

2 Regional briefs

This chapter describes key trends and emerging issues facing the agricultural sector in the six FAO regions: 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 2024-33 and provides background information on key regional issues that relate to the projections.

The regional briefs in the *Outlook* highlight broad trends for the regions defined by the FAO in the implementation of its global workplan. Recognising regional diversity, the intention is not to compare results across regions. Instead, they illustrate some of the latest regional developments, highlighting responses to global challenges and emerging trends, and relating these to the main messages of the *Outlook*. The assessments generally compare the end point of the *Outlook's* projection (2033) to the base period of 2021-23.

Agrifood systems globally have navigated multiple disruptions in recent years, including the COVID-19 pandemic, the impact of Russia's war against Ukraine, weather related supply fluctuations in several regions, surging energy prices, a cost-of-living crisis and spiralling inflation. The sharp rise in food prices impacted the cost and affordability of healthy diets as well as food security in several regions. Differences in resource endowments, economic structure, development and income levels mean that the magnitude of these impacts are not uniform in all regions. These briefs do not present a quantitative assessment of the impacts of these disruptions, though they do account for the latest expectations with respect to macro-economic developments as the world emerges from them. The trends and issues presented are those expected to underpin the *Outlook* in the medium term. They assume that the adverse effects on food, feed and fuel production, consumption and trade will gradually moderate, recognising that several uncertainties remain.

This chapter contains 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 for the region concerned.

2.1. Regional outlook: Developed and East Asia

2.1.1. Background

China's declining population and weaker income growth to slow demand growth in the region

The Developed and East Asia region¹ comprises a diverse range of countries that includes the second and third largest economies in the world, in the People's Republic of China (hereafter "China") and Japan. In per capita terms, income levels range from USD 9 298 in China to USD 64 182 in Australia. The region is the second most populous of those covered in this chapter. It comprises 21% of the global population and most of its 1.6 billion people reside in China. It is the only region where the population is expected to decline over the coming decade, mainly on account of the decline in China and to a lesser extent Japan. Urbanisation has been rapid and estimates suggest that by 2033, 73% of people will reside in urban settings, up from just 55% in 2010. Such urbanisation occurs mainly in China, as an estimated 89% of the population in the rest of the region already resided in urban areas in 2023. China's nutrition patterns are stabilising, but continued urbanisation may still drive demand for more, processed and conveniently packaged food.

In the midst of various global disruptions, income growth in the region has shown remarkable resilience. On average, from 2020 to 2023, the region maintained growth of 3% in per capita GDP, which includes a contraction of less than 0.5% in 2020. While some countries like Japan, Australia, and New Zealand saw declines, China maintained a 2.0% growth. The rebound was such that by 2021 all countries except Japan had exceeded pre-2020 GDP levels in per capita terms. Subsequent global challenges such as Russia's war against Ukraine, increased energy prices and spiraling inflation with associated monetary tightening slowed momentum but growth remained positive and is expected to be sustained in 2024 at 4.7% in China and 3.3% in the Developed and East Asia region as a whole. In the medium term, per capita incomes are expected to rise by an average of 2.8% p.a., significantly slower than in the past. Inflation has slowed, but investment remains lacklustre, particularly in China, as many post-pandemic economies continue to localise and drive domestic manufacturing with reduced focus on foreign sourcing. Medium-term risks to growth include geo-economic fragmentation and further de-risking policies in other major economies – which include reorienting demand for goods towards domestic, as opposed to imported supply, and could slow growth further in China. This combination of weaker economic growth and a declining population suggests that China's role in driving global food demand may diminish compared to the past.

Economic growth has been accompanied by a reduction in the share of food in total household expenditure to 13%, but it ranges in the region from 17% in China to 8% in Australia. While global disruptions influenced food security in the region, domestic protection in several countries muted the shocks to some extent. Consumer food inflation in the region remained at the lower end of the global spectrum and as agricultural commodity prices continue to decline, affordability and associated food security continues to improve.

The share of primary agriculture and fish value-added in the region's total economy has declined to about 4% and is expected to fall further to 3% by 2033. The region's agricultural natural resource base mirrors the diversity of the countries it contains. Abundance in Australia and New Zealand stands in contrast to severe resource constraints in China, Korea, and Japan. Consequently, the region encompasses a range of important exporters and importers of agricultural and food products. China, Japan, and Korea rank amongst the largest net food commodity importers in the world. These countries' trade activities are sufficient to wield considerable influence on global agricultural markets and food value chains. Conversely, New Zealand and Australia are among the top ten global net exporters of food commodities, particularly for livestock and dairy products. Resource differentials and specialisation have fostered extensive and expanding interregional trade. Such opportunities may be accentuated in the short term by challenges in the global shipping industry such as conflicts around the Black Sea and Red Sea, which are affecting shipping through the Suez Canal, as well as water level constraints in the Panama Canal. Apart from Australia and New Zealand, interventionist government policies play a pivotal role in local markets. Given

the size and contribution to global trade of the countries in which they are implemented, changes to these domestic policies have the potential to exert significant influence on global markets.

The region is confronted with a myriad of diverse challenges, including water scarcity and vulnerability to climate change. Increasingly severe droughts are occurring more frequently, particularly in Australia, a situation that will persist and intensify due to climate change. In China, Korea and Japan, natural resource constraints drive intensive use of inputs and subsequent sustainability concerns. In the livestock sector, diseases such as African Swine Fever (ASF) and Avian Influenza (AI) pose the greatest threats, with significant impacts in recent years highlighting the need for improved measures to combat these risks and improve the resilience of food systems.

Despite these challenges, agricultural value addition per unit of land used for agricultural purposes continues to rise, with a projected improvement of 0.6% p.a. over the coming decade. In view of the resource constraints faced, continued investments in productivity growth, adaptation to climate and facilitation of the green transition in the region will be critical to achieve such growth sustainably.

2.1.2. Production

Sustainable productivity gains critical

The region is the largest global producer of agriculture and fish commodities, contributing almost 30% of the value of global output in the 2021-23 base period. By 2033, 5.8% growth in the net value of production is expected to result in a modest decline in its share of global production. China plays a pivotal role in the region's output, across crops, livestock and fish products. In the 2021-23 base period, it already accounted for almost 90% of total value and, as Figure 2.1 shows, it is also the sole driver of growth over the *Outlook* period. While China is expected to add 6.8% to the value of its agricultural and fish production by 2033, production in the rest of the region is expected to contract by 1%, mainly due to reduced output in Japan and Korea which is not fully offset by growth in Australia and New Zealand. Aside from recovery in the livestock sector following African Swine Fever (ASF), growth in the region as a whole has slowed as domestic markets have matured and trade competition strengthened.

Crops comprise around half of the total value of agricultural and fish output, with a further 27% attributed to animal products and 22% to fish production. Growth is expected to be fastest in the fish sector, which is set to expand by almost 13% pushing its share in total output value to 24% by 2033, at the expense of crops, where growth is only projected at 3.4%.

More than 80% of total agricultural land is used for pasture and, in line with historic trends, the almost 7 Mha (less than 1%) decline in total agricultural land use over the coming decade is underpinned by reduced pasture while cropland could expand by 2%. Land use projections suggest that productivity gains will be central to unlocking further growth, but these are expected to slow. The value generated per hectare of cropland is already substantially higher in Developed and East Asia than in any other region. However, the combination of water scarcity and disproportionately high use of synthetic fertiliser has led to mounting environmental and food safety concerns. This results in only modest gains in fertiliser application per hectare by 2033 and slower yield gains relative to the past despite progress in improved seed varieties and production practices. The combination of crop mix and fertiliser use efficiency is expected to yield a 2% improvement in the energy produced per unit of fertiliser applied.

Most crop area is dedicated to cereals, resulting in notable contributions to global production of rice, maize and wheat. The region's strong processing sector also contributes a substantial share of global production of protein meal and vegetable oil but it draws heavily on imported oilseeds. China contributes almost all of the maize, more than 90% of the rice and approximately 80% of the wheat produced in the region. Outside of China, wheat production is primarily from Australia and rice production from Japan. Given that rice production in Japan and wheat production in Australia are also expected to decline by 8% and 4%

respectively, maize will be the major driver of cereal production growth from the Developed and East Asia region.

Livestock production constitutes 27% of the total value of agricultural and fish production and growth of almost 5% is sufficient to sustain this share by 2033. Growth emanates from a combination of intensification and productivity gains, reflecting the contracting pasture land base in Australia, China, New Zealand and Japan. More than half of meat production growth is expected to be in the pig sector, with a further 20% and 18% respectively attributable to poultry and beef.

Livestock production trends in the region mirror those of China, which accounts for more than 80% of livestock production value. Pigs and poultry are the largest subsectors, constituting 60% and 26% respectively of China's meat production. By 2033, China's meat production is expected to expand by 7% and almost two-thirds of this expansion could be pigmeat. Following the devastating impact of the 2018 African Swine Fever (ASF) outbreak, China's pig herd has largely been rebuilt and in 2022, its pig inventory surpassed 2017 levels. In rebuilding, the sector also restructured with many smaller producers replaced by large, commercial production units that prioritise biosecurity and use top class genetics, yielding substantial productivity gains. By 2033, pig production in China is expected to approach 60 Mt, while poultry and beef production could exceed 25 Mt and 8 Mt respectively.

Despite its much smaller share in total meat production from the Developed and East Asian region, Australia's resource base is more conducive to cattle which account for almost half of its total meat production. In turn, Australia contributes 20% of the bovine meat produced in the region. Growth of 15% by 2033 implies that it will account for 27% of the expansion in regional bovine production.

The Developed and East Asian region contributes almost 40% of global fish production and more than 90% is sourced from China. With China at the forefront, the region's growth in fish production is mainly driven by aquaculture, which is projected to make up 83% of China's total fish production by 2033. However, growth is expected to slow as the regulatory focus shifts increasingly towards sustainability.

Total agricultural greenhouse gas (GHG) emissions in the region are projected to increase by 2.3% by 2033. This comes predominantly from crops where emissions could rise by 5.3%, compared to a decline of less than 0.1% from animal production. Despite these increases, the decline in GHG emissions per unit value produced in agriculture and fisheries is anticipated to persist, albeit at a slower pace. This year's *Outlook* features a scenario that simulates the impact of halving food losses along supply chains and food waste at the retail and consumer levels by 2030 (SDG 12.3). For the region, the scenario projects that total agricultural emissions in the region could be reduced by 5.3% relative to the baseline, while calorie intake improves. This implies that by 2030, agricultural GHG emissions could reduce by 3.9% from the average level in the 2021-23 base period.

2.1.3. Consumption

Greater nutritional stability in China driving regional demand preferences

The East Asian region has significantly enhanced food security and experienced a smaller impact from recent disruptions compared to other regions. While the COVID-19 pandemic did affect consumer behavior and agricultural supply chains, China's robust GDP performance and income support measures in developed countries helped alleviate major food security concerns. Moderate to severe food insecurity increased slightly in 2020 but recovered promptly and has since stabilised well below pre-pandemic levels despite slower income growth. Similarly, total calorie availability increased consistently and by 2033 is expected to reach 3 300 kcal/person/day. This is the third highest amongst all regions covered in this chapter, trailing only North America and Europe, which reflects generally high per capita income levels in most countries. However, when accounting for estimated household waste, total calorie intake is anticipated to be below 2 850 kcal/person/day. Combined food waste and losses in the region are estimated to be 9% below the global average. Such waste is most prevalent in vegetal products, particularly

cereals which account for more than half, and perishables such as fresh fruit and vegetables which are widely consumed in the region (Figure 2.2). In the *Outlook* scenario where food waste and losses can be halved by 2030, as envisioned in SDG targets, calorie intake in the region could be increased by 2.6% relative to the baseline and the number of undernourished people in the region could decline by 14%, while at the same time, reducing GHG emissions. This implies that by 2030, calorie intake could increase by 6.2% relative to the average level in the 2021-23 base period.

As the only region with a projected decline in population by 2033, Developed and East Asia also exhibits some distinctive age distribution trends that may influence demand prospects. In Japan and Korea, age dependency ratios are already high and set to increase further (UN DESA, 2024^[11]). It is generally assumed that aging populations will dampen overall food consumption growth rates. In China, rising age dependency is combined with rapid urbanisation, which is expected to drive growing consumption of convenience foods as well as sugars and fats, albeit much slower than in the past. Sugar consumption is expected to grow fastest among the various food groups. Vegetable oil consumption growth is slower, absolute levels are already high. By 2033, it is expected to exceed 26 kg per capita, exceeding the global average by 65%.

Given generally high income, high levels of development, and maturity in most countries of the region, shifts in dietary composition are limited. Even in China, where such shifts have been rapid in the past, weaker income growth is expected to slow the rate of change substantially. By 2033, per capita consumption of sugar products is expected to rise by 17%, whereas fish, dairy and meat consumption are set to expand by 13%, 12% and 7% respectively. By contrast, staple consumption growth is expected at less than 0.5%.

Protein availability is also set to increase, with the greatest gain in China where it is already higher than any other country in the region and almost 40% above the global average level. Almost 42% of this 10g/person/year gain by 2033 is attributed to vegetal sources, with a further 31% to meat and 17% to fish. Smaller gains are also evident in Korea (2.8g/person/year) and Australia (2.9g/person/year), whereas a decline is expected in Japan and relative stability in New Zealand.

Led by China, the region accounts for more than a quarter of global animal feed use. By 2033, feed use is expected to rise by 10%, reflecting a combination of meat production growth, particularly in China, increased intensity of feeding operations as production systems modernise and improved feed use efficiency in intensive pork and poultry operations. Large scale, fully commercial production systems that are increasingly prevalent in China use feed more intensively than smaller, more traditional producers, but the combination of controlled environment and improved genetics also yields much improved feed conversion. Despite these gains, the effects of rising feed use intensity still result in feed use outpacing meat production growth in China over the *Outlook* period but this gap is expected to narrow substantially compared to the past decade.

Maize and protein meal remain the core ingredients in most pre-mixed feed rations and account for almost 70% of total feed raw material use between them. Their use in animal feed across the region is expected to grow by 12% and 14% respectively over the coming decade.

The region accounts for roughly 10% of global ethanol use and 80% of this is attributed to China. With limited incentive to increase ethanol production while feed demand is rising and stocks reduced, China's blend rate is expected to rise to 2.5% by 2033, from only 1.6% in the base period, despite its ambitious 10% target. This is sufficient to support growth of 10% in ethanol use by 2033 from the 2021-23 base period which sustains China's share in global use at 7.4%.

2.1.4. Trade

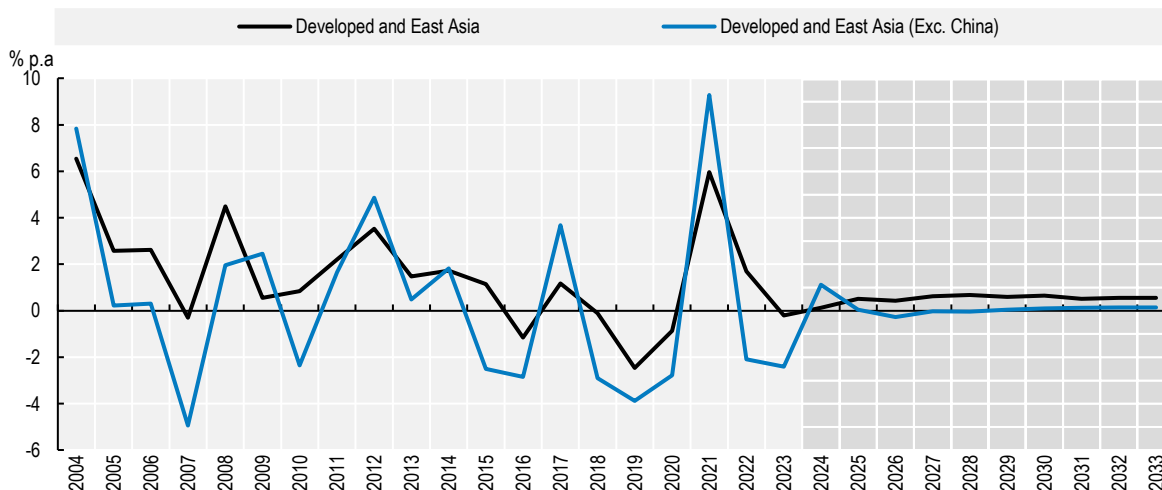
Diverse group of net importers and exporters

The Developed and East Asia region is the second largest net importing region amongst those covered in this chapter and by 2033 it is expected to be the largest. While the deficit continues to widen, it does so at a substantially slower rate than in the past. Its net deficit position is reflective of its major importers in East Asia, led by China, which masks net exports from the Oceanic region. The major products imported into East Asia include soybeans, maize, wheat, barley, sorghum, meats and vegetable oil. Conversely, the Oceanic region is a net exporter of wheat, barley, canola, dairy products, meat and sugar.

The net value of imports into the region is expected to rise 11% by 2033 relative to the 2021-23 base period. Approximately 85% of the additional imports accrue to China, with the major products being maize and soybeans for use in its growing animal feed industry. As meat production in China continues to expand and intensify, maize and soybean imports are expected to rise by 1.4% and 0.8% p.a. respectively over the *Outlook* period. These will likely be sourced primarily from Brazil and the United States and imply that by 2033, China will account for 61% and 13% of global soybean and maize imports respectively. At least in the short term, exports of US soybeans to China may be affected by the reductions in traffic through the Panama Canal, due to low water levels amid ongoing drought. Expanded meat production also results in weaker demand for imports, which are set to decline by 17% over the ten-year period to 2033. These trends reflect a combination of China's resource base, and indications of a drive to increase self-sufficiency in meat products, but also its recovery post-ASF, which accelerated intensification in its pork industry and initiated investment in additional poultry production. Consequently, pork and poultry account for the biggest share of declining meat imports, with bovine imports still expected to rise by 1.3% p.a. over the coming decade. A substantial share of this demand will likely be met by expanding exports from Australia, which is favorably located and already one of the top five suppliers of bovine meat into China.

Net exports from the region are expected to rise by 13% over the *Outlook* period, with two thirds attributed to China and almost a third to the combination of Australia and New Zealand. China's export growth is mainly driven by fish, whereas growth from Australia and New Zealand is derived from meat, sugar, pulses and dairy. While the Oceanic region is a notable global exporter of several other products, many of these are expected to contract over the coming decade. Australia's wheat exports are expected to decline by 9%, due to declining production, but it will still retain a 10% share in global exports and its importance as a supplier should not be understated amid Russia's war against Ukraine. New Zealand accounts for 30% of global sheep meat exports and 23% of global dairy exports, despite its small land area. With pastureland increasingly constrained and set to decline further over the *Outlook* period, dairy exports are expected to expand by a modest 6%, while sheep meat exports could contract marginally. Subsequently, New Zealand's share in global exports is expected to decline for both products.

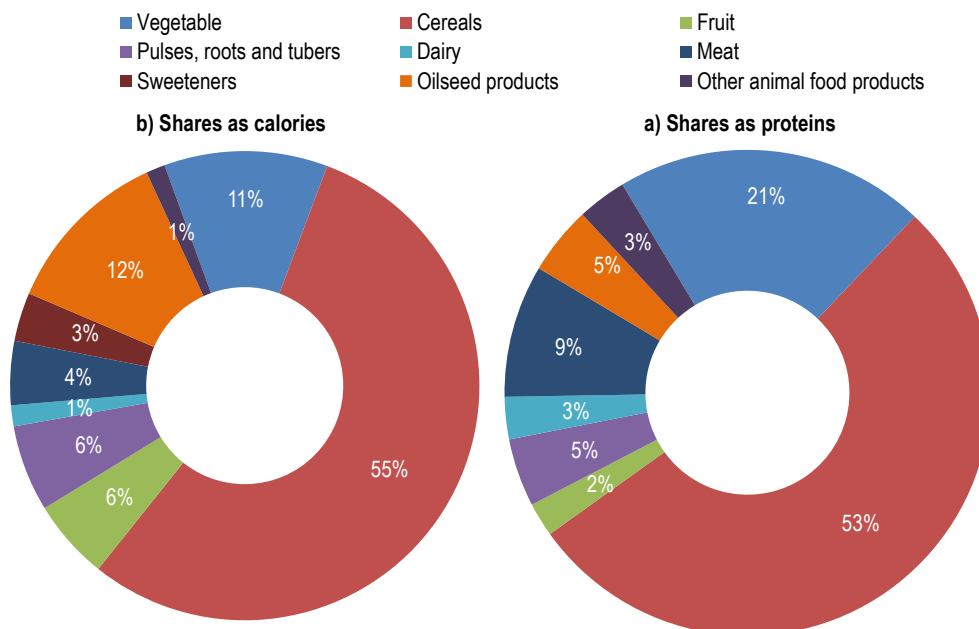
Figure 2.1. China a major driver of growth in agriculture and fish output in the Developed and East Asia region



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 (2024). FAOSTAT Value of Agricultural Production Database, <http://www.fao.org/faostat/en/#data/QV>; OECD/FAO (2024) "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

Figure 2.2. Distribution of food waste and losses in Developed and East Asia in terms of calories and proteins, 2021-2023

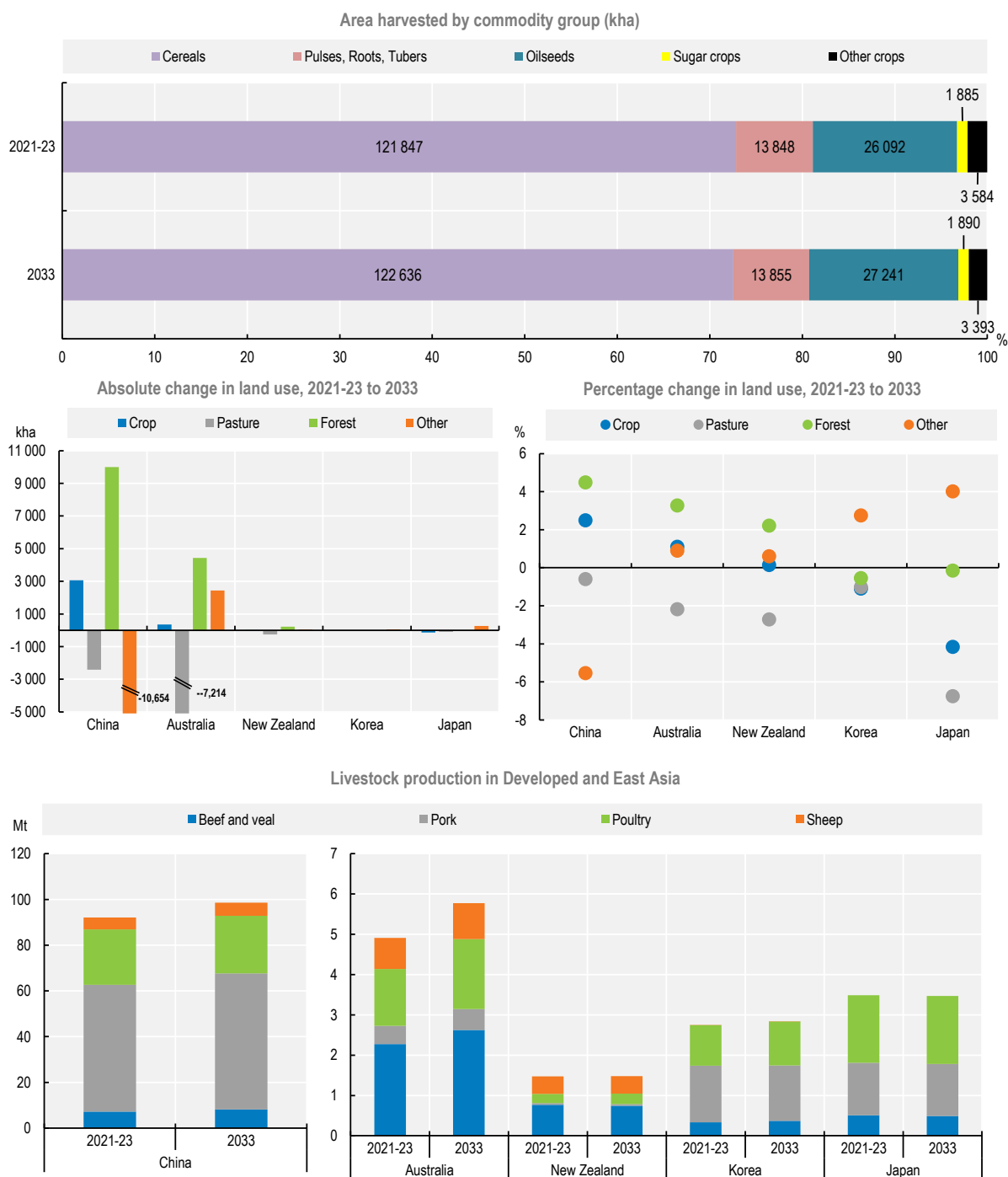


Note: Other animal food products include egg and fish.

Source: OECD/FAO (2024), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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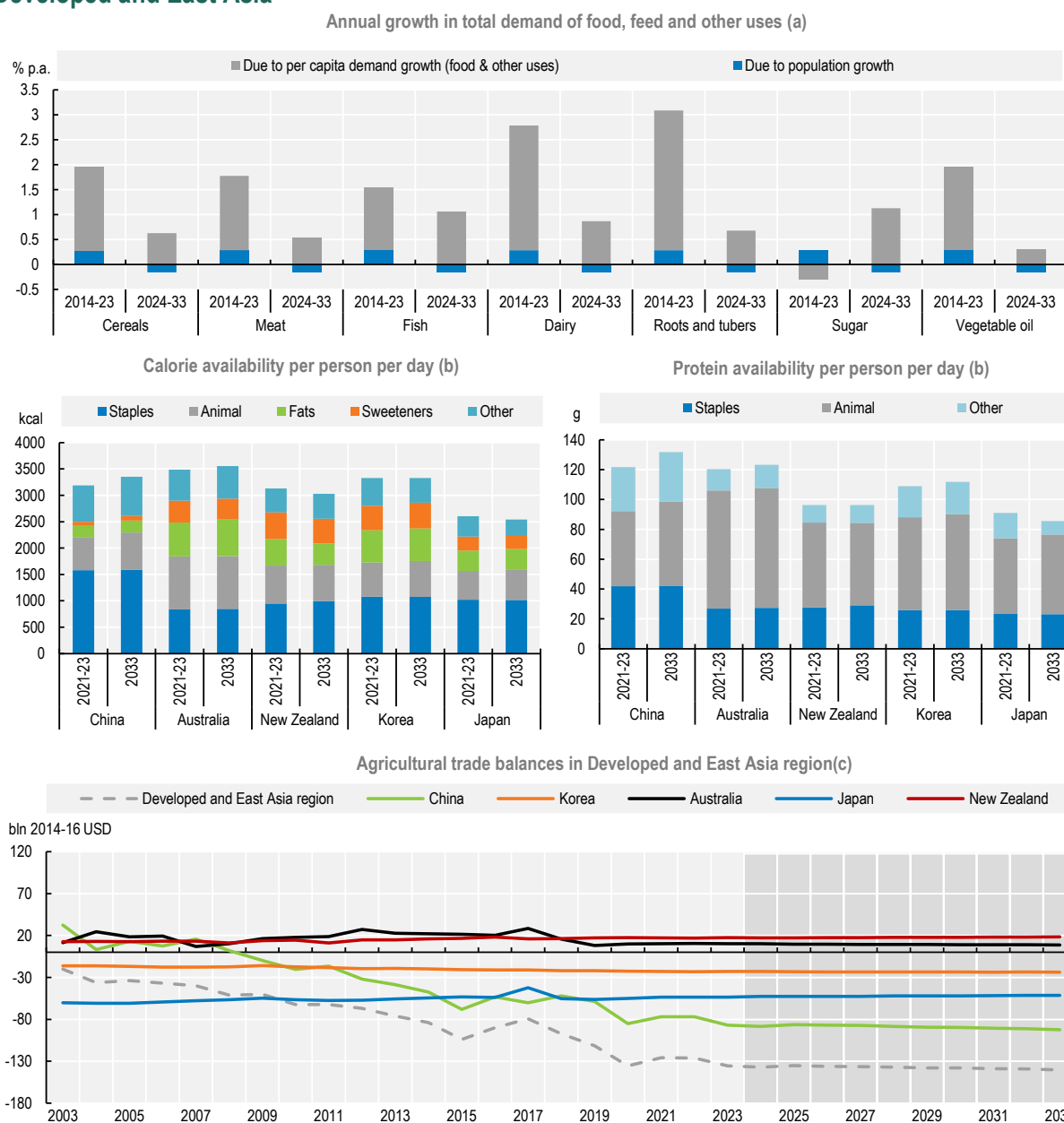
Figure 2.3. Land use change and livestock production in Developed and East Asia



Source: OECD/FAO (2024), "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 and tubers. c) Include processed products, fisheries (not covered in the FAOSTAT trade index) based on outlook data.
 Source: FAO (2024). FAOSTAT Value of Agricultural Production Database, <http://www.fao.org/faostat/en/#data/QV>; OECD/FAO (2024) "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	
	2011-13	2021-23 (base)	2033		Base to 2033	2014-23
Macro assumptions						
Population ('000)	1 571 213	1 632 941	1 608 552	-1.49	0.29	-0.16
Per capita GDP ¹ (kUSD)	10.03	14.02	19.20	36.98	3.22	2.77
Production (USD bln 2014-16)						
Net value of agricultural and fisheries ³	818.3	889.6	941.1	5.79	0.47	0.58
Net value of crop production ³	415.1	446.9	461.9	3.37	0.59	0.42
Net value of livestock production ³	232.3	242.9	254.3	4.69	-0.05	0.31
Net value of fish production ³	170.8	199.8	224.8	12.53	0.82	1.23
Quantity produced (kt)						
Cereals	554 321	637 787	668 797	4.86	0.91	0.56
Pulses	7 384	9 156	10 194	11.34	3.08	0.75
Roots and tubers	40 843	54 000	57 548	6.57	3.24	0.26
Oilseeds ⁴	44 402	63 507	69 553	9.52	4.77	0.64
Meat	92 111	104 731	112 102	7.04	0.85	0.44
Dairy ⁵	9 195	10 551	11 482	8.83	1.36	0.62
Fish	60 758	71 734	80 778	12.61	0.97	1.23
Sugar	17 622	14 318	15 597	8.93	-0.99	0.97
Vegetable oil	22 832	31 570	35 903	13.73	2.18	0.79
Biofuel production (mln L)						
Biodiesel	1 462	3 268	3 452	5.63	9.90	-1.03
Ethanol	9 198	10 756	11 937	10.99	0.68	0.98
Land use (kha)						
Total agricultural land use	931 796	906 817	900 103	-0.74	0.01	-0.07
Total land use for crop production ⁶	159 845	160 118	163 380	2.04	0.03	0.18
Total pasture land use ⁷	771 952	746 698	736 723	-1.34	0.00	-0.12
GHG emissions (Mt CO₂-eq)						
Total	961	834	853	2.31	-1.55	0.26
Crop	458	355	374	5.28	-2.77	0.50
Animal	487	464	464	-0.05	-0.53	0.06
Demand and food security						
Daily per capita caloric food consumption ⁸ (kcal)	2 909	3 151	3 296	4.59	0.79	0.28
Daily per capita protein food consumption ⁸ (g)	105.0	118.8	127.5	7.35	1.38	0.46
Per capita food consumption (kg/year)						
Staples ⁹	156.2	162.0	162.9	0.52	0.58	0.01
Meat	40.6	45.8	49.0	7.04	1.73	0.54
Dairy ⁵	4.4	5.2	5.6	8.99	2.85	0.83
Fish	37.0	43.2	48.2	11.48	1.37	1.20
Sugar	11.5	11.5	12.9	12.32	-0.06	1.14
Vegetable oil	20.5	24.3	26.1	7.24	1.35	0.32
Trade (bln USD 2014-16)						
Net trade ³	- 68	- 129	- 140	8.61	..	..
Value of exports ³	112	122	138	12.84	0.16	1.33
Value of imports ³	180	251	278	10.66	2.71	0.82
Self-sufficiency ratio (calorie basis) ¹⁰	86	82	81	-0.77	-0.36	0.03

Notes: 1 Constant 2010 USD. 2. Least square growth rates (see glossary). 3. Follows FAOSTAT methodology, based on commodities in the Aglink-Cosimo model. 4. Oilseeds represent soybeans and other oilseeds. 5. Milk solid equivalent units. 6. Area accounts for multiple harvests of arable crops. 7. Land for grazing. 8. Food availability, not intake. 9. Cereals, oilseeds, pulses, roots and tubers. 10. Production / (Production + Imports - Exports)*100.

Sources: FAO (2024). FAOSTAT Food Balance Sheets and trade indices databases, <http://www.fao.org/faostat/en/#data>; OECD/FAO (2024), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

2.2. Regional outlook: South and Southeast Asia

2.2.1. Background

Strong demand on account of robust income growth and expanding population

The South and Southeast Asia region is home to 35% of the global population, making it the most populous region amongst those covered in this chapter. Just over half of its 2.7 billion people reside in India. Conversely, its 575 Mha of agricultural land equates to merely 12% of the global total. This translates to an average of 0.2ha of agricultural land per person, only a third of the global average of 0.6 ha. With a further 10% expected to be added to the population by 2033, resource pressures will escalate, underscoring the importance of further productivity gains which were critical to enabling past growth. Given existing pressure on its resource base, sustainability will need to be at the core of further enhancements to productivity.

The region encompasses a range of countries with significant heterogeneity in terms of income and development. An average, income level of USD 3 273 per capita is the second lowest amongst the regions covered in this chapter, exceeding only Sub Saharan Africa. However, income ranges from USD 1 350 amongst its least developed nations to USD 12 488 in Malaysia and more than USD 60 000 in Singapore. Urbanisation is rising slowly across the region and the share of population residing in urban areas is expected to surpass 47% by 2033, from an average of 41% in 2021-23.

At almost 4% p.a., growth in per capita income is expected to outpace all other regions in the coming decade. The resilience of income growth was evident by its rebound from the COVID-19 pandemic induced recession, as well as robust performance through global disruptions such as the Russia's war against Ukraine, rising energy costs and monetary tightening globally to curb spiralling inflation. In several countries endowed with energy or commodity reserves, the initial rebound was supported by the higher commodity price cycle, which has since waned.

With strong economic growth, the average share of food in household expenditures in the region has fallen to below 17%. However, within the least developed countries this share is as high as 27%.² In these countries, where consumers already dedicate a higher share of total expenditure to food, elevated consumer inflation, which averaged almost 10% from 2021 to 2023 with a peak of 11% in 2022 can have grave consequences for food security. This is reflected in the rising prevalence of moderate or severe food insecurity in Southeast Asia in 2021. While robust income growth has enabled a slight improvement since, food insecurity and the prevalence of undernourishment in South and Southeast Asia remains well above pre-pandemic levels.

A growing, increasingly urbanised population with rising spending power suggests that demand growth for food products will remain strong. Nevertheless, the evolution of consumer preferences is less clear, particularly with respect to animal sourced products. Urbanisation typically carries the expectation of rising consumption of higher value, more processed and convenience food products, but large parts of the population are either vegetarian (particularly in India) or averse to pig meat consumption. This suggests potential divergence in dietary trends compared to other regions although preferences within the region are also diverse with rapid growth in meat product demand observed in some countries.

The region has maintained a small positive trade balance, but it encompasses a number of leading importers and exporters of different agriculture and food products. The Southeast Asia region is considered a major player in many global value chains such as fisheries and cassava or those involving vegetable oils and their further processed products.³ It currently exports around a third of agriculture and fish production, with rice and vegetable oil sustaining a global market share of 82% and 61% respectively. In this regard, the challenges associated with shipping in the Red Sea can impact on trade performance. The Suez Canal represents the shortest trade route from Southeast Asia to Europe and the need to reroute away from it amid current disruptions adds significant time and costs to shipping.

The region faces momentous challenges in sustainably boosting productivity and fostering innovation, especially amidst constraints posed by limited resources, climate change and a burgeoning population. Despite past advances, the region still harbours about one-third of the world's undernourished population. Continuing progress in improving food security will require sustained income growth in a less supportive global environment characterised by increased geopolitical fragmentation and escalating trade costs. Thus, key policy deliberations include the nature and extent of market intervention schemes and how they affect global market interactions.

2.2.2. Production

Sustainable productivity gains are paramount to offset resource constraints

The South and Southeast Asian region is the second largest contributor to the global value of global output from agriculture and fisheries, after Developed and East Asia. Growth of 1.8% p.a. over the *Outlook* period is among the fastest of all regions and it is expected to account for the largest share of global production growth by 2033. Around half of its agricultural production value is derived from crops but this share is declining as livestock production growth is faster.

By 2033, crop production is expected to expand by 17% compared to the 2021-23 base period, despite a mere 3.5% increase in land used for crop production. This reflects intensification, crop mix changes and enhanced productivity, which combine to accelerate growth in the value generated per hectare of cropland compared to the past. A 17% increase in fertiliser application rates, partly enabled by the normalisation in prices from 2022 peaks, will contribute to envisaged productivity gains.

The region is a notable contributor to global output for a variety of food products, including rice, wheat, vegetable oil, pulses and sugar. Apart from pulses and vegetable oil, where it remains stable, the region's share in global production is expected to rise for all these products. Cereal production is concentrated in India, Indonesia, Pakistan and LDC's such as Bangladesh, Cambodia, and Myanmar, but half of cereal production comes from India alone with a further 15% attributed to the region's LDC's. Growth is also concentrated in India, which accounts for 80% and 45% respectively of wheat and rice production growth. While India's wheat area is expected to expand by 7%, rice production growth is almost exclusively yield based. LDC's are also expected to contribute 27% of the growth in rice production through a minor area expansion of 3.3% by 2033 and yield gains of 1.5% p.a. over the ten-year period.

India's dominance also stretches to sugar, where it accounts for almost 60% of regional production but this share is expected to decline as growth of 1.9% p.a. in Thailand is sufficient to boost its share in regional production to 21% by 2033 from 17% in the 2021-23 base period. Thailand's growth is productivity based, as a mere 5% increase in sugarcane area is contrasted by a 24% improvement in yields by 2033 relative to the base period. Such gains will likely be supported by varietal improvements and extraction gains.

Led by Malaysia and Indonesia, South and Southeast Asia contributes 44% and 88% respectively of global vegetable oil and palm oil production. The palm oil sector faces mounting constraints, such as sustainability concerns and reduced consumer acceptance particularly in higher income countries. Combining these with its vulnerability to changing climates, multiple weather-related disruptions in recent years, labour mobility challenges and high financing costs, it becomes clear that incentives to replant aging oil palm plantations have been limited, though these would be required to provide the yield gains that would support production growth. Under baseline conditions, palm oil production in the region is only expected to rise by 0.7% p.a. compared to almost 3% p.a. over the past decade. Indonesia is expected to account for three quarters of additional production.

By 2033, the value of livestock output from the region is expected to rise by 38%, sufficient to increase its share in total agricultural value added above 30% from just 27% in the 2021-23 base period. This growth is underpinned by rising production of dairy products, mainly in India and Pakistan, which contribute more than 90% of the region's dairy production between them. Milk production growth of 38% stems from a 23%

expansion in cow numbers and a 13% improvement in milk yield per cow. Two thirds of the expansion in the region's cow inventory is attributed to India.

Meat production growth is dominated by poultry, which already accounts for half of total meat production in the base period and also constitutes 55% of its growth. Growth in this sector is largely the result of breeding improvements and increased feed intensity. Pig meat production in the region is limited and concentrated mainly in Viet Nam and Thailand. The former has recovered from the devastating ASF outbreak in 2018 and growth of 3.6% p.a. is sufficient to account for half of pork production growth by 2033. Bovine meat production is expected to rise by 2% p.a., with India and Pakistan maintaining their combined share of 70% of total output by 2033.

Fish production constitutes 22% of total agricultural output, more than in most other regions. However, growth of 12% by 2033 is the slowest amongst the three subsectors, reducing its contribution over time. Whilst expansion of capture fisheries is limited by resource constraints, growth in aquaculture has been such that it surpassed capture fisheries in 2023. By 2033, it is expected to account for 54% of total production, as growth decelerates to 2% p.a., from more than 5% in the past decade. This reflects a growing focus on sustainability in the policy space.

Total direct GHG emissions from agriculture are set to rise by 7.2% by 2033 relative to 2021-23, driven by a combination of livestock and crops. While crop-related emissions will rise by 7.3%, livestock-related emissions, which reflect ruminant herd expansion, will increase at 0.6% p.a., marginally slower than the past decade. By 2033, 29% of agriculture-related GHG emissions globally will be attributable to the region, more than to any other, and also marginally higher than the 28% accruing to it in the base period. This year's *Outlook* features a scenario that simulates the impact of halving food losses along supply chains and food waste at the retail and consumer levels by 2030 (SDG 12.3). The scenario projects that total agricultural emissions in the region could be reduced by 4.8% relative to the baseline, while calorie intake improves. This implies that by 2030, agricultural GHG emissions could increase by only 0.5% from the average level in the 2021-23 base period.

2.2.3. Consumption

Distinct regional preferences in demand but India remains dominant in the region

Having made great strides in improving food security in the past, the combination of reduced income through the COVID-19 pandemic and subsequent high food price inflation just as income levels started recovering severely strained affordability. Consequently, despite some modest improvements in 2022, both the prevalence of food insecurity and undernourishment remain well above pre-pandemic levels. On the back of robust income growth and softer agricultural commodity prices, improvements in calorie availability are expected to accelerate. By 2033, average calorie availability for consumption is projected to increase by 270 kcal/person/day to exceed 2800 kcal, just 5% below the world average. Accounting for household waste reduces it to 2455 kcal/person/day. Food waste and losses in the region are comparatively high, estimated at 22% above the global average. More than half of the calories lost or wasted are attributed to cereals, reflecting their prevalence in the consumption basket, with a further 12% accruing to fruit and vegetables (Figure 2.6). In the *Outlook* scenario where food waste and losses can be halved by 2030, as envisioned in SDG targets, calorie intake in the region could be increased by 6.2% relative to the baseline and the number of undernourished people in the region could decline by 24%, while at the same time, reducing GHG emissions. This implies that by 2030, calorie intake could increase by 14.6% relative to the average level in the 2021-23 base period and the number of undernourished people in the region would decline by 165 million.

The combination of improved purchasing power and consistent, albeit slow urbanisation would typically be expected to evolve dietary patterns to include more calorie and nutrient dense food (Reardon et al., 2014^[2]; Kelly, 2016^[3]; Law, Fraser and Piracha, 2020^[4]), but product mix is also dictated by the region's somewhat unique preferences, with a significant share of the population being vegetarian. Thus growth in calorie intake comprises a mix of cereals, dairy products, vegetable oil, sugar and pulses, with a comparatively small contribution from meat.

Cereals still account for 53% of the calories available for consumption in the region and while these remain popular, as evidenced by further gains in per capita consumption of wheat (1.1% p.a.) and rice (0.2% p.a.), some slow diversification is expected. In several countries, such as Viet Nam, Iran and Thailand, per capita rice consumption will decline at the expense of wheat. Furthermore, by 2033, the share of cereals in total calories consumed is expected to fall to 52%, with modest increases evident in calories attained from dairy, vegetable oil, fruits and vegetables.

Average protein intake remains well below the global level but, with gains of almost 9g/person/day by 2033, the deficit is expected to be close to 14%. This is derived from increased consumption of dairy products and plant-based proteins with a smaller but still positive contribution from meat consumption growth. Per capita dairy consumption in the region is already 16% above the global average, and this is expected to rise to 35% by 2033. This picture is somewhat skewed by India, where dairy accounts for 27% of additional protein with pulses a further 15%. In Malaysia, Viet Nam, the Philippines and Indonesia, meat is more prominent with respectively 84%, 62%, 49% and 28% of additional protein derived from meat. Meat consumption growth in the region occurs from a small base with consumption in the 2021-23 base period only 33% of the global average but expected to rise to almost 40% by 2033. At the regional level, more than half of the growth in meat consumption is attributed to poultry, but in Viet Nam and Thailand it is mainly driven by pig meat.

The South and Southeast Asia region is responsible for 16% of animal feed use globally with the biggest share attributed to India but notable quantities also in Indonesia and Viet Nam. By 2033, feed use in the region is expected to rise by 25% compared to the 2021-23 base period due to a combination of herd expansion and rising feed use intensity in meat and dairy production. The evolution of production practices, technology and genetics, combined with the growing share of poultry in the meat production mix, are expected to support significant improvements in feed conversion, expanding feed use at a slower rate than meat and milk production. The use of maize and protein meal, the primary ingredients in feed rations, is expected to expand by 31% and 26% respectively by 2033, implying that the combined share of these ingredients will rise to 57%.

The region is a notable user of biofuel, accounting for 8% of ethanol use and 23% of biodiesel use globally. It is also expected to be a significant driver of growth, accounting for almost 35% and 39% of the expected growth in global ethanol and biodiesel use globally by 2033. In the case of ethanol, this is mainly attributed to India, where sugarcane-based ethanol is expected to contribute substantially to reaching a 15% blending rate by 2025 and 17% by 2033. In the case of biodiesel, growth in Southeast Asia is underpinned by rising transportation fuel demand and industrial use. Thailand has developed blending targets as part of its Alternative Energy Development Plan and Indonesia's blending rate expected to remain above its ambitious 30% target. Consequently, biodiesel use in Indonesia is expected to rise by 56% over the *Outlook*, accounting for more than 80% of additional biofuel use in the region and reducing its dependency on imported fossil fuels. It will also direct domestic palm oil supplies to the biodiesel market, providing a regular market and price stability that could rekindle investment in the renewal of oil palm plantations.

2.2.4. Trade

Declining exports from India lead a transition to net imports for the region

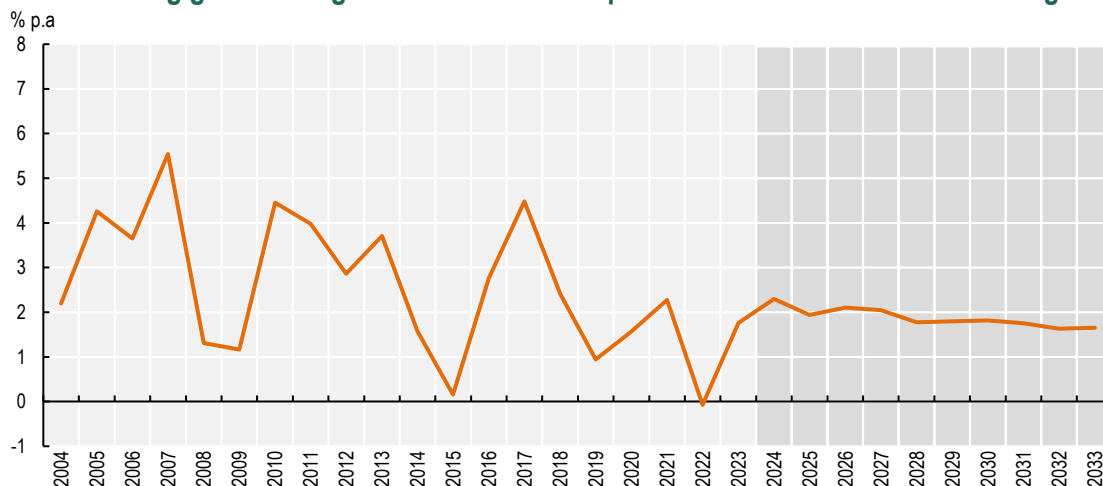
Trade dynamics in the South and Southeast Asia region are shifting with a small trade surplus in the base period expected to transition to a deficit by 2029. India stands out as a major driver of this shift. Historically the biggest net exporter in the region, its trade surplus by 2033 is expected to reach only 22% of the base period level, which is less than that of Indonesia and Thailand. Southeast Asia is expected to maintain a modest but consistent surplus while net imports from the LDC's and other developing nations continue to rise. Consequently, the net effect is that by 2033, the region's trade deficit will equate to almost 60% of the surplus that was observed through the 2021-23 base period.

Total net exports from the region are expected to contract by 6.5% over the next ten years. Export products consist mainly of vegetable oil, rice, fruit and sugar. Vegetable oil exports are primarily from Malaysia and Indonesia, the biggest palm oil exporters in the world, but further growth is limited, at only 2.5% for the ten-year period, resulting in a declining share of global exports. By contrast, rice and sugar exports are expected to expand rapidly by respectively 2.8% and 2.2% p.a., enabling the region's share in global exports to expand to 86% and 27% respectively by 2033. More than half of the growth in rice exports is attributed to LDC's such as Myanmar and Cambodia with a further 25% coming from Thailand and 12% from Viet Nam. Growth in sugar exports is almost exclusively from Thailand. Currently, the region also contributes more than a quarter of global fish exports but this share is expected to decline due to strong demand within the region.

While a substantial share of trade occurs within the region, the combination of disruptions to major shipping routes such as water level constraints in the Panama Canal and the conflict in the Red Sea that is affecting transit through the Suez Canal is a major risk. While the conflict remains, trade from Southeast Asia into Europe and North Africa will have to reroute away from Suez Canal around the Cape, adding time and costs to shipping that can be disruptive to supply chains.

In line with strong demand growth, the regions dependence on imports is growing and its total import bill for food and agricultural products is expected to be 26% higher by 2033 compared to the 2021-23 base period. Import dependence is expected to rise for most commodities, along with the region's share in global imports. Imports of meat and dairy products are comparatively small in the total import basket where the major products include wheat, maize, protein meal, soybeans, fruit and cotton.

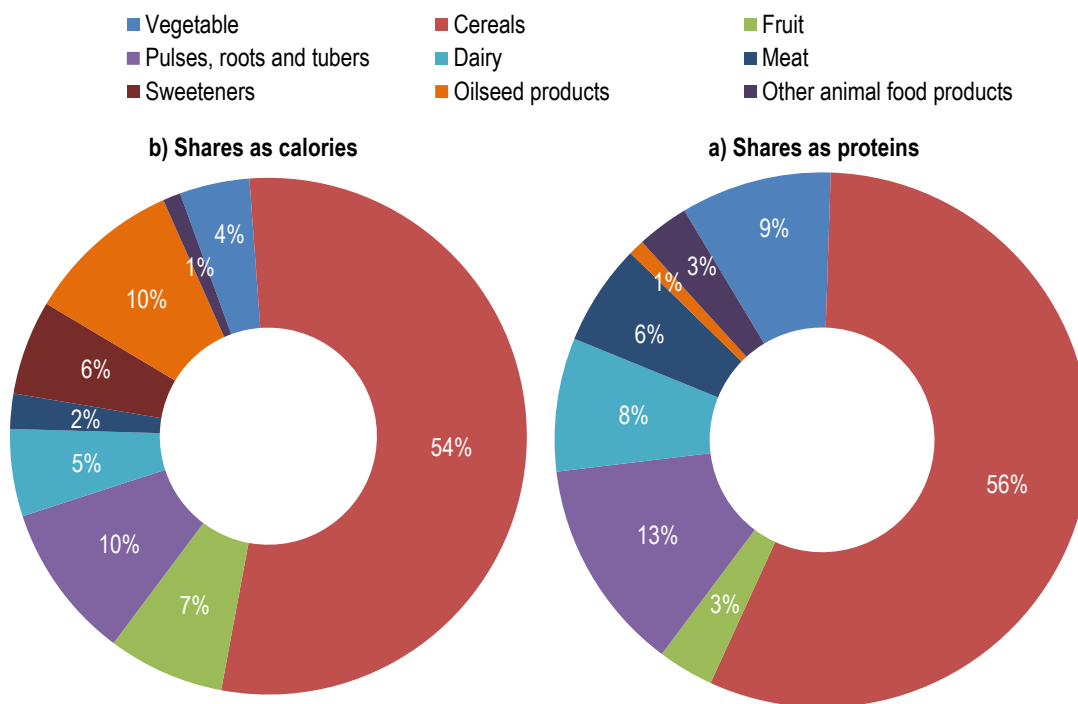
Figure 2.5. Slowing growth of agriculture and fish output in South and Southeast Asia region



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 (2024). FAOSTAT Value of Agricultural Production Database, <http://www.fao.org/faostat/en/#data/QV>; OECD/FAO (2024) "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

Figure 2.6. Distribution of food waste and losses in South and Southeast Asia in terms of calories and proteins, 2021-2023



Note: Other animal food products include egg and fish.

Source: OECD/FAO (2024), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.


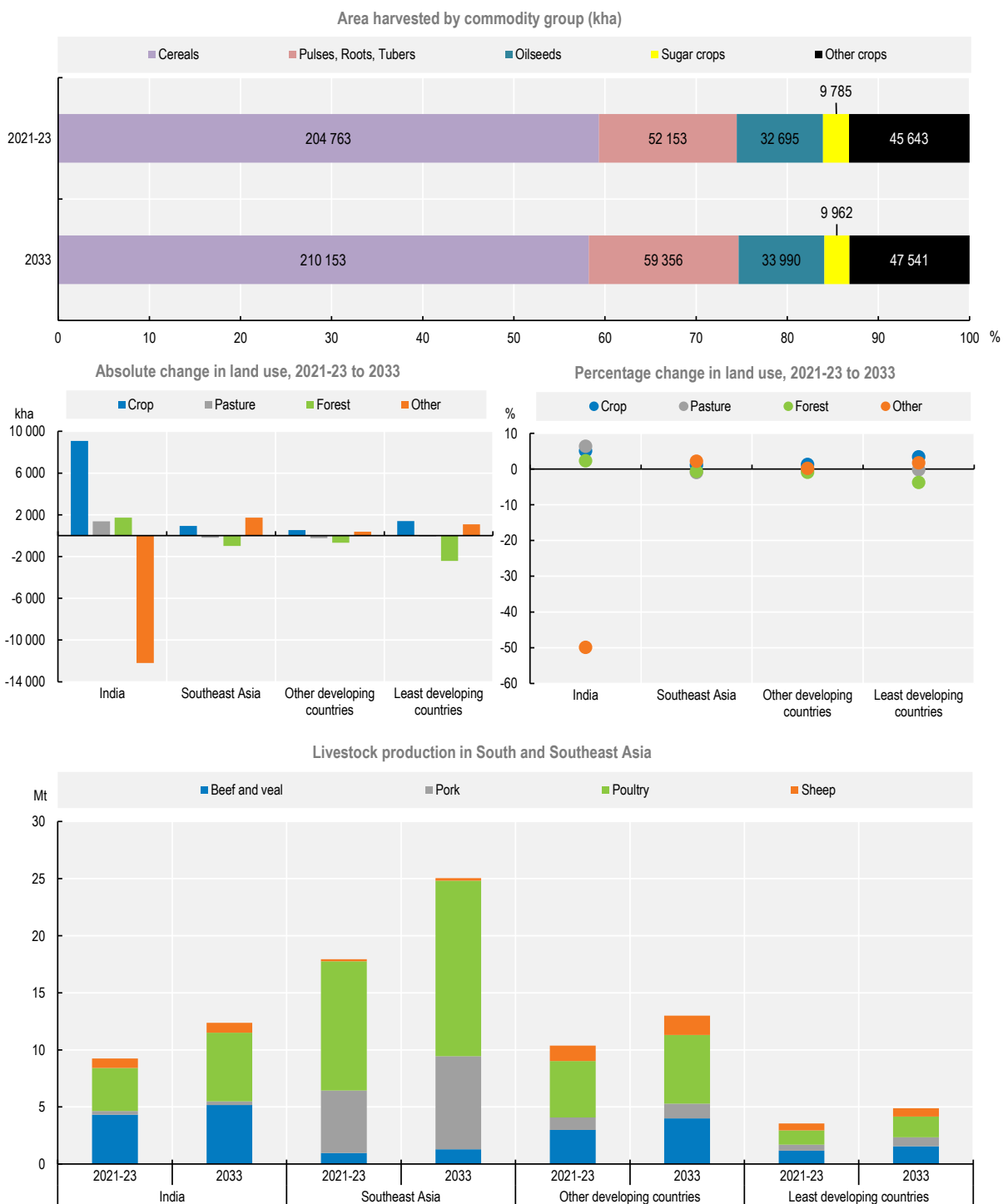
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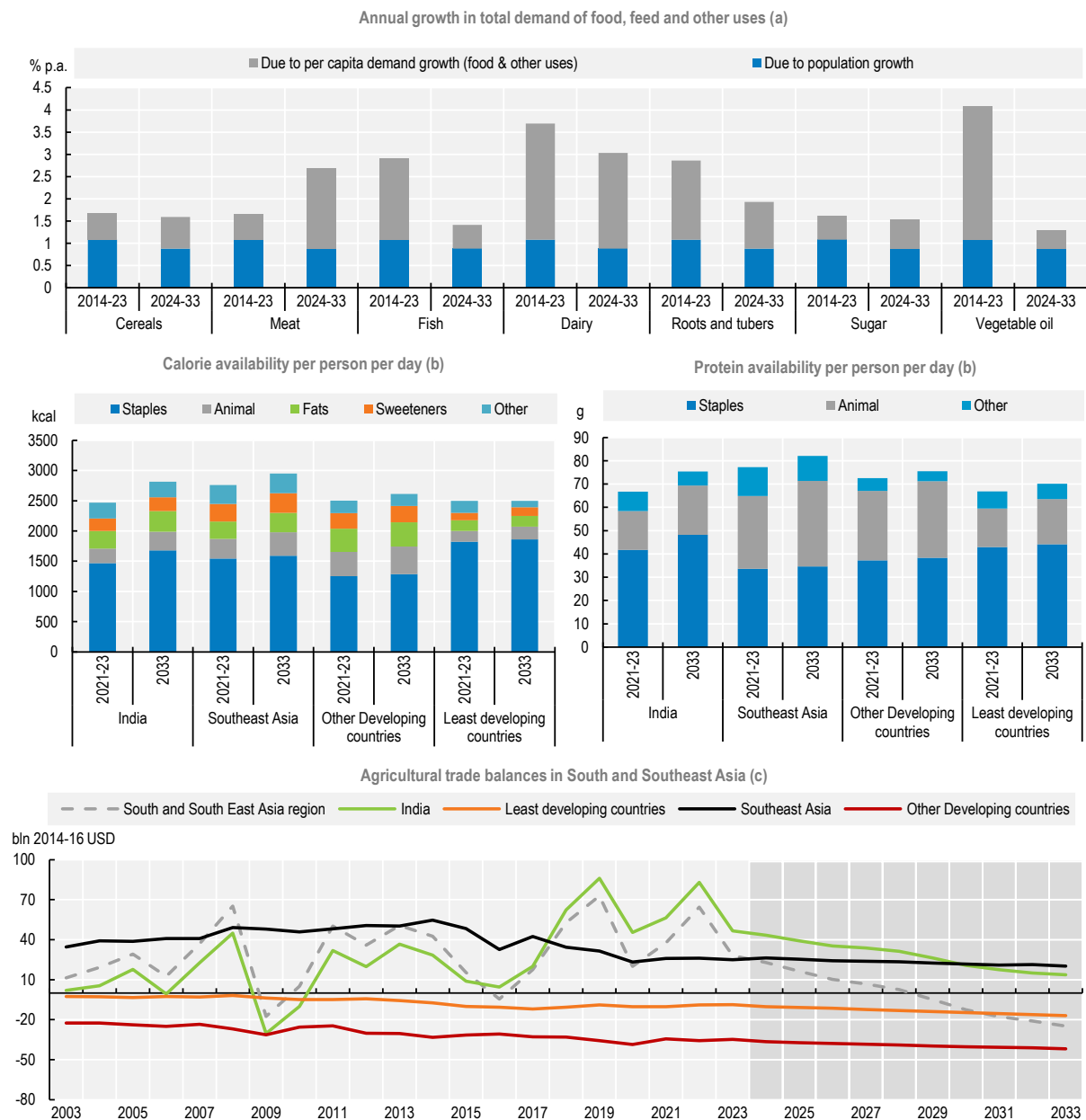
Figure 2.7. Land use change and livestock production in South and Southeast Asia



Source: OECD/FAO (2024), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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

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 and tubers. c) Include processed products, fisheries (not covered in the FAOSTAT trade index) based on outlook data.

Source: FAO (2024). FAOSTAT Value of Agricultural Production Database, <http://www.fao.org/faostat/en/#data/QV>; OECD/FAO (2024) "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	
	2011-13	2021-23 (base)	2033		Base to 2033	2014-23
Macro assumptions						
Population ('000)	2 444 747	2 737 645	3 020 406	10.33	1.08	0.88
Per capita GDP ¹ (kUSD)	2.43	3.27	4.96	51.57	2.63	3.89
Production (USD bln 2014-16)						
Net value of agricultural and fisheries ³	602.3	734.3	894.7	21.85	1.94	1.84
Net value of crop production ³	338.8	377.1	442.3	17.29	1.31	1.40
Net value of livestock production ³	143.9	199.1	274.7	37.99	2.84	3.01
Net value of fish production ³	119.6	158.1	177.8	12.42	2.39	1.25
Quantity produced (kt)						
Cereals	516 668	592 977	697 216	17.58	1.72	1.51
Pulses	27 024	33 283	41 617	25.04	2.64	2.10
Roots and tubers	40 956	54 609	70 018	28.22	2.83	2.04
Oilseeds ⁴	31 384	39 194	45 026	14.88	4.58	1.35
Meat	32 329	41 110	55 318	34.56	1.70	2.65
Dairy ⁵	30 718	46 555	64 592	38.74	3.79	3.06
Fish	42 475	57 208	65 316	14.17	2.67	1.26
Sugar	49 303	57 790	67 769	17.27	1.27	1.68
Vegetable oil	73 401	99 186	110 363	11.27	2.97	0.80
Biofuel production (mln L)						
Biodiesel	4341.54	15485.34	23118.87	49.30	15.45	2.05
Ethanol	4 585	9 852	19 012	92.98	8.49	4.68
Land use (kha)						
Total agricultural land use	549 474	573 337	586 198	2.24	0.53	0.18
Total land use for crop production ⁶	319 057	346 154	358 119	3.46	0.94	0.28
Total pasture land use ⁷	230 417	227 183	228 079	0.39	-0.08	0.04
GHG emissions (Mt CO ₂ -eq)						
Total	1 571	1 693	1 815	7.20	0.88	0.56
Crop	657	679	728	7.27	0.59	0.53
Animal	895	993	1 063	7.00	1.05	0.57
Demand and food security						
Daily per capita caloric food consumption ⁸ (kcal)	2 369	2 541	2 810	10.55	0.65	0.90
Daily per capita protein food consumption ⁸ (g)	62.1	69.9	78.6	12.45	1.1	1.2
Per capita food consumption (kg/year)						
Staples ⁹	169.0	171.3	186.4	8.86	0.23	0.66
Meat	8.6	9.3	11.3	21.54	0.18	1.72
Dairy ⁵	13.1	16.9	21.2	25.41	2.33	2.11
Fish	14.7	17.4	18.7	7.46	1.23	0.58
Sugar	19.2	20.4	22.0	7.55	0.72	0.65
Vegetable oil	8.2	9.7	10.6	9.45	0.87	0.75
Trade (bln USD 2014-16)						
Net trade ³	46	43	-25	-157.24	..	..
Value of exports ³	188	247	231	-6.54	3.07	-0.23
Value of imports ³	142	204	256	25.55	2.16	2.12
Self-sufficiency ratio (calorie basis) ¹⁰	102.5	97.6	95.1	-2.56	-0.14	-0.16

Notes: 1 Constant 2010 USD. 2. Least square growth rates (see glossary). 3. Follows FAOSTAT methodology, based on commodities in the Aglink-Cosimo model.

4. Oilseeds represent soybeans and other oilseeds. 5. Milk solid equivalent units. 6. Area accounts for multiple harvests of arable crops. 7. Land for grazing. 8.

Food availability, not intake. 9. Cereals, oilseeds, pulses, roots and tubers. 10. Production / (Production + Imports - Exports)*100.

Sources: FAO (2024). FAOSTAT Food Balance Sheets and trade indices databases, <http://www.fao.org/faostat/en/#data>; OECD/FAO (2024), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

2.3. Regional outlook: Sub Saharan Africa

2.3.1. Background

Food security for a growing population still a major challenge

Sub-Saharan Africa is a vast and diverse region that comprises 19% of the world's agricultural land, yet provides only 7% of global agricultural output value. It is home to 1.1 billion people, 14% of the global population and possesses a distinct demographic profile. Amongst the regions covered in this chapter, its population is the youngest, its rate of population growth is the fastest and it is amongst the least urbanised, second only to South and Southeast Asia. By 2033, Sub-Saharan Africa's 1.5 billion inhabitants are expected to account for 17% of the world's population. Half of these could reside in urban areas by 2033, from 43% in the 2021-23 base period and only 32% 20 years ago. Concurrent to this trend, the rate of population growth is such that it is one of only two regions where the absolute size of the rural population is still increasing.

Notwithstanding differences in endowments, many economies in the region are highly dependent on resource-based commodities such as oil, mining and agriculture. On average, agriculture, forestry and fisheries accounted for 10% of economic output in the region between 2021 and 2023 but in several less developed nations this share is substantially higher, with the World Bank noting shares of 21% in Kenya, 22% in Malawi and as much as 36% in Mali. High dependence on agriculture in the economy amplifies impacts of volatility in the sector on livelihoods, but also implies that diversification of production beyond just food security crops could contribute substantially to income generation and economic development. Strong commodity prices were a major factor that supported the initial, albeit slow recovery following the COVID-19 pandemic induced recession but momentum has stalled as further disruptions such as Russia's war against Ukraine, the energy crisis and sharply increased cost of living affected economic performance and inflation globally. Amid tightening financial conditions and slower international demand, exchange rates in many countries depreciated, fuelling further inflation and in some instances also concern over foreign currency reserves. The region has limited means to support an accelerated recovery as fiscal challenges are already widespread. In 2023, income growth per capita was less than 0.5% at regional level and it is expected to remain below 1% in 2024. While more accommodating global conditions and subsiding inflation in the medium term would be expected to support growth, population growth is such that per capita incomes are only expected to rise by 0.9% p.a. over the *Outlook* period.

Income levels in Sub-Saharan Africa on average are already the lowest globally and projected income growth is insufficient to substantially narrow the gap. By 2033, average income levels are expected to reach USD 1 876 in constant 2010 terms – still only 14% of the world average. In least developed countries such as Ethiopia, this gap is even wider, with incomes remaining below USD 1 000 but in South Africa, they reach USD 8 687. As is expected at such low-income levels, households spend a bigger share of their income on food than any other region covered in this chapter. On average, across Sub-Saharan Africa, this share is 23% although it varies amongst countries, with the LDCs in the region spending on average 31%.⁴ This substantial budgetary allocation to food heightens vulnerability to price spikes. It suggests that, amid a myriad of disruptions globally, average food inflation of 15% from 2021-23 contributed meaningfully to rising prevalence of undernourishment as well as moderate or severe food insecurity over the past three years. The FAO's State of Food Security and Nutrition (2023^[5]) notes that by 2022, more than 300 million people faced severe food insecurity in the region – a third of the global total. As agricultural commodity prices come down, it is imperative to turn the deterioration in food security around. This will require a holistic approach by multiple stakeholders to improve affordability within the region.

Despite limited spending power and low-calorie intake per capita, the region's vast population means that it still accounts for a substantial share of global consumption, particularly of core staples. In the 2021-23 base period, it accounted for 35% of root and tuber consumption globally and 13% of cereals. Despite significant variation across countries, self-sufficiency rates for Sub-Saharan Africa overall are decreasing

for most major food commodities as domestic supply growth has failed to keep up with the rate of population expansion.

Sub-Saharan Africa is an agro-ecologically diverse, land abundant region that accounts for 16% of global crop land and 20% of pasture. Despite its high share of land use globally, production practices are often less intensive in nature with a high prevalence of rainfed systems. While the region as a whole is considered land abundant, significant differences exist among countries in terms of land availability and farm structures. In some regions, there is clear evidence that more medium scale farmers are emerging (Jayne et al., 2016^[6]) whereas in others the agricultural sector is facing pressures from land shortages and declining plot sizes. Large parts of available arable land are situated in remote areas, poorly connected to markets and infrastructure, which amplifies already high costs of transportation and frequently leads to large price differentials between markets and extreme localised price volatility. Such volatility is exacerbated by the unpredictability of production which results from rainfed, low input production systems that are widespread amongst small-scale producers in the region. This also suggests that it is particularly vulnerable to the potential impact of climate change. Such volatility is evident in recent years, when the drought in Eastern Africa created extreme food security challenges, while the El Nino related drought in Southern Africa in 2024 has reduced food production in the region substantially, leading to sharp price increases at a time when global market prices are declining. Climate resilient production practices will be critical to improve resilience and sustain growth in the region.

The foremost challenges facing the region relate to reducing hunger and improving food security in a persistently low-income environment, amid increasingly unpredictable and extreme weather patterns associated with climate change. Despite pockets of progress and success in selected countries, productivity in most of the region remains stubbornly low. Some opportunities may arise to expand intra-regional trade, but trade-related costs need to be reduced to improve competitiveness. With imports into the region still expected to rise and against the backdrop of an increasingly fragmented global market and disruptions to logistical systems, the region's greatest opportunity to improve food security rests in sustainably closing the productivity gap, improving market access and improving the efficiency of regional trade.

2.3.2. Production

Productivity gains critical as land expansion slows

The value of agriculture and fish production is expected to increase by 27% over the coming decade, an average annual gain of 2.2%. This remains slower than population growth in the region, implying that the value of production per capita is set to decline further, in line with the trend observed since 2015 (Figure 2.9). Crop production contributes the bulk of agricultural value at 72%, the largest share amongst the various regions in this chapter, and growth is such that a further marginal increase is projected by 2033. This contrasts with growth of less than 1% p.a. in fisheries, implying a declining share in total value, while livestock production growth of 2.2% p.a. is sufficient to sustain its share at 17%.

Total agricultural land use is expected to expand only marginally and by 2033 is expected to be only 2% higher than in the base period. This constitutes only half of the expansion observed over the past decade, a substantial slowdown in a region that is considered land abundant. This abundance is however concentrated in a few countries (Chamberlin, Jayne and Headey, 2014^[7]) and in many others expansion is constrained by land fragmentation, land degradation challenges, conflict, poor connection to markets and the presence of other competing uses such as mining and urban sprawl. Within the limited expansion, there is also some reallocation, as an 18 Mha expansion in crop area is partially offset by a 1.3 Mha reduction in land used as pasture. Little change is expected in the crop mix, with the combination of maize, other coarse grains, roots and tubers accounting for almost half of total crop land use by 2033. Within these commodities, Sub-Saharan Africa's share in global production is also set to rise and by 2033, it will account for 38% of global roots and tuber production, as well as 8% and 16% of global maize and other

coarse grain production respectively. Cotton is also widely produced, particularly in the region's LDC's, which contribute two-thirds of the region's cotton output. Benin and Burkina Faso are prominent producers.

By 2033, food crop production in Sub-Saharan Africa is expected to expand by almost 30% and the real value of crop production, expressed per unit of cropland used, is expected to rise by 2.3% p.a., accelerating from the past decade. This reflects a combination of productivity gains and further intensification. The projected expansion in area harvested exceeds that of land use by 20%, suggesting that double cropping could increase. This practice is prevalent in many of the tropical regions with bimodal rainfall as well as irrigated areas in Southern Africa. The expansion of rice cultivation, notably in Nigeria, is also expected to benefit from rising prevalence of multiple annual harvests. Despite ample resource potential, yield gaps remain substantial compared to what is achieved in other parts of the world. Growth over the *Outlook* is such that the gap to world average levels narrows for almost all crops but efforts to fully close it remains constrained by the limited use of inputs, slow adoption of seed technology in many countries and poor irrigation infrastructure. This also exacerbates vulnerability to extreme climatic events, with droughts and flooding causing frequent disruptions to food production. Despite widespread implementation of fertiliser subsidy programs, fertiliser use is the lowest of all regions. Over the *Outlook* period, it is projected to increase by 19%, but application per hectare is still expected to be less than 20% of the global average (Figure 2.10). Efforts to reach more optimal application rates remains constrained by affordability, partly due to the high cost of imported fertiliser in the region, which are amplified by high logistical costs. Nevertheless, as production practices evolve, seed varieties improve and fertiliser application rates rise, notable yield growth is expected, at 1.6% p.a. for maize, 2% p.a. for other coarse grains, 1.5% p.a. for rice and 1.2% p.a. for cotton.

Livestock production growth is expected to be led by dairy, where an expansion of 28% by 2033 equates to 8.3 Mt of additional milk production, compared to 3.3 Mt of additional meat. Bovine meat currently constitutes the greatest share of meat production but growth in the poultry sector is expected to be faster enabling it to account for 30% of additional meat produced by 2033, compared to 38% for bovine meat and 17% for ovine meat. With few exceptions, production systems are still largely extensive, particularly for bovine and ovine animals but also amongst the large constituent of poultry producers that rely on indigenous, dual-purpose breeds. Herd expansion is expected to contribute substantially to bovine and ovine production growth with expansion of 12% and 24% respectively by 2033. The region will have an increasing share of the global herd for both of these species with a substantial share reliant on grazing on a slightly reduced pasture area. Such animals are often kept in semi-arid regions where crop production is not viable which means that they are highly vulnerable to fluctuating climatic conditions, as evidenced by widespread losses due to the drought in the horn of Africa over the past three years. Conversely, in the poultry sector, adoption of broilers and specialised layers produced in feed intensive production systems are increasing in countries such as Zambia, Tanzania, Kenya, Nigeria and Malawi, having been widespread in South Africa for some time. The productivity gains achieved from such genetic improvement is a major contributor to the poultry production growth of 28% over the *Outlook*.

Fish production comprises just 11% of agricultural output in the region and is still predominantly based on capture fisheries, much of which occurs in its vast inland lakes. In the 2021-23 based period, capture fisheries constituted 91% of total fish production and despite growth of 2.2% p.a. in aquaculture output from a small base the share of capture fisheries in total production will only decline to 90% by 2033. Given the finite nature of fisheries resources, growth in capture fisheries is slower at 0.7% p.a. A substantial share of aquaculture also occurs in the region's freshwater lakes so sustainable management of this natural resource will be of paramount importance.

Direct greenhouse gas (GHG) emissions from agriculture are expected to rise by 10.3% over the coming decade largely as a result of herd expansion in ruminant production. Emissions from livestock are expected to rise by 1.1% p.a. compared to increases of merely 0.3% p.a. from the crop sector. By 2033, Sub-Saharan Africa will account for 16% of global emissions from agriculture. This year's *Outlook* features a scenario that simulates the impact of halving food losses along supply chains and food waste at the retail and

consumer levels by 2030 (SDG 12.3). The scenario projects that total agricultural emissions in the region could be reduced by 4% relative to the baseline, while calorie intake improves. This implies that by 2030, agricultural GHG emissions could increase by 3.1% from the average level in the 2021-23 base period.

2.3.3. Consumption

Food demand driven by population growth, with limited dietary diversification

Sub-Saharan Africa harbours the highest concentration of poor and undernourished people in the world, and total calorie availability per capita is the lowest amongst the regions covered in this chapter. Pre-existing food security challenges were exacerbated in recent years by a multitude of disruptions that include the prolonged effects of the COVID-19 pandemic, Russia's war against Ukraine, surging inflation, spiralling energy prices, the cost-of-living crisis, slow economic recovery and conflicts in several countries. While many of the supply chain challenges associated with the COVID-19 pandemic and the war have abated, persistently high food inflation, often fueled by currency depreciation, combined with the slow economic recovery perpetuated affordability challenges and total calorie availability in the region declined consistently through the 2021 to 2023 base period. The first small increase is expected in 2024, but gains remain slow and by 2033, an increase of 75 kcal/person per day will only bring intake to 77% of the global average. Consequently, food security and undernourishment will likely remain challenges and even as income levels start to rise, a sustained recovery will require improvements in the availability, accessibility, affordability, and utilisation of food supplies in the future.

Food waste and losses are a major challenge in the region, with the FAO estimating that these equate to USD 4 billion annually in Sub-Saharan Africa. Estimates put combined losses and food waste almost 41% above the global average, suggesting that investments to reduce them hold potential to substantially improve calorie intake. In the *Outlook* scenario where food waste and losses can be halved by 2030, as envisioned in SDG targets, calorie intake in the region could be increased by 10.1% relative to the baseline and the number of undernourished people in the region could decline by 31%, while at the same time, reducing GHG emissions. In the least developed countries in the region, this gain in calorie intake is 19%. This implies that by 2030, calorie intake in Sub-Saharan Africa could increase by 13.3% relative to the average level in the 2021-23 base period, while the number of undernourished people in the region would decline by 53 million. In the least developed countries in the region, calorie intake could rise by 16.6%.

Population growth is a major contributor to demand in the region, such that, despite a mere 3% gain in total calorie availability per capita by 2033, Sub-Saharan Africa will still be one of the largest sources of additional food demand. Consequently, the region's share of total food calorie consumption in the world is expected to rise from 12% in the 2021-23 base period to 14% by 2033. This share is higher in staples as the role of staples such as maize, roots and tubers in total calorie intake is more prominent in Sub-Saharan Africa than any other region. While population growth fuels large scale expansion in food consumption, compositional changes and associated dietary diversification in the region are expected to be limited under baseline assumptions. Growth in staple consumption is such that by 2033, it is still expected to account for almost 70% of calorie intake – similar to the base period (Figure 2.13). Within the staples group, the share of rice could increase modestly at the expense of other coarse grains such as sorghum and millet. While sugar consumption is expected to increase substantially in per capita terms by 2033, the gain in meat consumption is marginal at 0.4% p.a., while dairy, fish and vegetable oil show a modest decline. Per capita consumption of these commodities are already the lowest in the world and projected changes suggest that dietary diversity in the region will remain lacking compared to global norms. Diversification of agricultural production could aid in improving such dietary diversity.

Limited increases in meat consumption combined with reduced per capita intake of fish and dairy products constrains large scale growth in protein intake. Owing to some gains in plant-based protein, intake is expected to rise by less than 1g/capita/year by 2033 and so will remain the lowest in the world. Such limited gains in protein intake also inhibit improvements in vital nutrient and micronutrient intake.

The high prevalence of extensive production systems implies that Sub-Saharan Africa only accounts for 4% of global animal feed use. By 2033, total feed use in the region is expected to expand by 30% but from a small base and so its share in the global market remains stable. Drivers of feed demand include some expansion in animal inventories as well as the expectation of further intensification. Particularly in the poultry sector, the adoption of improved breeds and feed intensive production systems is accelerating, leading to increased demand for animal feed. In countries that already use feed intensively, genetic improvements and better feed conversion over time will reduce the amount of feed required per animal. These trends are somewhat offsetting at regional level and the net result is that feed use is expected to grow faster than meat production. Cereals, particularly maize, comprise the main raw material in feed rations but its share is lower than the global average, with a substantial contribution also made by roots and tubers. The inclusion of protein meal in total feed remains low at around 55% of the global average.

2.3.4. Trade

Import dependence grows with slow progress in regional trade agreements

To supply its rapidly expanding population, the region is expected to rely increasingly on imports to supplement regional production. With few exceptions, most basic food commodities in the region are produced for domestic consumption rather than export but domestic production of many products is insufficient to meet demand. Nevertheless, many countries also benefit from counter seasonality in the northern hemisphere and competitive labour costs, enabling net exports of high value fresh produce.

The region's trade deficit in major food items is anticipated to deepen over the coming decade and by 2033, its import bill, based on constant global reference prices, is expected to rise by 48%. In several countries, mounting debt, balance of payment challenges and foreign exchange constraints already hamper required food imports. The region is largely self sufficient in maize, roots and tubers, with the major contributors to its food import bill being vegetable oil and staples such as rice and wheat. Self sufficiency ratios are expected to deteriorate further for all three of these commodities, with wheat imports expected to rise by 36%, rice imports by 56% and vegetable oil imports by 27% over the coming decade. The historic reliance by many countries on both the Russian Federation (hereafter "Russia") and Ukraine for wheat imports has dwindled in the face of the ongoing war with increased sourcing from Europe, Canada, and the United States.

Amongst the greatest challenges adding to the cost of imported products is the high cost of transport and logistical inefficiencies. The region scores poorly in trade efficiency indicators such as the World Bank's logistics performance and container port performance indices. Pre-existing structural challenges were exacerbated by the disruptions in global logistics in recent years. Such disruptions have resurfaced amid conflict that affects passage in the Black Sea and Red Sea regions, bringing heightened concerns around its impact on the persistence of high food inflation in the region. At the same time, the effect of delays in port and/or en route, combined with increased shipping rates on the region's exports of high value, perishable products is severe.

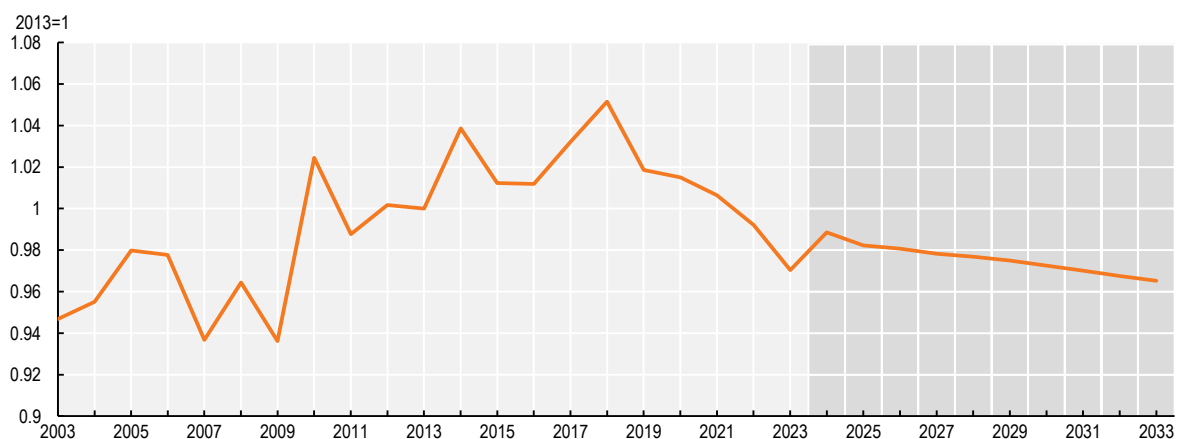
Fresh fruit and vegetables, along with high value products such as cotton, cocoa, tea and coffee are major contributors to export revenue. More than 85% of cotton production is destined for the export market and cotton exports are expected to rise by 7% over the coming decade. The real value of fruit and vegetable exports are expected to grow by 26% and 41% respectively by 2033. Consequently, the total value of agricultural exports from the region, expressed in 2014-16 USD, are expected to grow by 20% over the coming decade.

Regionalisation of agricultural value chains for prioritised commodities are part of the African Union strategy to drive agrifood system transformation, increased productivity and agro-processing growth by linking producers and agro-parks in surplus areas to markets and areas of need. The region has placed much hope for expanded intra-regional trade on the successful implementation of the AfCFTA. The

agreement is in its third year of operation and holds much potential, with the World Economic Forum suggesting that successful implementation can boost intra-regional trade by more than 50% and UNCTAD noting that the projected USD 3 trillion borderless market could be instrumental in reversing current trends in poverty, inequality and growth on the continent.

The agreement has the ambition of achieving 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. Despite progress made, some customs union members are yet to ratify the agreement, 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. Furthermore, the success of the agreement will ultimately hinge on the extent to which it deals successfully with non-tariff measures, which are highly prohibitive to trade in the region, and high costs of trade and logistics. While it includes a mutual recognition of standards and licences, harmonisation of sanitary and phytosanitary (SPS) measures, rules of origin and a Pan African payment and settlement system that will undoubtedly aid particularly SME's, many non-tariff barriers are more difficult to remove.

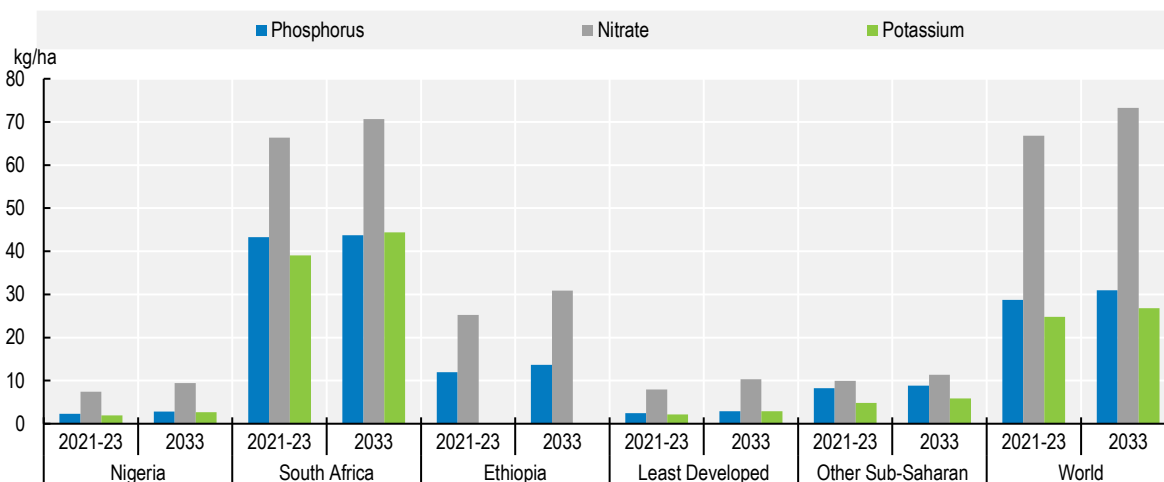
Figure 2.9. Per capita net value of agriculture and fish production in Sub-Saharan Africa



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 (2024). FAOSTAT Value of Agricultural Production Database, <http://www.fao.org/faostat/en/#data/QV>; OECD/FAO (2024) "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

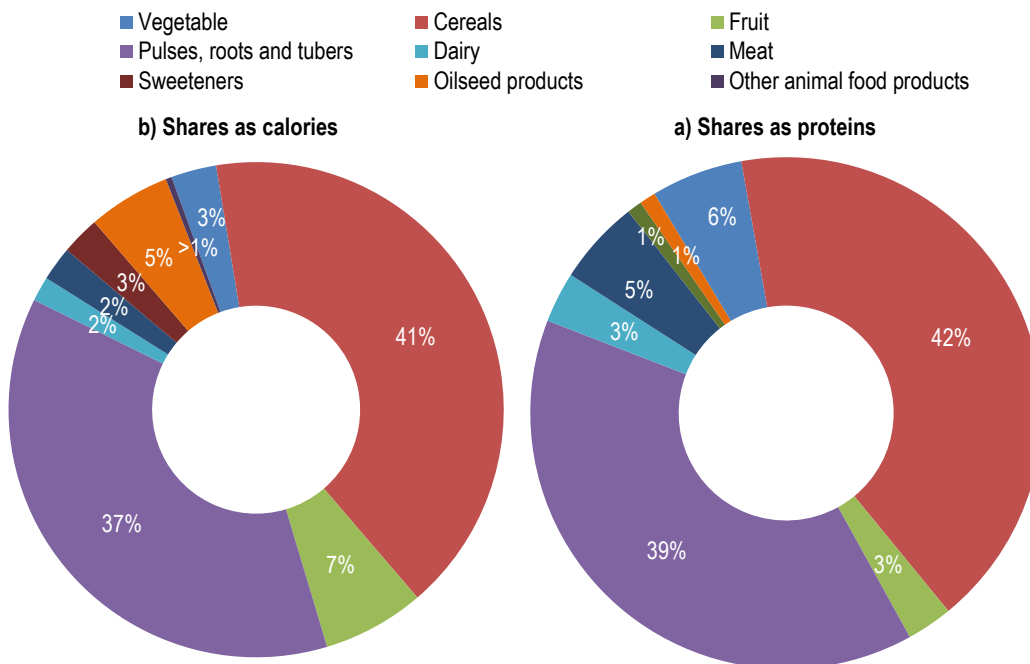
Figure 2.10. Fertiliser application per hectare of land used for crop production is low in Sub-Saharan Africa



Source: OECD/FAO (2024), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

StatLink <https://stat.link/6ycte7>

Figure 2.11. Distribution of food waste and losses in Sub-Saharan Africa in terms of calories and proteins, 2021-2023



Note: Other animal food products include egg and fish.

Source: OECD/FAO (2024), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

StatLink <https://stat.link/5q2oup>

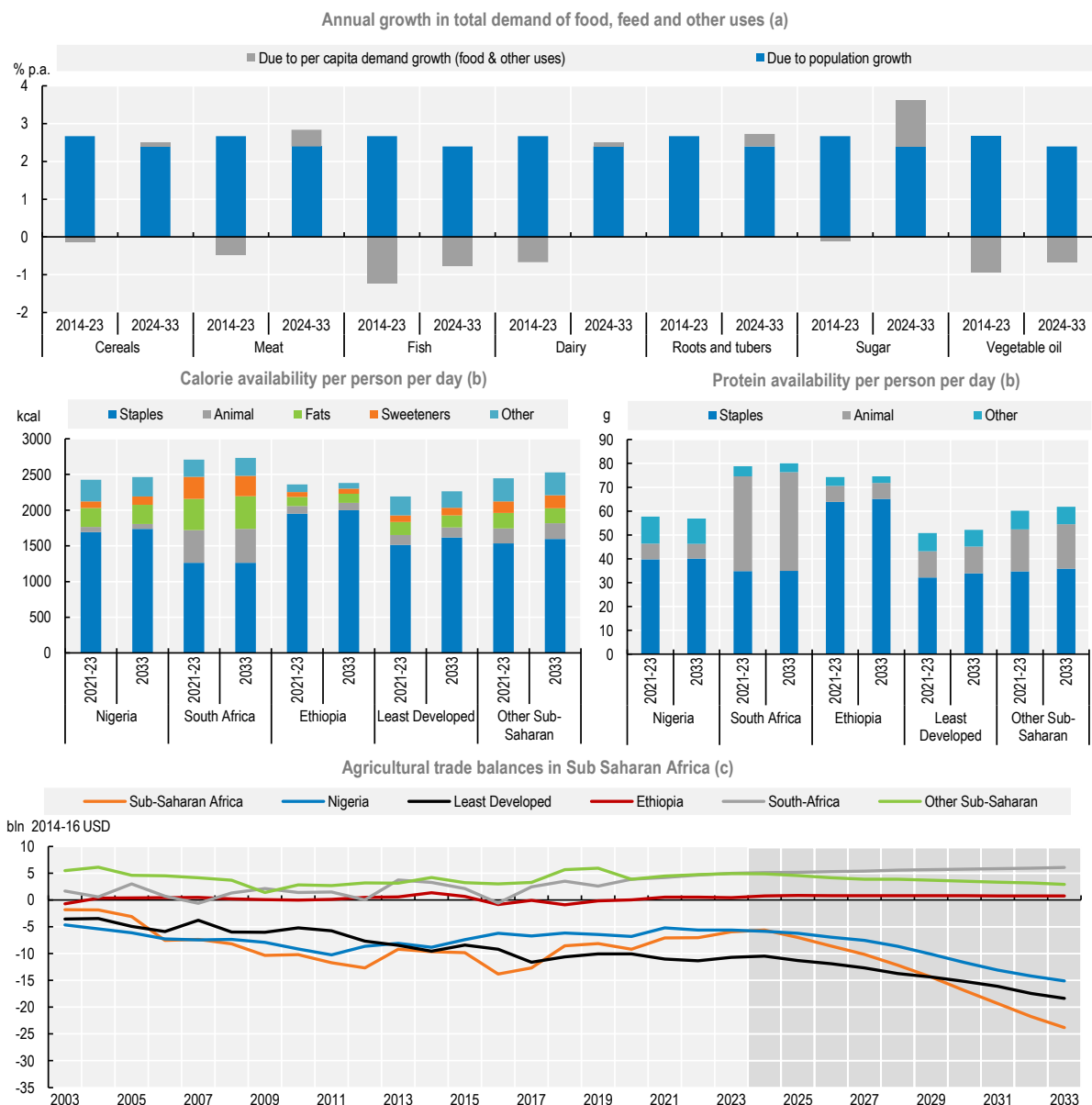
Figure 2.12. Land use change and livestock production in Sub-Saharan Africa



Source: OECD/FAO (2024), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

StatLink <https://stat.link/uhdse7>

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 and tubers. c) Include processed products, fisheries (not covered in the FAOSTAT trade index) based on outlook data. Source: FAO (2024). FAOSTAT Value of Agricultural Production Database, <http://www.fao.org/faostat/en/#data/QV>; OECD/FAO (2024) "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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

Table 2.3. Regional indicators: Sub-Saharan Africa

	Average			%	Growth ²	
	2011-13	2021-23 (base)	2033		Base to 2033	2014-23	2024-33
Macro assumptions						
Population ('000)	881 501	1 150 610	1 497 070	30.11	2.67	2.40
Per capita GDP ¹ (kUSD)	1.72	1.71	1.88	9.97	-0.53	0.88
Production (USD bln 2014-16)						
Net value of agricultural and fisheries ³	158	205	261	26.94	2.13	2.15
Net value of crop production ³	110	147	190	29.87	2.18	2.33
Net value of livestock production ³	30	36	45	26.58	2.11	2.21
Net value of fish production ³	18	23	25	8.97	1.90	0.80
Quantity produced (kt)						
Cereals	122 116	159 850	208 606	30.50	2.65	1.94
Pulses	18 363	21 385	29 349	37.24	2.26	3.01
Roots and tubers	64 601	85 803	117 094	36.47	2.62	2.69
Oilseeds ⁴	9 915	14 756	17 027	15.39	4.06	1.21
Meat	10 972	13 520	16 871	24.79	2.00	2.26
Dairy ⁵	3 400	3 965	5 064	27.72	2.28	2.39
Fish	6 556	8 349	9 195	10.13	2.12	0.80
Sugar	7 219	7 648	9 115	19.17	1.97	1.18
Vegetable oil	6 006	8 239	9 157	11.14	3.33	0.89
Biofuel production (mln L)						
Biodiesel	0	0	0	-25.34	0.00	4.07
Ethanol	574	1 038	1 304	25.63	5.32	2.34
Land use (kha)						
Total agricultural land use	837 440	867 314	884 224	1.95	0.31	0.15
Total land use for crop production ⁶	178 869	210 979	229 218	8.65	1.56	0.61
Total pasture land use ⁷	658 571	656 335	655 006	-0.20	-0.07	-0.01
GHG emissions (Mt CO₂-eq)						
Total	788	932	1 028	10.25	1.94	0.89
Crop	232	231	239	3.46	0.77	0.27
Animal	554	699	786	12.49	2.34	1.09
Demand and food security						
Daily per capita caloric food consumption ⁸ (kcal)	2 319	2 321	2 396	3.23	-0.02	0.40
Daily per capita protein food consumption ⁸ (g)	58.7	57.5	58.5	1.72	-0.25	0.32
Per capita food consumption (kg/year)						
Staples ⁹	176.4	178.7	188.0	5.21	-0.11	0.36
Meat	8.9	8.6	8.7	1.58	-0.47	0.37
Dairy ⁵	3.9	3.5	3.4	-1.39	-0.77	0.13
Fish	9.5	8.6	8.1	-5.32	-0.81	-0.77
Sugar	9.9	10.0	11.3	12.67	0.07	1.15
Vegetable oil	7.9	7.4	7.2	-2.41	-0.95	-0.19
Trade (bln USD 2014-16)						
Net trade ³	-11	-7	-24	254.89	..	..
Value of exports ³	35	50	61	20.17	2.96	1.55
Value of imports ³	46	57	84	47.69	1.38	4.27
Self-sufficiency ratio (calorie basis) ¹⁰	85.6	85.8	83.6	-2.61	0.36	-0.39

Notes: 1 Constant 2010 USD. 2. Least square growth rates (see glossary). 3. Follows FAOSTAT methodology, based on commodities in the Aglink-Cosimo model. 4. Oilseeds represent soybeans and other oilseeds. 5. Milk solid equivalent units. 6. Area accounts for multiple harvests of arable crops. 7. Land for grazing. 8. Food availability, not intake. 9. Cereals, oilseeds, pulses, roots and tubers. 10. Production / (Production + Imports - Exports)*100.

Sources: FAO (2024). FAOSTAT Food Balance Sheets and trade indices databases, <http://www.fao.org/faostat/en/#data>; OECD/FAO (2024), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

2.4. Regional outlook: Near East and North Africa

2.4.1. Background

Rising import dependence amid resource constraints

The Near East and North Africa⁵ region encompasses a range of countries with diverse income and socioeconomic profiles. Many face similar challenges with respect to the agricultural production environment and a fragile natural resource base. Less than 5% of total land is considered arable and water resources are constrained resulting in widespread water scarcity. In several countries this is extreme. In 2020, 19 of 22 Arab states fell below the threshold for renewable water scarcity with 13 states situated below the absolute water scarcity threshold (UN WWDR, 2022^[8]). The region's arid nature and already limited natural resource base places it amongst the most vulnerable to climate change and climate resilience is a distinct policy and investment focus.

Economic performance in the region reflects the significant impact of the various global disruptions since 2020. Spanning across least developed, middle-income, and high-income economies, the region encompasses numerous oil-exporting nations in the Gulf. These economies are closely intertwined with energy markets which shapes their economic landscape. Russia's war against Ukraine and associated disruptions in energy markets heightened volatility in these economies while many others were influenced by conflict within the region. The initial rebound from the pandemic-induced recession of 2020 was modest and while rising energy prices provided new impetus in 2022, the momentum was short-lived as the combination of persistent conflict, reduced oil production and tight monetary policy induced a further contraction in 2023. Medium term prospects remain highly uncertain. The global environment could become more accommodating as inflation continues to moderate but persistence or escalation of the war in Gaza or disruptions in the Red Sea bring ample downside risk. Per capita income growth is expected to average only 1.3% p.a. over the next ten years which is a concern in a region where food insecurity is rife and healthy diets are unaffordable to more than 40% of the population (FAO, 2023^[5]).

Another notable determinant of food demand is the rate of population expansion which is expected to average 1.6% p.a. towards 2033, a rate second only to Sub-Saharan Africa. This is sufficient for its total population to exceed 530 million people by 2033, with two thirds of them expected to reside in urban settings. Provided affordability allows, urbanisation would typically encourage consumption of higher value products including meat and dairy products as well as convenience products that often contain substantial quantities of vegetable oil and sugar. On the other hand, it is also notable that the rate of population growth and urbanisation implies that the absolute number of people in rural areas could still increase by 2033.

In light of its resource limitations that constrain agricultural production, the region is amongst the largest net food importers in the world. High import dependency spans most commodities and implies that the region is vulnerable to disruptions in global markets and logistical systems. Such disruptions have been increasingly frequent in recent years due to the COVID-19 pandemic, Russia's war against Ukraine, the subsequent energy crisis, conflict along major maritime routes in the Red Sea and the Black Sea. With multiple shipping companies electing to reroute around the Suez Canal, the consequent increase in transit times and shipping rates could prolong inflationary pressure and the cost-of-living crisis. Food price inflation in the region averaged almost 12% from 2021 to 2023, more than double the 5.2% of the preceding five years. In a low-income growth environment, persistence of high inflation will strain the affordability of basic foods in lower income areas and that of healthy diets across the whole region. With average food expenditures around 14% of total household expenditures and 31% in the least developed countries, income and price shocks impact significantly on welfare.

Given its vulnerability to trade disruptions, policies have sought to stimulate domestic production and reduce import dependence. However, while reducing risk, such policies have also had the unintended consequence of limiting growth, with scarce water resources allocated to cereals at the expense of higher

value crops. Consequently, the region's already limited resource base was further stretched and with rising cereal production, the availability of higher value fresh produce declined. Such produce might otherwise have aided in improving dietary diversity and raised income generated from the same limited resources. Nevertheless, the extent of disruptions in global trade and logistics in recent years has heightened the focus on risk mitigation in the policy space. Climate change remains a major challenge and geopolitical conflict in the region has further reduced investment and displaced populations, hindering production growth.

Some of the greatest challenges facing the region relate to accessibility of affordable food products to a growing population. Such challenges have intensified amid weak income growth and escalating conflict in several countries. The limited endowment of productive resources suggests that import dependence is inevitable and increasingly important amid climate change risks. Despite vulnerability to disruptions in an increasingly fragile trade system, such imports contribute substantially to dietary diversity and efficient trade facilitation can propel progress toward the 2030 goal of eradicating hunger, food insecurity and malnutrition. The resilience of the trade environment can be improved by effective and adaptable policies and procurement practices, with active diversification of import sources, which has already accelerated as a result of Russia's war against Ukraine.

2.4.2. Production

Productivity led growth essential amid structural resource constraints

Agriculture, forestry and fisheries comprises less than 5% of economic activity in the region. While the value of agricultural production is expected to rise by 1.5% p.a., its share in the economy will likely decline further by 2033. North Africa's influence in this performance is strong, as Egypt accounts for 28% of total agricultural output value, with a further 45% attributed to the rest of North Africa. In terms of commodity groups, crop production comprises 32% of total value with a further 48% accruing to livestock and 21% to fisheries. Livestock production growth is expected to outpace crops and fisheries with its share in total output rising to 50% by 2033.

Dairy production is more prominent in the region than meat and is foreseen to grow by 1.7% p.a. over the *Outlook* period, less than the 2.5% p.a. expected for meat production growth. Of the 2 Mt of additional meat production by 2033 relative to the base period, more than 1.2 Mt is expected to be poultry, which is typically produced intensively in a controlled environment. Bovine and ovine meat production, which is more extensive in nature, could rise by 22% and 21% respectively by 2033. In the case of ovine meat, this represents an acceleration from the past decade, whereas for bovine meat it reverses an historic contraction. For all of milk, bovine meat and ovine meat, production growth is faster than that of inventories, highlighting the contribution of productivity gains in output growth.

Fish production remains an important subsector, with 70% coming from capture in coastal areas, but fish stocks are under pressure, so production growth slows to 0.3% p.a. over the *Outlook* period from 4% p.a. in the past. Aquaculture is growing in importance and with projected growth of 2.6% p.a., could account for 35% of total fish production by 2033. Its growth is mainly underpinned by Egypt, which is expected to account for 87% of the region's aquaculture and 37% of its total fish production by 2033.

Total agricultural land use remains fairly stable, expanding by only 0.4% to reach 455 Mha by 2033. Some shifts are expected in composition with a modest contraction in land used as pasture contrasting with a 4% increase in cropland, mainly in the Middle East. However, projected cropland comprises less than 10% of total agricultural land use by 2033 as most of the region is not conducive to large scale crop production. Despite this limitation, two thirds of total cropland is dedicated to cereals, mainly coarse grains and wheat. The share of both these products is expected to rise marginally by 2033 as more than three quarters of the additional land allocated to crop production will be dedicated to them.

Amid severe constraints in availability of arable land and water resources, productivity gains are paramount. Such gains have been instrumental in past growth, as evidenced by persistent improvements of 2.4% p.a. in the value generated per hectare of land used for crop production over the past decade. While slower, this trend is expected to continue with growth of 1.5% p.a. towards 2033. Such gains reflect a combination of intensification, yield gains and crop mix developments. The projected expansion of 1.8 Mha in crop area harvested is only marginally more than the 1.7 Mha expansion in land use, suggesting that yields gains will have a more pronounced impact. Both wheat and coarse grain yields remain well below global norms, but gains of 1% p.a. and 1.8% p.a. respectively are sufficient to narrow this gap by 2033. This is supported by increased use of synthetic fertiliser, which is expected to rise by 9% over the ten-year period, further complemented by technological improvement and evolving farming practices. The region's scarce resource base has prompted widespread adoption of technology to optimise production prospects and improve resilience.

By 2033, direct GHG emissions from agriculture in the region are expected to be almost 8% higher than in the 2021-23 base period, mainly on account of the livestock sector, which is larger than crop production. Emissions from crop production increase by 0.1% p.a., whereas livestock-based emissions are set to rise by 0.7% p.a. in line with animal inventories but substantially slower than ruminant production growth. This clearly illustrates that productivity gains are imperative to contain emissions. Such gains also imply that the historic decline in GHG emissions per unit value of output is set to continue. This year's *Outlook* features a scenario that simulates the impact of halving food losses along supply chains and food waste at the retail and consumer levels by 2030 (SDG 12.3). The scenario projects that total agricultural emissions in the region could be reduced by 4.2% relative to the baseline, while calorie intake improves. This implies that by 2030, agricultural GHG emissions could increase by only 1.3% from the average level in the 2021-23 base period.

2.4.3. Consumption

Food security concerns increasing amid persistent affordability challenges

Despite historic progress in reducing food insecurity and the prevalence of undernourishment, which was supported by subsidies, the economic challenges over the past decade led to a deterioration in the situation. This deterioration accelerated from 2020 as disruptions such as the COVID-19 pandemic, Russia's war against Ukraine and the cost-of-living crisis exacerbated existing challenges. Amid persistently high food price inflation and conflict in several countries, the prevalence of undernourishment increased again in 2022 despite accelerated income growth. Despite policy actions by a number of countries including additional subsidies, value added tax reductions and export controls on selected commodities⁶, calorie availability declined further in 2023 as income and affordability pressure intensified. Given ongoing conflict in several countries and weak economic growth expectations in the short-term, broad-based support will be critical to stabilise the situation and ultimately build resilience to improve both calorie intake and dietary diversity.

Per capita calorie availability in the region is expected to increase only marginally to reach 2900 kcal/person/day by 2033, just 2% below the world average. Accounting for household food waste estimates implies that total calorie intake could be around 2 140 kcal/person/day. Calorie availability has declined over the past decade and the limited gains expected by 2033 suggests that it fails to surpass levels already observed in 2010. Many factors contribute to this trend. The prevalence of conflict in many countries in the region has severely hampered efforts to improve food security. Sharp increases in food price inflation in recent years in a low growth environment constrained affordability and while agricultural commodity prices are expected to decline over the *Outlook* period, income growth remains slow, limiting large scale improvement in affordability for lower-income consumers. Amongst the least developed countries in the region, calorie intake remains 12% below the world average. The high share of total income spent on food in these countries further magnifies the impact of affordability challenges. However there is great diversity

within the region and while food insecurity is a major challenge, there is also growing awareness of healthy eating among more affluent consumer groups, further contributing to limited calorie gains on average.

Amid the multitude of disruptions, the prevalence of undernourishment in the region has risen to its highest level in more than 20 years. This is not only a matter of calorie availability but also of dietary composition where improvements are projected to remain limited. By 2033, 50% of calories are still expected to come from cereals, well above the global average of 42%. Similarly, the region's share of calorie intake derived from sugar will be 10%, compared to a global average of 7%. While substantial diversity exists across countries, this calorie dense and nutrient poor dietary composition is often associated with a rising incidence of over-weight and obesity as well as chronic diseases such as diabetes. At the same time, the growing prevalence of undernourishment as well as high levels of stunting and wasting in young children in lower income and conflict affected countries suggests that the “triple burden” of malnutrition (undernutrition, overweight and micronutrient deficiency) will be a key policy challenge over the medium term. Food quality is central to a solution. However, affordability remains a major constraint to the adoption of healthier, higher quality diets.

A key factor to mitigate availability and affordability challenges is a reduction in food waste and losses. The share of food wasted or lost in the North Africa and Near East region is the highest amongst those covered in this chapter, 58% above the world average. Cereals constitute almost 60% of total calories lost or wasted in the region with a further 12% contribution from fruit and vegetables (Figure 2.16). In the *Outlook* scenario where food waste and losses would be halved by 2030, as envisioned in SDG targets, calorie intake in the region would be increased by 9.5% relative to the baseline and the number of undernourished people in the region would decline by 19%, while at the same time, reducing GHG emissions. This implies that by 2030, calorie intake would increase by 10.5% relative to the average level in the 2021-23 base period, while there would be almost 4 million fewer undernourished people in the region.

The average level of protein availability in the region is projected to reach 84 g/day in 2033, only 0.1 g more than in the base period. While the bulk of protein consumption is still derived from plant-based sources, growth by 2033 is driven by animal protein which is set to increase by 2.9% while plant-based protein consumption reflects a modest decline. Despite this shift, more than two thirds of total protein intake will still be derived from plant-based sources by 2033. Per capita consumption of poultry, bovine meat, fish, and most dairy products is set to rise but typically by 1% p.a. or less and from a low base.

On account of expected growth in livestock, particularly poultry, production, feed use is foreseen to increase 20% by 2033. This growth is slower than the 23% expansion in meat production, reflecting the impact of efficiency gains and improved feed conversion. Maize and other coarse grains constitute more than half of total feed materials with a further 16% attributed to protein meal. In an environment with very limited production potential, food crop production is typically prioritised and so the feed industry will remain highly reliant on imported raw materials. By 2033, maize and protein meal imports are expected to rise by 31% and 12% to reach almost 30 Mt and 7 Mt respectively by 2033.

2.4.4. Trade

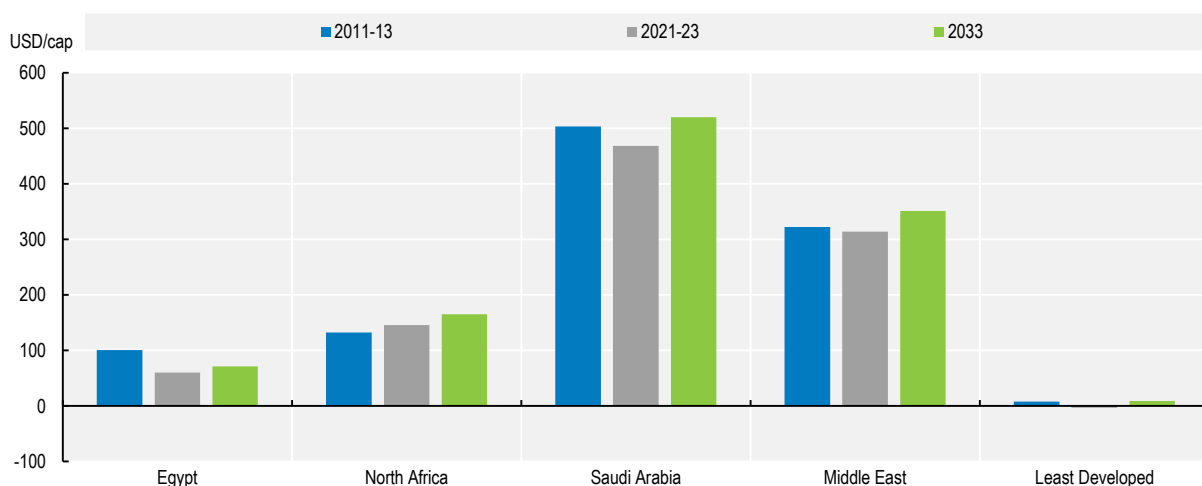
Import bill continues to rise

The region's dependence on global markets is expected to deepen over the coming decade, owing to the combination of strong population growth and severe limitations in production capacity. By 2033, the region's net imports of food products are expected to be second only to the Developed and East Asia region but on a per capita basis will be the largest amongst the regions covered in this chapter. Within the region, food imports per person are highest in Saudi Arabia and the Other Middle East area which includes the Gulf States (Figure 2.14).

Imports have been affected by various disruptions over the past few years, including the economic and logistical challenges of the COVID-19 pandemic, Russia's war against Ukraine and associated shipping disruptions in the Black Sea, and most recently the war in Gaza and subsequent challenges in the Red Sea that is affecting passage through the Suez Canal. The latter is particularly relevant given geographical proximity of major importers in the region. These disruptions brought significant volatility in the cost and volume of imports into the region and influenced sourcing strategies with reduced volumes from Ukraine, but increases from Russia, Europe and North America. This implies that the shipping delays and cost increases associated with disruptions on major maritime routes such as the Suez and Panama Canals could pose further challenges to the region in the short term. Some mitigating actions have already been taken to enable alternatives in the Red Sea and Mediterranean region, so as to ensure availability of supplies. The region's total import bill bottomed out in 2020 at the height of the COVID-19 pandemic, but by 2023 had increased almost 10% to well above pre-pandemic levels. It is expected to rise further in the medium term despite softer agricultural commodity prices and by 2033 could be 28% higher than in the 2021-2023 base period.

The region's vulnerability to disruptions is underscored by the high share of imports in domestic consumption as well as its high share in global markets for a number of commodities. These characteristics are expected to become more pronounced over the *Outlook* period. Imports are expected to rise for almost all commodities but fruit, vegetables, dairy products, wheat, rice, poultry and sugar will account for the greatest share of import growth. The region's share in global trade is also rising for most products and by 2033 will be significant for sheep meat (29%), wheat (26%), poultry (22%), sugar (22%), dairy products (21%) and maize (14%). By implication, significant developments in either global or domestic markets could have broad food security implications in the Near East and North Africa.

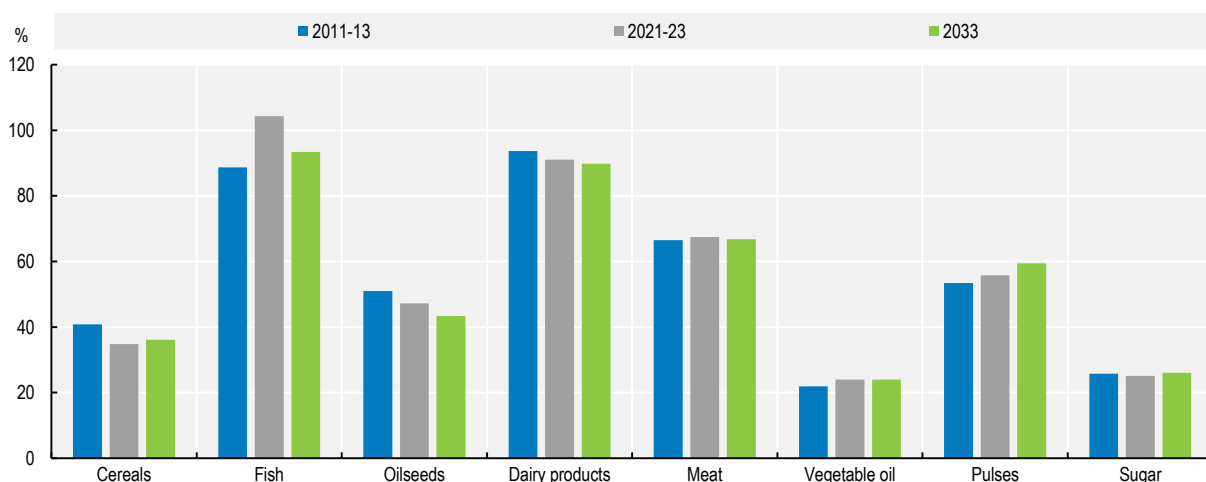
Figure 2.14. Value of net food imports per capita in Near East and North Africa (including processed products)



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 (2024). FAOSTAT Value of Agricultural Production Database, <http://www.fao.org/faostat/en/#data/QV>; OECD/FAO (2024) "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

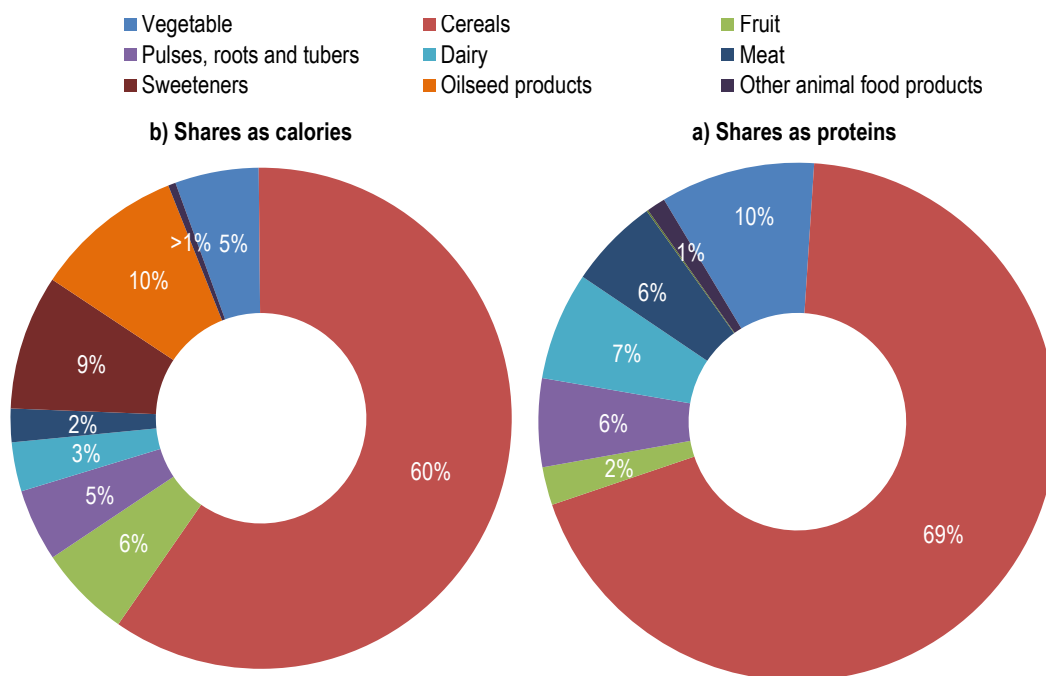
Figure 2.15. Self-sufficiency ratios for selected commodities in Near East and North Africa



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

Source: OECD/FAO (2024), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

Figure 2.16. Distribution of food waste and losses in Near East and North Africa in terms of calories and proteins, 2021-2023

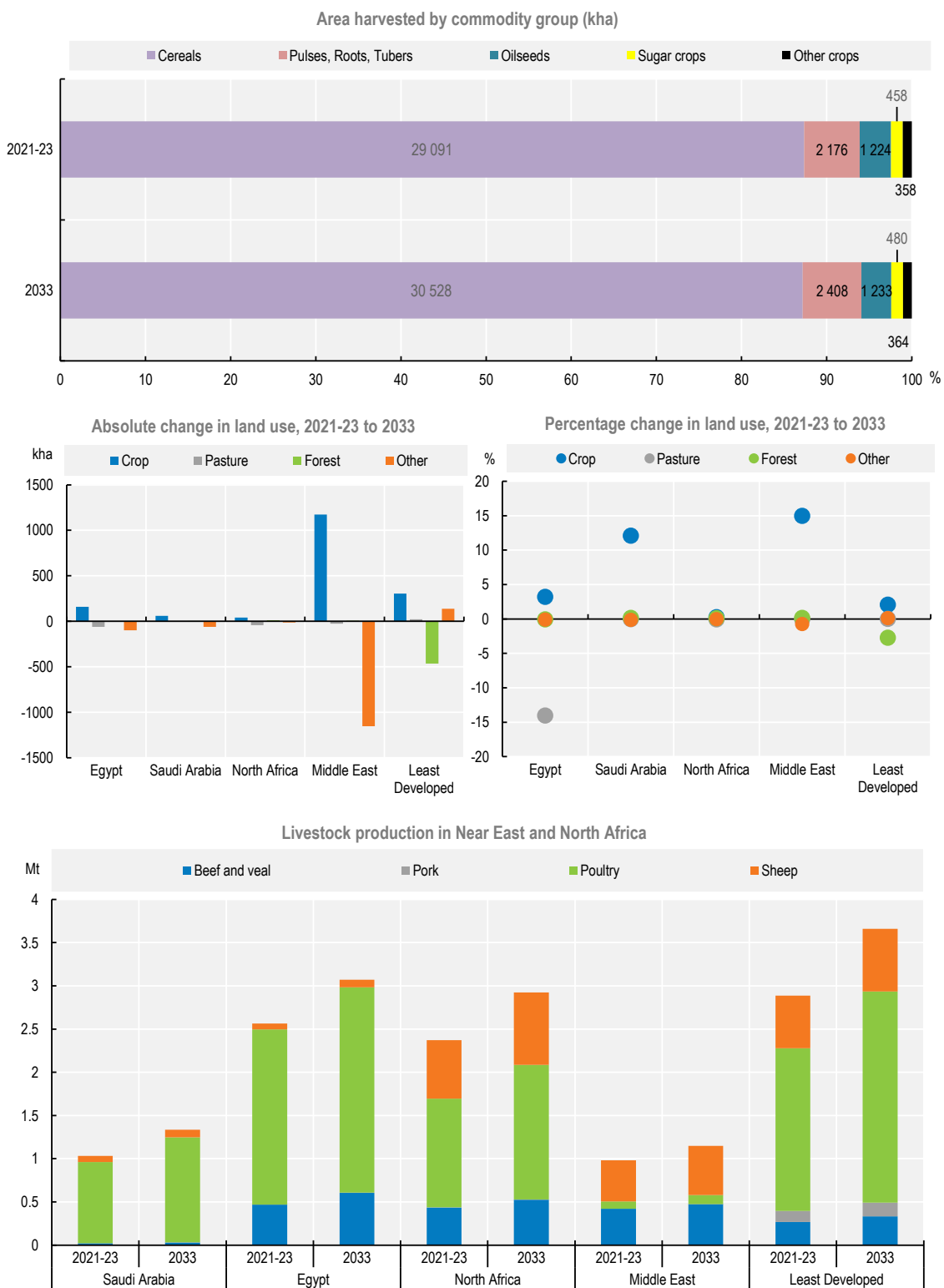


Note: Other animal food products include egg and fish.

Source: OECD/FAO (2024), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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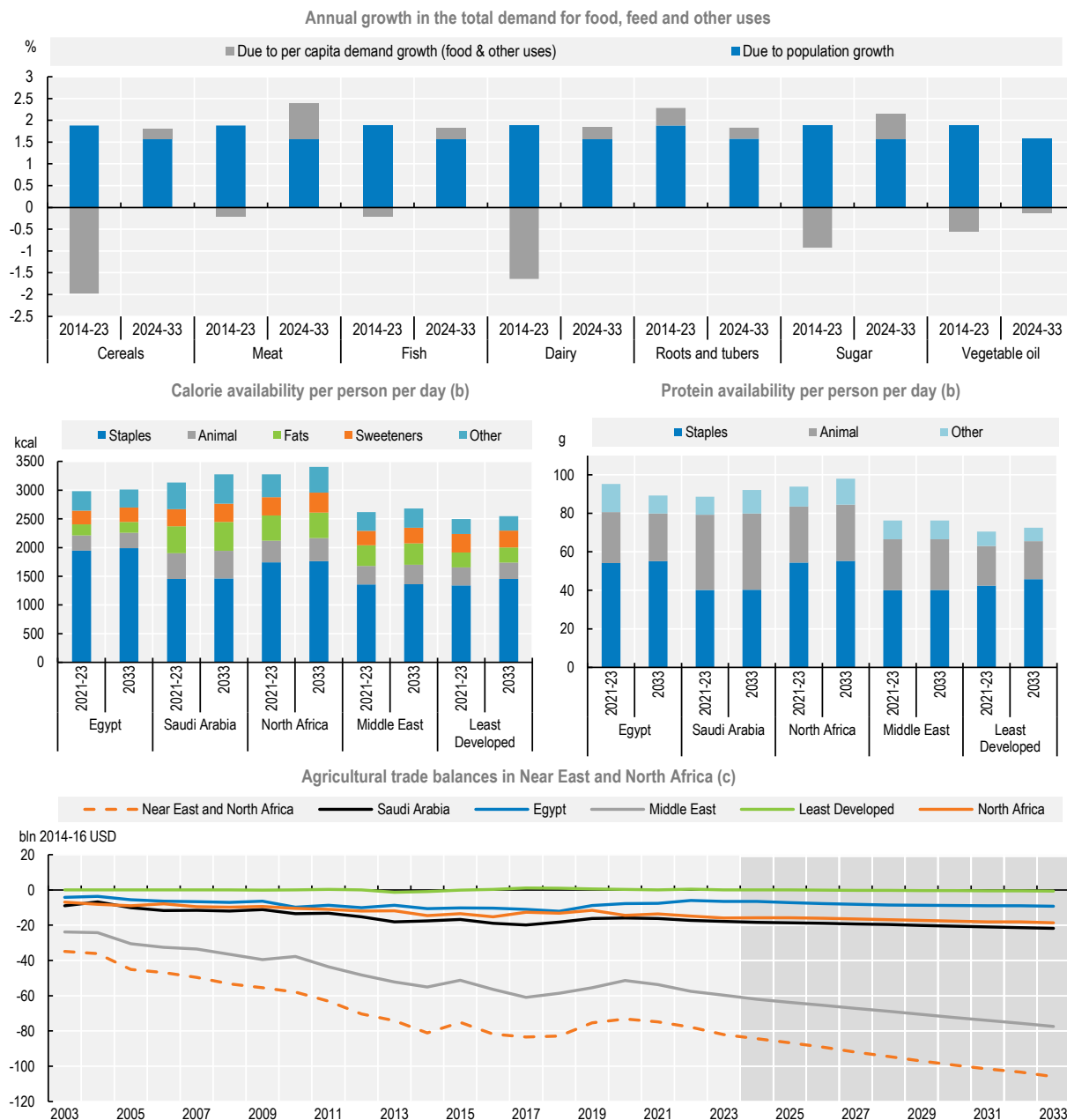
Figure 2.17. Land use change and livestock production in Near East and North Africa



Source: OECD/FAO (2024), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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

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 and tubers. c) Include processed products, fisheries (not covered in the FAOSTAT trade index) based on outlook data.
 Source: FAO (2024). FAOSTAT Value of Agricultural Production Database, <http://www.fao.org/faostat/en/#data/QV>; OECD/FAO (2024) "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

StatLink <https://stat.link/471e80>

Table 2.4. Regional indicators: Near East and North Africa

	Average			%	Growth ²	
	2011-13	2021-23 (base)	2033		Base to 2033	2014-23	2024-33
Macro assumptions						
Population ('000)	366 685	445 474	531 326	19.27	1.88	1.58
Per capita GDP ¹ (kUSD)	6.33	6.41	7.39	15.24	-0.28	1.26
Production (USD bln 2014-16)						
Net value of agricultural and fisheries ³	67.7	82.9	101.1	21.98	2.15	1.61
Net value of crop production ³	25.0	26.3	32.8	24.69	1.01	0.95
Net value of livestock production ³	31.7	39.5	49.8	26.04	2.07	2.30
Net value of fish production ³	10.9	17.1	18.5	8.39	4.42	1.03
Quantity produced (kt)						
Cereals	53 060	47 451	60 547	27.60	-1.29	1.19
Pulses	1 634	2 098	2 824	34.60	3.26	2.74
Roots and tubers	2 998	4 113	5 038	22.50	3.12	1.66
Oilseeds ⁴	1 092	1 104	1 150	4.14	-0.26	0.20
Meat	6 990	8 803	10 800	22.68	2.50	2.54
Dairy ⁵	3 454	3 385	4 002	18.23	0.02	1.67
Fish	3 887	5 976	6 451	7.94	4.21	1.02
Sugar	3 148	3 302	4 482	35.72	-0.94	1.13
Vegetable oil	1 519	2 145	2 486	15.88	4.78	0.92
Biofuel production (mln L)						
Biodiesel	0.00	0.00	0.00	-41.30	0.00	1.53
Ethanol	487	538	661	22.83	0.44	1.98
Land use (kha)						
Total agricultural land use	464 775	453 750	455 322	0.35	-0.04	0.01
Total land use for crop production ⁶	44 231	42 369	44 048	3.96	-0.27	0.10
Total pasture land use ⁷	420 544	411 381	411 274	-0.03	-0.02	0.00
GHG emissions (Mt CO2-eq)						
Total	182	184	198	7.62	-0.12	0.57
Crop	26	25	28	9.21	0.57	0.10
Animal	156	158	170	7.38	-0.23	0.65
Demand and food security						
Daily per capita caloric food consumption ⁸ (kcal)	2 852	2 844	2 899	1.93	-0.12	0.31
Daily per capita protein food consumption ⁸ (g)	81.6	83.7	83.8	0.08	0.2	0.3
Per capita food consumption (kg/year)						
Staples ⁹	205.8	201.7	205.7	1.99	-0.24	0.15
Meat	17.5	17.1	18.2	6.02	-0.59	0.70
Dairy ⁵	11.4	10.1	10.4	3.17	-1.17	0.25
Fish	11.5	11.3	11.8	4.04	-0.63	0.44
Sugar	30.4	28.7	30.4	5.91	-0.97	0.45
Vegetable oil	10.9	11.1	11.4	2.49	-0.74	0.25
Trade (bln USD 2014-16)						
Net trade ³	-69	-78	-106	35.38	..	..
Value of exports ³	22	35	39	11.68	3.49	1.17
Value of imports ³	91	113	145	28.12	0.71	2.18
Self-sufficiency ratio (calorie basis) ¹⁰	42	38.6	39.0	1.04	-0.26	-0.37

Notes: 1 Constant 2010 USD. 2. Least square growth rates (see glossary). 3. Follows FAOSTAT methodology, based on commodities in the Aglink-Cosimo model. 5. Milk solid equivalent units. 6. Area accounts for multiple harvests of arable crops. 7. Land for grazing. 8. Food availability, not intake. 9. Cereals, oilseeds, pulses, roots and tubers. 10. Production / (Production + Imports - Exports)*100.

Sources: FAO (2024). FAOSTAT Food Balance Sheets and trade indices databases, <http://www.fao.org/faostat/en/#data>; OECD/FAO (2024), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

2.5. Regional outlook: Europe and Central Asia

2.5.1. Background

Increasing focus on sustainability in environment with elevated risks

The Europe and Central Asia⁷ region includes a diverse range of countries that span two continents and exhibit various stages of development. Considerable differences exist across countries in terms of agricultural resources, demographics and public policies. The challenges facing the region are diverse. Russia's war against Ukraine has caused extensive destruction and continues to raise uncertainty. While supply chains are adapting, the prolonged nature of the war raises uncertainty, at a time when the European Union continues its transition to greener, more sustainable growth, which may be slower than in the past.

The region accounts for 12% of world population, but with growth of less than 1% by 2033, this share is set to decline. The rate of urbanisation is typically high and by 2033, 76% of inhabitants are expected to reside in urban settings. Population dynamics vary widely across the region, both in terms of growth and urbanisation which underpins differences in food demand. In both Western and Eastern Europe, which together comprise 90% of the regional inhabitants, populations are expected to decline by 0.4% and 0.7% respectively by 2033 compared to the 2021-2023 base period. Conversely, Central Asia's population is expected to expand by 12%, adding 12 million people, compared to a reduction of 4.3 million people combined in Western and Eastern Europe. Central Asia will still only account for 11% of the region's population by 2033. It is also less urbanised, with 52% of its people expected to reside in urban areas by 2033, compared to 48% in the 2021-23 base period.

At USD 27 800 per capita per year in constant 2010 terms, average income in the regions is more than double the global average. This encompasses a range from almost USD 40 200 in Western Europe's highly developed economies to USD 13 400 per capita in the resource dependant eastern regions and only USD 5 200 per capita per year in central Asia. Having rebounded firmly from the COVID-19 pandemic induced recession in 2021, on average the region has managed to maintain positive growth through the 2021-23 base period despite navigating challenges such as Russia's war against Ukraine, the associated energy price shocks in 2022 and the need to control obstinately high food inflation. With fiscal support scaling back and monetary policy tight, growth has slowed but is expected to remain positive. Inflation is slowly cooling and monetary policy is approaching the end of the tightening cycle so growth in per capita GDP is expected to be 1.2% in 2024 and an annual average rate of 1.6% p.a. in the medium term. Risks remain tilted towards the downside, particularly in economies that are resource dependent or rely on large manufacturing sectors as these face low external demand with greater exposure to high energy prices.

In line with different stages of development, the share of primary agriculture, forestry and fish production in GDP ranges from less than 2% in the European Union to 7% in Central Asia. Similarly, it is estimated that the share of food in household expenditures averaged about 10% in the region in 2021-2023, ranging from around 6% for the United Kingdom to around 16% in Türkiye and even higher in many Central Asian countries.⁸ Food price inflation in the region averaged 10% from 2021 to 2023, substantially higher than the 2.4% of the preceding five years. The impact of this surge, as well as the continued moderation over the *Outlook*, on food security is greater in countries and households that spend a larger share of total income on food. This is evident in the sharp increase in the prevalence of moderate and severe food insecurity in Central Asia in 2021 despite the recovery in income. Notwithstanding improvements in 2022, food insecurity remains well above pre-pandemic levels but improvements could accelerate as food price inflation continues to cool. However, some risks remain, and Russia's war against Ukraine for example could constrain rapid progress in the region.

The Europe and Central Asia region accounts for 15% of the global value of agriculture and fish production with major contributions from the European Union, United Kingdom, Russia, Ukraine, Türkiye, and

Kazakhstan. The region's share in global output could decline to 14% by 2033, reflecting the impact of Russia's war against Ukraine which has caused severe damage to productive capacity, and an increased focus on sustainability in the European Union.

The region's agricultural sector navigated a multitude of challenges in recent years, many of which will have lasting impacts. Many of the supply chain disruptions and logistical bottlenecks that emanated from the COVID-19 pandemic have eased but it also induced a renewed focus on shorter, more localised supply chains and an increased awareness of healthy eating habits which will likely persist. Similarly, many of the initial shocks associated with Russia's war against Ukraine, such as the spike in energy, fertiliser and agricultural commodity prices, are dissipating but shifts in trade patterns may persist. While many uncertainties remain with respect to possible resolutions to the conflict, significant damage to infrastructure suggests that restoration of productive capacity will be slow. Consequently, the striking growth in exports from Eastern Europe that was observed over the past decade is expected to slow considerably.

The European Union accounts for 47% of the value of the region's agriculture and fish production. Its priority afforded to sustainability and improved resilience is reflected in its Farm to Fork and Biodiversity strategies. The Farm to Fork strategy envisions a fair, healthy, environmentally friendly, and sustainable food system. It may influence demand trends, trade flows, competitiveness, and production growth in the region. Reforms to the Common Agricultural Policy (CAP) have strengthened its environmental pillar, including enhanced conditions for support related to good agricultural and environmental practices and incentives to adopt climate and environmentally friendly farming practices.

Meanwhile, the European Union's heightened focus on sustainability and associated stricter environmental and climate regulatory framework may add to production costs, potentially eroding competitiveness of its producers. Innovations to achieve sustainable productivity gains that are sufficient to offset additional costs will be critical to bolster the resilience of the agricultural sector to exogenous shocks that will likely increase in frequency and intensity.

2.5.2. Production

Growth slows amid Russia's war against Ukraine and stricter environmental legislation

By 2033, the net value of agriculture and fish production in Europe and Central Asia is expected to expand by only 7% relative to the 2021-23 base period. This represents less than half of the growth attained over the past decade and reflects a substantial slowdown in Europe. Amid Russia's war against Ukraine, growth in Eastern Europe slows from 30% over the past decade, to just 13% over the *Outlook*. While Ukraine is assumed to reach historic productive capacity by 2033, the recovery is slow and output growth from Eastern Europe is expected to be led by Türkiye and Russia, at 25% and 7% respectively. In Western Europe, output growth of only 1.6% is expected by 2033, due to slower growth in the European Union, while in Central Asia, rapid expansion in Kazakhstan fuels growth of 24%.

Productivity gains are central to growth as the land used for agricultural purposes is set to decline by 3.4 Mha, in line with historic trends. The reduction is almost exclusively attributed to pasture. Reductions are concentrated in Europe, but are not uniform across sectors. In Western Europe, both cropland and pasture are set to decline, whereas in Eastern Europe and Central Asia, the projected decline in pasture is partly offset by smaller gains in land used for crop production.

Crops account for almost 40% of the total value generated by agriculture and fisheries in the region. An expansion of 0.7% p.a. is sufficient to sustain this share by 2033. This growth combines the effect of region-wide yield improvements underpinned by technological innovation and intensification in Central Asia. Yield gains are expected across all major crops, ranging from 0.5% p.a. for oilseeds, to 0.8% p.a. for pulses. Such gains are partially underpinned by greater fertiliser use, where prices continue to normalise following the spike in 2022. By 2033, fertiliser application per hectare is expected to rise by 8%, similar to the gain

observed in the past decade but concentrated in Eastern Europe and Central Asia while a 5% expansion is expected in Western Europe.

Little change is expected in crop mix, with the bulk of production growth attributed to cereals and oilseeds mainly in Eastern Europe. Russia in particular is expected to sustain robust growth in maize (26%), wheat (15%), soybeans (28%) and other oilseeds (17%) over the coming decade. By 2033, Russia is expected to account for 43% of the region's soybean production, 29% of other oilseeds and 30% of wheat. This growth stems from a combination of area expansion and yield gains with these four crops collectively accounting for an additional 2.2 Mha by 2033 compared to the 2021-23 base period. At the same time, yield gains are expected to exceed 1% p.a. for wheat and maize and remain only marginally below 1% for oilseeds. Significant wheat production growth is also expected in Türkiye and Kazakhstan, at 23% and 26% respectively by 2033. In Ukraine, a major contributor to historic increases, the need to recover from the ongoing war limits future growth prospects.

Half of the total value of agriculture and fish production in the region is attributed to livestock, the highest share amongst the regions covered in this chapter. Output growth is expected to lag behind that of crops at only 0.5% p.a. Almost 60% of the region's livestock production value is generated in Western Europe but this is expected to decline to 56% by 2033 owing to its ongoing transition to environmental sustainability. Stronger growth in Eastern Europe and Central Asia will enable these regions to expand their contribution to total livestock production in the region to 33% and 11% respectively. Around a third of livestock production accrues meat and pork is the largest amongst the various meat sectors. However, poultry accounts for the majority of additional production growth and by 2033 is set to account for 38% of total meat produced. Conversely, pork production is expected to decline by 2033 while bovine meat production growth is slow at just 2.6% for the ten year period. More than half of the additional poultry production is from Eastern Europe where surplus feed grains and less restrictive environmental legislation bolsters competitiveness.

The dominance of Western Europe also extends to dairy, where it accounts for 47% of total production, compared to 39% in Eastern Europe and 14% in Central Asia. The European Union accounts for almost 90% of milk production in Western Europe but a reduction of 11% in its cow herd by 2033 compared to 2021-2023 is expected. Anticipated yield gains suggest that the decline in production will be minimal. By contrast, milk production is foreseen to expand by 10% in Eastern Europe and 22% in Central Asia, yielding a net gain of 3.5% in the region. Rapid growth in Central Asia benefits from an expected 8% expansion in cow inventories and a 13% gain in milk yield whereas growth in Eastern Europe is almost exclusively yield based.

Fish production constitutes 12% of total agricultural output and growth of 10% by 2033 is sufficient to sustain this share. Aquaculture's prominence is rising, and by 2033, it is expected to account for 24% of total fish production. This reflects growth of 1.9% p.a. in aquaculture compared to only 0.6% p.a. in capture fisheries.

By 2033, direct agricultural GHG emissions are projected to decline at regional level, albeit by only 0.6%. This encompasses a decline of 4% in Western Europe and European Union, combined with a 1% increase in Eastern Europe and a 9% increase in Central Asia where livestock herds are still growing. Productivity gains are such that GHG emissions expressed relative to the value of agricultural production are projected to decline by 8% compared to its level in the 2021-23 base period. This year's *Outlook* features a scenario that simulates the impact of halving food losses along supply chains and food waste at the retail and consumer levels by 2030 (SDG 12.3). The scenario projects that total agricultural emissions in the region would be reduced by 3% relative to the baseline, while calorie intake improves. This implies that by 2030, agricultural GHG emissions would be reduced by 3.5% from the average level in the 2021-23 base period.

2.5.3. Consumption

Diverging trends in animal sourced foods with reductions in Western Europe and increases in Central Asia

Despite high relative income and the mature consumer base in large parts of the region, the impact from disruptions such as the COVID-19 pandemic, Russia's war against Ukraine, the cost-of-living crisis and high food inflation has been significant. At regional level, the incidence of moderate to severe food insecurity peaked in 2021 before improving somewhat in 2022 as disruptions associated with the COVID-19 pandemic eased. The persistence of high food inflation implied that the recovery was insufficient to reduce food insecurity to pre-pandemic levels. Affordability concerns were greatest in regions with less comprehensive income support measures and a higher share of total income spent on food. Furthermore, in Eastern Europe, the ongoing war brought a whole new set of food security concerns and supply chain disruptions with millions of people displaced, infrastructure and distribution channels damaged and significant price volatility, resulting in further deterioration in food security in 2022. With cooling food price inflation, average calorie availability in the region increased in 2023 and this recovery is expected to accelerate as affordability continues to improve over the *Outlook*.

The region's daily calorie availability per capita is well above the global average and by 2033, a gain of 3%, or 98 kcal/person implies it will exceed 3400 kcal/person. Diversity in income levels and consumer preferences underscore differences within the region. In Eastern Europe and Central Asia, improved affordability over the *Outlook* period supports a 7% increase in calories available for consumption. In the *Outlook* scenario where food waste and losses can be halved by 2030, as envisioned in SDG targets, calorie intake in Eastern Europe and Central Asia could be increased by 1.9% and 3.7% respectively relative to the baseline, while at the same time, reducing GHG emissions. This implies that by 2030, calorie intake could increase by 7.2% and 9.4% respectively relative to the average level in the 2021-23 base period. In Western Europe, total calorie availability is expected to remain almost unchanged by 2033 under the baseline, but preferences amongst its higher income, more mature consumer base reflect a growing awareness of healthy eating and environmental impacts in the food chain. While the cost-of-living crisis heightened awareness of the costs associated with such preferences, they are still expected to exert substantial influence on the composition of food intake. Consequently, per capita consumption of vegetable oil and animal-based products are expected to decline.

Protein availability, expressed in per capita terms, was 21% above the global average in 2021-23. By 2033, it is only expected to increase by 4%, to reach 111g/day. While gains are expected across the region, the increase in Western Europe (1.8%) is only a quarter of what is expected elsewhere. In Western Europe, gains are exclusively attributed to plant-based sources which are often perceived as healthy and sustainable alternatives. In Eastern Europe and particularly in Central Asia, animal products comprise a greater share in additional protein consumption and by 2033, protein derived from animal products is expected to increase by 7.5% and 13% respectively compared to the 2021-23 base period. While these growth projections support some convergence within the region, meat consumption per capita is still expected to be highest in Western Europe, at 52 kg per capita by 2033, compared to 46kg per capita in Eastern Europe and 32kg per capita in Central Asia.

In the European Union, protein consumption is already high, with a marginally bigger contribution from meat than dairy. While environmental considerations are expected to drive a 1.7% reduction in meat consumption per capita by 2033, dairy product intake could rise by 1.3%. By 2033, per capita consumption of cheese and butter will remain more than six times and double the global average respectively. Amongst meat products, declines in pig meat, bovine and ovine meat consumption are expected to be partly offset by increasing poultry meat consumption which will increase its share in the total meat basket to more than 30% by 2033. Regardless of the 5% decline by 2033, pig meat will still account for half of total and per capita meat consumption and remain more than double the world average level.

Fish consumption in the region is expected to grow by 0.3% p.a. over the next ten years but the decline of 9% in Eastern Europe by 2033 masks growth of almost 20% in Central Asia and 6% in the European Union. In Western Europe, consumption levels are already high and by 2033 are expected to be more than double the global average. Conversely, growth in Central Asia, from a small base, is only sufficient for consumption to reach 60% of the global average level by 2033.

The region accounts for 23% of global animal feed use, reflecting the relative importance of animal products in total output, and the intensity of production systems. Growth prospects mirror those of livestock, with a distinct deceleration in the coming decade reducing the region's global market share to 21%. Total feed use is only expected to expand by 3.2% by 2033, with a 3% reduction in Western Europe offset by gains of 12% and 26% respectively in Eastern Europe and Central Asia. In Western Europe, the decline in feed use is greater than that of livestock production, reflecting some extensification of production practices amid more stringent environmental legislation. Conversely, Eastern Europe and Central Asia are expected to intensify production practices with feed use expanding faster than livestock production.

The European Union's commitment to increase renewable energy production is enshrined in its ambitious new target of 45% renewable energy by 2030. The energy crisis only served to accelerate the drive to renewables in the region. Despite expected reductions in both gasoline and diesel use, owing to decarbonisation of road transport and subsequent increasing prominence of electric vehicles, ethanol use is expected to expand by 5%. Biodiesel use is foreseen to decline by almost 6%, over the coming decade. In view of the sustainability concerns surrounding palm oil, which is classified as high risk under the new Renewable Energy Directive, it is being phased out as a feed stock by many countries and its use for biodiesel production is expected to decline by almost 70% by 2033.

2.5.4. Trade

Recovery in Ukraine exports depends on resolution of the war

Trade in Europe and Central Asia has been amongst the most dynamic of the regions covered in this chapter. Historically a major net importer, this trade deficit has shrunk to less than half of its level of ten years ago. The region's prominence in global markets also rose, as it accounted for almost 40% of additional exports over the past decade despite contributing just 14% of additional global output. The shift was largely underpinned by Eastern Europe, particularly Russia and Ukraine, where large scale productivity gains far outpaced limited population growth. This increased role in global markets was largely underpinned by exports of the major cereals and oilseeds, reflected in Eastern Europe's 33% share in global wheat exports in the 2021-23 base period. With Russia's war against Ukraine weighing on Ukraine's ability to expand production, exports from the region are expected to slow. The projected 22% expansion in exports from Eastern Europe by 2033 equates to less than half of the growth observed in the past decade. Growth is expected to be concentrated in Russia and Türkiye, where exports are set to expand by 2.5% p.a. and 1.8% p.a. respectively. In Western Europe, exports are expected to rise by 1.5% p.a., implying that its contribution to total export growth from the region will be larger than in the past. Combined with growth of 1.3% p.a. from Central Asia, this is sufficient for the total Europe and Central Asian region to transition to a trade surplus by 2033 that is equivalent to its current deficit.

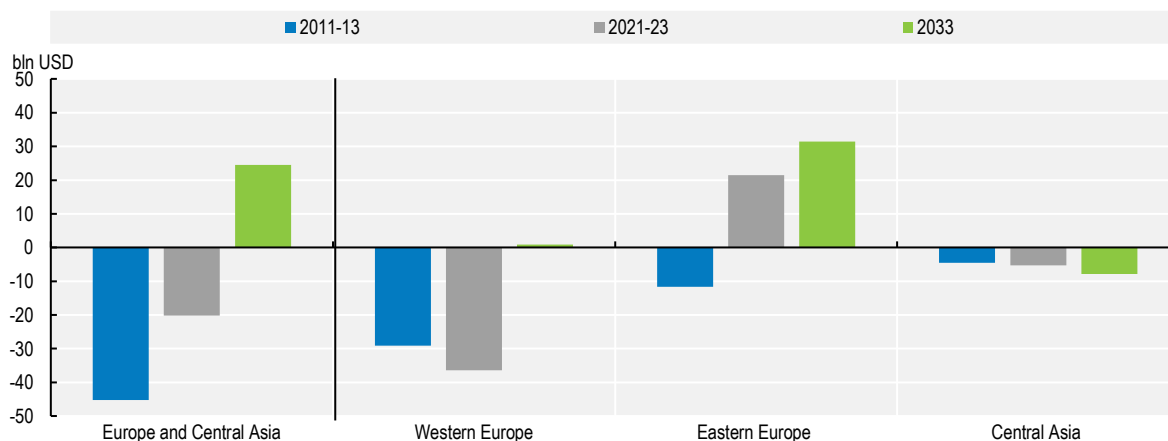
Underpinned by a growing surplus in the European Union, Western Europe is expected to transition from a substantial trade deficit in the 2021-23 base period, to a small surplus by 2033. The biggest contributors to the additional surpluses generated by the European Union are expected to be fresh fruit and vegetables, for which exports could rise by 21% and 26% respectively over the coming decade, along with wheat, sugar and value added dairy products such as cheese. The region is already a major contributor to global cheese exports and by 2033, a further expansion of 25% is expected, while wheat and sugar exports could rise by 10% and 15% respectively by 2033. The net surplus is also influenced by a substantial slowdown in imports into the European Union, reflecting subdued demand, and sustainability concerns that drive a near 50% reduction in palm oil imports.

Europe and Central Asia contribute more than 40% of the value of livestock product exports globally and almost 90% of this is attributed to the European Union. With growth in the European Union's exports of animal-based products set to accelerate over the *Outlook* due to stagnant domestic demand its share in global exports of such products could rise to 46% by 2033. This mainly results from growing dairy product exports. In line with reduced production, meat exports from the European Union are expected to decline by 6% but most of this will be due to reductions in the pig meat sector, as poultry exports are anticipated to rise by 11%. The reduction in pig meat exports implies that its share in global pig meat trade will decline to 32%.

The region is also an important exporter of fish products. It accounts for 25% of the volume of global fish exports, the second highest share amongst the regions covered in this chapter, behind South and Southeast Asia. Growth of 0.7% p.a. is sufficient to maintain this share at 24% by 2033. Within the region, Russia and Norway are the major contributors to exports.

Despite the increasing export orientation which raises its exposure to trade related disruptions, such as the conflict in the Red Sea that is affecting passage through the Suez Canal, the region also remains a significant importer of many agricultural products. In the European Union, such imports will increasingly be influenced by its environmental regulations. By 2033, imports are anticipated to increase by almost 9%, though growth from Central Asia is much faster at almost 31%, from a smaller base. The growing export orientation in Europe, combined with rising imports from Central Asia implies that a substantial share of additional imports could be supplied from within the region. Almost 20% of Central Asia's additional imports is expected to be animal products for which the European Union is a major supplier.

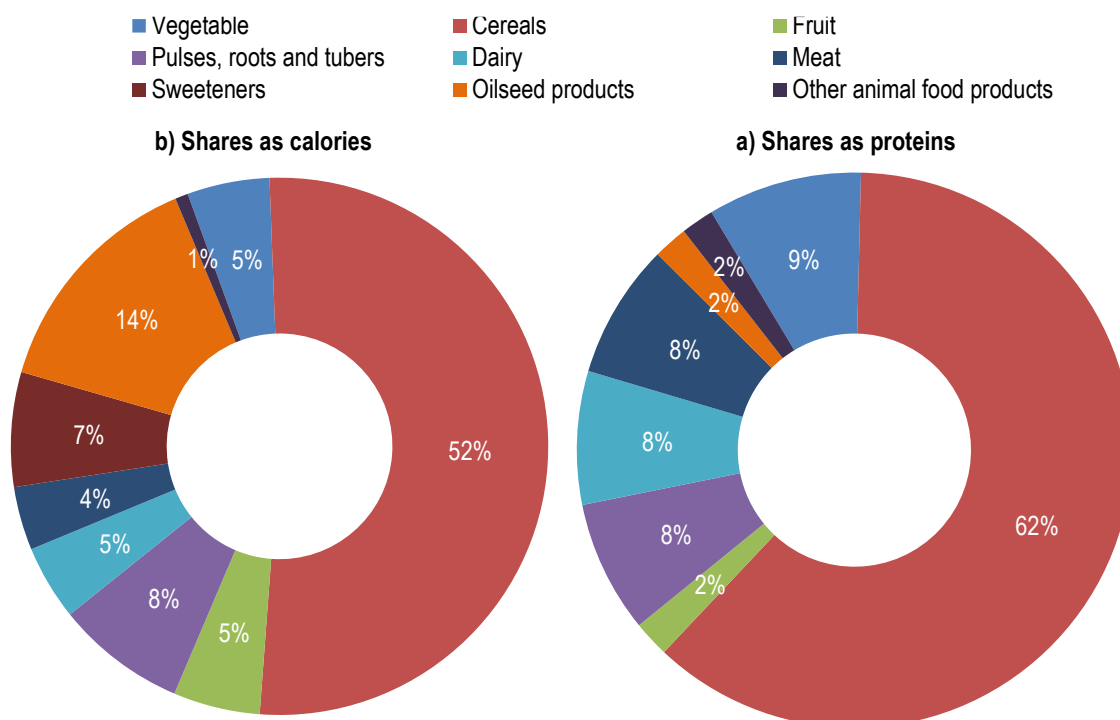
Figure 2.19. Net exports of agriculture and fish products from Europe and Central Asia (including processed products)



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 (2024). FAOSTAT Trade Indices Database, <http://www.fao.org/faostat/en/#data/TI>; OECD/FAO (2024) "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

Figure 2.20. Distribution of food waste and losses in Europe and Central Asia in terms of calories and proteins, 2021-2023



Note: Other animal food products include egg and fish.

Source: OECD/FAO (2024), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.


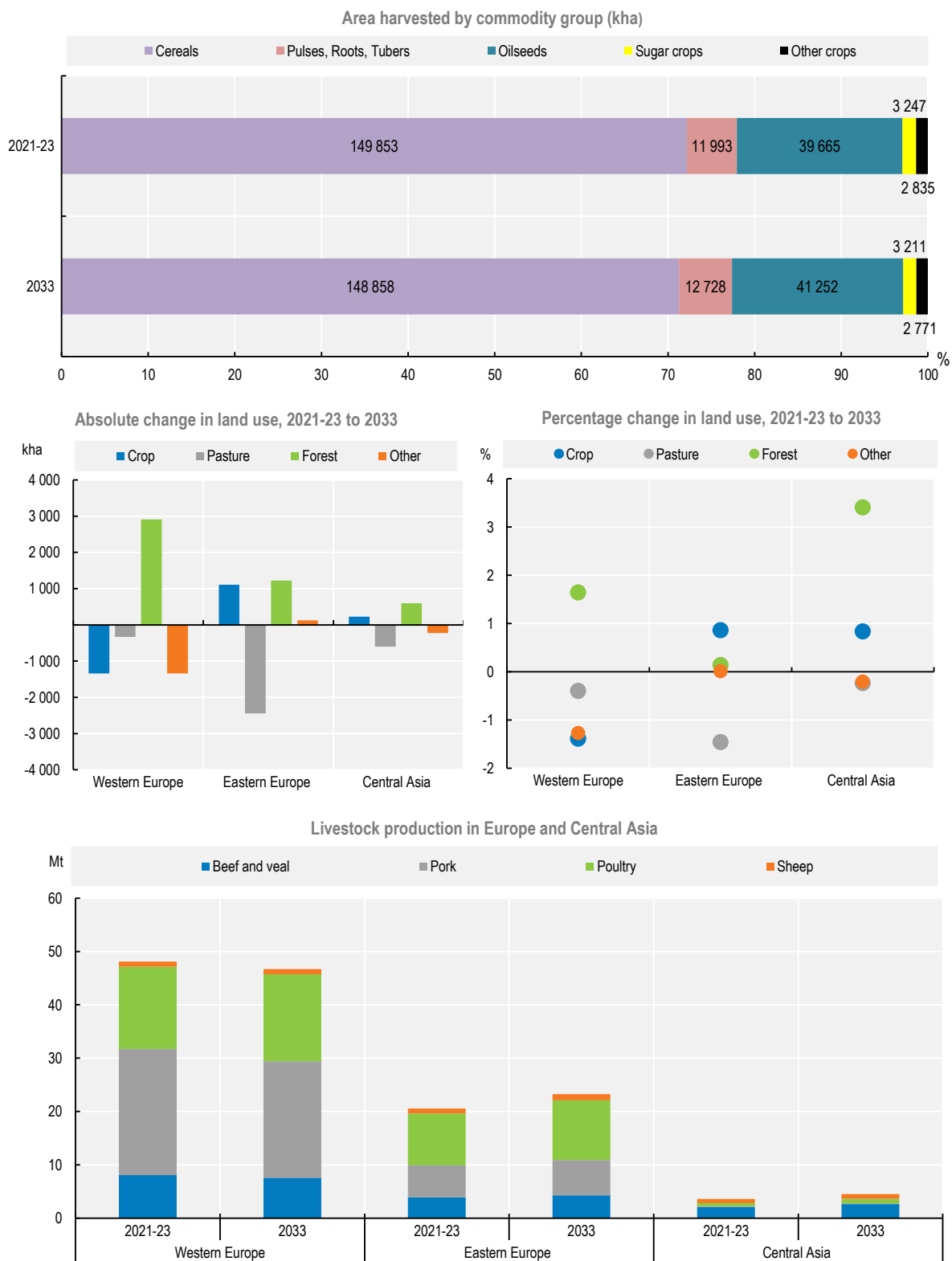
StatLink  <https://stat.link/a6optx>

Figure 2.21. Land use change and livestock production in Europe and Central Asia



Source: OECD/FAO (2024), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.


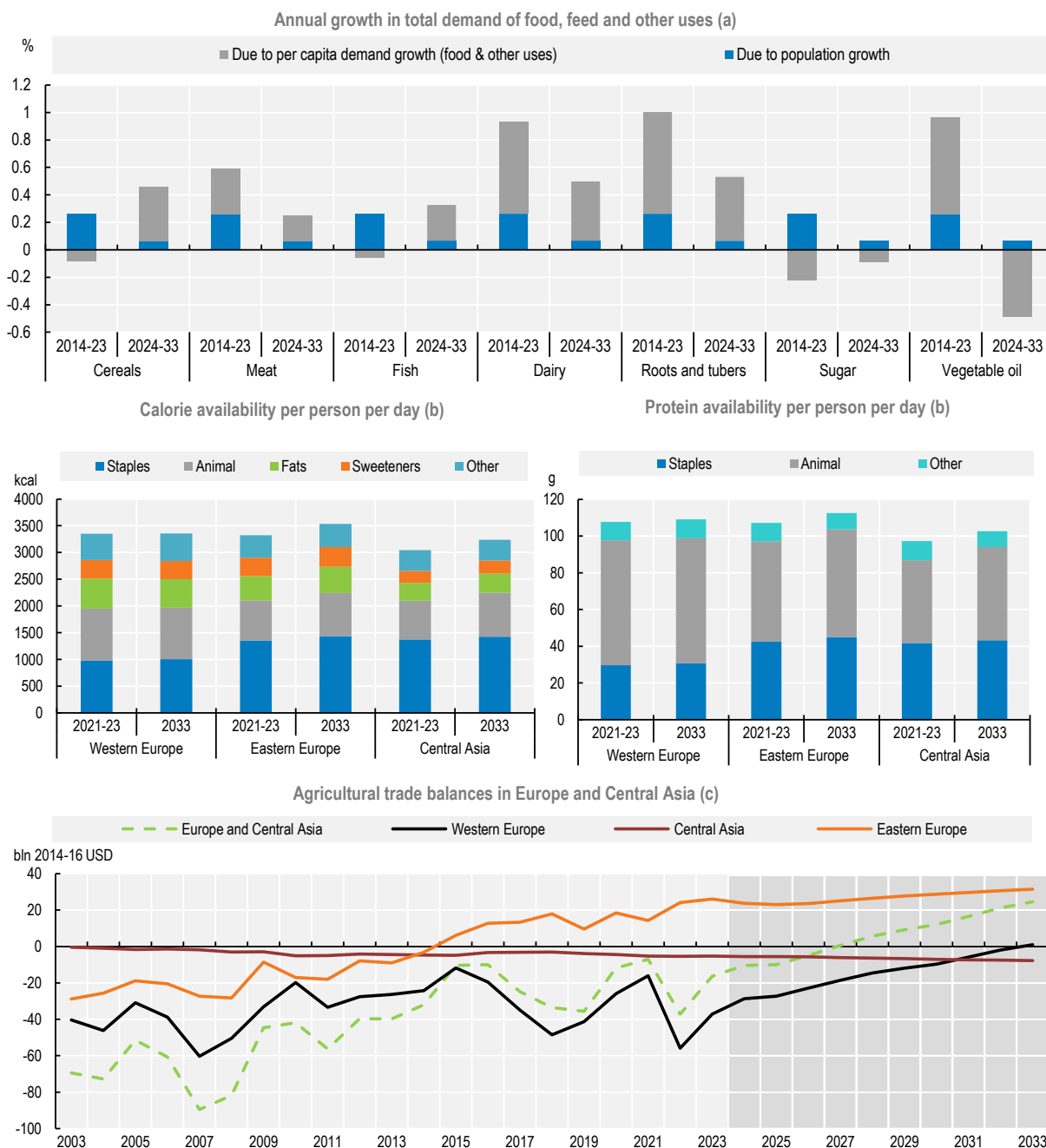
StatLink  <https://stat.link/aluzqv>

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 and tubers. c) Include processed products, fisheries (not covered in the FAOSTAT trade index) based on outlook data.
 Source: FAO (2024). FAOSTAT Value of Agricultural Production Database, <http://www.fao.org/faostat/en/#data/QV>; OECD/FAO (2024) "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.


StatLink  <https://stat.link/oj8dww>

Table 2.5. Regional indicators: Europe and Central Asia

	Average			%	Growth ²	
	2011-13	2021-23 (base)	2033		Base to 2033	2014-23	2024-33
Macro assumptions						
Population ('000)	902 528	931 028	938 211	0.77	0.26	0.07
Per capita GDP ¹ (kUSD)	24.36	27.80	32.88	18.28	1.32	1.55
Production (USD bln 2014-16)						
Net value of agricultural and fisheries ³	392.9	454.6	487.3	7.20	1.21	0.62
Net value of crop production ³	151.7	176.3	190.8	8.26	0.98	0.72
Net value of livestock production ³	193.2	225.0	237.8	5.69	1.52	0.47
Net value of fish production ³	48.0	53.3	58.6	10.07	0.69	0.92
Quantity produced (kt)						
Cereals	523 947	595 937	634 033	6.39	0.34	0.79
Pulses	8 295	12 928	15 595	20.62	2.51	1.78
Roots and tubers	28 338	31 035	33 492	7.92	0.83	0.54
Oilseeds ⁴	60 270	88 457	99 540	12.53	2.95	0.79
Meat	62 503	72 247	74 451	3.05	1.14	0.35
Dairy ⁵	26 077	29 706	31 536	6.16	0.94	0.52
Fish	17 140	18 712	19 844	6.05	0.45	0.91
Sugar	26 818	28 164	29 853	6.00	0.47	0.11
Vegetable oil	25 978	35 921	38 431	6.99	2.79	0.40
Biofuel production (mln L)						
Biodiesel	11867	19432	18800	-3.25	4.87	0.08
Ethanol	7 356	8 049	8 994	11.73	0.52	1.04
Land use (kha)						
Total agricultural land use	771 812	763 942	760 556	-0.44	-0.08	-0.01
Total land use for crop production ⁶	252 469	251 913	251 905	0.00	0.07	0.09
Total pasture land use ⁷	519 343	512 029	508 651	-0.66	-0.15	-0.06
GHG emissions (Mt CO2-eq)						
Total	750	772	767	-0.65	-0.02	-0.04
Crop	188	198	201	1.48	0.03	0.27
Animal	547	555	545	-1.74	-0.09	-0.16
Demand and food security						
Daily per capita caloric food consumption ⁸ (kcal)	3 262	3 311	3 409	2.98	0.35	0.23
Daily per capita protein food consumption ⁸ (g)	101.9	106.4	110.7	4.0	0.6	0.4
Per capita food consumption (kg/year)						
Staples ⁹	159.8	162.4	169.8	4.52	0.07	0.41
Meat	45.3	47.1	48.0	2.01	0.16	0.15
Dairy ⁵	26.4	28.2	29.7	5.19	0.58	0.43
Fish	18.4	17.2	17.5	1.42	-0.63	0.03
Sugar	34.6	32.9	32.6	-0.75	-0.12	-0.11
Vegetable oil	17.6	19.9	19.6	-1.23	0.01	-0.52
Trade (bln USD 2014-16)						
Net trade ³	- 45	- 20	25	-221.85	..	..
Value of exports ³	446	584	681	16.61	2.22	1.55
Value of imports ³	491	604	657	8.66	2.13	0.91
Self-sufficiency ratio (calorie basis) ¹⁰	100.9	106.4	111.4	4.65	0.25	0.39

Notes: 1 Constant 2010 USD. 2. Least square growth rates (see glossary). 3. Follows FAOSTAT methodology, based on commodities in the Aglink-Cosimo model. 5. Milk solid equivalent units. 6. Area accounts for multiple harvests of arable crops. 7. Land for grazing. 8. Food availability, not intake. 9. Cereals, oilseeds, pulses, roots and tubers. 10. Production / (Production + Imports - Exports)*100.

Sources: FAO (2024). FAOSTAT Food Balance Sheets and trade indices databases, <http://www.fao.org/faostat/en/#data>; OECD/FAO (2024), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

2.6. Regional outlook: North America

2.6.1. Background

Productive and resilient agro-food sector contributes substantially to global output

The North American region comprises just two countries – the United States and Canada – whose 377 million people constitute 4.7% of the world’s population. Growth of only 0.5% p.a. suggests that this share could decline somewhat by 2033. By contrast, it accounts for 10% of land used for agriculture globally and the availability of agricultural land per capita is the highest amongst all regions included in the *Outlook*. This enables a substantial contribution to global agriculture where it provides 10% of global output and accounts for 12% of global trade. Its agricultural trade surplus is the third largest among all regions, after Latin America and South and Southeast Asia, but it has halved over the past decade and is expected to diminish over the *Outlook* period on the back of slower production growth.

Agriculture in the region is capital intensive and highly productive. Large, commercially orientated farming enterprises deliver impressive yields using top end technology in input intensive production systems. Fertiliser application rates per hectare of cropland are high although they declined substantially in 2022 due to the sharp increase in costs which diminished producer margins. Use recovered in 2023 when prices normalised but application rates remain below the levels observed in the decade prior to 2022, reflecting investments in optimising efficiency. While application rates are expected to rise steadily over the coming decade, they will only marginally exceed 2021 levels by 2033 and efficiency gains are such that fertiliser use per calorie produced will decline further.

Both the United States and Canada are highly developed, mature and diverse economies where agriculture, forestry and fisheries constitutes less than 2% of total GDP. Per capita income is the highest among the regions covered in this chapter, at USD 57 300 in constant 2010 terms and is expected to rise by a further 15% by 2033. More than 80% of the population already resides in urban areas with little change expected by 2033. This high income, mostly urban consumer base has the highest per capita food intake of all regions. The share of total income devoted to food is also the lowest. This suggests that consumer preferences could play a bigger role than income growth in the evolution of food demand. Consumption is proportionately high in animal products, which comprise almost 30% of total calories and 69% of total protein intake compared to the global average of 19% and 43% respectively. Diets are also high in sweeteners and especially vegetable oil, where calorie shares are almost double the global average. This dietary composition and typical lifestyles in the region have led to higher incidence of obesity and food related chronic diseases such as diabetes, although the COVID-19 pandemic heightened awareness of healthy eating habits. This could have a lasting impact on consumer preferences and total calorie intake is expected to decline by 2033, along with the share of sweeteners and vegetable oil in it.

In line with its level of economic development and already high levels of calorie intake, non-food uses of agricultural commodities, such as biofuel and animal feed, have grown faster than food demand over the past decade (Figure 2.23). Furthermore, food consumption behaviour of the region’s mature consumer base is less sensitive to fluctuations in spending power than in lower income region, and total calorie intake remained fairly stable over the past five years despite disruptions such as the COVID-19 pandemic, the energy crisis, and the cost-of-living crisis. Nevertheless, such disruptions had a profound impact on the composition and distribution of food sales. Expenditure on food away from home declined while retail sales surged, prompting significant changes in the food supply chain to accommodate changes in both food types and packaging size requirements. Weersink et al. (2021^[9]) note that despite the time required to adapt to the changes, the enhancements to the supply chain have bolstered its resilience to potential future shocks.

Despite high average levels of income and food intake, the region is not immune to food security concerns amongst the lower echelons of its income distribution. Even prior to the COVID-19 pandemic, 10-13% of

the region's population was estimated to experience food insecurity (Tarasuk and Mitchell, 2020^[10]). Despite the mitigating effects of income support measures, the prevalence of moderate to severe food insecurity increased for the first time in 2020 but the recovery was swift despite high food price inflation that rose to more than 10% in 2022 having been close to zero for the five years preceding 2020. The recovery benefitted from significant expenditure on long standing policies to address food cost burdens on the poor, which were complemented by actions such as the Inflation Reduction Act which supports programs to reduce energy costs.

Economic growth also recovered quickly from the pandemic-induced recession in 2020 but momentum was lost quickly as the start of Russia's war against Ukraine and the associated energy crisis ushered in the cycle of higher inflation that induced significant monetary tightening. Consequently, growth in per capita GDP has been below 2% since 2022 and is expected to bottom out at 0.9% in 2024. A key factor that contributed to consistently positive growth despite global disruptions was the strength and resilience of the labour market. While high labour costs and tight labour supply do contribute to inflation, wage increases have been faster and with inflation now moderating, medium term growth in per capita GDP is expected to average 1.3% p.a. towards 2033.

The agriculture sector in North America is mature, productive, and resilient, contributing substantially to global production and exports of several products. Its ability to ramp up production has been critical to the moderation in agricultural commodity prices despite Russia's war against Ukraine that has reduced production and exports from the Black Sea region. Nevertheless, it also faces challenges. Evidence suggests that its impressive historic productivity growth has slowed in the past decade (Fuglie, 2018^[11]), agricultural commodity prices have declined faster than major input costs, and as environmental costs continue to rise, competitiveness may be eroded in the future. Climate change means that the frequency and intensity of extreme weather events are increasing, as evidenced by widespread drought that has affected cattle numbers and crop production and the wildfires, storms and tornadoes that can cause significant damage to production infrastructure. The greater recognition of such risks means that policies are increasingly driven to not only reduce carbon emissions but also, as with the Sustainable Canadian Agricultural Partnership, to promote greater resilience among producers to manage climate risks.

2.6.2. Production

Productivity based crop production driving growth

Growth in agricultural and fish production in North America is expected to persist but the expected expansion of 12% by 2033 is indicative of slower growth than in the past. This slowdown reflects the expectation that most prices will continue to moderate, returning to a declining trend in real terms. The relative strength of the United States Dollar also suggests that other regions, such as Latin America, may become relatively more competitive. Livestock's contribution to total agricultural value is comparatively high in the global context but the projected expansion in crop production over the coming decade is larger. This reverses the trend observed over the past decade and reflects the impact of high feed prices in the base period which leads to a short-term decline in livestock production before growth resumes from 2025 onwards. Consequently, by 2033, livestock's share in total output will decline marginally to 45% while the share of fisheries remains stable at 5%, leaving crop production accounting for half of total value.

Agricultural land use has stabilised over the past decade with a consistent share of 37% dedicated to crop production. While little change is expected in total agricultural land use by 2033, some reallocation may occur as just over 3 Mha is repurposed from crop production to pasture, mainly in the United States. Despite the decline in cropland, the total value of crop production is expected to rise by 15%. Almost three quarters of this growth will be from the United States, where the value of crop production per hectare is expected to rise by 16% over the ten year period. In Canada, the increase is even more pronounced at 29% although its crop sector is significantly smaller than that of the United States and by 2033 it will account for 16% of the region's crops.

Value gains in crop production represent a combination of intensification, yield gains and crop mix changes. The decline in area harvested, at 2.3 Mha, is less than the decline in land use, reflecting some additional double cropping. Amongst the major crops produced in the region, maize, wheat, cotton, pulses and rapeseed areas are expected to expand at the expense of soybeans and barley. The expansion in cotton and pulses area is the fastest but by 2033 the combination of the maize, wheat and soybeans, where growth is from a much larger base, will account for almost 60% of total crop area. Yield gains are expected to remain robust across all commodities, ranging from 0.5% p.a. for maize, to 0.8% p.a. for wheat and 1.3% p.a. for cotton. The range of growth rates also reflects differences in the base period. Maize yields already averaged almost 11 tonnes per hectare between 2021 and 2023 – 85% above the global average. Conversely, for wheat and barley, yields were significantly reduced in 2021 and 2023, due to inclement weather conditions, particularly in Canada, and so gains over the *Outlook* period carry an element of recovery. Yield gains reflect continuous evolution of production technologies which, along with more efficient management practices could also improve resilience to climate shocks.

North America's meat production systems are highly intensive, enabling the region to supply 13% of the global value of livestock production with only 10% of the animal inventory. In the case of ruminants, it accounts for less than 3% of global inventories. The intensive nature of production systems means that feed is a major cost driver and so the cycle of high feed material prices over the past three years has brought profitability under extreme pressure. It followed an already severe impact from the pandemic-induced lockdown which resulted in capacity and labour constraints at abattoir and processing facilities that pushed meat prices down. The persistence of high labour and energy costs has also driven up costs beyond the farmgate. Consequently, pork production declined through 2021 and 2022 while poultry production growth stalled. Owing to a longer production cycle, beef production did not decline until 2023 but this downward cycle is expected to persist to 2025 whereas modest gains are projected from 2024 in the pork and poultry sectors. Poultry, with its rapid production cycle, may have shown more of a recovery in 2023 had it not been for the impact of widespread Highly Pathogenic Avian Influenza. Over the medium term, the region's total meat production is expected to expand by only 7%, with more than 90% attributed to the United States. Growth rates are fastest for beef production, which is expected to recover from the short term decline to grow by 1.4% p.a. on average over the ten year *Outlook*, while poultry and pork production are expected to rise by 0.8% p.a. and 0.4% p.a. respectively. Across all livestock subsectors, production gains outpace inventory expansion, reflecting the impact of productivity gains.

Milk production growth is expected to exceed that of meat and could expand by 13% by 2033 relative to the 2021-23 base period. The United States is expected to account for almost 85% of this increase. These gains are derived predominantly from increased milk yields which are already higher in North America than any other region. Cow inventories are only expected to rise by 1.5% in the United States while Canada's dairy cow herd could contract by almost 1%. By 2033, milk yields in the United States and Canada are expected to rise by 10% and 21% respectively. This implies that yields in Canada will be more than five times the global average. Consumer preferences dictate that an increasing share of total milk production is expected to be processed into products such as cheese, butter, and milk powders, with less going to fluid milk.

Fisheries is a much smaller sector in North America than crops and livestock, and comprises mainly capture fisheries. By 2033, capture fisheries are expected to expand by 5% relative to the 2021-23 base period. This rate is similar to aquaculture although aquaculture starts from a much smaller base, accounting for only 11% of total production. Production over the coming decade will be significantly impacted by environmental regulations. At present, 84% of total production comes from the United States but growth in Canada is slightly faster and by 2033, Canada is expected to supply 17% of the region's fish.

The North American region is responsible for 7% of direct agriculture related GHG emissions globally – less than its share in global output. Total agricultural emissions are expected to rise by 4% over the coming decade, significantly less than in the past decade. Policy actions such as carbon pricing in Canada are expected to contribute to the slowdown. The total emissions per unit of output value is expected to decline

further. Additional emissions emanate mainly from crop production, increasing by 9.6% by 2033 compared to the 2021-23 base period, compared to 2% from livestock production. This year's *Outlook* features a scenario that simulates the impact of halving food losses along supply chains and food waste at the retail and consumer levels by 2030 (SDG 12.3). The scenario projects that total agricultural emissions in the region could be reduced by 3.5% relative to the baseline, while calorie intake improves. This implies that by 2030, agricultural GHG emissions could increase by only 0.2% from the average level in the 2021-23 base period.

2.6.3. Consumption

Changing consumer preferences to dictate demand prospects

The advanced economies of the United States and Canada boast mature, affluent consumer bases, with food expenditures accounting on average for a mere 6% of total household expenditure. This implies that the fluctuations in food prices, which includes a run to double digit food price inflation in 2022 and continued moderation in food prices over the *Outlook* period, have less influence on food demand patterns than in many other regions. With a comparatively smaller effect from economic considerations, medium term demand prospects will reflect substantial influence from the preferences of these consumers. Anticipated shifts in these preferences revolve largely around an increased emphasis on healthy dietary practices, a trend accentuated by the COVID-19 pandemic, and a growing consciousness of environmental sustainability, particularly among younger demographics. Such a transition is poised to impact not only the overall quantity of calories consumed but also its composition.

Total calories available for consumption, which includes substantial household waste, is the highest in the world. An expected decline of 62 kcal/person/day by 2033 will bring availability to 3 750 kcal/person/day. Correcting for current estimates of household waste would bring caloric intake down to 3 385 kcal/person/day, still 28% above the world average. This represents a substantial reduction from the 2021-23 base period when total calorie intake in North America was 27% more than the global average. The reduction in calorie intake is underpinned by the United States, as calorie availability in Canada is expected to increase. Nevertheless, total calorie availability in Canada will still be lower than in the United States by 2033. Considering the composition of diets, the heightened focus on health may induce a shift to include more fresh produce, with fruit and vegetable consumption per capita expected to rise by 15% and 4% respectively by 2033. Consumption of pulses, which are perceived as healthy alternatives, could expand by 28% but from a small base and by 2033, absolute levels will still only reach half of the global average. Conversely, reduced intake per capita is expected by 2033 for vegetable oil (-9.5%), sweeteners (-1.5%) and cereals (-1.1%). Despite the decline, vegetable oil and sweetener consumption per capita will continue to exceed global averages by 130% and 38% respectively.

Protein intake in North America is expected to rise by just 1.5%, or 1.9g/person/day by 2033, to reach 123g/person/day – still more than 40% above the global average. This is derived primarily from animal sources, as protein from plant-based sources remains fairly stable, with reduced cereal intake offsetting a 15% increase in protein from pulses. Meat consumption per capita is expected to remain fairly stable, rising by just 0.9% over the ten year period. Increased intake of poultry and pig meat products, combined with reductions in bovine and ovine meat consumption, results in a 1.5% increase in protein intake from meat products. An increase of 1.8% in protein derived from dairy products reflects increased consumption per capita on a dry matter basis with gains of 11% and 9% in cheese and butter consumption more than offsetting a decline in milk powder intake. Per capita consumption of fish products is also expected to rise, to reach 10 kg per capita by 2033, a gain of just 3.5% compared to 2021-23.

The intensity of livestock production systems in the regions means that feed use is already high. The region is responsible for 15% of global feed use and calories dedicated to animal feed already exceed those consumed as food (Figure 2.23). With poultry and pork production accounting for 85% of the growth in meat production, feed use is also set to rise further and by 2033 could be 7% more than in the base period. Maize and protein meal already represent the primary feed ingredients and their share in total ration composition is set to rise further since 85% of additional feed use will comprise these two commodities. By 2033, the share of maize in total feed use is expected to reach 53%, with a further 17% attributed to protein meal.

North America's industrial use of agricultural products is high in the global context with the United States being the biggest producer of biofuel globally, accounting for 38% of global output. Biofuel production is also an important market for feed grains, accounting for more calories than food in the base period (Figure 2.23). Biofuel use in the United States is governed by the Renewable Fuel Standard. Presently, ethanol derived from maize feedstocks accounts for 82% of total biofuel used in the region but growth of 16% over the coming decade is mainly driven by biodiesel, reflecting increased renewable fuel targets and biomass-based diesel tax credits. Along with the continuous drive to improve sustainability, the recent energy crisis and subsequent imposition of the Inflation Reduction Act provided additional impetus to growth in biofuel use. However, ethanol markets are constrained by limitations in infrastructure and technology that limit large scale expansion in E15 blending and results in most gasoline still being blended at E10 levels. Apart from its own use, the United States also exports significant quantities of ethanol to Canada where clean fuel regulations and carbon pricing policies are expected to drive substantial growth in biofuel use, primarily driven by higher blend rates.

2.6.4. Trade

Trade surplus to diminish

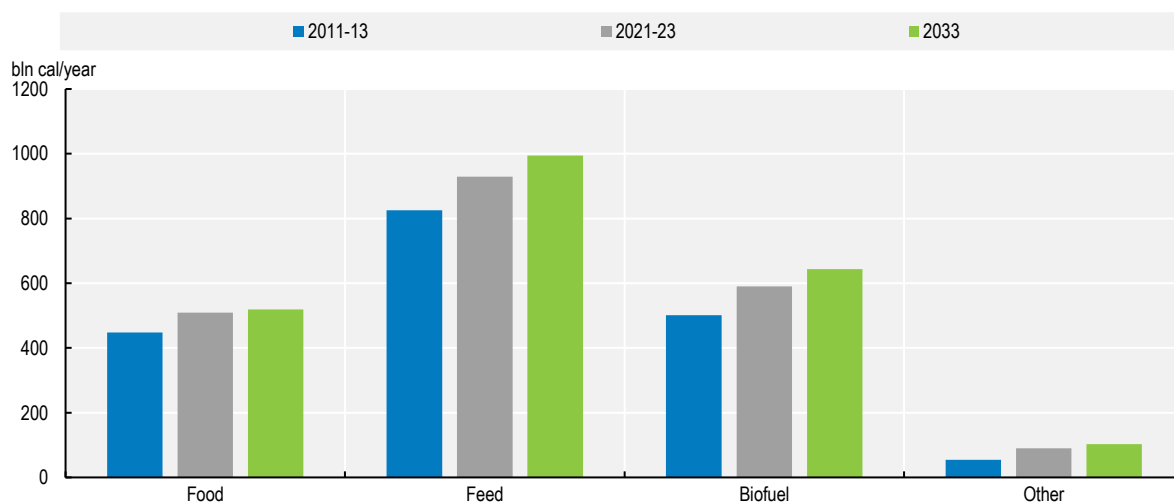
Over the past decade, North America's trade surplus in major agricultural and food commodities has halved and by 2033 is expected to diminish to almost zero. This transition emanates from growth of 19% in the value of imports compared to just 13% growth in the value of exports by 2033 relative to the 2021-23 base period. It is most pronounced in the United States where the magnitude of import expansion, at 22% over the next ten years, is more than double that of exports, which only rise by 10%. In Canada, the converse is true: the expansion in exports, at 20% by 2033 relative to the base period, is more than double that of imports which expand by 9%. However, the relative magnitudes of the two countries' trade means that the regional trend mirrors that of the United States.

Amongst the factors contributing to the marked deceleration in export growth from the United States, is the slowdown in global demand, particularly in China. Historically, China was the biggest export destination for the United States but in 2023, was overtaken by Canada with Mexico in third position. Such trends reflect the influence of the the United States-Mexico-Canada (USMCA) Agreement. With increased competition from Latin America and Chinese import demand projected to slow markedly due to a combination of weaker economic growth and a declining population, expansion of trade to Canada and Mexico could present the biggest opportunity. This will also affect the export product mix as almost half of China's agricultural imports from the United States are soybeans whereas Canada and Mexico's import mix is more diverse. Consequently, soybean exports are expected to decline by 4% over the next ten years and by 2033 soybean's share in total agricultural exports from the United States could decline.

While North America's share in global soybean exports is set to decline from 34% in the base period to 31% by 2033, its prominence in global trade is set to rise for several other products, such as wheat, maize, protein meal, pork, milk powder and ethanol. In the case of cereals such as wheat and maize, this partly reflects the impacts of Russia's war against Ukraine which reduced exports from the Black Sea region but the United States' ability to ramp up exports has been a key factor contributing to moderating prices. This increasing prominence also implies that import demand for its products, particularly from North Africa and the Near East, may come under pressure in the short term due to conflict in the Red Sea which is causing delays in shipping times and subsequent increases in shipping rates. The extent of this impact will be highly dependent on how long the disruptions persist but following the COVID-19 pandemic, large-scale shipping cost increases resulting from container shortages reduced trade volumes across the world, including from North America. The impact of conflict in the Red Sea and Black Sea is compounded by the reduced volumes through the Panama Canal as a result of ongoing drought. Persistence of such delays have the potential to increase shipping times and subsequently also rates on routes from the United States East coast to Asia. Through the first quarter of 2024, rail freight rates in the United States also increased with greater volumes when diversion of Asian traffic through the Suez Canal was no longer a viable strategy to mitigate delays in the Panama Canal.

Despite its trade surplus and prolific role in global exports, the North American region is also a significant and growing importer of several products. These include fresh produce, fish and vegetable oil, where imports are expected to rise by 27%, 9% and 11% respectively. While meat import volumes are expected to decline on the back of reduced consumption, they remain significant and by 2033, the North American region will still account for 15% of global bovine meat imports. Its share of global fish imports is expected to rise to 16%.

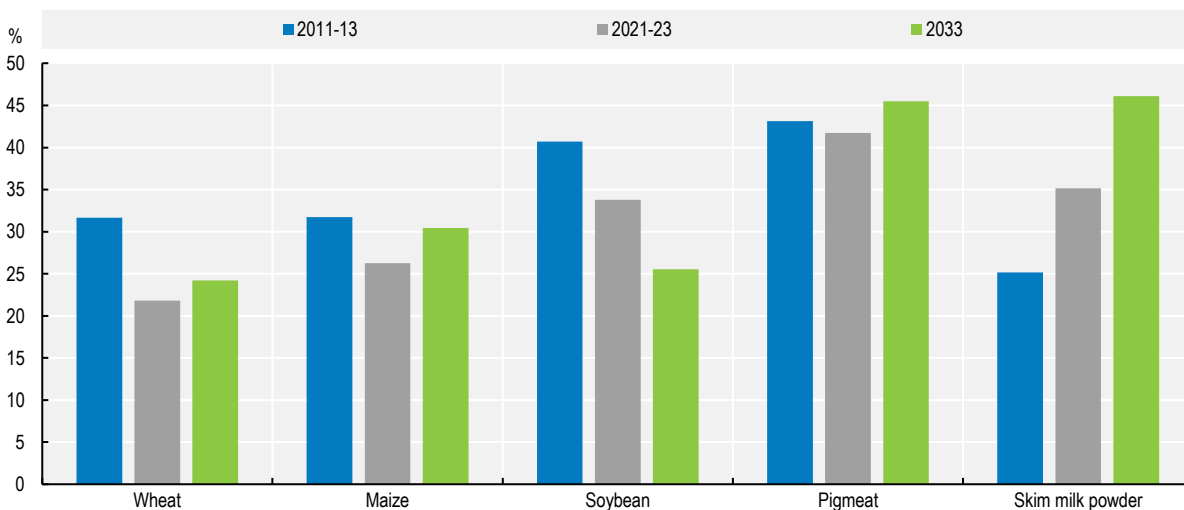
Figure 2.23. Calories used in food, feed and other use in North America



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.

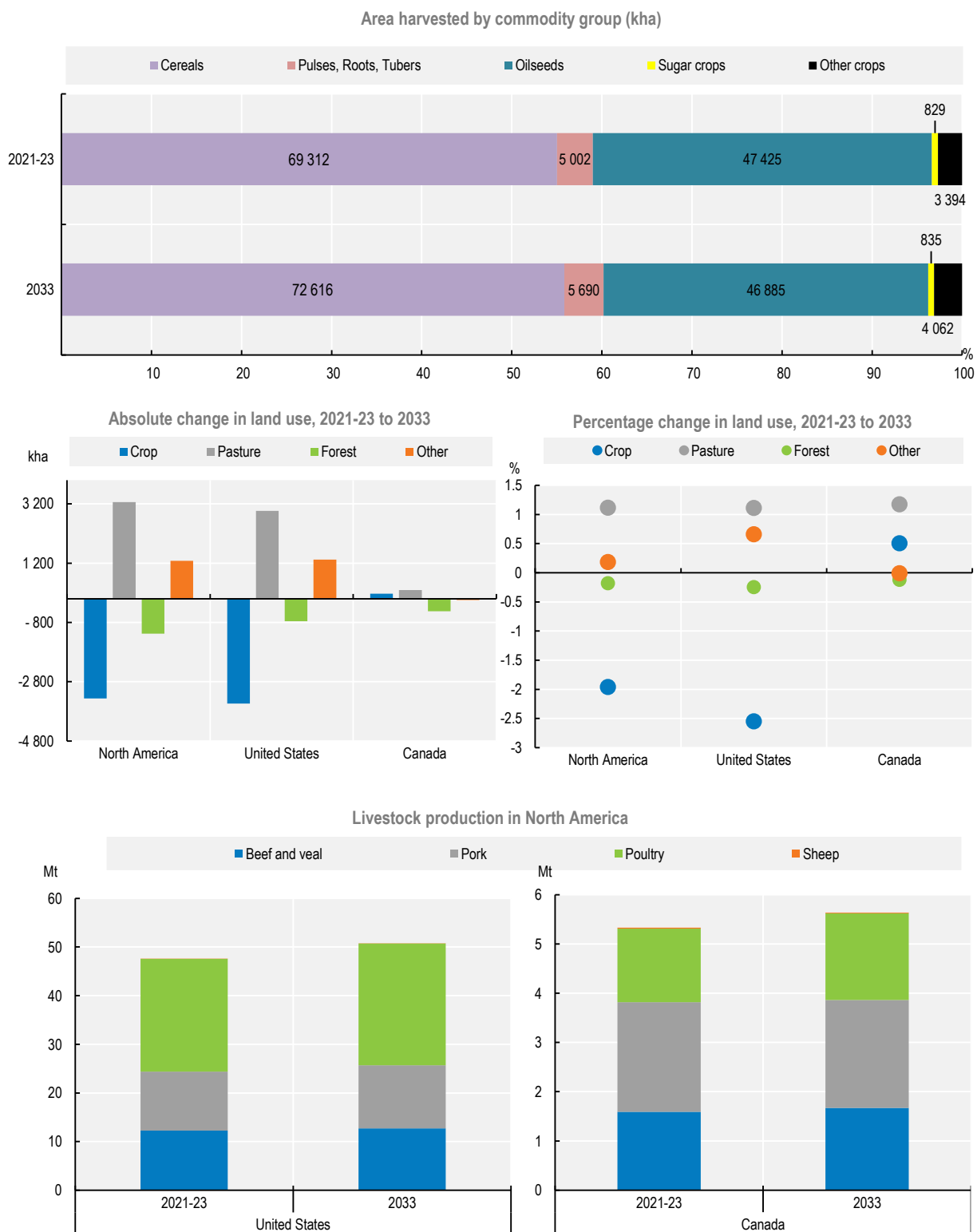
Source: FAO (2024). FAOSTAT Food Balances Database, <http://www.fao.org/faostat/en/#data/FBS>; OECD/FAO (2024) "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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



Source: OECD/FAO (2024), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

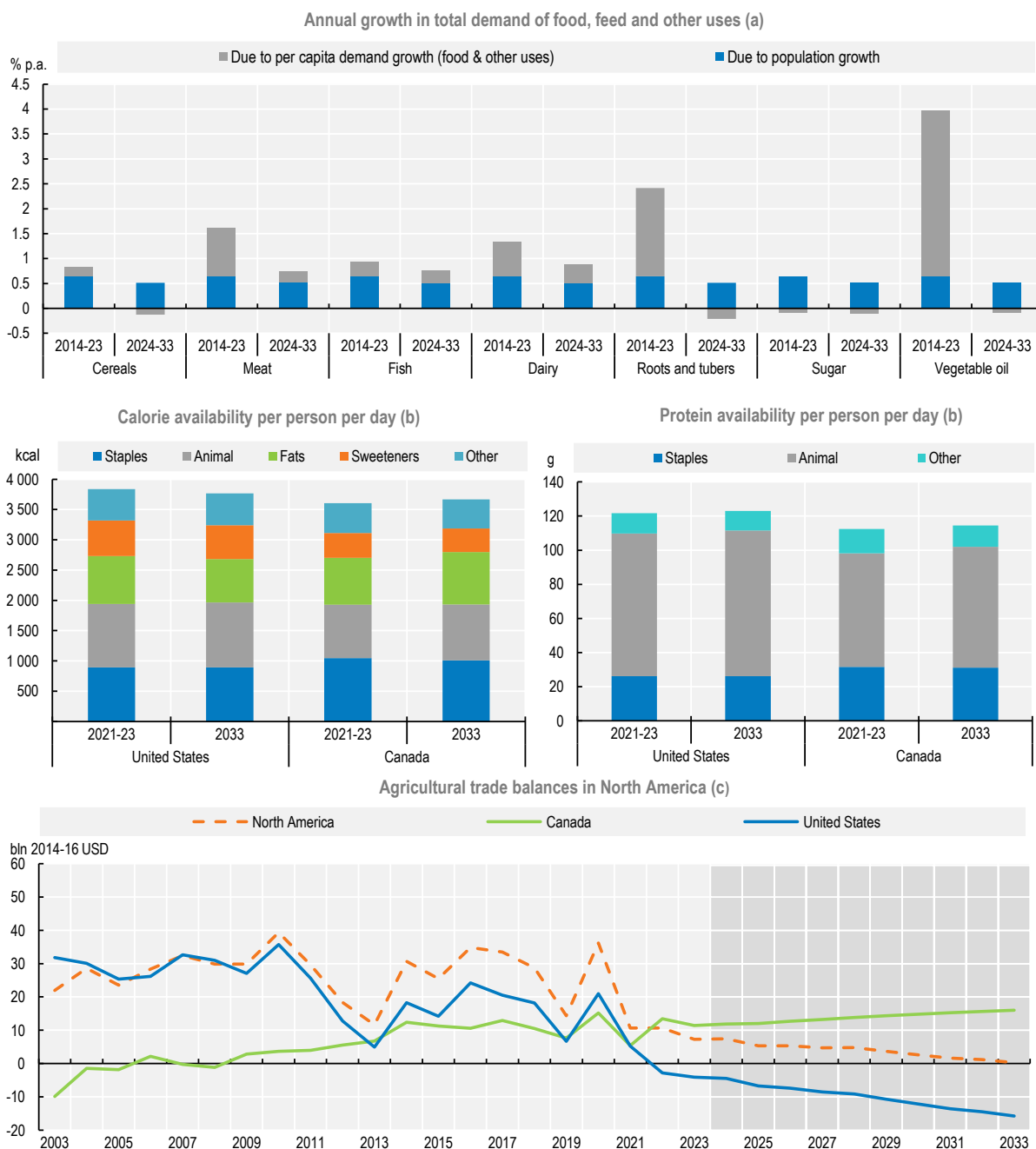
Figure 2.25. Land use change and livestock production in North America



Source: OECD/FAO (2024), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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Figure 2.26. 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 and tubers. c) Include processed products, fisheries (not covered in the FAOSTAT trade index) based on outlook data. Source: FAO (2024). FAOSTAT Value of Agricultural Production Database, <http://www.fao.org/faostat/en/#data/QV>; OECD/FAO (2024) "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.


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Table 2.6. Regional indicators: North America

	Average			%	Growth ²	
	2011-13	2021-23 (base)	2033		Base to 2033	2014-23
Macro assumptions						
Population ('000)	351 327	376 892	398 917	5.84	0.65	0.51
Per capita GDP ¹ (kUSD)	49.32	57.30	65.73	14.72	1.44	1.26
Production (USD bln 2014-16)						
Net value of agricultural and fisheries ³	252.0	289.7	323.1	11.54	0.85	0.98
Net value of crop production ³	121.0	140.8	162.2	15.20	-0.01	0.80
Net value of livestock production ³	112.6	132.9	143.8	8.23	2.22	1.27
Net value of fish production ³	18.4	16.0	17.1	6.89	-1.71	0.24
Quantity produced (kt)						
Cereals	444 544	496 382	559 410	12.70	0.01	0.62
Pulses	7 790	7 311	10 247	40.17	-2.63	2.99
Roots and tubers	5 272	6 051	6 308	4.25	1.44	0.27
Oilseeds ⁴	110 446	144 850	153 361	5.88	0.40	0.70
Meat	45 812	52 949	56 424	6.56	1.80	0.82
Dairy ⁵	12 350	14 547	16 405	12.77	1.59	1.16
Fish	6 543	5 650	5 955	5.39	-1.82	0.24
Sugar	7 202	7 871	8 595	9.21	0.65	0.70
Vegetable oil	14 257	18 754	21 097	12.49	2.22	0.84
Biofuel production (mln L)						
Biodiesel	4 615	11 947	20 846	74.49	10.21	2.38
Ethanol	54 476	61 636	64 941	5.36	0.35	0.33
Land use (kha)						
Total agricultural land use	461 686	463 475	463 370	-0.02	0.02	0.00
Total land use for crop production ⁶	170 827	171 800	168 435	-1.96	-0.04	-0.18
Total pasture land use ⁷	290 859	291 676	294 935	1.12	0.06	0.10
GHG emissions (Mt CO₂-eq)						
Total	427	431	449	4.33	0.14	0.43
Crop	127	124	136	9.63	-0.21	0.33
Animal	285	289	294	1.98	0.25	0.48
Demand and food security						
Daily per capita caloric food consumption ⁸ (kcal)	3 698	3 815	3 753	-1.63	0.60	-0.18
Daily per capita protein food consumption ⁸ (g)	114.8	120.7	122.6	1.5	0.8	0.2
Per capita food consumption (kg/year)						
Staples ⁹	125.5	124.8	124.8	0.01	0.19	-0.02
Meat	72.3	78.6	79.2	0.76	0.57	0.22
Dairy ⁵	31.2	33.7	34.9	3.52	0.68	0.39
Fish	21.4	22.8	23.9	4.93	0.60	0.15
Sugar	30.3	30.2	29.7	-1.52	-0.11	-0.10
Vegetable oil	33.9	40.2	36.4	-9.49	0.72	-0.72
Trade (bln USD 2014-16)						
Net trade ³	20	10	0	-97.39	..	..
Value of exports ³	144	172	194	12.60	0.19	1.12
Value of imports ³	124	163	194	19.05	2.21	1.51
Self-sufficiency ratio (calorie basis) ¹⁰	128.6	127.6	130.1	1.99	-0.59	0.26

Notes: 1 Constant 2010 USD. 2. Least square growth rates (see glossary). 3. Follows FAOSTAT methodology, based on commodities in the Aglink-Cosimo model.

4. Oilseeds represent soybeans and other oilseeds. 5. Milk solid equivalent units. 6. Area accounts for multiple harvests of arable crops. 7. Land for grazing.

8. Food availability, not intake. 9. Cereals, oilseeds, pulses, roots and tubers. 10. Production / (Production + Imports - Exports)*100.

Sources: FAO (2024). FAOSTAT Food Balance Sheets and trade indices databases, <http://www.fao.org/faostat/en/#data>; OECD/FAO (2024), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

2.7. Regional outlook: Latin America and the Caribbean

2.7.1. Background

Export led growth facing an increasingly fragmented global environment

The Latin America and Caribbean region encompass some 2 billion hectares and is endowed with an abundance of agricultural resources. It houses more than 660 million people, almost 8.5% of the global population. While average population density is low, it is the most urbanised of the developing regions. By 2033, its population is expected to approach 710 million of which 84% could reside in urban settings. This implies that most of the region's poor will live in urban areas but almost 120 million people will remain in rural settings, where obstinately high incidence of poverty presents significant challenges.

Despite its vast resources, which are not equal across the region, food security is a perpetual challenge. Progress since the early 2000's already began to reverse from 2014 when historic progress in poverty reduction stalled amid a multitude of macro-economic challenges. The prevalence of moderate and severe food insecurity has been rising since 2014, but the combination of global disruptions of the recent past accelerated the decline substantially. These include the COVID-19 pandemic, the economic challenges that it induced and some of which still linger, Russia's war against Ukraine, the energy and cost of living crises, ongoing conflict in the Near East and food price inflation that averaged almost 15% over the past three years. The Economic Commission for Latin America and the Caribbean suggests that the COVID-19 pandemic pushed the extreme poverty rate in the region to 13.8% by 2021 but this recovered to 11.2% by 2022, similar to pre-pandemic levels. The incidence of moderate or severe food insecurity also peaked in 2021 before declining slightly in 2022 but it remains well above pre-pandemic levels and continues to affect women and rural residents most severely. The gender gap narrowed in 2021 and 2022 but remains at 9.1 percentage points (FAO, IFAD, PAHO, UNICEF and WFP, 2023^[12]). Improved food security, despite high food inflation, is testament to the recovery in income and the success of social protection schemes implemented to mitigate the crisis. With food price inflation expected to continue moderating, affordability should improve, accelerating progress in improving food security.

Economic prospects across much of the region have been challenging for some time and income levels per capita contracted by an annual average of 0.9% over the past decade. Pre-existing structural challenges such as high inequality and poverty incidence accentuated the effect of the COVID-19 pandemic but the rebound from the resultant recession was swift. Propelled by high commodity prices and the substantial role of trade in the region, real GDP per capita in 2022 exceeded 2019 levels. Momentum stalled by 2023 amid rising interest rates, weaker commodity prices, slower growth in trading partners and a generally less accommodating global environment. With inflation converging slowly to central bank targets, growth is expected to bottom out in 2024 and in the medium term, could average 1.6% p.a. As in most of the world, the balance of risks, particularly in the short term, are on the downside, but high trade dependence makes the region particularly vulnerable to possible escalation of geopolitical fragmentation. Given the diversity of the countries in the region in terms of economic composition of their economic activity and the extent of domestic risks that amplify global impacts, the magnitude of the rebound and subsequent slowdown differs.

Per capita GDP in the region is expected to approach USD 10 900 per capita by 2033. While representing a 19% gain relative to the 2021-23 base period, it is still only 9% higher than in 2014 and almost 20% below the global average. On average across the region, households spend around 16% of their total expenditure on food but this varies significantly within the region, influenced by income levels and inequality. In countries that allocate a higher share of total expenditure to food, the benefit of moderating food price inflation is substantial. In countries with heightened macroeconomic instability, this impact may be smaller as exchange rate depreciation, which has been a core factor fuelling food price inflation, could offset some of the decline in dollar-based world prices.

Agriculture in the region is highly diverse. Farm structures range from large commercial units, often oriented to exports, to medium and large-scale family-run operations and some 15 million smallholders that are responsible for much of the region's food production (OECD/FAO, 2019_[13]). Smaller operations are often resource constrained compared to large, export orientated entities, entrenching the duality that exists in the sector. Agriculture and fish production accounts for just over 6.4% of total GDP and this share has increased through the various disruptions that plagued global economies over the past four years. This reflects the resilience of the region's agrifood system, robust performance in 2020 when it was exempt from lockdown restrictions, and the sustained period of high prices. As agricultural commodity prices continue to normalise over the *Outlook*, the share of agriculture in total GDP is foreseen to decline to 5.7% by 2033.

Given its favourable resource endowment, the Latin America and Caribbean region is a major contributor to global agriculture. Between 2021 and 2023, it accounted for 13% of the net value of agriculture and fish production globally and its share in total exports was even higher at 18%. This stems primarily from South America, with the Caribbean being a net importer. The importance of agricultural exports in the region is further underscored by its growing share in total production value, which has risen to almost 70%. Historic export growth has been aided by greater competitiveness, with total factor productivity increasing by 40% from 2000 to 2019.⁹ Growth has been underpinned by greater input use, notably fertiliser which rose by 27% in the past decade alone. The sharp increase in fertiliser costs in 2022, combined with supply chain challenges arising from Russia's war against Ukraine induced a significant contraction in fertiliser application per hectare and heightened focus on efficient use. The benefits of investment in increased efficiency are reflected in a deceleration of growth in fertiliser application per hectare to 8% over the coming decade. With expected growth in the coming decade predominantly export-led, openness to trade, input use efficiency, successful climate change mitigation and adaptation strategies and an increased focus on environmental sustainability will be critical to maintain and grow competitiveness.

As the biggest net exporter amongst all the regions in the *Outlook*, it is paradoxical that some of the major challenges facing the Latin America and Caribbean region relate to food security. These stem from affordability rather than availability constraints reflecting a combination of income distributional issues and high food price inflation in the recent past, and exacerbated by widespread rural poverty and macroeconomic instability in many countries. The region's robust export orientation shielded agricultural growth from the macroeconomic challenges but also made it vulnerable to increasing volatility, tighter financial conditions and weaker import demand globally. Post pandemic, increased focus on development of domestic supply chains and the heightened awareness of environmental sustainability among some importers may influence trade policy and subsequent export prospects. Other trade-related issues arise from increased concentration of exports by destination which exposes export demand to higher market risks, the re-emergence of shipping disruptions amid ongoing conflict in the Black Sea and the Red Sea, as well as drought related limitations to passage through the Panama Canal. Persistence of such disruptions could drive up shipping rates, again influencing competitiveness. Further to trade-related risks, the sector's adaptation strategies and resilience to climate change impacts will be critical to sustained growth.

2.7.2. Production

Growth reflects a combination of expansion and productivity gains

Agricultural and fish production in the region is projected to expand by almost 15% by 2033. Almost half of this growth is expected to come from crop production, which expands by 14%, compared to a more muted expansion of 12% in the livestock sector. The net value of fish production is expected to rise by 23%, but from a much smaller base and by 2033, will still account for only 14% of agriculture and fish output value compared to 48% from crops and 39% from livestock.

The region's land abundance contributes to strong crop production growth which is derived from a combination of expansion and intensification. Total land used for agriculture is expected to rise by almost 7 Mha, the most of any region covered in this chapter. This is exclusive to the crop sector, and almost 60% of the projected expansion is in Brazil. The gain in area harvested is almost double that of land use, pointing to rising prevalence of double cropping. The comparative advantage of Brazil and Argentina in soybean production is reflected in their combined share of almost 50% of global output. Consequently, soybeans will also account for 31% of the additional area with a further 25% allocated to maize. The 8% allocation of additional area to wheat contributes to filling potential supply gaps from the Black Sea region amid Russia's war against Ukraine.

The region's high share in soybean and maize output globally, at 53% and 18% respectively, is set to rise further over the *Outlook* period. By implication, supply fluctuations within the region can cause substantial world price volatility. This was evident from the sharp increase in soybean prices during the 2021 drought and, in the face of ongoing climate change, such events are expected to become more frequent. Many countries in the region are already challenged by prolonged drought conditions which reduce productive potential, as well as the increasing frequency of extreme heat and wildfires. Consequently, the region's ability to adapt to climate change and remain resilient in the face of increased weather disturbances will be critical not only to its own agricultural performance but also to the stability of global markets. The Climate Action Platform for Latin America and the Caribbean in 2022 suggested that most countries in the region possess the institutional framework and adaptation plans to navigate climate change but lack detailed monitoring and evaluation systems to track implementation, which can affect funding allocations.

Intensification and yield gains have been instrumental to the region's strong production growth. Growth in fertiliser application rates is expected to slow substantially over the *Outlook* but remain positive. Combined with technological innovation and practices that optimize efficiency, increased fertiliser use is set to support further yield improvements across most major crops. This includes a 11% gain in maize and wheat yields by 2033 relative to the 2021-23 base period, along with a 12% improvement in soybean yields. It also enables a further improvement of 10% in the net value of production per hectare of cropland as well as a 5% reduction in the fertiliser required per calorie produced.

The region contributes 15% of global livestock production and growth of 1.2% p.a. is sufficient to sustain this share by 2033. Owing to its surplus of feedgrains, intensive livestock production is highly competitive, but growth prospects remain sensitive to the risks posed by animal disease. Meat production accounts for a far bigger share than dairy in expected production growth. Amongst the various meat types, almost 60% of the additional production by 2033 is attributed to poultry. Poultry's short production cycle facilitates rapid advancements in genetics and feed conversion rates, thereby driving productivity enhancements, while the decline in feed prices relative to meat prices in the medium term will incentivise expansion. Bovine and pig meat are expected to grow by 0.9% p.a. and 1.3% p.a. respectively, accounting for 19% and 20% respectively of additional meat produced by 2033. Productivity gains remain instrumental to growth, as a 9% increase in beef production is achieved with only a 2% expansion in the beef herd by 2033.

Latin America and the Caribbean account for just under 10% of global fish production and projected growth of 0.6% p.a. is sufficient to sustain this share by 2033. Three-quarters of production is still derived from capture fisheries but the contribution of aquaculture is rising in several countries, resulting in growth of 1.2% p.a., compared to just 0.4% p.a. for capture fisheries. Capture fisheries are inherently volatile, owing to the intermittent but strong influence of *El Nino* conditions which increase sea surface temperatures, and reduce availability of fish used for the production of fishmeal and fish oil. *El Nino* effects also influence the availability of food supply for high value aquaculture production such as abalone. These effects could become more severe with climate change, influencing the consistency of supply and leading to price volatility.

GHG emissions from agriculture are expected to rise by 3% over the coming decade with a comparatively larger contribution from crops than livestock products. By 2033, the region is expected to account for 18%

of global emissions from agriculture, higher than its share in total output. Nevertheless, expressed relative to the net value of agricultural production, emissions per unit value of output are set to decline consistently over the next ten years. This year's *Outlook* features a scenario that simulates the impact of halving food losses along supply chains and food waste at the retail and consumer levels by 2030 (SDG 12.3). The scenario projects that total agricultural emissions in the region could be reduced by 4.6% relative to the baseline, while calorie intake improves. This implies that by 2030, agricultural GHG emissions could reduce by 2.6% from the average level in the 2021-23 base period.

2.7.3. Consumption

Dietary patterns are diverse but slowly evolving

Growth in total calorie availability in the region has largely stagnated since 2015. This mirrors movements in per capita income levels which declined because of macroeconomic instability. More recently, the COVID 19 pandemic-induced recession in 2020 and subsequent increase in food prices constrained affordability of nutritious food products but, while the incidence of food insecurity and undernourishment increased in 2020 and 2021, average calorie availability remained fairly stable. This suggests that average calorie availability masks significant differences across consumers in different countries and across different income levels. It is likely reflective of income inequality in the region and the disproportionate impact of the economic hardship induced by the COVID-19 pandemic and subsequent food price inflation on the poor and vulnerable, who spend a greater share of total budgets on food. By 2033, average calorie availability per capita is expected to exceed 3 100 kcal/person per year but growth remains slow at 0.3% p.a. on average over the ten-year period. This marks an increase of 122 kcal/person/day, due to gains in consumption of cereals, meat, dairy, vegetable oil and fresh produce along with reduced sugar consumption. Despite the decline of 1 kg per person per year by 2033, sugar consumption in the region remains high and 60% above the global average.

In a region challenged by the triple burden of malnutrition, with food insecurity and undernourishment amid rising incidence of overweight and obesity, the reduction in sugar intake reflects a growing awareness of the links between diet and health. This has been promoted by initiatives such as front of package labelling legislation and sugar-sweet beverage taxes. While efforts to induce healthy eating may have some effect, affordability remains a challenge with nutritious fresh foods comparatively expensive across large parts of the region. Affordability constraints among the lower echelons of the income distribution affects both the quality and quantity of food intake despite the positive impact of initiatives such as school feeding programs which are estimated to benefit up to 37% of the poorer members of the population. A reduction in food waste and losses also has the potential to improve availability and affordability. Estimates suggest that the greatest contributors to total calories lost and wasted in the region are cereals, oilseed products, fresh produce and sweeteners with more than half attributed to cereals (Figure 2.28). In the *Outlook* scenario where food waste and losses can be halved by 2030, as envisioned in SDG targets, calorie intake in the region could be increased by 5% relative to the baseline and the number of undernourished people in the region could decline by 22% while at the same time, reducing GHG emissions. This implies that by 2030, calorie intake could increase by 8.3% relative to the average level in the 2021-23 base period and the number of undernourished people would decline by 15.4 million.

By 2033, per capita protein consumption is projected to reach 94g/person/day, marking a rise of 4 g/person from current levels. This gain stems mainly from animal products, which contribute 70% of the growth in protein availability. Meat consumption is expected to rise by 3.3 kg per capita to reach almost 52 kg/person/year by 2033. This is 80% higher than the global average. Growth is derived from poultry and pig meat for which consumption is expected to rise by 0.8% p.a. and 0.7% p.a. respectively, compared to a modest decline in bovine meat consumption by 2033. Fish consumption in the region is still low, at 62% of the global average, but is set to expand by 0.3% p.a. to reach 3 kg/person/year by 2033.

The Latin America and Caribbean region accounts for 12% of animal feed use globally. Projected growth of 1.2% p.a. is similar to meat production and slightly faster than that dairy production. Coming despite expected genetic improvement that results in better feed conversion ratios, this points to further intensification in production systems which is essential to growth. Just over 50% of additional feed use is attributed to maize with a further 21% coming from protein meal. This implies growth of 1.4% p.a. and 1.1% p.a. respectively in maize and protein meal used as feed.

The region contributes substantially to global biofuel markets, and it currently produces 28% of global ethanol and 17% of global biodiesel. Brazil constitutes almost 90% of ethanol production and use in the region, as well as 71% and 79% respectively of biodiesel production and use. Sustained by its RenovaBio programme, designed to reduce emission intensity as part of its COP 21 commitments, and rising demand for transport fuel, ethanol use is expected to rise by 37% over the coming decade. Sugarcane is expected to remain the primary feedstock. The competitiveness of Brazil's sugarcane-based ethanol has also bolstered its share in global exports which is expected to be sustained at 24%, despite rapid growth in domestic consumption.

2.7.4. Trade

Exports are key to sustained agricultural growth, but risks are rising

Led by South America, Latin America and the Caribbean is the largest net exporter amongst all the regions included in this chapter. At the same time, several countries and subregions are net importers of agricultural products, including Panama, El Salvador, and most of the Caribbean. Despite these differences, intra-regional trade remains low.

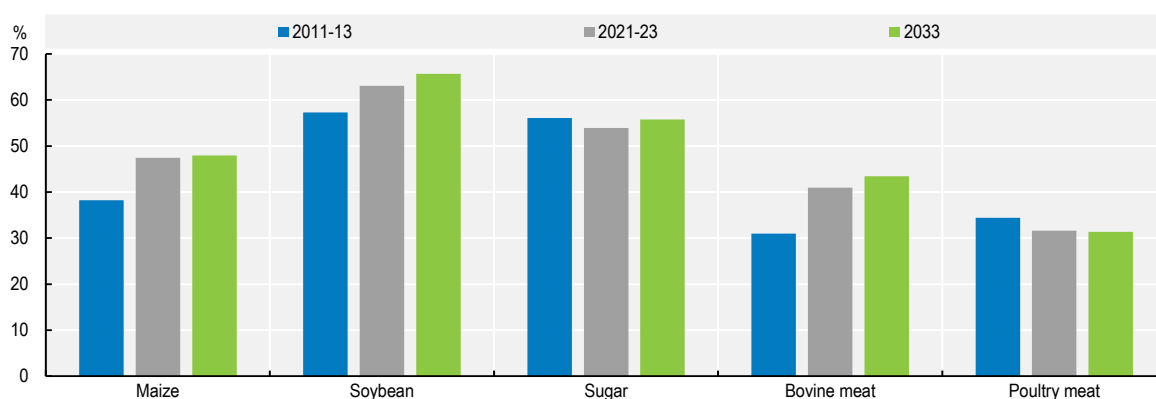
Exports have played a pivotal role in driving agricultural growth within the region, mitigating its vulnerability to inherent macroeconomic instability and enhancing its resilience to exogenous shocks. Its relative importance is underscored by consistent increases in the share of exports in total production value which could exceed 70% by 2033. This reflects a 26% expansion in its trade surplus for agricultural products – more than any other region covered in this chapter. Consequently, its share in global exports is set to rise to 19% by 2033. Brazil is the biggest exporter in the region and accounts for almost half of the growth, but its projected expansion of 1.8% p.a. is significantly slower than the 7.2% p.a. attained over the past decade. Other notable contributors to regional export growth include Mexico and Argentina while exports of fresh fruit from Peru are also expected to rise rapidly.

Amid robust production gains, the region has consolidated its share in global exports and by 2033 is expected to account for a major share of global exports for several commodities: 66% for soybeans, 56% for sugar, 54% for protein meal, 48% for maize, 43% for beef, 40% for fishmeal, 31% for poultry, 24% for fruit and 28% for cotton. In the case of soybeans, sugar and bovine meat, this represents a growing share. This striking dominance of export markets reinforces a global trend towards increased concentration in the export market.

The importance of exports to agriculture in the region is underscored not only by its central position in global trade but also the pivotal role of exports in driving production growth. Sustained growth will depend on continued orientation towards open trade in the global market. The disruptions of the past four years exposed vulnerabilities in the global trade system which resulted in logistical bottlenecks and rising costs. The latest of these is the disruption to flows through the Panama Canal due to drought, and through the Suez Canal due to conflict in the Red Sea. While exports to the European Union and the United States comprise less than 14% and 22% of total exports respectively, the impact may seem limited but it is substantial for countries on the Pacific Coast such as Chile, Peru, Ecuador and Colombia. Growing fresh produce exports from both Chile and Peru, with substantial volumes typically destined for the European Union, could be at risk. Persistence of these constraints also carries the risk of raising shipping costs and hence reducing competitiveness of exports from the region.

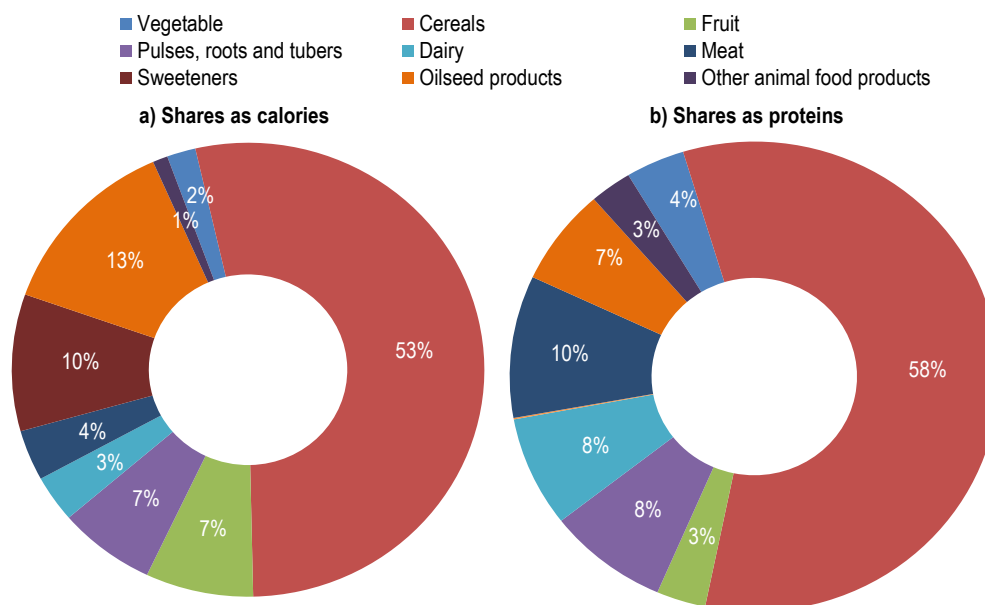
Amid the various crises, several exporting countries imposed trade policies that prioritise domestic supply. The absence of such constraints in Latin America and Caribbean provided opportunities to gain market share. However, the development of domestic supply chains has been prioritised in many parts of the world to mitigate risks of disruption. Over the coming decade, the evolution of trade relations in various parts of the world will have an influence on the region, creating both new opportunities and heightened risks. Despite the success of export-led growth in the past, global import demand is slowing and the market is increasingly volatile and fragmented, increasing the fragility of international trade. Improving internal market integration and functioning of small and medium enterprises, cooperatives and family farms could expand trade within the region, thus diversifying market opportunities and bolstering the sector's resilience.

Figure 2.27. Trends in export market shares of the Latin America and the Caribbean



Source: OECD/FAO (2024), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

Figure 2.28. Distribution of food waste and losses in Latin America and the Caribbean in terms of calories and proteins, 2021-2023

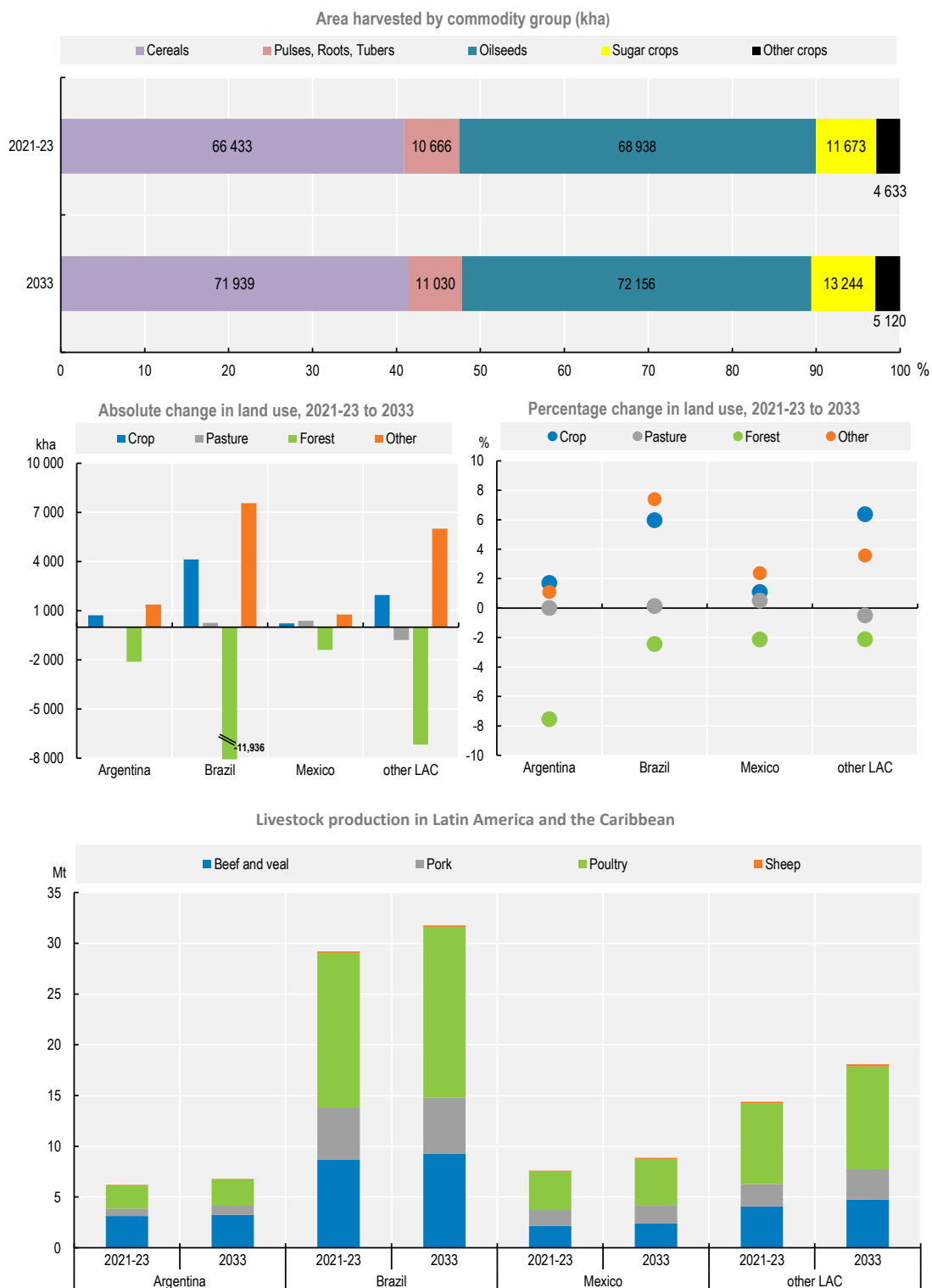


Note: Other animal food products include egg and fish.

Source: OECD/FAO (2024), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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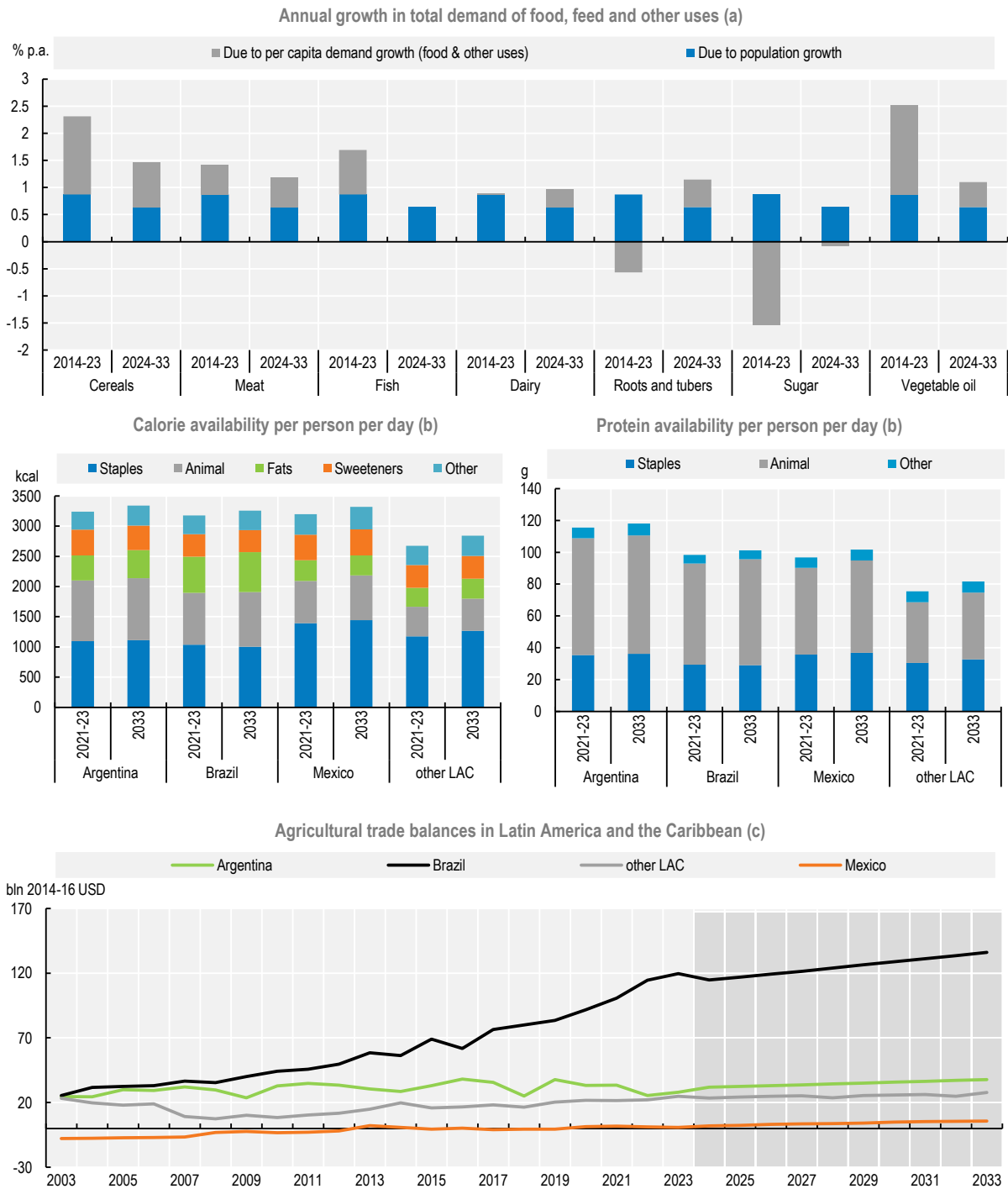
Figure 2.29. Change in area harvested and land use in Latin America and the Caribbean



Source: FAO (2024). FAOSTAT Value of Agricultural Production Database, <http://www.fao.org/faostat/en/#data/QV>; OECD/FAO (2024) "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

StatLink <https://stat.link/dm59is>

Figure 2.30. 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 and tubers. c) Include processed products, fisheries (not covered in the FAOSTAT trade index) based on outlook data. Source: FAO (2024). FAOSTAT Value of Agricultural Production Database, <http://www.fao.org/faostat/en/#data/QV>; OECD/FAO (2024) "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

Table 2.7. Regional Indicators: Latin America and the Caribbean Region

	Average			%	Growth ²	
	2011-13	2021-23 (base)	2033		Base to 2033	2014-23	2024-33
Macro assumptions						
Population ('000)	602 008	659 589	709 221	7.52	0.87	0.64
Per capita GDP ¹ (kUSD)	9.85	9.12	10.89	19.41	-0.88	1.63
Production (USD bln 2014-16)						
Net value of agricultural and fisheries ³	321.7	385.7	442.2	14.65	2.02	1.06
Net value of crop production ³	139.1	183.8	210.3	14.42	2.53	1.10
Net value of livestock production ³	137.4	152.9	171.4	12.13	1.06	1.18
Net value of fish production ³	45.2	49.0	60.4	23.42	3.33	0.56
Quantity produced (kt)						
Cereals	210 669	297 982	360 204	20.88	3.51	1.76
Pulses	7 485	7 766	9 024	16.20	0.37	1.34
Roots and tubers	14 545	14 577	16 406	12.54	0.53	1.07
Oilseeds ⁴	145 187	208 926	243 967	16.77	2.27	0.81
Meat	48 132	57 394	65 501	14.12	1.81	1.25
Dairy ⁵	9 630	10 940	12 043	10.08	0.87	0.98
Fish	16 032	16 993	18 687	9.97	2.91	0.61
Sugar	57 692	58 635	66 688	13.73	0.69	0.98
Vegetable oil	21 163	28 895	33 157	14.75	1.64	1.00
Biofuel production (mln L)						
Biodiesel	5 976	9 916	12 505	26.11	4.72	2.04
Ethanol	26 739	35 374	47 811	35.16	1.89	2.21
Land use (kha)						
Total agricultural land use	657 465	651 601	658 517	1.06	-0.01	0.08
Total land use for crop production ⁶	149 222	163 214	170 263	4.32	0.85	0.31
Total pasture land use ⁷	508 243	488 387	488 254	-0.03	-0.28	0.00
GHG emissions (Mt CO₂-eq)						
Total	1 019	1 108	1 142	3.12	0.99	0.33
Crop	98	114	123	8.13	2.11	0.79
Animal	905	969	993	2.45	0.80	0.28
Demand and food security						
Daily per capita caloric food consumption ⁸ (kcal)	2 909	2 979	3 101	4.09	0.35	0.29
Daily per capita protein food consumption ⁸ (g)	86.5	89.8	94.2	4.9	0.4	0.4
Per capita food consumption (kg/year)						
Staples ⁹	149.1	146.8	151.8	3.41	-0.05	0.31
Meat	46.0	49.0	51.8	5.65	0.79	0.56
Dairy ⁵	15.9	16.2	16.6	2.38	-0.03	0.34
Fish	10	11	11	5.47	-0.03	0.41
Sugar	41	35	34	-1.83	-1.40	-0.11
Vegetable oil	18	20	20	0.85	1.72	0.08
Trade (bln USD 2014-16)						
Net trade ³	96	165	207	26.00	..	..
Value of exports ³	171	263	320	21.73	4.47	1.75
Value of imports ³	75	98	112	14.54	2.93	1.27
Self-sufficiency ratio (calorie basis) ¹⁰	130.9	137.6	138.0	0.32	0.43	0.03

Notes: 1 Constant 2010 USD. 2. Least square growth rates (see glossary). 3. Follows FAOSTAT methodology, based on commodities in the Aglink-Cosimo model. 4. Oilseeds represent soybeans and other oilseeds. 5. Milk solid equivalent units. 6. Area accounts for multiple harvests of arable crops. 7. Land for grazing. 8. Food availability, not intake. 9. Cereals, oilseeds, pulses, roots and tubers. 10. Production / (Production + Imports - Exports)*100.

Sources: FAO (2024). FAOSTAT Food Balance Sheets and trade indices databases, <http://www.fao.org/faostat/en/#data>; OECD/FAO (2024), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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Notes

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

² Source OECD-FAO interpolated for 2017-19 from the database of the Global Trade Analysis Project (GTAP) 2011, using food expenditure and GDP data used in this *Outlook*.

³ See “Southeast Asia, Prospects and Challenges” in the OECD-FAO Agricultural *Outlook* 2017-2026.

⁴ Source OECD-FAO interpolated for 2018-20 from the database of the Global Trade Analysis Project (GTAP) 2011, using food expenditure and GDP data used in this *Outlook*.

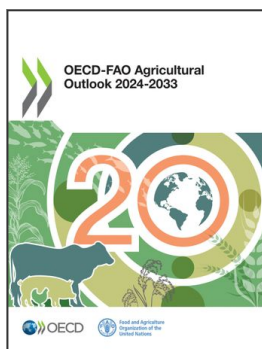
⁵ Middle East: Saudi Arabia and Other Western Asia. Least Developed: North Africa Least Developed. North Africa: Other North Africa. For mentioned regions, see summary table for regional grouping of countries.

⁶ Source: FAO (2023) Food Policy Monitoring in the Near East and North Africa Region. 2nd Quarter 2023, Bulletin. Cairo. (<https://www.fao.org/3/cc9189en/cc9189en.pdf>)

⁷ For mentioned regions, see summary table for regional grouping of countries.

⁸ Source: OECD-FAO interpolated for 2018-20 from the database of the Global Trade Analysis Project (GTAP) 2011, using food expenditure and GDP data used in this *Outlook*.

⁹ Fuglie, Keith (2015), “Accounting for growth in global agriculture,” *Bio-based and Applied Economics* 4 (3): 221-254 (updated to 2019, USDA).



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