucial for the region's agri-food sector

As a major agricultural surplus producer, exports have been a key component driving agricultural growth, reducing the sector's vulnerability to exogenous shocks and economic risks within the region. The rate of export growth has enabled the share of exports in total agricultural production to increase consistently, along with the region's contribution to global trade. Over the past decade its trade surplus almost doubled and its share in global exports grew to 17%. By 2031, the region is expected to increase its trade surplus by a further 28% to account for 18% of global exports. The deceleration in export growth reflects a slowdown in Brazil, which contributes more than half of the region's exports. Nevertheless, while slower than the 6% p.a. achieved over the past decade, Brazil's export growth is still expected to remain above 2% p.a. and, combined with strong growth in fruit and vegetable exports from Mexico, Costa Rica and Ecuador, the share of net export value in the region's agriculture and fish production should approach 50% by 2031.

Robust supply growth will enable the region to consolidate its position as a major exporter of maize, soybean, beef, poultry, fish meal, fish oil, sugar and ethanol. With the exception of fishmeal, ethanol, and sugar, the region will increase its share in the global market for all of the aforementioned commodities. By 2031, it will account for 61% of global exports of soybeans, 59% of sugar, 45% of fish meal, 43% of maize, 40% of beef and fish oils, 32% of poultry and 25% of ethanol.

Given the importance of the region in the global market, the extent of openness to trade will have significant consequences for the sector. The pandemic and associated restrictions resulted in multiple bottlenecks in global trade systems, adding costs and highlighting risks in global supply chains. The extent to which this influences trade will be crucial for the region. At the same time, the ability to respond to supply constraints from the Black Sea region while the war persists could enable it to increase market share in the short-term. The EU-Mercosur Free Trade agreement and the Regional Comprehensive Economic Partnership could further expand trade opportunities, but trade relations outside of the region, such as those between China and the United States can also play a role. While the benefits to the region of a trade orientated global market are clear, improved internal market integration and functioning of SMEs, cooperatives and family farms would expand trade within the region, thus diversifying market opportunities and bolstering the sector's resilience.

Figure 2.28. Trends in export market shares of the Latin America and the Caribbean



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


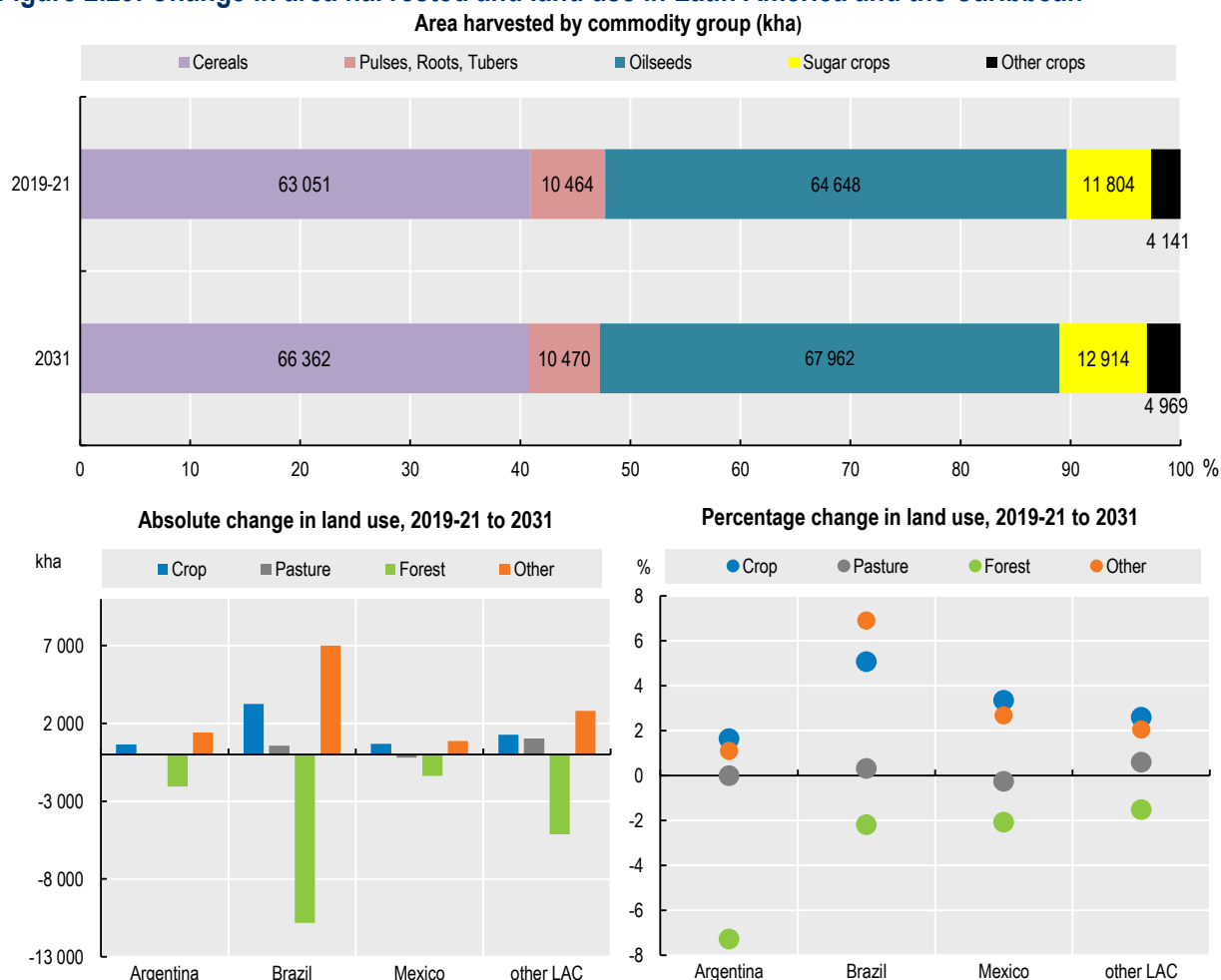
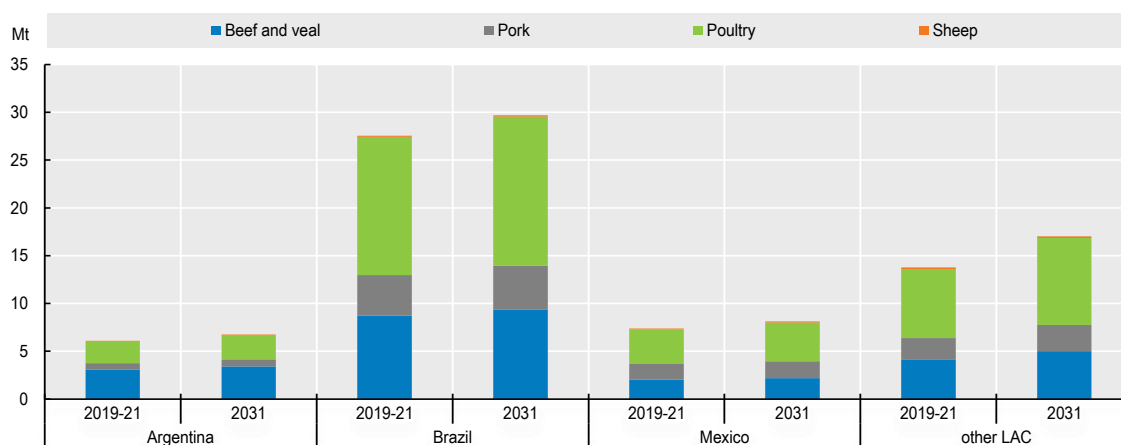
StatLink  <https://stat.link/eaqlnx>

Figure 2.29. Change in area harvested and land use in Latin America and the Caribbean

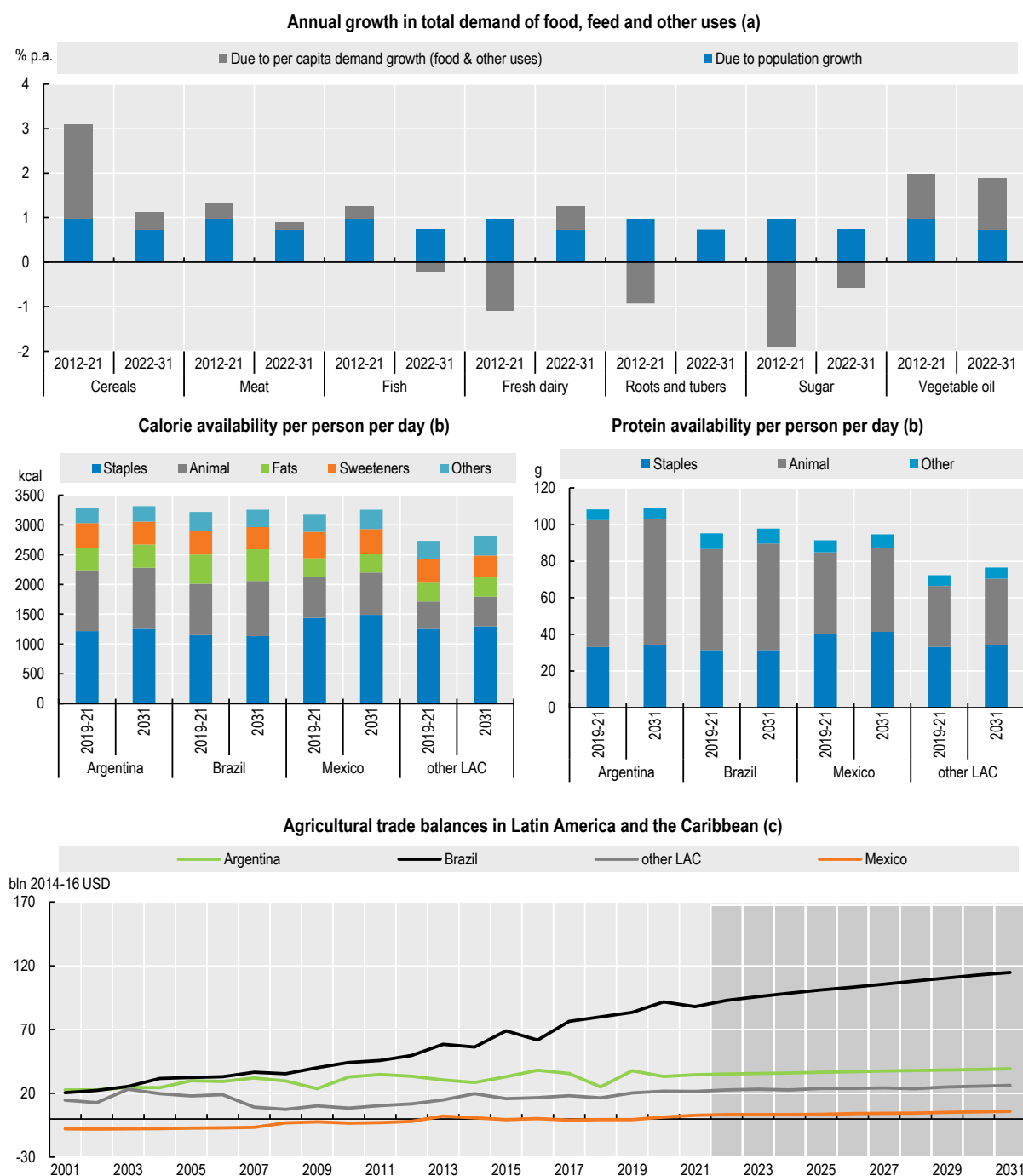
Source: OECD/FAO (2022), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>

StatLink <https://stat.link/pqcvto>

Figure 2.30. Livestock production in Latin America and the Caribbean

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

StatLink <https://stat.link/mpj34t>

Figure 2.31. Demand for key commodities and food availability in Latin America and the Caribbean

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 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>.


StatLink  <https://stat.link/bo36q1>

Table 2.7. Regional Indicators: Latin America and Caribbean Region

	Average		2031	%	Growth ²	
	2009-11	2019-21 (base)			2012-21	2022-31
Macro assumptions						
Population ('000)	589 712	652 217	708 787	8.67	0.97	0.73
Per capita GDP ¹ (kUSD)	9.32	8.66	10.19	17.66	-1.81	1.58
Production (bln 2014-16 USD)						
Net value of agricultural and fisheries ³	435.9	538.5	614.3	14.08	2.23	1.08
Net value of crop production ³	240.1	311.8	360.7	15.70	2.38	1.30
Net value of livestock production ³	148.8	180.9	202.4	11.92	2.03	0.77
Net value of fish production ³	47.0	45.9	51.2	11.62	2.09	0.80
Quantity produced (kt)						
Cereals	186 644	274 962	318 628	15.88	3.34	1.19
Pulses	6 748	7 640	8 431	10.35	1.20	1.00
Roots and tubers	14 623	14 050	15 013	6.86	-0.03	0.63
Oilseeds ⁴	5 097	6 181	6 933	12.16	2.94	0.80
Meat	46 101	54 816	61 613	12.40	1.60	0.91
Dairy ⁵	8 938	9 994	11 706	17.13	0.00	1.42
Fish	16 674	16 255	18 151	11.66	2.10	0.80
Sugar	54 971	56 905	63 649	11.85	-0.98	1.65
Vegetable oil	20 879	27 337	31 421	14.94	2.36	1.30
Biofuel production (mln L)						
Biodiesel	4673.03	8896.96	10834.98	21.78	5.28	1.65
Ethanol	27 592	36 656	38 948	6.25	3.29	0.91
Land use (kha)						
Total agricultural land use	672 957	672 201	679 465	1.08	0.01	0.09
Total land use for crop production ⁶	160 482	172 019	177 866	3.40	0.80	0.28
Total pasture land use ⁷	512 475	500 182	501 599	0.28	-0.25	0.03
GHG Emissions (Mt CO ₂ -eq)						
Total	1 009	1 069	1 095	2.37	0.66	0.10
Crop	100	117	121	3.18	1.58	0.23
Animal	886	923	944	2.26	0.58	0.07
Demand and food security						
Daily per capita caloric availability ⁸ (kcal)	2 946	3 017	3 077	2.00	-0.04	0.33
Daily per capita protein availability ⁸ (g)	81.7	86.0	89.1	3.6	0.2	0.3
Per capita food availability (kg/year)						
Staples ⁹	159.5	157.5	161.5	2.54	-0.19	0.25
Meat	57.6	61.4	63.4	3.30	0.48	0.22
Dairy ⁵	15.8	15.9	17.2	8.26	-0.75	0.69
Fish	8	9	10	5.74	-0.01	0.34
Sugar	45	38	36	-5.41	-1.68	-0.56
Vegetable oil	18	18	20	14.55	-1.18	1.31
Trade (bln 2014-16 USD)						
Net trade ³	81	145	186	27.89	..	..
Value of exports ³	151	240	298	24.30	4.26	1.88
Value of imports ³	71	94	112	18.75	3.20	1.52
Self-sufficiency ratio ¹⁰						
Cereals	102.1	107.3	108.9	1.42	0.57	0.09
Meat	110.2	111.8	111.2	-0.57	0.28	0.01
Sugar	215.7	227.9	248.6	9.09	-0.02	1.39
Vegetable oil	127.7	131.5	124.2	-5.57	0.29	-0.52

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 2004-06. 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 $\text{Production} / (\text{Production} + \text{Imports} - \text{Exports}) * 100$.

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 Unless otherwise specified, the data used in describing the historical and current situation in each region are aggregated from the underlying database used in the projections. These data are from a variety of sources including questionnaires from OECD countries and databases from AMIS, FAOSTAT, UN (Population) and IMF (Macro), with manipulations by the OECD and FAO Secretariats.

² Australia, China, Japan, Korea, New Zealand.

³ 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*.

⁴ This analysis assumes the EU-27 as one integral region.

⁵ (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>.

⁶ The old age dependency ratio is calculated that the over 65 population divided by 15-64 population.

⁷ India, Indonesia, Iran (Islamic Republic of), Malaysia, Pakistan, Philippines, Thailand, Viet Nam, Asia Least Developed, Other Developing Asia and Oceania. For mentioned regions, see Summary table for regional grouping of countries.

⁸ 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*.

⁹ (Fuglie, 2015_[12]) (updated to 2019, USDA).

¹⁰ See “Southeast Asia, Prospects and Challenges” in the *OECD-FAO Agricultural Outlook 2017-2026*.

¹¹ For mentioned regions, see Summary table for regional grouping of countries.

¹² 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*.

¹³ (Fuglie, 2015_[12])(updated to 2019, USDA).

¹⁴ FAO informal consultation with African ministers of agriculture held on 4 April 2022 leading up to the 32nd FAO Regional Conference for Africa.

¹⁵ ESCAP-World Bank trade cost database. <https://www.unescap.org/resources/escap-world-bank-trade-cost-database>

Summarised in Tralac report: <https://www.tralac.org/resources/infographics/15537-intra-africa-non-tariff-trade-costs-for-the-period-2015-2019.html>

¹⁶ Near East: Saudi Arabia and Other Western Asia. Least Developed: North Africa Least Developed. North Africa: Other North Africa. For mentioned regions, see Summary table for regional grouping of countries.

¹⁷ 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*

¹⁸ (Fuglie, 2015_[12]) (updated to 2019, USDA, regional aggregation of countries).

¹⁹ For mentioned regions, see Summary table for regional grouping of countries.

²⁰ 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*.

²¹ (Fuglie, 2015_[12])(updated to 2019, USDA)

²² Other LAC: Chile, Colombia, Paraguay, Peru and South and Central America and the Caribbean. For mentioned regions, see Summary table for regional grouping of countries.

²³ See also “The Outlook for Agriculture and Rural Development in the Americas: A Perspective on Latin America and the Caribbean 2021-2022”. ECLAC, FAO, IICA. https://repositorio.cepal.org/bitstream/handle/11362/47209/1/ECLAC-FAO21-22_en.pdf

²⁴ 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*.

²⁵ (Fuglie, 2015_[12])(updated to 2019, USDA)

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