

2 Regional briefs

This chapter describes key trends and emerging issues facing the agricultural sector in the six FAO regions, i.e. Asia and Pacific, 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 2021-30 and provides background information on key regional issues.

2.1. Introduction

The *Outlook's* regional briefs highlight broad trends for the regions defined by the FAO in the implementation of its global workplan. Recognising the diversity across the regions, the intention is not to compare results across regions. Instead, these briefs illustrate some of the latest regional developments, highlighting responses to global challenges and emerging trends within them and relating these to the main messages of the *Outlook* publication. The assessments generally compare the end point of the *Outlook's* projection (2030) to the base period of 2018-20. These briefs acknowledge that the impact of the COVID-19 pandemic, which is still playing out globally, and the response to it differs across the regions. The briefs do not contain a specific quantitative assessment of the pandemic's impact, but they reflect the latest available macro-economic projections and the extent to which the actions imposed to curb the spread of COVID-19 influenced this environment. Consequently, the trends and issues presented in this chapter are those which are expected to underpin the *Outlook* as economies re-emerge from the unexpected shock of the novel corona virus, assuming that its effects on food production, consumption and trade will gradually moderate.

This chapter proceeds in six 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 to provide common charts and tables outlining the key aspects of the projection for the region.

2.2. Regional outlook: Asia and Pacific

2.2.1. Background

The Asia and Pacific region¹ is by far the largest of all regions covered in this chapter and is exceptionally diverse in terms of economic structure, phase of development, income levels and trade dependence for food products. For instance, on a per capita basis, income levels range from USD 1 157 in the least developed countries of Asia, to USD 61 375 in Australia. At 4.3 billion people, the Asia Pacific region comprises more than half of the world's population, yet constitutes only around 30% of agricultural land globally. Its considerable natural resource base is therefore increasingly strained. Over the coming decade, this will likely intensify, as the population expands at a rate of 0.6% p.a., adding 322 million people by 2030. Urbanisation has advanced rapidly across the region, to the extent that 50% of the population resided in urban settings in 2020. This is expected to rise to 55% by 2030. In the People's Republic of China (hereafter "China"), which represents the largest share of the region's population, the share of the population residing in urban settings is set to reach 70% by 2030. Such urbanisation contributes to dietary change, underpinning rising consumption of higher value, as well as more processed and conveniently packaged food.

At regional level, per capita GDP declined by 3.2% in 2020, but this impact differs greatly within the region. Australia and Japan reflected declines of 5%, but China still realised growth of 1.4%. The recovery from the recession induced by the COVID-19 pandemic is the strongest in Asia and Pacific amongst the various regions, with average per capita incomes anticipated to grow at almost 4% p.a. over the next decade. China is projected to grow at 5% p.a., India and Viet Nam at 5-6% p.a., and Thailand and Indonesia at around 3-4% p.a. The share of primary agriculture and fish value added in the economy has declined to about 7.5% and is expected to reach 6% by 2030. Rapid economic growth has reduced the share of food in household expenditures to around 15%, which is still large enough for changes in incomes or prices to have a notable impact on consumers.² Within the least developed countries in the region, this share is considerably higher, which makes the food security of many consumers in these countries highly vulnerable to prices spikes and income shocks induced by the COVID-19 pandemic.

The region encompasses a range of important exporters and importers of various agricultural and food products, many of which face major uncertainties in the *Outlook*. Ongoing trade disputes are not fully resolved and weather conditions remain volatile, with Australia in particular facing a prolonged period of drought. The COVID-19 pandemic exposed vulnerabilities in global trade logistics and animal disease remains a risk. African Swine Fever (ASF) in China and parts of Southeast Asia critically impacted pig-meat production in recent years and while herd rebuilding has advanced rapidly, new cases are still being recorded, implying ever present risks to future production prospects.

2.2.2. Production

As the largest producer of agricultural and fish commodities, the region is anticipated to account for 53% of global agriculture and fish output by 2030. The total value of production expands 20% by 2030 relative to the 2018-20 base level. This rate exceeds that of population growth, implying that the value of agricultural production per capita is set to rise over the coming decade, driven by productivity gains, as total agricultural land use declines over the same period.

Crop production, which represents roughly 60% of total agricultural production value, is projected to grow by 22%, while that for livestock will increase by 19% over the ten-year period. In the pork sector, this recovery is from a small base due to the impact of ASF, which reduced regional production by 18% in 2019 and a further 4% in 2020. In China and Viet Nam, the ASF outbreak was so severe that it wiped out about 23% and 13% respectively of pig inventories in these countries. Both countries have made significant progress in rebuilding herds, with Viet Nam reflecting an increase of 12% in inventory in 2020 and China expecting a 10% increase in inventory in 2021. The shortages of pork resulted in higher livestock product prices in the region, inducing investments to expand production in other meat types that will support further growth over the next ten years. Poultry meat production, with its shorter production cycle, grew by 8% in 2019. Together with growth in bovine meat, sheep meat and milk production, this resulted in only a modest contraction in total livestock production, despite the sharp decline in pork output. The value of fish production is projected to increase by 15% over the projection period, due to the continued expansion in aquaculture. These rates of growth are considerably less than a decade ago when regional agricultural and fish output growth often averaged 3-4% p.a. (Figure 2.1). Growth has slowed as domestic markets have matured, policies have changed, markets have opened, and trade competition has strengthened.

The region is a major contributor to global grain output, notably in rice with a 90% production share. Its contribution to global output of wheat and maize is less, at 40% and 30% respectively, but still significant. The region's share in global maize production is expected to grow marginally over the outlook, while its role in other cereals remains similar to the base period. Almost 60% of the region's rice production occurs in China and India. While China's rice production is expected to increase by only 4% by 2030, India is expected to add 17% to its current production volumes, growing its share in regional production to 27%. Similarly, the same two countries account for more than 75% of the region's wheat production. Growth will however be driven by India and Australia, who account for 58% and 19% of additional wheat production in the Asia Pacific region by 2030 relative to the base period. In the case of Australia, this reflects an assumed recovery in yields following multiple years of drought impact which resulted in below average production levels.

The Asia Pacific region accounts for 58% of global vegetable oil production, much of which is obtained from palm oil output in Malaysia and Indonesia. The spread of COVID-19 and the associated restrictions on movement of people brought challenges to this sector, which relies strongly on foreign labour, exacerbating structural constraints that already reduced supply in 2019. The slowdown in the expansion of mature oil palm area implies that production growth in both Indonesia and Malaysia will remain slower in the coming decade.

Due to land scarcity within countries across the region, crop production growth will result from productivity enhancements and intensification. Irrigation expansion and improved seed varieties account for much of

production gains, but there are mounting environmental and food safety concerns, associated with water scarcity and the heavy use of chemical inputs. Multiple harvests and double cropping will contain expansion in crop land use to an additional 1 Mha, compared to 15 Mha increase in area harvested, which will be allocated mostly to maize, wheat, oilseeds and pulses.

Livestock production over the outlook period will also come largely from productivity gains associated with increased feed intensity and breeding improvements. Animal numbers will grow at a slower rate than total meat production, despite the initial recovery in pig inventory following the ASF induced herd reductions in the base period. Feed use will grow at a marginally slower rate to meat production, with increased feed use intensity in some countries offset by gains in feed use efficiency in others. Meat production growth is expected to accelerate over the *Outlook*, with significant contributions from poultry and pork, where a heightened focus on biosecurity results in a larger share of pork production coming from large, modern production units. The share of pork in total livestock production recovers only marginally from the base period and does not reach pre-ASF levels by 2030.

Nearly 70% of global fish output is produced by the Asia and Pacific region, most coming from a combination of capture fisheries and aquaculture production in China. The efficiency and sustainability changes set out in China's 14th Five Year Plan are expected to constrain growth, but the Asia Pacific region will nonetheless account for 80% of global production growth in the sector.

Total GHG emissions by the region are projected to increase by 2.7% by 2030. Emissions from animal sources are projected to increase by 5.6%, whereas those from crops decline by 0.8%.

2.2.3. Consumption

The Asian region has made immense progress in reducing the prevalence of undernourishment in its developing and least developed nations. In 2020, however, this regressed, largely due to the impact of the COVID-19 pandemic on income and food affordability. The prevalence of undernourishment as well as food insecurity in the region increased in 2020 and could remain under pressure in the short term. As the recovery from the COVID-19 pandemic gathers momentum, medium term income growth in the region is positive. Combined with the slowdown in population expansion and continued urbanisation, this supports the continued evolution of dietary patterns, resulting in rising demand for calorie and nutrient dense foods (Law, Fraser and Piracha, 2020^[1]) (Kelly, 2016^[2]) (Reardon et al., 2014^[3]). By 2030, average calorie availability in the region is projected to increase by almost 200 kcal/person/day to average just over 3 000 kcal, mainly due to increases in the consumption of vegetable oils, sugar and animal products, particularly dairy products. Average protein intake will rise by 10 g/person/day to 109 g/person/day, thanks to increased consumption of dairy and meat products.

Populations in many parts of the region are aging, with dependency ratios³ in Japan and Korea set to increase to 53.2% and 38.2% by 2030, respectively. The ratio in China will increase to 27.3%, which is higher than the world average (18.3%) in 2030 (United Nations, 2019). It is generally assumed that the aging population trend will have a negative impact on growth rates of overall food consumption in these countries. Within the broader region, urbanised lifestyles will lead to growth in consumption of sugars and fats that will outpace that of most other food groups. Consumption of vegetable oil will exceed the global average by 2030, reaching 21 kg/capita per year. Paired with stronger population growth in several countries, such as India, this implies that the region will account for 71% of global vegetable oil consumption growth over the next ten years. The share of calories obtained from animal products, sugars and fats will increase across most of the region by 2030, at the expense of basic food staples.

Rice consumption per capita, which is so important in many countries of the region, often accounting for as much as 50% or more of calorie availability, is projected to stagnate at regional level, with higher per capita consumption in India offset by a decline in countries such as Indonesia. By contrast, wheat

consumption is set to increase by 2.1 kg per capita at regional level, with substantial gains in Korea, Viet Nam, Indonesia, Thailand, and many other LDC's in the region.

Meat consumption will rise by 2.6 kg/capita to an average annual consumption of 29 kg/capita, but there is divergence within the region. In countries such as Korea, Viet Nam and China, demand is rising by 5-10 kg, whereas in India, per capita consumption growth will remain less than half a kilogram. The Asia Pacific region is a major consumer of fish, with the highest per capita intake of all regions. Consumption is expected to grow by a further 1.7 kg/capita to an average consumption of 25 kg/capita per year, mainly driven by China, India, and Indonesia. Dairy product consumption will also expand by 24%, largely driven by consumption in India, Pakistan, Iran, and China, as well as rapid growth in Viet Nam, albeit from a much smaller base.

With increasing livestock and dairy production, intensification through higher use of feed grains, and efficiency gains over time, feed use is projected to increase 20% by 2030. Feed use of maize and protein meals are projected to increase 17% and 21% respectively. Such growth in feed is also associated with increased commercialisation of farms, and less backyard production which may use non-grain inputs as feed.

Given increasing mandates, mainly in India, the Asia and Pacific region is projected to increase its share in global ethanol use to 19% by 2030, from 16% in the base period. Similarly, the region's share in global biodiesel use is expected to grow from 23% in the base period, to more than 30% by 2030, underpinned by gains in Indonesia.

This *Outlook* assumes that China does not fully implement the ambitious nationwide E10 mandate by 2030. Based on decreasing maize stocks, its increasing demand for animal feed and industrial uses that cannot be met entirely by domestic production, a 2% blend of gasoline-type fuels is projected. By contrast, the government of Indonesia is assumed to continue implementing the B30 programme nationwide as planned, but reaching the intended target to increase biofuel demand will largely depend on the relationship between domestic and international palm oil prices, as well as palm oil exports. Rising production costs could put the target into jeopardy. By 2030, biodiesel demand would reach about 9.5 bln L.

In Indonesia, the blending mandate is expected to direct domestic palm oil supplies to the biodiesel market. Together with strong short-term price support for vegetable oil on the back of current supply constraints, this could help catalyse investment in the sector. However, land availability remains a constraint and a key contributing factor to the replanting delays in oil palm in recent years. This also underpins slower growth in the Asia Pacific region's vegetable oil production over the outlook period, with production set to expand 18% by 2030, compared to 47% over the last ten years.

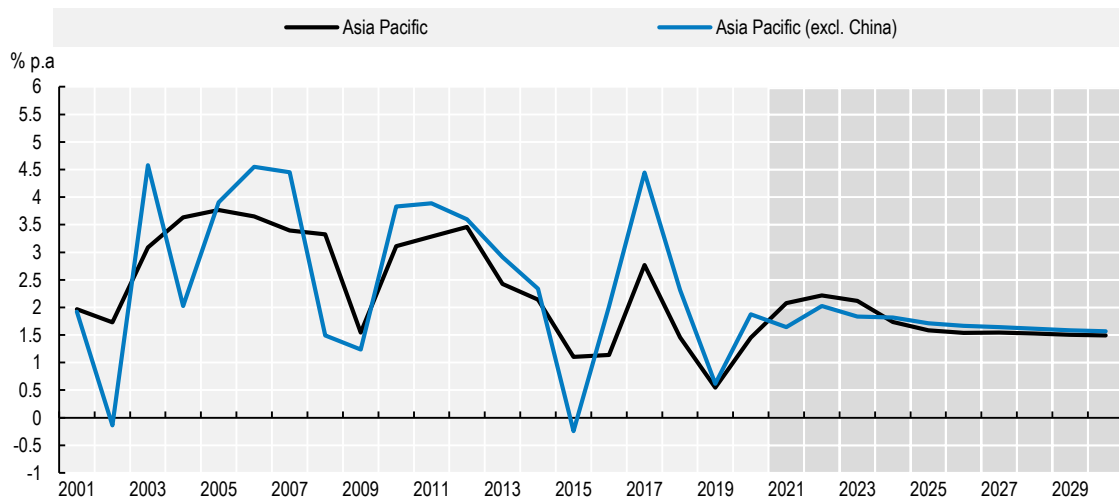
2.2.4. Trade

In terms of primary agricultural commodities, the Asia Pacific region is the largest net importer, accounting for over 30% of global imports. Net imports are trending higher over the medium term as demand outpaces supply. China represents one of the largest importers in the region, with soybeans a major contributor to its total import bill. Having declined in 2018 and 2019, due to a combination of trade actions and reduced demand from its diminished pig herd, Chinese soybean imports recovered to record levels in 2020. This was driven by the rapid expansion of its poultry sector, as well as the recovery of its pig breeding herd, and comes despite the logistical challenges and constraints associated with the ongoing COVID-19 pandemic, from which China was amongst the fastest countries to recover. With demand factors remaining firm and the trade environment less restrictive, soybean imports are set to rise by a further 17% by 2030 relative to the base period, to account for just over 60% of global soybean trade. Maize imports, which are smaller but still significant, also increased sharply in 2020, but are set to decline towards 2030, on the back of stronger domestic production growth.

Net imports of livestock products into the Asia Pacific region are set to increase further over the next ten years, despite reduced import demand from China. Chinese imports peaked during the base period as a result of ASF-related supply constraints and the projected decline in pork imports will only be partly offset by rising beef and sheep meat imports over the coming decade. While total meat imports are set to decline in China and Viet Nam, they are expected to rise in the Philippines, Malaysia, and Korea. This is partly offset by growing exports of bovine meat from Australia and poultry from Thailand. In the case of dairy products, net imports into the region expand, owing to rising import demand from South East Asia.

The Asia Pacific is also a major exporting region contributing 26% of global exports. The largest primary export commodity is rice, which is projected to rise to 54 Mt, led mainly by India, Viet Nam, Myanmar and Thailand. Net exports of vegetable oil from the region is however projected to contract 28% by 2030, as growth in imports exceeds that of exports. Being the main fish producer, the region is a net exporter of fish and fish products. Despite a slowdown in export growth, it will still constitute 47% of global export volumes by 2030. A significant share of this trade occurs within the region, as it also contributes 36% of global imports by 2030.

Figure 2.1. Slowing growth of agriculture and fish output in Asia Pacific 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 (2021). FAOSTAT Value of Agricultural Production Database, <http://www.fao.org/faostat/en/#data/QV>; OECD/FAO (2021), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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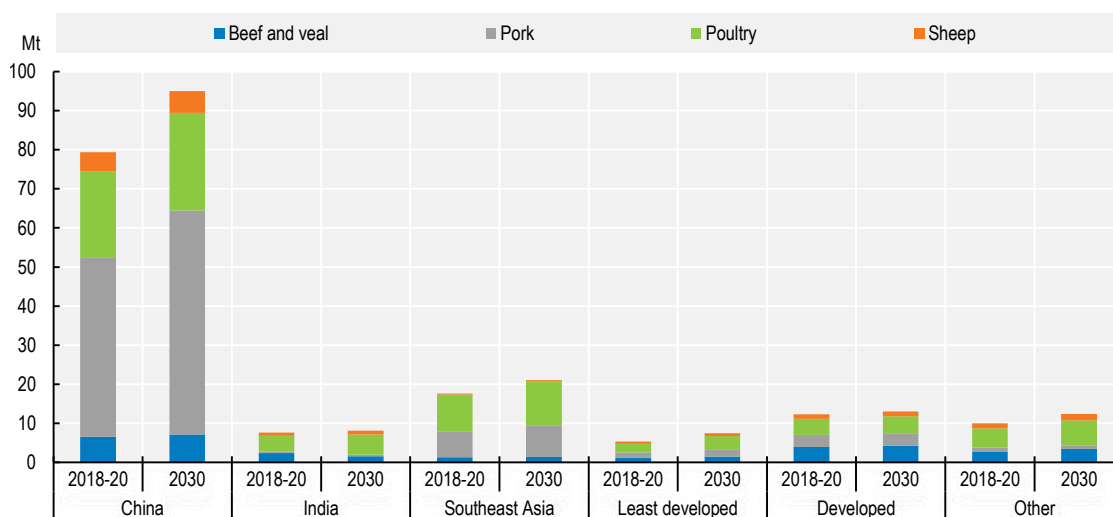
Figure 2.2. Change in area harvested and land use in Asia Pacific



Source: OECD/FAO (2021), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-out-data-en>.

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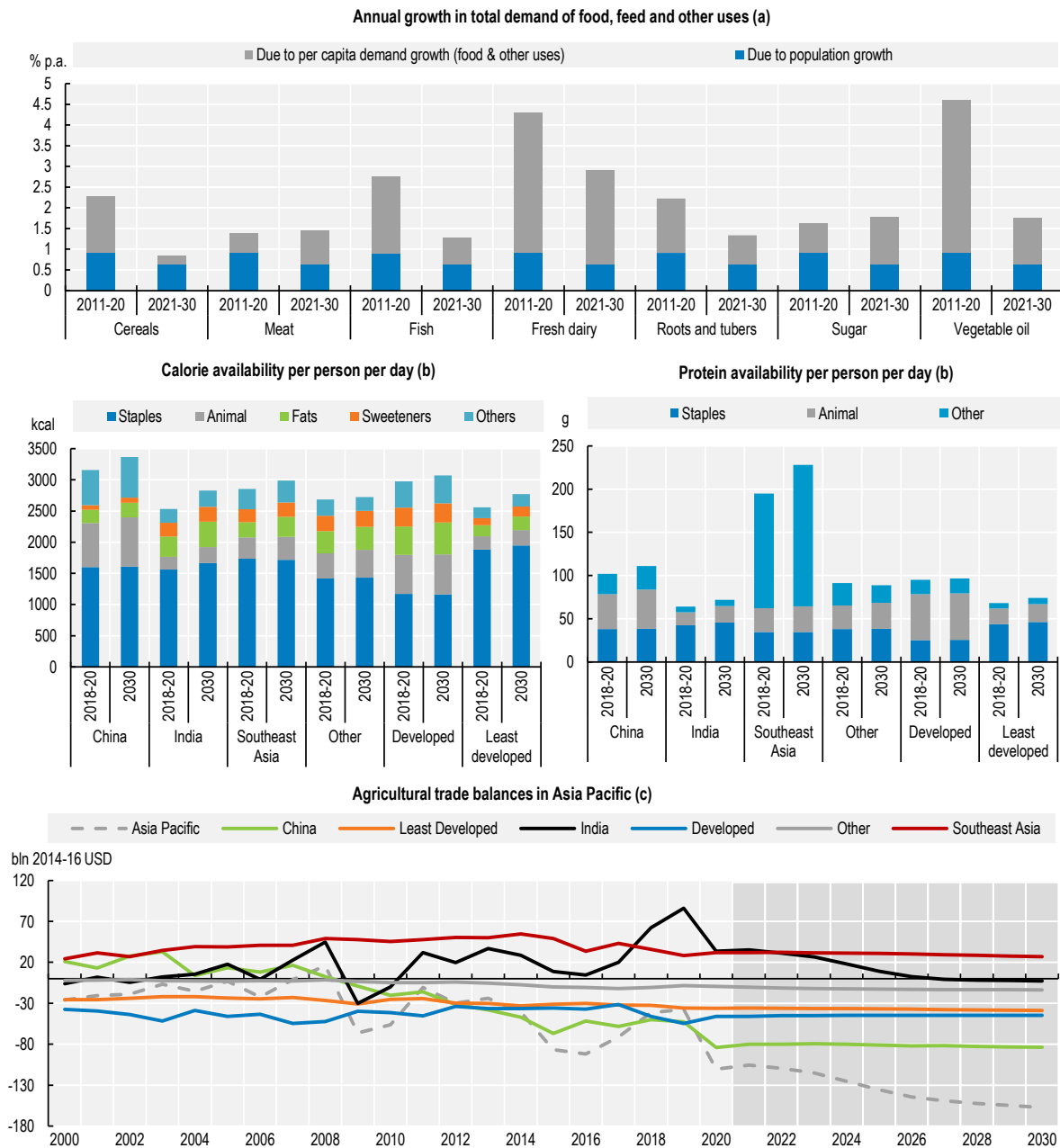
Figure 2.3. Livestock production in Asia Pacific



Source: OECD/FAO (2021), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-out-data-en>.

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



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

Source: FAO (2021). FAOSTAT Food Balance Sheets and trade indices databases, <http://www.fao.org/faostat/en/#data>; OECD/FAO (2021), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-out-data-en>.

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Table 2.1. Regional Indicators: Asia and Pacific

	Average			%	Growth ²	
	2008-10	2018-20 (base)	2030	Base to 2030	2011-20	2021-30
Macro assumptions						
Population ('000)	3 885 796	4 268 075	4 590 121	7.55	0.91	0.63
Per capita GDP ¹ (kUSD)	4.80	6.70	9.55	42.64	3.15	3.61
Production (bln USD)						
Net value of agricultural and fisheries ³	1737.0	2141.6	2572.3	20.11	1.75	1.66
Net value of crop production ³	1032.0	1295.6	1578.5	21.83	1.83	1.68
Net value of livestock production ³	438.2	502.7	600.0	19.36	1.10	1.78
Net value of fish production ³	266.8	343.3	393.8	14.72	2.43	1.38
Quantity produced (kt)						
<i>Cereals</i>	963 946	1157 083	1 300 538	12.40	1.17	0.97
<i>Pulses</i>	29 523	40 109	50 312	25.44	2.55	2.03
<i>Roots and tubers</i>	73 723	94 781	110 444	16.53	2.26	1.36
<i>Oilseeds⁴</i>	42 159	47 844	54 322	13.54	1.07	0.84
<i>Meat</i>	114 569	132 284	156 981	18.67	0.80	1.64
<i>Dairy⁵</i>	35 751	50 620	66 878	32.12	3.54	2.69
<i>Fish</i>	95 195	122 718	140 710	14.66	2.46	1.37
<i>Sugar</i>	54 287	70 073	83 348	18.94	0.71	1.51
<i>Vegetable oil</i>	83 118	122 492	145 105	18.46	3.72	1.31
Biofuels production (mln L)						
<i>Biodiesel</i>	2395.00	13201.60	16868.41	27.78	12.79	1.43
<i>Ethanol</i>	11 172	17 600	23 113	31.32	3.70	2.02
Land use (kha)						
Total agricultural land use	1 495 093	1469 641	1 459 978	-0.66	-0.29	-0.07
Total land use for crop production ⁶	525 121	533 056	534 051	0.19	-0.07	0.19
Total pasture land use ⁷	969 972	936 584	925 927	-1.14	-0.42	-0.21
GHG Emissions (Mt CO2-eq)						
Total	2 202	2 296	2 358	2.69	-0.04	0.46
Crop	994	1 051	1 043	-0.76	-0.46	0.06
Animal	1 176	1 212	1 280	5.61	0.35	0.80
Demand and food security						
Daily per capita caloric availability ⁸ (kcal)	2 669	2 824	3 020	6.93	0.45	0.63
Daily per capita protein availability ⁸ (g)	87.3	98.7	108.8	10.3	1.1	1.0
Per capita food availability (kg)						
<i>Staples⁹</i>	170.5	174.5	179.0	2.59	0.32	0.10
<i>Meat</i>	24.7	26.6	29.2	9.69	0.25	0.65
<i>Dairy⁵</i>	9.2	11.9	14.7	23.59	2.69	2.05
<i>Fish</i>	19.3	22.8	24.6	7.50	1.46	0.73
<i>Sugar</i>	16.2	17.7	19.9	12.50	0.49	1.14
<i>Vegetable oil</i>	14.2	18.1	20.6	13.95	2.76	1.33
Trade (bln USD)						
Net trade ³	- 36	- 63	- 157	149.02	..	..
Net value of exports ³	259.7	362	365	0.76	2.58	0.25
Net value of imports ³	295.3	425	522	22.77	4.19	1.49
Self-sufficiency ratio¹⁰						
<i>Cereals</i>	95.7	92.3	93	0.5	-0.62	0.11
<i>Meat</i>	97.6	94.1	95	0.8	-0.57	0.18
<i>Sugar</i>	90.6	92.2	90	-2.0	-0.14	-0.32
<i>Vegetable oil</i>	114.5	109.3	105	-3.5	-0.49	-0.37

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

Source: OECD/FAO (2021), "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

Among the six regions⁴ presented in this chapter, the demographic and economic growth profile of Sub-Saharan Africa⁵ stands out. Population growth is the highest and despite rapid progress, urbanisation remains by far the slowest among the regions. It is anticipated that SSA will add some 329 million people by 2030 compared to the 2018-20 base period, reflecting growth of 2.5% p.a. Although almost two thirds of that addition will be urban, 53% of the population will still live in rural areas by 2030. This makes it the only region with more than half of the population still residing in rural areas by 2030 and one of only two (along with Near East and North Africa) where the absolute size of the rural population is still expected to increase over the coming decade.

Economies in the region typically have a high dependency on resource-based commodities, such as agriculture, oil and metals. Agriculture, fish and forestry account for about 14% of GDP, and this is expected to decline to 12% by 2030. Economic growth, in per capita terms, is expected to be less robust than other emerging developing regions, expanding by 1.3% p.a. over the outlook period. This follows a contraction of 6% in 2020, followed by a recovery of merely 0.5% in 2021, reflecting the prolonged impact of economic restrictions to curb the spread of the pandemic, limited resources to support a recovery as well as a the strong reliance on commodity exports and tourism. Economic performance varies considerably within the region, with least developed economies growing faster, albeit from a lower base level. Average per capita incomes in the region are the lowest globally, at USD 1 675, and are assumed to rise to USD 1793 by 2030 in real 2010 terms; however, average per capita incomes in least developed countries (LDCs) of the region are expected to reach just USD 1 064 per year. Households in the region spend on average about 38% of their incomes on food, but this share varies considerably by country, from as low as 16% in South Africa to about 50% in Nigeria.⁶ Per capita calorie availability in the region is significantly lower relative to most others, which implies that food security and economic welfare is particularly vulnerable to food price or income shocks. This also magnifies the impact of the COVID-19 pandemic, which has significantly impacted food affordability and, hence, food security in the region.

Sub-Saharan Africa houses 14% of the global population and is an agro-ecologically diverse, land abundant region that accounts for 15% of global crop land and 20% of pasture. In many countries however, high population density in rural areas has resulted in the agricultural sector facing land shortages. Much of the land still available in the region is concentrated in few countries and/or is largely under forest cover. The region thus produced only 7% of the global value of agricultural and fish production in 2018-20. By contrast, the large population with its high consumption requirement and unique dietary composition resulted in the region accounting for 37% of global roots and tuber consumption, compared to only 7% of global cereal consumption, and 6% of global sugar, vegetable oil and fish consumption. The region's comparatively small share in global meat (4%) and fresh dairy (5%) consumption reflects weaker purchasing power and poor dietary diversity. Overall, Sub-Saharan Africa's self-sufficiency for major food commodities is decreasing, as the region's population is expanding quickly, beyond the pace of growth in domestic supply.

2.3.2. Production

Agricultural and fish production in SSA is expected to grow by 23% over the next ten years in net value added terms, implying that per capita production in the region will continue the decline that has been ongoing since 2015 (Figure 2.6). Crop production is projected to account for over 72% of total output by 2030, while the share of livestock products will advance to 20% and the share of fish production decline to 7%. Food and feed staples, namely cereals, pulses, roots and tubers, will be the main sources of growth for the region. In all of these commodities, the region's global market share will rise over the outlook period. By 2030, the SSA region may account for almost 40% of global roots and tubers output, 21% of pulses

production and 6% of cereal output. Area expansion in West Africa, coupled with support to the cotton sector, will sustain cotton production at regional level of nearly 22% by 2030, to comprise 7% of global production.

Total area harvested is expected to expand by almost 6 Mha by 2030. Due to cropping intensification this net growth is expected despite a smaller 4 Mha rise in agricultural land use. Intercropping with beans and cereals occurs in many countries. Double-cropping is also prevalent in tropical regions with bimodal rainfall, as well as irrigated systems in Southern Africa, where soybeans and wheat are often produced consecutively in a single year. The expansion of rice cultivation in the region, notably in Nigeria, is also expected to be based upon multiple harvests per year.

In other parts of the region, the ongoing expansion of agricultural land use is constrained by various sources of uncertainty, including land fragmentation trends, conflict in land abundant countries, and the presence of other competing uses such as mining and urban sprawl.

Average cereal yields across the region are projected to grow 21% over the outlook period, a similar rate to the past decade. Continued yields gains for most major crops stem from investments in locally adapted, improved crop varieties, and better management practices. Yield growth for most crops exceeds the rates projected at a global level, but occurs from a base which is typically less than half of the global average. Consequently, the region's substantial gap relative to yields achieved in the rest of the world will narrow, but still remain significant by 2030. Although productivity improvements will be central to output growth in the medium term, efforts to fully close the yield gap are challenged by the limited use of inputs, irrigation and farm infrastructure.

The net value of livestock production is projected to expand by 26% over the next ten years, with the fastest increases coming from poultry and milk production. The region will add 2.9 Mt of meat output by 2030, comprising almost 1.3 Mt of poultry, 740 Kt of bovine meat, 650 Kt of ovine meat and 260 Kt of pig meat. Bovine and ovine production systems in the region remain fairly extensive and growth in the coming decade is fuelled by herd expansion more than productivity gains. In the 2018-2020 base period, SSA accounts for 7% of global bovine meat output, but 17% of the global bovine herd. The region's share in the global bovine herd is projected to expand to almost 20% by 2030. Similarly, the region constitutes 14% of global ovine meat output, with 24% of the global ovine herd. Ovine meat production is expected to increase by 30% in the coming decade, allowing SSA to grow its share of global output to 15%. These herd expansions will occur despite land used for pasture purposes remaining almost unchanged by 2030. While extensive poultry production systems are still common in the region, a greater degree of intensification has been evident in this sector, particularly in countries such as South Africa, that produce surplus feed grains. Feed intensity is expected to continue increasing in the broader SSA region as supply chains modernise in countries such as Zambia and Tanzania. This increase comes from a small base and many smaller producers continue to use non-grain, often informally procured feed inputs. In countries that already use feed more intensively, genetic improvements and better feed conversion over time reduce the amount of feed required per animal. At the regional level, this results in feed use growing marginally slower than meat production. Some feed use also accrues to fish production, which is expected to increase 13% by 2030. The projected expansion of 28% in the aquaculture sector is faster than that of captured fisheries at 12%, but occurs from a small base and by 2030, aquaculture will represent only 9% of the fish production in the region, compared to 8% in the base period.

Based on these production projections, direct greenhouse gas (GHG) emissions from agriculture are expected to grow by 16% by 2030 compared to the base period. Sub-Saharan Africa will account for 62% of the global increase in direct emissions from agriculture and will reach a share of 16% of global direct emissions by 2030.

2.3.3. Consumption

The SSA region concentrates most of the world's poor. Similarly, the prevalence of undernourished individuals in the region is the highest in the world. Poor food security in the region was further exacerbated by the COVID-19 pandemic. Supply chain disruptions, particularly in informal sectors, influenced accessibility, while income and employment shocks weakened affordability. Food security and undernourishment will likely remain a challenge and even as income levels start to recover, a sustained recovery will require improvements in the availability, accessibility, affordability and utilisation of food supplies in the future.

Average income levels recover slowly following the economic contraction in 2020, thus population growth remains the biggest driver of rising food consumption (Figure 2.10). This combination of rapid population growth and gains in per capita calorie availability, make the region one of the largest sources of additional demand for the global agricultural sector in the coming decade. The region's share in global food calorie consumption is anticipated to rise from 10% in the base period to 11% by 2030.

The contribution of staples to total calorie availability is higher in SSA than any other region and per capita consumption of food staples is set to increase further by 2030. For most other commodity groups, including meat, dairy, fish, sugar and vegetable oils, per capita consumption levels are currently the lowest in the world. With the exception of fish, per capita consumption of all of the aforementioned commodity groups will increase over the coming decade, resulting in substantial growth in total consumption, but dietary diversification remains slow and staples still contribute the bulk of total calorie intake by 2030.

Gains of 61 kcal/day over the outlook period enables the region to reach an average calorie availability of almost 2 500 kcal/capita per day by 2030. This is well below the global average of 3 025 kcal/day and implies that calorie intake in the region will still be the lowest in the world by 2030. An increasing share of calories will come from cereals and sugar, and while meat consumption will increase marginally, this is more than offset by the decline in per capita fish consumption over the next decade, limiting gains in vital nutrients.

Roots and tubers, followed by cereals, are the main sources of feed for the region's livestock sector. However, total feed use in the region is low, accounting for less than 4% of global feed consumption.

2.3.4. Trade

Most basic food commodities in the region are produced for domestic consumption rather than exports as the region as a whole increasingly relies on imports to close the gap between domestic production and consumption. At the same time, many countries 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 widen over the coming decade. Evaluated at constant (2014-16) global reference prices, the deficit is anticipated to grow from about USD 7 billion to USD 18 billion by 2030.

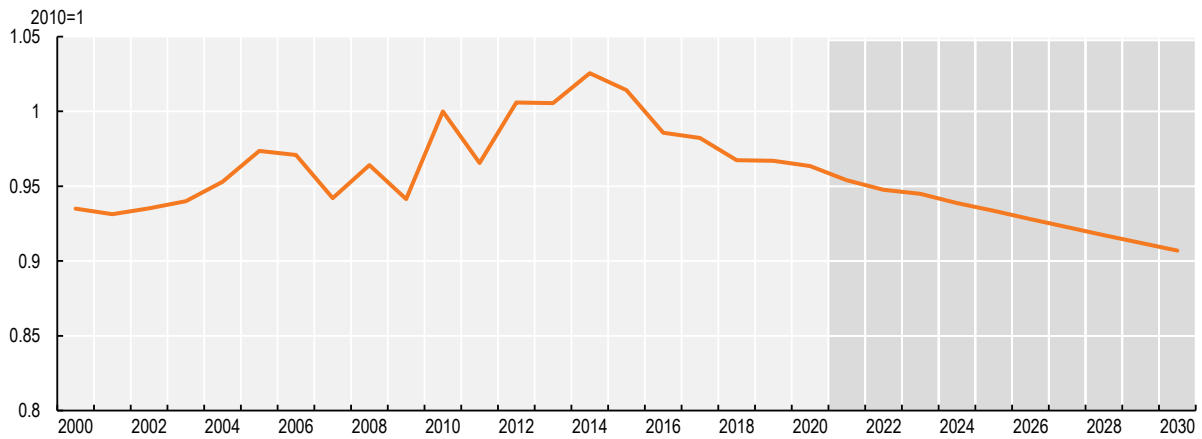
Amidst the pandemic related challenges in 2020, cereal and vegetable oil import volumes increased, while meat and sugar imports declined. At the height of the pandemic's first wave, intraregional trade in particular faced many logistical challenges, causing long delays at land border posts (Njiwa and Marwusi, 2020^[4]). Over the course of the next decade, import volumes of cereals, meat, fish, sugar and oils rise substantially, at a faster rate than production. Apart from cereals and fresh produce, export volumes tend to decrease over time. The region as a whole is not self-sufficient in basic food staples and its import dependence is expected to deepen over the next ten years.

In contrast to basic food crops, the bulk of cotton production is sold on global markets and almost 90% of cotton production from the region will be exported by 2030. Most of this comes from the least-developed

countries of the region. The region's share in global exports is expected to remain fairly constant over the outlook period.

Improving internal trade in the SSA region is an important policy objective. The African Continental Free Trade Agreement entered into force on 30 May 2019 and after initial delays due to the pandemic, trade under the agreement officially started on 1 January 2021. The ambition of the agreement was for 90% of tariff lines to be phased to zero in a linear form over a period of ten years for LDC's and five years for others. In reality however, rules of origin agreements have only been reached on 81% of tariff lines and while trade has officially started based on this 81%, many countries have not yet submitted tariff reduction offers. Furthermore, in some customs unions, all members of the union have not ratified the agreement, thus prohibiting the union from trading under preferential terms unless concessions can legally be implemented on individual basis. Despite the slow start and the need to conclude further engagements regarding rules of origin, the agreement will ultimately only exclude three percent of tariff lines and therefore has significant potential to increase intra-Africa trade in the medium term. According to recent estimates by the UN Economic Commission for Africa, the agreement is projected to increase intra-African trade of agriculture and food products by 20-35% (or USD 10-17 bln). Intra-trade gains are expected to be particularly pronounced for meat products, fish, milk and dairy products, sugar, beverages and tobacco, vegetables/fruit/nuts and paddy and processed rice. However, trade within the region is hampered by high non-tariff barriers and while the agreement includes a mutual recognition of standards and licences, as well as the harmonisation of sanitary and phytosanitary (SPS) measures, many non-tariff barriers remain more difficult to remove or reduce. A major contributor in this regard is the high cost of road transportation, which emanates from poor infrastructure, as well as inefficiencies at border posts. This increases costs and weakens logistical performance, as illustrated by the presence of only six SSA countries in the top half of the World Bank's logistical performance index ranking, which covers 160 countries in total. Further to the logistical performance, the imposition of discretionary export controls weakens market integration. Based on the regulations implemented to date and the need to finalise tariff reduction schedules and sensitive product lists, no discernible impact was included in the baseline projection this year.

Figure 2.5. Per capita net value of agriculture and fish production in Sub Saharan Africa

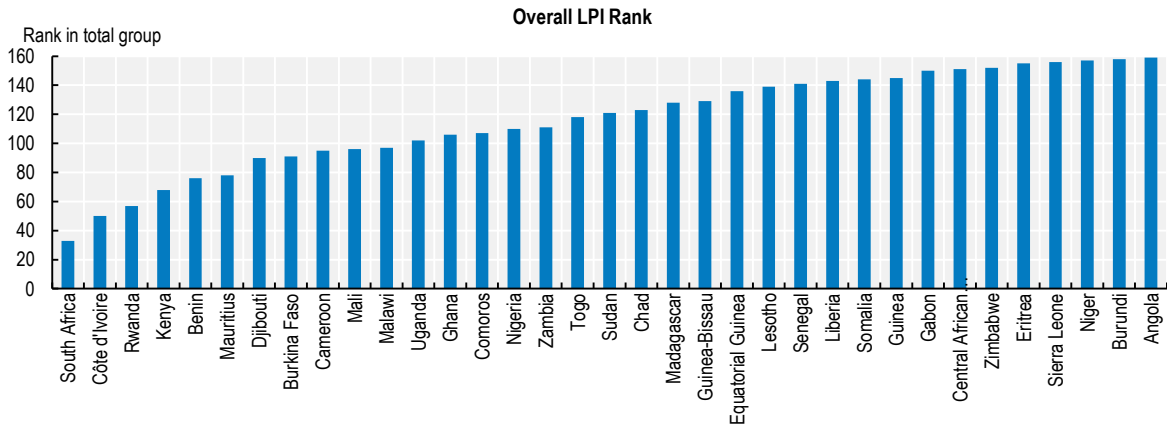


Note: Estimates are based on historical time series from the FAOSTAT Value of Agricultural Production domain which are extended with the Outlook database. Remaining products are trend-extended. The Net Value of Production uses own estimates for internal seed and feed use. Values are measured in constant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

Source: FAO (2021). FAOSTAT Value of Agricultural Production Database, <http://www.fao.org/faostat/en/#data/QV>; OECD/FAO (2021), “OECD-FAO Agricultural Outlook”, OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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Figure 2.6. World Bank Logistical Performance Index – Few SSA countries in the top half (80) of the global sample



Source: World Bank.


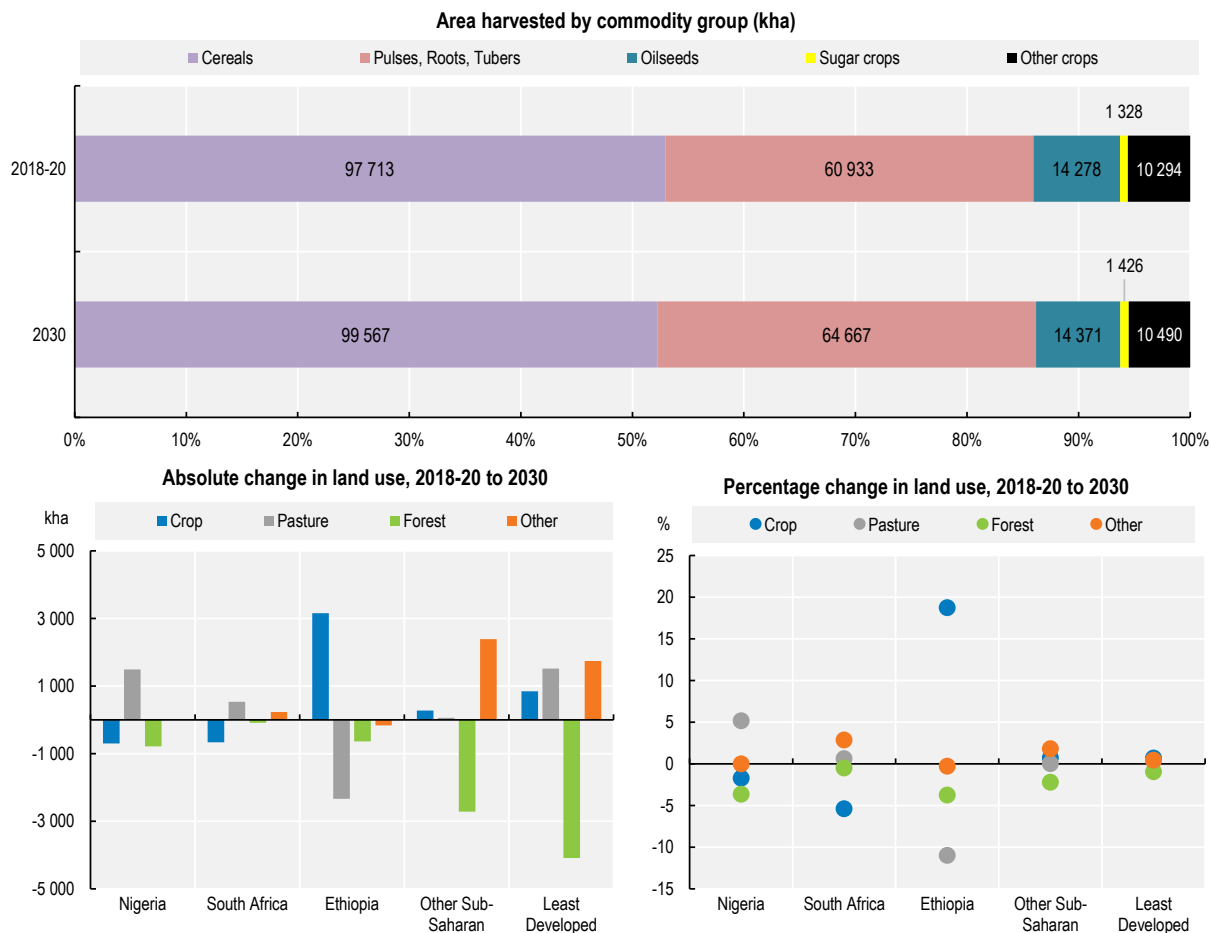
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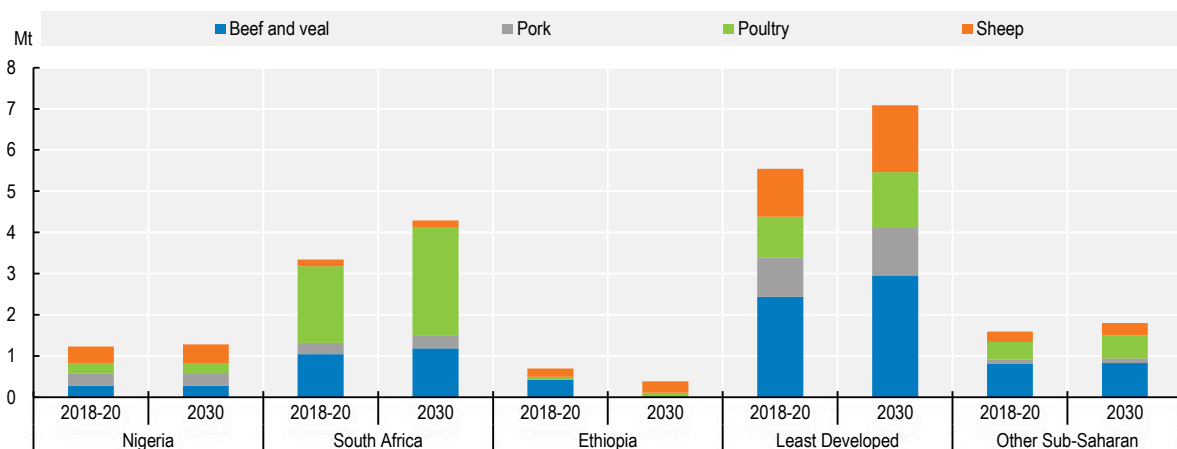
Figure 2.7. Change in area harvested and land use in Sub Saharan Africa



Source: OECD/FAO (2021), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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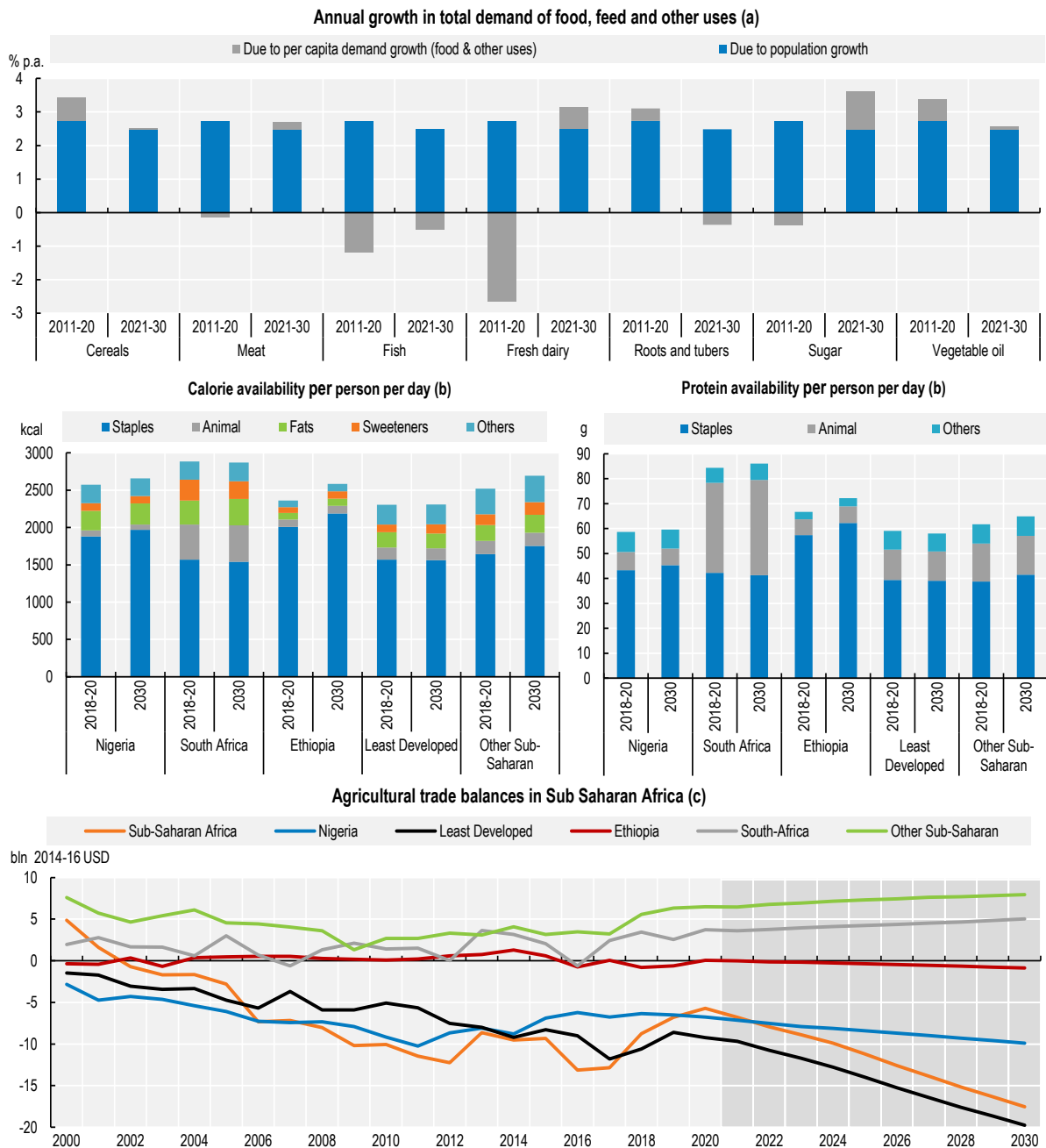
Figure 2.8. Livestock production in Sub Saharan Africa



Source: OECD/FAO (2021), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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Figure 2.9. Demand for key commodities, food availability and agricultural trade balance in Sub Saharan Africa



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

Source: FAO (2021). FAOSTAT Value of Agricultural Production Database, <http://www.fao.org/faostat/en/#data/QV>; OECD/FAO (2021), "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: Sub Saharan Africa

	Average		2030	%	Growth ²	
	2008-10	2018-20 (base)			Base to 2030	2011-20
Macro assumptions						
Population ('000)	800 857	1 050 243	1 379 515	31.35	2.74	2.48
Per capita GDP ¹ (kUSD)	1.57	1.67	1.79	7.08	-0.09	1.25
Production (bln USD)						
Net value of agricultural and fisheries ³	208.8	273.0	336.6	23.33	2.34	1.91
Net value of crop production ³	147.2	197.0	243.9	23.77	2.54	1.92
Net value of livestock production ³	45.4	54.0	68.0	26.00	1.48	2.19
Net value of fish production ³	16.2	22.0	24.8	12.75	2.73	1.07
Quantity produced (kt)						
<i>Cereals</i>	115 275	153 779	190 157	23.66	3.47	1.77
<i>Pulses</i>	13 338	18 246	23 141	26.83	3.08	2.23
<i>Roots and tubers</i>	58 798	88 322	110 487	25.09	2.82	2.16
<i>Oilseeds⁴</i>	7 081	8 253	9 120	10.51	1.01	0.89
<i>Meat</i>	9 568	12 391	15 323	23.66	2.51	2.01
<i>Dairy⁵</i>	3 325	3 582	4 783	33.53	0.29	3.10
<i>Fish</i>	5 784	7 878	8 887	12.81	2.78	1.08
<i>Sugar</i>	6 455	7 565	9 854	30.26	0.90	2.73
<i>Vegetable oil</i>	4 909	7 213	8 277	14.76	2.67	1.23
Biofuel production (mln L)						
<i>Biodiesel</i>	0.04	0.04	0.07	49.87	0.00	4.02
<i>Ethanol</i>	541	766	948	23.82	3.50	2.39
Land use (kha)						
Total agricultural land use	858 750	886 843	890 984	0.47	0.24	0.03
Total land use for crop production ⁶	206 447	226 437	229 332	1.28	0.54	0.07
Total pasture land use ⁷	652 303	660 406	661 652	0.19	0.14	0.01
GHG Emissions (Mt CO₂-eq)						
Total	628	739	857	15.94	1.38	1.43
Crop	199	185	187	1.05	-1.29	0.07
Animal	429	553	669	20.95	2.42	1.85
Demand and food security						
Daily per capita caloric availability ⁸ (kcal)	2 395	2 429	2 489	2.51	-0.05	0.32
Daily per capita protein availability ⁸ (g)	60. 444	61. 65	62. 206	. 903	-0.09	0.18
Per capita food availability (kg)						
<i>Staples⁹</i>	177.5	193.3	197. 565	2.21	0.21	0.26
<i>Meat</i>	10.7	10.8	10. 965	1.07	-0.31	0.29
<i>Dairy⁵</i>	4.6	3.7	3. 829	4.06	-2.38	0.54
<i>Fish</i>	8.2	7.8	7. 446	-5.02	-1.12	-0.35
<i>Sugar</i>	10.4	10.4	11. 626	11.32	-0.59	1.12
<i>Vegetable oil</i>	7.7	8.7	9. 172	5.87	0.03	0.61
Trade (bln USD)						
Net trade ³	-9.43	-7.09	-17.54	147.5	..	..
Net value of exports ³	28.61	48.64	64.23	32.05	4.78	2.40
Net value of imports ³	38.04	55.72	81.77	46.73	2.93	3.78
Self-sufficiency ratio¹⁰						
<i>Cereals</i>	84.8	82.7	77.5	-6.3	-0.02	-0.64
<i>Meat</i>	88.9	86.4	81.8	-5.4	-0.03	-0.70
<i>Sugar</i>	75.8	64.9	60.4	-7.0	-1.29	-0.81
<i>Vegetable oil</i>	58.9	54.7	47.8	-12.7	-0.14	-1.25

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

Source: OECD/FAO (2021), "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

The Near East and North Africa⁷ region is a challenging environment for agriculture and fish production. Its endowment of land and water resources is limited, with less than 5% of land considered arable. All countries in the region, except for Iraq and Mauritania face water scarcity, and for some countries this water scarcity is extreme, at less than one quarter of sustainable levels on a per capita basis.

The region encompasses a broad range of countries, exhibiting diverse income and resource profiles. Among them are least developed, middle income, and high income oil exporting nations in the Gulf. As one of the highest net food importing regions, self-sufficiency rates for most commodities are low, but particularly for cereals, vegetable oils and sugar (Figure 2.11). Uncertainties abound on both the supply and demand side, which raises concern regarding reliable access to basic foods. The COVID-19 pandemic and related restrictions on economic activity revealed vulnerabilities in global trade logistics, while policy responses to curtail exports from some key suppliers influenced cereal prices in the short term. Within the region, the limited land and water resources that are characteristic of most countries constrain growth and have been further stretched in some countries by policy incentives that sought to increase production and limit the deficit in cereal trade. Cereal production often competes with higher value crops for water. Geopolitical conflict further hinders agriculture and fish production, reduces needed investments and induces displacement of populations. Furthermore, in a region where oil export revenues represent the main source of income, unstable energy markets affect economic activity, including consumption and investment. With average food expenditures around 13% of total household expenditures, income and price shocks can have a meaningful impact on welfare.⁸

Population growth exceeded 23% in the past decade and constitutes a key source of additional demand. Growth of 1.7% annually over the next ten years will see the region's population approach 500 million people by 2030. More than half of the population is expected to reside in urban areas, which may encourage consumption of higher value products, including meat and dairy products, but also convenience products that contain vegetable oil and sugar. The strong reliance on oil export revenue implies that economies in the region were some of the most affected by the pandemic in 2020, with per capita GDP contracting by 8%. Activity is expected to remain constrained in 2021 and on average, over the coming decade, will only grow by 1.1% p.a. Consequently, it is unlikely to constitute a major driver of demand over the next ten years.

Egypt produces almost 30% of the net value of agriculture and fish production in the region, with a further 49% attributed to the rest of North Africa (15% from LDC's and 34% from other North Africa). These shares are expected to increase in the coming decade, such that North Africa will constitute almost 80% of net agricultural output value in the broader region by 2030. Gross domestic product in the agriculture, forestry and fishery sector is currently about 6% of total GDP in the region, and is expected to remain fairly stable over time.

Fish production is about 12% of total net agricultural and fish production. Capture in coastal areas has grown most recently, but fish stocks are under pressure. The contribution of aquaculture to total fish production is growing, with Egypt the major contributor.

2.4.2. Production

Agricultural and fish production in the Near East and North Africa region is projected to expand by 1.5% p.a. over the next ten years, slightly slower than population growth of 1.7%. The region will therefore become increasingly dependent on global markets (Figure 2.10). Crop production contributes the bulk of total value, but average annual growth of 1.3% will see its share decline by 1 percentage point to 61% of total net value by 2030. Livestock production growth is stronger at 2.2% p.a., which will see its share in total net value increase to just over 27% by 2030. The value of fish production is set to expand by 1.2% p.a., the slowest of the three sub sectors over the coming decade.

Land use under crops will decline by 2030 relative to the base period, with the greatest share in Saudi Arabia, where conditions are not conducive to large scale cropping. Land utilized for cereal production is projected to account for almost 50% of total cropland by 2030, a minor increase from the base period. This increase comes primarily from coarse grains and wheat, which is expected to contribute 60% and 35% respectively to total land used for cereal production by 2030. Total area harvested in the region remains almost unchanged, increasing by merely 3% by 2030 due to higher crop intensity. Yield improvements will account for the majority of crop production gains, with wheat, maize, other coarse grains and rice yields growing at 0.9%, 0.7%, 1.3% and 1.1% p.a. respectively. Wheat yields will remain at 77% of the global average, while other coarse grain yields improve somewhat to almost 50% of the global average.

Growth in poultry production, at 3% p.a., will outpace all other meat products. Favourable progress is also expected for ovine meat production, at 1.5% p.a, while bovine meat production gains are slower at 1.1% p.a. Expansion in the poultry sector slows from the previous decade, whereas ovine meat production growth accelerates. Bovine meat production gains reflect a turnaround from the decline evident over the past decade. These rates of growth will help to curb the longer term decline in meat self-sufficiency (Figure 2.11).

With average annual growth of 2.3% and 2.0% for meat and dairy products respectively over the coming decade, GHG emissions from livestock activities in the region will expand by 4% by 2030 compared to the base period. Total GHG emissions in the region are projected to expand 3.5% by 2030.

2.4.3. Consumption

Food policies in the region have traditionally focused on food security by supporting consumption of basic foodstuffs, primarily cereals. In recent years, some policies have been expanded to include animal products. Since 2005 however, the prevalence of undernourishment has only declined modestly from 11% to 9% and even prior to the impact of the COVID-19 pandemic, the absolute number of undernourished people in the region has increased since 2015. This accelerated as a result of the pandemic in 2020, with increases in both the prevalence of undernourishment and the number of undernourished people in the region. As the economic recovery strengthens in the medium term, per capita calorie availability in the region is set to increase by 41 kcal/day by 2030 relative to the base period. This would enable the region to exceed 3050 kcal/person/day on average by 2030, marginally higher than the global average of 3 025 kcal/person/day. There is however great diversity within the region and despite gains of 106 kcal per person and day by 2030, the LDC's only reach 2700 kcal/person/day, roughly 11% below the global average.

The projection for the average diet in the region indicates about 55% of calories will come from cereals by 2030, down 1% from the base period. This compares to the world average of 44%. A similar phenomenon applies to sugar consumption, where the region's share of total calories derived from sugar will be 10% compared to a global average of 7%. This diet which relies on starchy foods and sugar is associated with a rising incidence of over-weight and obesity, and various non-communicable diseases such as diabetes. Combined with the prevalence of undernourishment in certain countries, this suggests that the "triple burden" of malnutrition will be a policy challenge over the medium term.

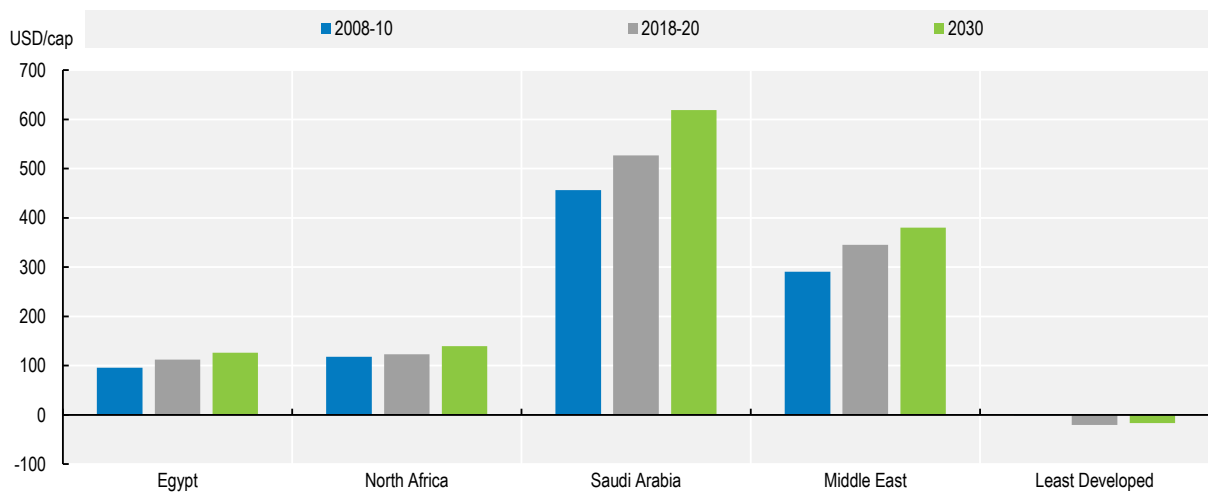
The average level of protein availability in the region is projected to reach 85 g/day in 2030, up only 0.6 g/day from the base period. A fall in protein from cereal consumption is expected to be more than offset by growth from meat and fish sources, as well as pulses. Protein availability in the region increases at a slower rate than the global average and by 2030, will be 13% below the average levels available globally.

The growth of the livestock sector will increase feed use by 24% over the coming decade. Three commodities, namely maize, barley and protein meals, are expected to account for almost 80% of the total feed use. The bulk of feed materials will continue to be imported, with maize imports for example reaching 37 Mt by 2030 compared to 28 Mt in the base period. This trend reflects policies that prioritise the production of food crops over feed crops in an environment that has limited production potential.

2.4.4. Trade

The region's strong population growth together with limited production capacity will drive higher food imports over the projection period. The region is expected to become the second largest net importer of food, following the Asia and Pacific region but on a per capita basis will be the largest. Within the region, food imports per person are highest in Saudi Arabia and the Other Middle East area which includes the Gulf States, followed by Egypt and other North African countries (Figure 2.10).

Figure 2.10. Value of net food imports per capita in Near East and North Africa (including processed products)



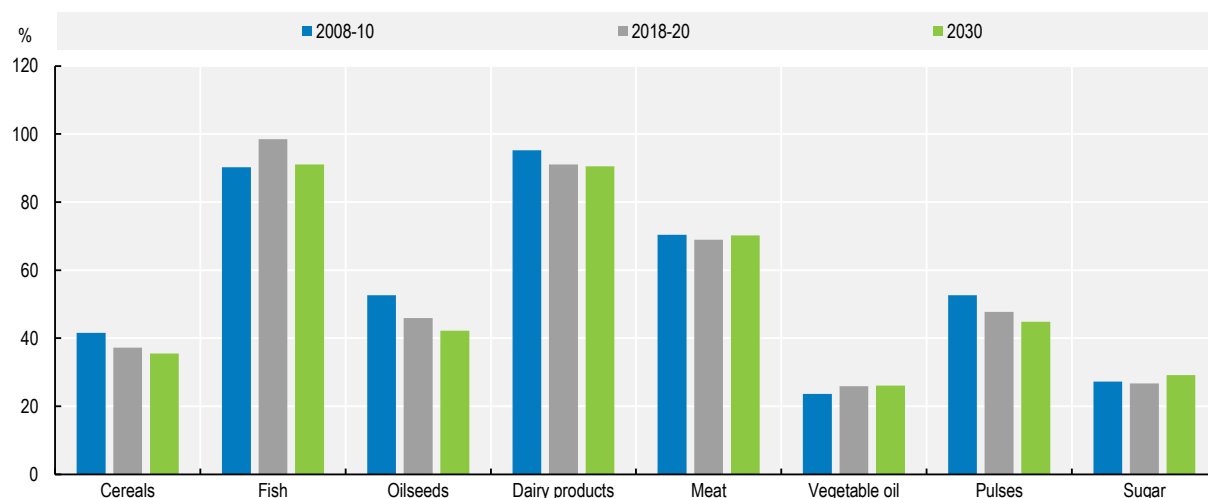
Note: Estimates are based on historical time series from the FAOSTAT Trade indices domain which are extended with the *Outlook* database. Products not covered by the *Outlook* are extended by trends. Total trade values include also processed products, usually not covered by the *Outlook* variables. Trade 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 (2021). FAOSTAT Trade Indices Database, <http://www.fao.org/faostat/en/#data/TI>; OECD/FAO (2021), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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Amidst the logistical and economic challenges of the pandemic, the region's total import bill, expressed in real terms, increased further in 2020 relative to 2019. This trend is expected to continue over the coming decade. In line with growing demand, the region's imports will increase for almost all commodities and self-sufficiency ratios will continue their long term decline with the exception of meat products, vegetable oil and sugar (Figure 2.11). In the case of vegetable oil, this reflects increased processing of imported oilseeds, as the oilseed self-sufficiency ratio still deteriorates. The region's imports will maintain high shares of certain global markets such as maize, other coarse grains and wheat which will reach 18%, 32% and 27% respectively by 2030. The region's imports will also account for 37% of global trade in sheep meat, as well as 18% of cheese and 17% poultry meat traded globally by 2030.

Figure 2.11. 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 (2021), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.


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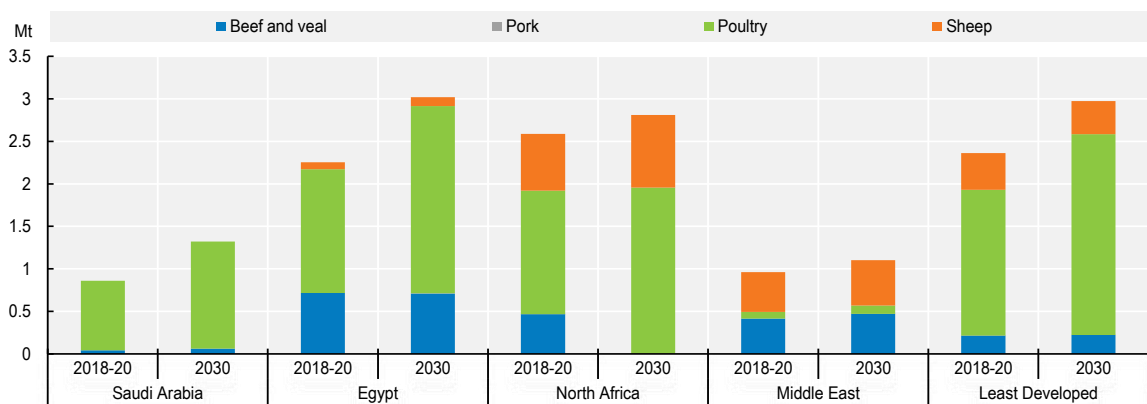
Figure 2.12. Change in area harvested and land use in Near East and North Africa



Source: OECD/FAO (2021), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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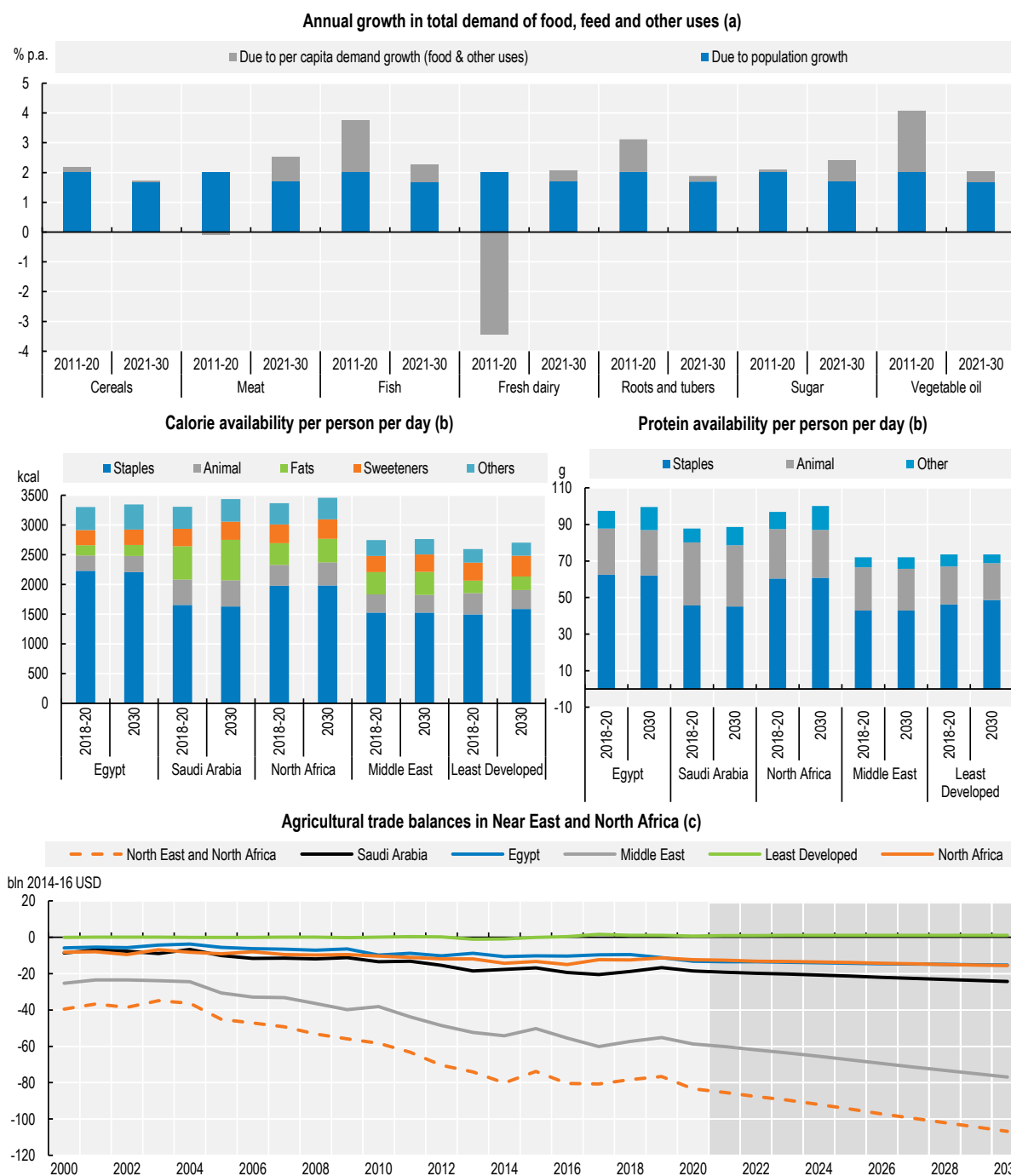
Figure 2.13. Livestock production in Near East and North Africa



Source: OECD/FAO (2021), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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Figure 2.14. Demand for key commodities, food availability and agricultural trade balance in North East and North Africa



Notes: Estimates are based on historical time series from the FAOSTAT Food Balance Sheets and trade indices databases and include products not covered by the Outlook. a) Population growth is calculated by assuming per capita demand constant at the level of the year preceding the decade. b) Fats: butter and oils; Animal: egg, fish, meat and dairy except for butter; Staples: cereals, oilseeds, pulses and roots. c) Include processed products. Source: FAO (2021). FAOSTAT Value of Agricultural Production Database, <http://www.fao.org/faostat/en/#data/QV>; OECD/FAO (2021), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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Table 2.3. Regional indicators: Near East and Northern Africa

	Average			%	Growth ²	
	2008-10	2018-20 (base)	2030	Base to 2030	2011-20	2021-30
Macro assumptions						
Population ('000)	333 439	410 958	496 138	20.73	2.02	1.69
Per capita GDP ¹ (kUSD)	6.14	6.35	6.67	5.03	-0.08	1.07
Production (bln USD)						
Net value of agricultural and fisheries ³	109.2	132.4	159.9	20.74	1.39	1.54
Net value of crop production ³	68.1	81.5	97.8	19.92	1.24	1.30
Net value of livestock production ³	31.4	35.1	43.6	24.36	0.22	2.24
Net value of fish production ³	9.6	15.8	18.5	16.93	5.42	1.24
Quantity produced (kt)						
<i>Cereals</i>	48 346	54 659	63 907	16.92	0.44	0.98
<i>Pulses</i>	1 442	1 651	1 944	17.79	0.76	1.70
<i>Roots and tubers</i>	2 533	3 778	4 701	24.43	2.66	2.09
<i>Oilseeds⁴</i>	1 022	1 066	1 181	10.85	0.16	1.27
<i>Meat</i>	6 552	8 164	10 501	28.62	2.23	2.30
<i>Dairy⁵</i>	3 528	3 150	3 770	19.68	-1.47	1.92
<i>Fish</i>	3 421	5 684	6 645	16.91	5.56	1.24
<i>Sugar</i>	2 895	3 664	5 218	42.43	2.03	3.29
<i>Vegetable oil</i>	1 415	2 325	2 892	24.40	6.13	1.88
Biofuel production (mln L)						
<i>Biodiesel</i>	0.02	0.02	0.02	15.39	0.00	1.35
<i>Ethanol</i>	256	161	188	16.64	-5.95	2.40
Land use (kha)						
Total agricultural land use	432 038	430 915	430 848	-0.02	0.02	0.00
Total land use for crop production ⁶	64 517	63 636	63 102	-0.84	0.16	-0.06
Total pasture land use ⁷	367 521	367 279	367 746	0.13	-0.01	0.01
GHG Emissions (Mt CO2-eq)						
Total	199	218	226	3.52	0.88	0.38
Crop	47	52	54	2.10	1.60	-0.10
Animal	151	166	172	3.97	0.65	0.54
Demand and food security						
Daily per capita caloric availability ⁸ (kcal)	2 956	3 013	3 054	1.37	-0.20	0.24
Daily per capita protein availability ⁸ (g)	83.3	84.6	85.2	0.7	-0.3	0.2
Per capita food availability (kg)						
<i>Staples⁹</i>	220.6	221.2	221.8	0.25	-0.03	-0.02
<i>Meat</i>	23.7	23.7	25.3	7.04	-0.38	0.85
<i>Dairy⁵</i>	13.1	10.7	11.1	3.64	-2.35	0.37
<i>Fish</i>	9	11	12	8.63	0.92	0.87
<i>Sugar</i>	32	33	36	7.55	0.06	0.74
<i>Vegetable oil</i>	12	14	15	9.21	1.47	1.03
Trade (bln USD)						
Net trade ³	- 56	- 79	- 107	34.34	..	..
Net value of exports ³	21.2	31	37	20.02	5.41	1.44
Net value of imports ³	77.1	110.1	144	30.35	2.95	2.25
Self-sufficiency ratio¹⁰						
<i>Cereals</i>	41.6	37.4	35	-5.2	-1.34	-0.67
<i>Meat</i>	69.3	70.4	70	-0.3	0.30	-0.21
<i>Sugar</i>	26.6	26.7	29	9.4	0.28	0.85
<i>Vegetable oil</i>	23.5	26.7	26	-2.1	2.2	-0.1

Notes: 1. Per capita GDP in constant 2010 US dollars. 2. Least square growth rates (see glossary). 3. Net value of agricultural and fisheries data follows FAOSTAT methodology, based on the set of commodities represented in the Aglink-Cosimo model valued at average international reference prices for 2014-16. Projections for not included crops have been made on the basis of longer term trends. 4. Oilseeds represents soybeans and other oilseeds. 5. Dairy includes butter, cheese, milk powders and fresh dairy products, expressed in milk solid equivalent units. 6. Crop Land use area accounts for multiple harvests of arable crops. 7. Pasture land use represents land available for grazing by ruminant animals. 8. Daily per capita calories represent availability, not intake. 9. Staples represents cereals, oilseeds, pulses, roots and tubers. 10. Self-sufficiency ratio calculated as $\text{Production} / (\text{Production} + \text{Imports} - \text{Exports}) * 100$.

Source: OECD/FAO (2021), "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

Europe and Central Asia⁹ is a diverse region that includes the European Union, United Kingdom, the Russian Federation (hereafter “Russia”), Ukraine, Turkey and Kazakhstan as the main agricultural producers. There is considerable variation across its countries in terms of stage of development, demographics, agricultural resources and public policies. Population dynamics also diverge – as a whole the region’s population is expected to expand gradually, but it remains static in Western and Eastern Europe and grows at around 1% p.a. in Central Asia. The region is highly urbanised and by 2030 75% of its population will live in urban environments.

Average income in the region is over USD 26 000 per capita per year, but there are substantial differences across countries. While the economies of Western Europe are diverse, those in more eastern regions are focused on commodities, particularly in Russia where oil and gas are critical sectors. The continued spread of COVID-19 around the world presented challenges to economies across the region. However the extent of impact from the pandemic differs in line with the region’s diversity, both in terms of economic structure and the actions taken to contain the virus. On average across Europe and Central Asia, per capita GDP declined by 7.4% in 2020 and is projected to recover by 4% in 2021, followed by average annual growth of 1.7% over the ten year period. The contraction in 2020 was most severe in Western Europe, at 7.8%. In Central Asia, where economic restrictions were less severe, the contraction was 3.3%. Across the region, the agricultural sector faced many challenges as a result of the pandemic, including logistical issues, workforce shortages and changes to demand, both in terms of quantity and product mix.

The share of primary agriculture, forestry and fish production in total GDP is low, ranging from just 1.6% in the European Union, to 9% in Ukraine. It is estimated that the share of food in household expenditures averaged about 11% in the region in 2018-2020 base period, ranging from around 5% for United Kingdom to around 19% in Central Asian countries such as Kazakhstan.¹⁰

The region produces 16% of the global value of agricultural and fish production, a share which continues to decline by 2030, largely due to slow growth in Western Europe. Crop production averages about 55% of the net value of total production, fish about 8% and livestock the remainder of about 37%. Whereas the region accounted for 12% of the total growth in the global net value of agriculture and fish in the last decade, it constituted 35% of growth in global exports. This growing export orientation is largely driven by Eastern Europe where productivity levels in both the crop and livestock sectors have improved, but a fairly static population and relatively mature consumption levels mean demand growth has been weak. Trade within the region is affected by various factors, notably the future trading arrangements between the United Kingdom and the European Union, and the Russian embargoes on imports from the European Union that have been continuously renewed since 2014. Further uncertainty has been added by the short term restrictions imposed on exports from countries in the Black Sea region in order to safeguard domestic availability during COVID-19 related lockdown periods.

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

Within the European Union in particular, environmental sustainability is increasingly prioritised, both from a consumer and policy perspective. For instance, the Farm to Fork Strategy is a growth strategy seeking to promote fair, healthy and environmentally friendly food systems, accelerating the transition to

environmental sustainability. In future, this may influence the demand structure, as well as the rate of productivity and production gains in the region. Technological progress, including digital technology, will be critical to achieve this.

2.5.2. Production

The net value of agriculture and fish production (net of feed and seed inputs) is projected to grow 8% by 2030 compared to the base period average of 2018-20, with Western Europe growing by less than 1% compared to growth in Eastern Europe of 15% and Central Asia of almost 30%. Eastern Europe's strong growth will be led by Russia and Ukraine at 12% and 22% respectively. While both crop and livestock sector growth is strong, the crop sectors are expected to grow faster than livestock in both countries. In Russia, the impact that import embargoes have had on domestic markets have stimulated local production of livestock products.

The long term decline in agricultural land use is expected to continue in future, albeit slowly, suggesting that further growth in the sector will be underpinned by productivity gains. By 2030, crop and pasture land use are expected to decline by 1.3 Mha and 2.6 Mha respectively. In relation to changes in land use, direct GHG emissions from agriculture are projected to decline 1.2% over the next decade.

The value of crop production in the region is expected to expand by 11% over the next ten years, accounting for almost 75% of the region's growth in agricultural and fish production. This expansion will be largely due to rising cereals and oilseeds output in the Black Sea region. Russia and Ukraine are projected to sustain robust growth in maize, wheat, soybean and other oilseeds to increase their share in regional production to 40% for maize, 38% for wheat and 54% for all oilseeds. Maize production grows the fastest of all crops in Russia, whereas wheat production growth outpaces others in Ukraine. Yield improvements will drive the bulk of production growth in all these commodities, though total area harvested is still projected to expand in both countries by 2030.

Livestock production growth is slower at 0.34% p.a. over the next decade. Western Europe accounts for the bulk of livestock value in the region, but as the transition to environmental sustainability continues, a minor contraction over the coming decade will see its share diminish from 64% in the base period, to 61% by 2030. Stronger growth in the rest of the region still sees the total value of livestock production expand by 4% over the ten year period. Growth will be based predominantly on intensified production resulting in higher carcass weights. Growth in the total volume of poultry production is expected to be robust across the region, increasing by 10% by 2030 relative to the 2018-20 base period. Most poultry will be produced to supply the domestic market and per capita consumption will rise by 1.5 kg/capita to an average consumption of 24 kg/capita per year. Fish production is expected to grow by 7% over the coming decade. Despite a 14% growth of aquaculture compared to 6% for capture fisheries, aquaculture will still represent only 20% of the total fish production in the region by 2030.

Production of dairy products is expected to remain strong. Positive growth is anticipated across the region, and while the rate of expansion slows slightly relative to the past decade in Western Europe and Central Asia, growth of 0.7% p.a. in Eastern Europe represents an acceleration from the past decade. Across the region, domestic food demand for dairy products will remain strong, contributing 12% of daily calorie intake by 2030 and 19% towards daily protein availability. However, the dairy output expansion will increasingly feed international demand, as an increasing share of the region's butter, cheese and milk powders is expected to be exported over the next decade. The region as a whole will account for 44% of global dairy product exports by 2030. The bulk of the region's dairy product exports accrue from the European Union, which will grow its share in total regional exports of dairy products to 72% by 2030. Shaped by the transition towards environmental sustainability, the European Union's share of global milk production will however decline to 16% by 2030, compared to 18% in the base period.

2.5.3. Consumption

Although most of the region constitutes a fairly mature market, consumers were not spared from the impact of the COVID-19 pandemic (De Vet et al., 2021^[5]) (FAO, 2020^[6]) (OECD, 2020^[7]). This impact entails shorter term affordability implications, particularly in countries where consumers spend a larger share of total income on food products and where income support measures were less comprehensive, as well as changes in product mix and procurement channels. Retail sales increased and more food was consumed at home, while consumers tended towards local products with shorter supply chains, as well as products with a longer shelf life. The pandemic further accentuated consumer trends that had been evident before, such as rising awareness of healthy eating habits.

Average daily calorie availability per capita in the region is well above the global average and is projected to increase by a further 83 kcal/day to exceed 3460 kcal/day. This increase is mainly attributed to increased consumption of cereals, pulses and dairy products. Food demand for sugar is projected to continue to contract as consumers in Europe seek to curb high consumption levels amid increasing health consciousness. Western Europe's sugar consumption per capita is projected to fall by 1.5 kg per year by 2030, but will remain almost 50% higher than the world average.

Protein availability per capita in the region is projected to increase by 3 g/day to 105 g/day by 2030, which is roughly 7% higher than the world average of 98 g/day. Pulse consumption, which has been rising rapidly from a low base in the last decade given its positive health image, is projected to rise 27% to 5.5 kg per capita by 2030. Per capita meat consumption may rise slightly to 59 kg/capita per year, largely due to higher poultry meat consumption, which is anticipated to be the fastest growing meat item, reaching 24 kg per capita. Bovine and pig meat consumption per capita is anticipated to decline over the period, by 2.2% and 2.5% respectively. By contrast, fish consumption is expected to rise slowly to reach 16 kg per capita per year by 2030 – almost 3kg below the global average. Significant differences occur across the region, with central Asia reflecting very low fish consumption, whereas consumption levels in Western Europe are well above the global average. Dairy product consumption is expected to rise faster than meats, adding 8% to current levels by 2030.

Owing largely to the importance of animal products, the region consumes almost a quarter of global protein feed. With slower growth projected for the livestock sector, which includes a positive contribution for poultry and sheep meat, but declining pig meat and bovine sectors, feed use is anticipated to increase only 4% by 2030 over the base period. Maize feed use is expected to expand faster than wheat, reflecting stronger meat production growth in Eastern Europe relative to a minor decline in Western Europe.

Non-food demand for vegetable oil is expected to contract as its role in biofuel production in the European Union will diminish. The region is decreasing its demand for diesel, with an ongoing shift towards electric vehicles. The region's production of biodiesel is therefore projected to contract 7% by 2030, reducing its share of global biodiesel production from 34% to 30%.

2.5.4. Trade

The European and Central Asian region has seen a substantial shift in trade patterns over the past decade. Traditionally the region was one of the largest net importers. Over the past decade, rapid growth in exports has seen Eastern Europe move to a net export position (Figure 2.18). The bulk of export growth originated from Russia and the Ukraine, where the combination of rising productivity and slow domestic demand growth resulted in an ever increasing exportable surplus. With a large land base, both Eastern Europe and Central Asia have a comparative advantage in cereal and oilseed production. Across the total Europe and Central Asian region, growth in total exports outpace growth in imports over the projection period, resulting in a substantial improvement in its net trade balance by 2030. In light of already high consumption levels and a stagnant population, the trend of rising exports is set to persist.

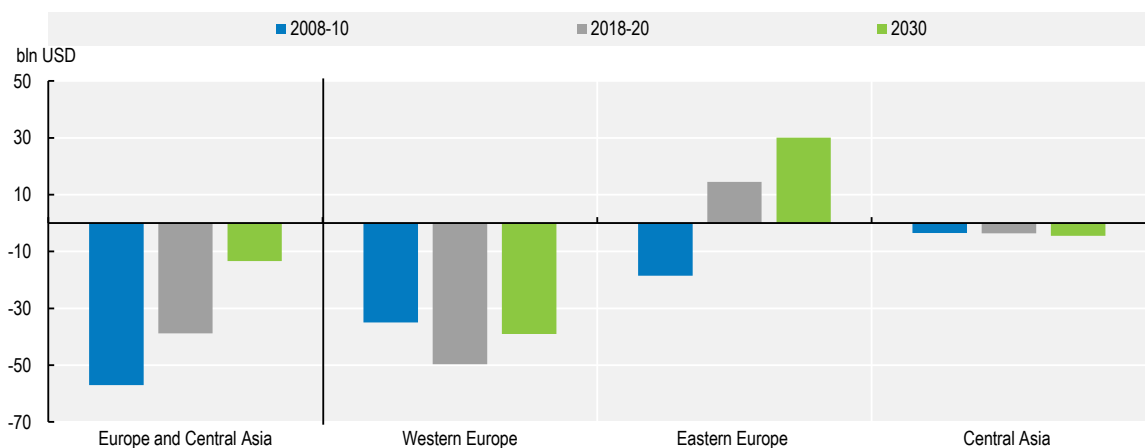
The total value of exports from the region are set to expand 21% by 2030 relative to the base period, underpinned by a 25% expansion in crop exports and a more subdued 14% expansion in animal product exports. The region's cereal exports will grow from 161 Mt in the base period to 209 Mt in 2030, an increase of 30%, with the Near East and North Africa region as a major importer. This will see its global market share increase from 36% in the base period to 39% by 2030, its highest share ever. Similarly, the region will add almost 28 Mt to its wheat exports by 2030, to grow its share in the global market to 57% by 2030, from 54% in the 2018-20 base period. From an import perspective, the requirement for soybean and protein meal imports is anticipated to decline by 5% and 7% respectively by 2030, which still leaves it as one of the major importers of these products globally. The region also remains a net importer of sugar, but this requirement is set to contract 29% by 2030.

In terms of livestock, the region is a major exporter of meat and dairy products. The region accounts for 42% of global pig meat exports and 29% of global poultry exports. This is mostly attributed to the European Union, which accounts for 90% of the region's pig meat exports and 55% of the region's poultry meat exports. The Central Asian region is a net importer of meat products and extensive trade occurs within the broader region. In this respect, the movement controls imposed through the pandemic induced lockdown period in 2020 posed unprecedented challenges to logistical systems, but the sector showed resilience to keep products available. In light of the importance of intra-regional trade, the future status of Russia's import embargo will affect trade within and outside the region, while any recurrence of the short term export controls imposed through the COVID-19 lockdown could have a substantial influence on markets.

The region is the most important dairy product exporter in the world, with a current share of 41% in the global trade of dairy products. Much of this is attributed to the European Union, which accounts for 29% of global dairy product trade. For cheese, the region as a whole constitutes 60% of the global market, with the European Union contributing 41%. For all dairy products, the European Union and the region as a whole's share in global trade is set to rise. By 2030, the European Union will contribute 46%, 33%, 35% and 14% respectively of global exports for cheese, butter, SMP and WMP.

Led by Russia and Norway, the region is also one of the most important exporters of fish. Russian exports are set to expand by 33% over the ten year projection period, supporting growth of 13% for the Europe and Central Asian region.

Figure 2.15. 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 (2021). FAOSTAT Trade Indices Database, <http://www.fao.org/faostat/en/#data/TI>; OECD/FAO (2021), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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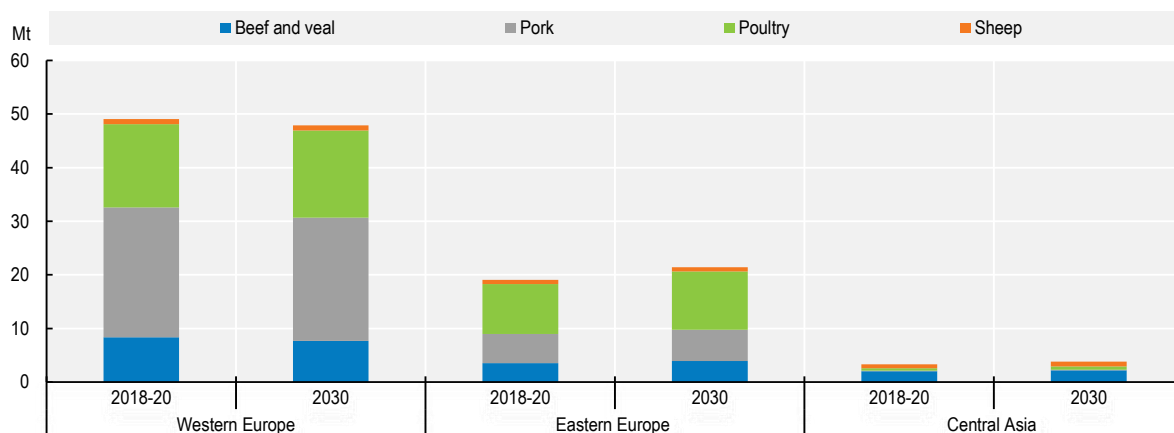
Figure 2.16. Change in area harvested and land use in Europe and Central Asia



Source: OECD/FAO (2021), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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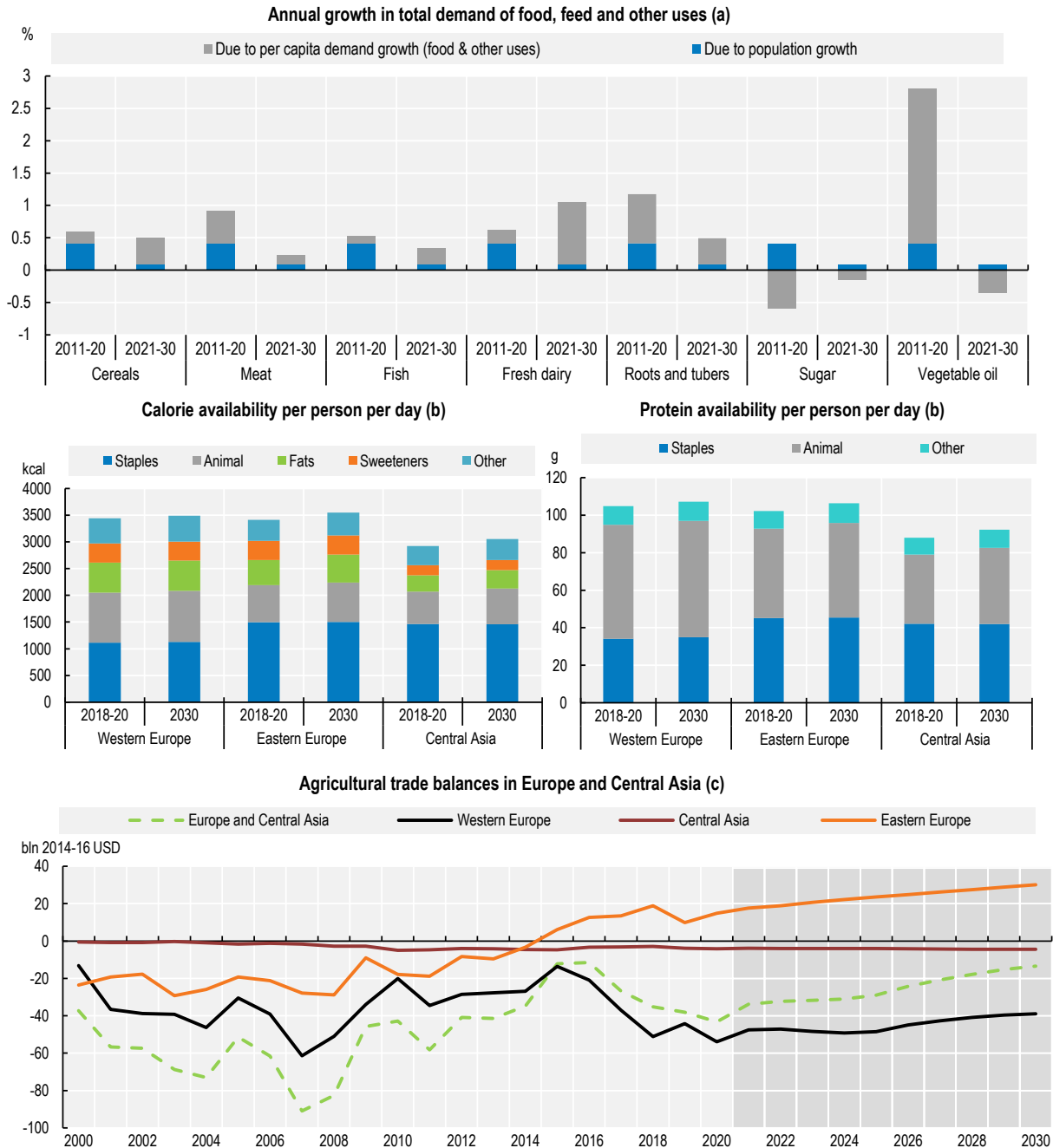
Figure 2.17. Livestock production in Europe and Central Asia



Source: OECD/FAO (2021), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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

Figure 2.18. Demand for key commodities, food availability and agricultural trade balance in Europe and Central Asia



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

Source: FAO (2021). FAOSTAT Value of Agricultural Production Database, <http://www.fao.org/faostat/en/#data/QV>; OECD/FAO (2021), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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

Table 2.4. Regional indicators: Europe and Central Asia

	Average			%	Growth ²	
	2008-10	2018-20 (base)	2030	Base to 2030	2011-20	2021-30
Macro assumptions						
Population ('000)	891 851	929 872	942 601	1.37	0.41	0.09
Per capita GDP ¹ (kUSD)	23.82	26.10	30.27	15.99	0.94	1.71
Production (bln USD)						
Net value of agricultural and fisheries ³	592.7	679.7	736.0	8.28	1.35	0.73
Net value of crop production ³	324.9	374.4	416.6	11.27	1.44	1.00
Net value of livestock production ³	220.6	252.4	262.6	4.05	1.22	0.34
Net value of fish production ³	47.2	53.0	56.8	7.33	1.40	0.63
Quantity produced (kt)						
<i>Cereals</i>	516 835	582 818	648 737	11.31	1.55	0.88
<i>Pulses</i>	7 728	10 304	13 349	29.54	3.51	2.50
<i>Roots and tubers</i>	26 770	30 284	32 089	5.96	1.07	0.57
<i>Oilseeds⁴</i>	47 283	68 581	80 453	17.31	3.37	1.67
<i>Meat</i>	59 203	71 442	73 103	2.32	1.90	0.18
<i>Dairy⁵</i>	24 632	29 077	32 449	11.60	1.68	1.10
<i>Fish</i>	16 940	18 931	20 303	7.25	1.39	0.62
<i>Sugar</i>	24 776	28 680	30 049	4.77	0.18	0.66
<i>Vegetable oil</i>	22 994	34 515	38 774	12.34	3.89	1.31
Biofuel production (mln L)						
<i>Biodiesel</i>	9687.52	15965.57	14921.01	-6.54	4.33	-1.08
<i>Ethanol</i>	6 006	7 694	8 104	5.33	0.69	0.22
Land use (kha)						
Total agricultural land use	802 064	798 983	795 092	-0.49	-0.05	-0.04
Total land use for crop production ⁶	337 322	333 826	332 512	-0.39	-0.05	-0.04
Total pasture land use ⁷	464 743	465 157	462 580	-0.55	-0.05	-0.04
GHG Emissions (Mt CO₂-eq)						
Total	665	691	682	-1.22	0.54	-0.11
Crop	190	205	205	0.31	0.92	-0.06
Animal	458	466	458	-1.73	0.35	-0.13
Demand and food security						
Daily per capita caloric availability ⁸ (kcal)	3 331	3 380	3 463	2.46	0.20	0.23
Daily per capita protein availability ⁸ (g)	100	102	105	2.9	0.2	0.3
Per capita food availability (kg)						
<i>Staples⁹</i>	167.5	168.1	170.6	1.48	0.09	0.14
<i>Meat</i>	54.7	57.8	58.9	1.90	0.49	0.16
<i>Dairy⁵</i>	26.7	29.3	31.6	8.07	0.95	0.90
<i>Fish</i>	16	16	16	2.26	-0.48	0.20
<i>Sugar</i>	36	35	34	-1.69	-0.48	-0.11
<i>Vegetable oil</i>	20	25	25	1.14	2.77	0.43
Trade (bln USD)						
Net trade ³	-48.9	-38.8	-13.4	-65.5	..	..
Net value of exports ³	411.5	530.4	644.1	21.43	2.5	1.73
Net value of imports ³	460.4	569.3	657.5	15.49	2.4	1.24
Self-sufficiency ratio¹⁰						
<i>Cereals</i>	110.2	121.6	128	5.5	0.84	0.42
<i>Meat</i>	98.0	106.8	106	-0.8	0.92	-0.03
<i>Sugar</i>	81.5	87.4	93	6.0	0.65	0.78
<i>Vegetable oil</i>	79.6	91.5	104	13.8	1.05	1.64

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

Source: OECD/FAO (2021), "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

North America comprises two highly developed countries, the United States and Canada, implying that it is more homogeneous than others covered in this chapter. Both economies are mature and diverse, with agriculture's (including forestry and fisheries) share to total GDP less than 1%. The region is a notably important contributor to global agriculture. Its 366 million people comprise just 5% of the global population, yet it produces 10% of global agricultural and fish output. It has the most agricultural land per person and provides the highest value of agricultural and fish production per capita. Over the 2018-20 base period, the region had the second largest trade surplus for agricultural commodities. Nevertheless, in proportionate terms, the role of North America in global agriculture is slowly diminishing over time, as the output from other regions are growing more quickly. By 2030, North America is expected to constitute 9% of the global value of agriculture and fish production. While it is still expected to have the second largest trade surplus by 2030, this surplus will be less than half of the base period value by 2030.

Agriculture in North America is characterised by high input intensity in general, but particularly for capital, as agricultural production occurs to a significant degree on large commercial units. Consequently, the region exhibits very high partial factor productivities for land and livestock, as measured by crop yields, milk yields and livestock/meat off-take ratios. The long term decline in agricultural land use has slowed in recent years, but land utilised for crop production continues to trend downwards and contracted by 2.4% over the past decade. Yields have improved to the extent that the value of crop production increased by 17% over the same period. This trend is expected to continue. Animal production is very important in the region, contributing 35% of its net value of agricultural production. This compares to the global average share of livestock of 28%. However, livestock inventory is proportionately lower given its high productivity. For example, bovine meat production per animal in inventory is three times the global average level. The region is a small producer of fish compared to other regions, with a current 4% share in agricultural value within the region and a dwindling share of global fish production, which is set to reach 3% by 2030.

Food consumption per capita in the region is the highest of all. This is enabled by the highest per capita income (USD 54 280) and the highest urbanisation rate (83%), which affects both the level and composition of food intake. The COVID-19 pandemic and the measures imposed to curb its spread reduced per capita GDP in the region by 4.5% in 2020. Despite the largest year-on-year increase in 2020 in the prevalence of food insecurity since 2014, the mature consumer base, combined with income support measures implies that the shock from the pandemic had a greater influence on the composition and distribution of food sales than absolute quantities consumed. Retail sales increased, while food away from home declined, forcing changes in the food supply chain.

Following a recovery in per capita GDP of almost 3% per annum in 2021 and 2022, real per capita income is projected to grow at an average of 1.4% p.a. over the coming decade. With income levels already high and population growth at 0.6% p.a., possible changes in dietary preferences could be important in influencing food demand over the outlook period. Further to its influence on spending power, the pandemic may also have lasting impacts on such preferences, having provided a renewed focus on the benefits of healthy eating.

While estimates include considerable food waste, calorie and protein availabilities in the region already averaged almost 3 760 kcal/capita per day and 113 g/capita per day over the base period, some 29% and 22% higher than the global average. Food consumption is proportionately high in animal products, with caloric and protein shares of 27% and 64% respectively, compared to global averages of 18% and 35%. North Americans consume substantial amounts of vegetable oil and sweeteners, with caloric shares of 19% and 15% compared to the global averages of 10% and 8% respectively. The North American diet has led to problems of obesity and incidence of food related non-communicable diseases such as diabetes. However, despite this level of aggregate consumption, food insecurity was estimated to be experienced

by 10-13% of the region's population prior to accounting for pandemic related impacts (USDA, 2020^[8]) (Tarasuk and Mitchell, 2020^[9]).

North America (specifically the United States) is the largest bio-fuel producing region, with a production share of global output approaching 50%. It comprises primarily ethanol derived from maize feedstocks, and to a much lesser extent, biodiesel derived from soybean oil. Production has been mainly policy driven, with mandates largely filled at blending rates near the blend wall for transportation fuels. Trade within the region is important, with Canada relying strongly on ethanol imports from the United States in order to fulfil its own blending mandate.

2.6.2. Production

Agricultural and fish production in North America is projected to continue expanding, albeit at a slower rate of 9% over the coming decade, relative to the past expansion of 15%. The general cause of slowing growth is stable and in some instances declining real prices for the main crop and livestock commodities and strength in the US dollar relative to competing countries. Growth is expected to be stronger in crop sectors, which grow 10% by 2030 relative to the base period, whereas the value of livestock production only expands by 8%.

Growth in crop output comes despite a continuation of the historic decline in crop land use, which contracts by a further 3% by 2030. Land use in cereal production is projected to remain almost unchanged, thereby increasing its share in total cropland to 41% by 2030. Oilseed area is expected rise by 3% over the next ten years, supported by high prices in the beginning of the outlook period, and feed demand from livestock production growth. This implies that the share of oilseeds in total crop area will rise to 28% by 2030. From a much smaller base, the land used for pulse production will also expand by 11% over the next ten years, while declines are evident in roots and tubers. Total area harvested in the region is expected to remain fairly stagnant, rising by only 1.4% over the next ten years due to intensification. This entails an increase in the United States of 1.1%, together with a 2.4% increase in Canada. In the United States, total crop output volume is set to rise by 8% relative to the base period, whereas in Canada this growth will be faster at 13%, building on a strong season in 2020, where field crop production in Canada reached record levels. In both countries, production gains will emanate mostly from yield gains in the range of 9% for cereals and 10% for oilseeds.

The impact of the pandemic related recession resulted in downward pressure on meat prices in 2020, due both to consumer spending power and the influence of the disease and measures to contain its spread on processing facility capacity. After a short term recovery, real prices trend downwards over time. Nevertheless, feed prices remain competitive and total meat production in North America is expected to rise to 56 Mt by 2030, a 9% increase relative to the base period. Of the 4.5 Mt gain, 4 Mt, or 88%, is attributed to the United States. Poultry meat production is expected to grow faster than any other meat type at 1.1% p.a. and accounts for more than 60% of additional meat produced by 2030. Bovine meat and pig meat production are expected to increase by modest annual average rates of 0.6% and 0.3% respectively. Consequently, poultry will increase its share in total meat output to 47% by 2030.

An increase in milk production of 13.5% will be achieved by growth in dairy cow milk yields of 11%, as dairy herds expand by only 2% over the same period. Led by consumer preferences, an increasing share of milk will be allocated to processed dairy products and a decreasing share to fluid milk products.

Fish production in North America, which is dominated by captured fisheries (89%), is expected to rise by 8% by 2030 relative to the base period, with aquaculture increasing its share of total production to 12.5% by 2030. The latter sector continues to develop from a low base, encouraged by favourable relative prices emanating from firm demand for fish.

The increase total GHG emissions from agriculture is expected to slow relative to the past decade. Emissions will be 1.3% higher in 2030 than in the base period. Emissions from livestock activities are the major contributor, growing by 3.2% in light of minor ruminant inventory expansion. Emissions from the crop sector, however, are projected to decline by 2.7%.

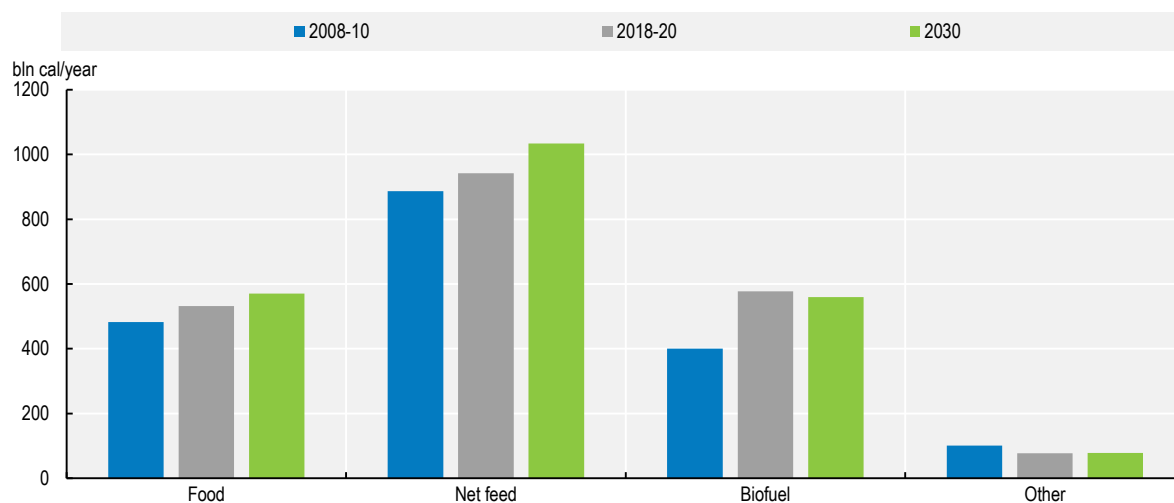
2.6.3. Consumption

Movements in food consumption on a per capita basis will largely be determined by adjustments in preferences, which are projected to be minor. Though the effects of the pandemic may induce a greater focus on healthy eating, this would have a greater influence on fresh produce, which is not directly covered in this *Outlook*. As measured by caloric availability, food consumption in North America is set to remain at high levels increasing by a further 48 kcal/capita/day by 2030. This implies that average caloric availability in the region will exceed 3800 kcal/capita/day. Regionally, the greatest increase is expected to come from vegetable oils (+25kcal) followed by dairy products (+19 kcal), meat products (+17 kcal) and pulses (+11 kcal). Such gains are partly offset by a decline in calories from sweeteners (-43 kcal) and cereals (-7kcal). The increase in caloric availability will be greater in Canada than in the United States, but the absolute levels of caloric availability will still be higher in the United States than in Canada by 2030.

Protein intake in the region will increase only marginally from 113 g/day in the base period, to 117g/day by 2030. The split between animal and vegetal sources is expected to remain constant, with 64% of total protein availability obtained from animal sources. Consumption of both meat and dairy products are expected to rise further, with a comparatively larger (2.2 kg/capita) increase in meat products. The bulk of consumption growth in this sector is attributed to poultry, where consumption is set to increase by 2.4 kg per capita per year, compared to a minor increase of 0.7kg per capita for pork and a decline of 0.5 kg per capita for bovine meat. Protein availability from dairy products is also expected to rise, as growth in cheese, butter and WMP consumption more than offsets the continued decline in fresh dairy products. Fish consumption is projected to increase 4% by 2030 relative to the base period. Despite the trend decline in cereal consumption, growth in pulse intake will result in modest gains in protein availability from vegetal sources.


Feed use in the region is a significant offtake of agricultural output, consuming more energy/calories than final food use (Figure 2.19). Following livestock production, total feed use is projected to rise by 10% to 290 Mt by 2030, with shares from sources of maize (including distiller dried grains) rising slowly over time to 67%, while protein meal remains stable at 17%.

Biofuel production is another important market uptake for feed grains in the region. Ethanol production is projected to decline to just under 60 billion litres by 2030, down by 3% from the base period, on the back of reduced gasoline usage in the United States and Canada over the coming decade. Decarbonisation programs will sustain ethanol use to some extent, limiting the decline in production. Biodiesel production is also expected to decline by 2% over the coming decade. The outlook for biofuel is heavily contingent on developments in the energy sector, and biofuel policies in the region.

Figure 2.19. 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 by the *Outlook* are extended by trends.

Source: FAO (2021). FAOSTAT Food Balances Database, <http://www.fao.org/faostat/en/#data/FBS>; OECD/FAO (2021), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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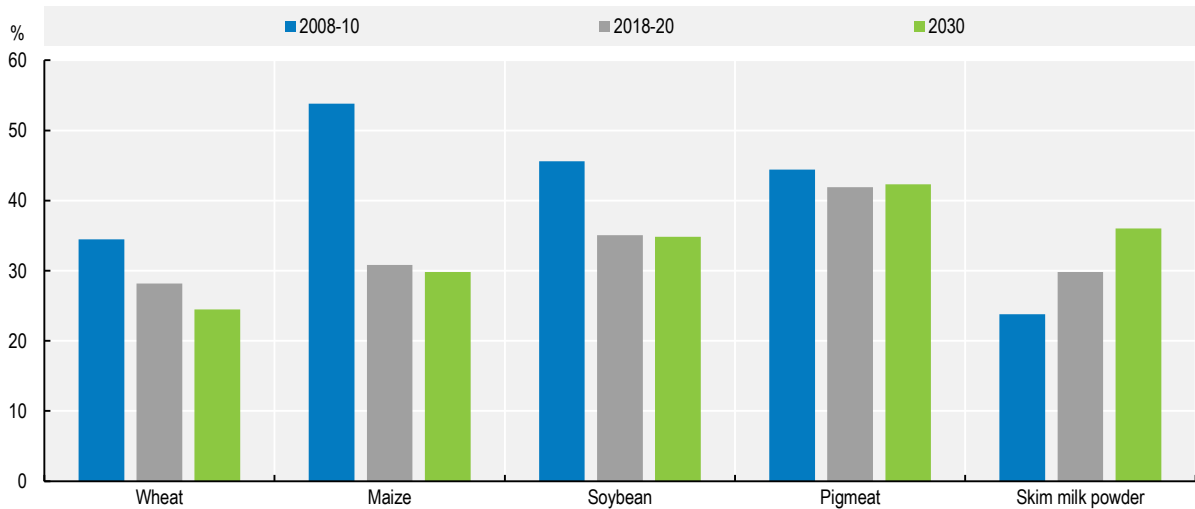
2.6.4. Trade

North America's agricultural trade surplus remains second only to Latin America and the Caribbean, but has declined by more than 25% over the past decade. This trend is expected to prevail over the outlook period, as the net value of imports into the region grows faster than that of exports from the region. Growth in both exports and imports will decelerate. The slower growth reflects weakening domestic and foreign demand, and the subsequent slowdown in production growth. Trade relations, particularly between the United States and China, will substantially affect the region, as bilateral trade has been significant. These relations have improved and in 2021, China is expected to once again become the top market for exports from the United States. While this points to resumed and potentially expanded trade opportunities, it is also a factor of China's expansion in poultry production, rapid rebuilding of its pig herd and resulting increased demand for feed products. The United States-Mexico-Canada (USMCA) Agreement, which was implemented on 1 July 2020 to replace the North American Free Trade Agreement (NAFTA), will improve intra-regional trade, especially for certain dairy products.

The net value of exports, measured at international commodity prices in 2014-16, is, projected to rise 14% by 2030 relative to the 2018-20 base period. This compares to an increase in the last decade of 21%. Reasons for slower growth relate largely to soybean exports, where growth slows substantially relative to the past decade, despite improvements in trade relations with China. Ethanol exports are also projected to decline in the coming decade, along with pig meat, where the rebuilding of China's herd as it recovers from the devastating African Swine Fever outbreak will reduce its demand for imports. The region has lost considerable trade share in recent times for cereals and oilseeds. In the case of cereals, this trend is expected to continue, but at a slower rate, due to growing competition from Latin America and the Black Sea region. North America's share in global oilseed exports is set to stabilise at 35% by 2030 (Figure 2.20). While North America's share in global pig meat trade is expected to stabilise, it will continue to rise for Skim Milk Powder.

Despite its trade surplus, the region is also the third largest importer of agricultural produce in the world. The net value of imports, measured in constant 2014-16 value, is expected to rise 25% by 2030. The region used to be a large net importer of bovine meat, and while it still has a large share of world imports (18%), the region became a net exporter in the last decade. This trend is expected to persist. The region remains a relatively large importer of fish, with a 15% share of global markets and imports are set to grow by 6% by 2030. The region is also a major importer of fresh fruit and vegetables.

Figure 2.20. Trends in export market shares of selected commodities of North America



Source: OECD/FAO (2021), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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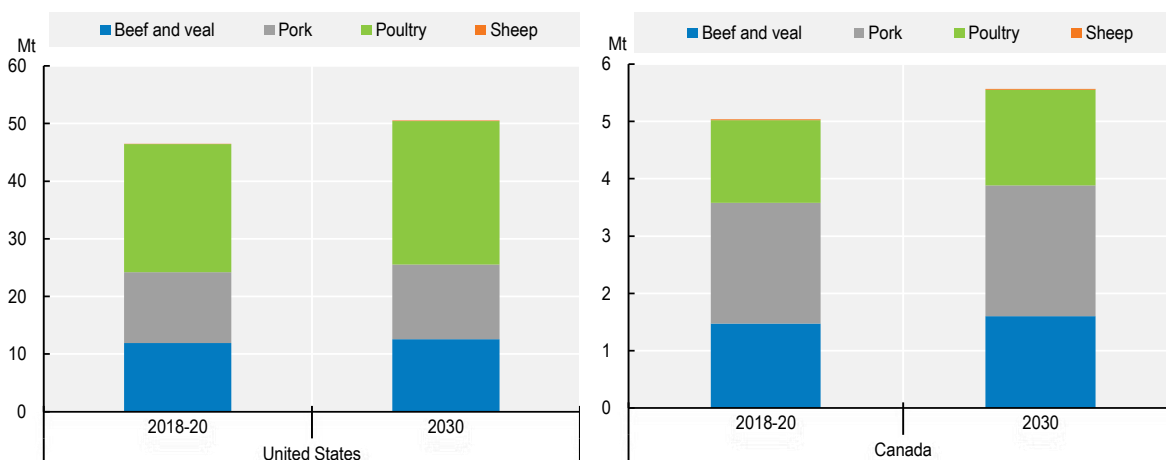
Figure 2.21. Change in area harvested and land use in North America



Source: OECD/FAO (2021), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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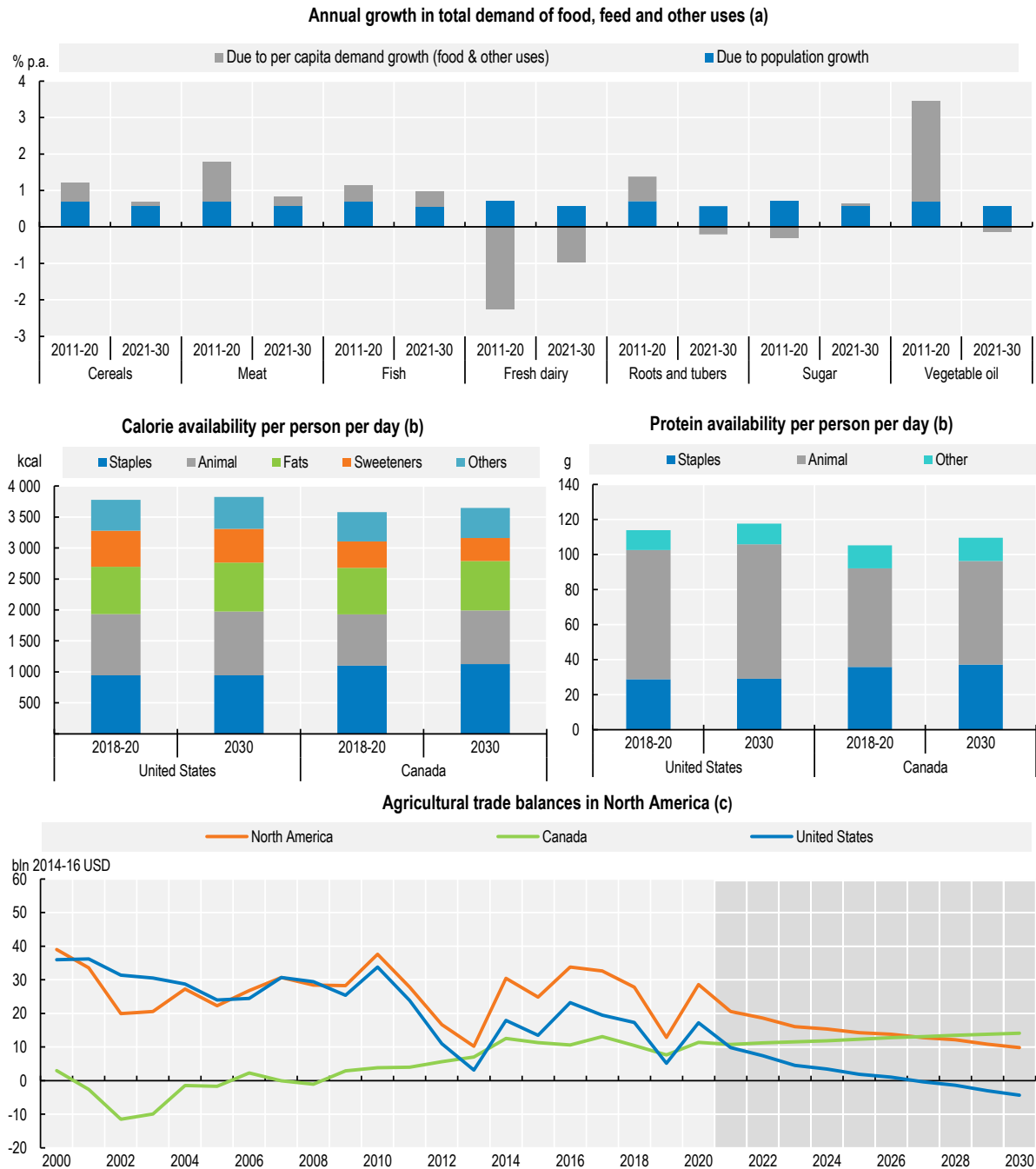
Figure 2.22. Livestock production in North America



Source: OECD/FAO (2021), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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Figure 2.23. Demand for key commodities, food availability and agricultural trade balances in North America



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

Source: FAO (2021). FAOSTAT Value of Agricultural Production Database, <http://www.fao.org/faostat/en/#data/QV>; OECD/FAO (2021), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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Table 2.5. Regional indicators: North America

	Average			%	Growth ²	
	2008-10	2018-20 (base)	2030	Base to 2030	2011-20	2021-30
Macro assumptions						
Population ('000)	340 012	366 464	390 476	6.55	0.70	0.57
Per capita GDP ¹ (kUSD)	48.44	54.28	61.87	13.98	1.28	1.38
Production (bln USD)						
Net value of agricultural and fisheries ³	343.6	395.3	431.1	9.06	1.73	0.77
Net value of crop production ³	204.4	239.3	262.9	9.85	2.14	0.76
Net value of livestock production ³	122.6	138.6	149.4	7.82	1.36	0.79
Net value of fish production ³	16.5	17.4	18.8	8.13	-0.68	0.61
Quantity produced (kt)						
Cereals	455 153	489 594	529 621	8.18	1.53	0.58
Pulses	7 422	10 582	12 798	20.94	4.68	1.69
Roots and tubers	4 955	5 566	5 816	4.50	0.94	0.28
Oilseeds ⁴	16 451	24 206	27 703	14.44	3.73	1.12
Meat	45 756	51 543	56 085	8.81	1.73	0.73
Dairy ⁵	11 415	13 516	15 364	13.67	1.73	1.09
Fish	5 898	6 213	6 713	8.05	-0.69	0.60
Sugar	6 592	7 440	8 134	9.33	0.50	0.39
Vegetable oil	12 897	18 241	19 668	7.82	3.61	0.91
Biofuel production (mln L)						
Biodiesel	2092.57	8833.02	8677.32	-1.76	9.75	-0.31
Ethanol	44 085	61 336	59 620	-2.80	1.48	-0.32
Land use (kha)						
Total agricultural land use	467 803	463 418	460 804	-0.56	0.05	-0.05
Total land use for crop production ⁶	176 523	172 303	166 462	-3.39	0.11	-0.31
Total pasture land use ⁷	291 280	291 115	294 342	1.11	0.01	0.10
GHG Emissions (Mt CO ₂ -eq)						
Total	397	414	419	1.33	0.49	0.07
Crop	131	140	136	-2.74	0.08	-0.21
Animal	245	246	254	3.16	0.54	0.21
Demand and food security						
Daily per capita caloric availability ⁸ (kcal)	3 680	3 756	3 804	1.28	0.42	0.04
Daily per capita protein availability ⁸ (g)	111.9	113.0	116.8	3.3	0.6	0.2
Per capita food availability (kg)						
Staples ⁹	136.0	133.6	133.6	-0.02	0.09	-0.03
Meat	94.0	97.9	100.1	2.25	1.24	0.24
Dairy ⁵	31.2	33.4	34.9	4.33	0.90	0.33
Fish	19	21	21	4.31	1.11	0.33
Sugar	31	30	31	1.22	0.09	0.02
Vegetable oil	34	40	40	0.91	1.57	0.06
Trade (bln USD)						
Net trade ³	31	23.09	10	-57.39	..	..
Net value of exports ³	146.3	177	202	14.10	2.78	1.26
Net value of imports ³	114.9	154.1	192	24.81	2.80	1.92
Self-sufficiency ratio ¹⁰						
Cereals	127.5	129.6	129	-0.8	0.60	-0.06
Meat	114.8	116.4	115	-0.8	0.09	-0.03
Sugar	60.0	64.9	65	0.7	0.18	-0.31
Vegetable oil	102.8	99.6	101.3	1.7	0.09	0.42

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

Source: OECD/FAO (2021), "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

The Latin America and Caribbean¹¹ region comprises about 8.5% of the global population and will add another 58 million people by 2030. The region has urbanised rapidly and by 2030, 84% of the population is expected to reside in urban settings. This makes it the most urbanised amongst developing regions. This rapid urbanisation implies the most of the region's poor dwell in urban locations, but the incidence of poverty in rural areas remains persistently high. The region's farm structures are highly diverse: large, commercial export-oriented farms dominate agriculture in the Southern Cone, particularly in Argentina and Brazil, but there are also some 15 million smallholder and family farms responsible for much of the region's food production.

Even prior to COVID-19, the region was affected by considerable economic uncertainty, which has only been heightened by the pandemic. On a per capita basis, incomes grew by only 0.2% over the past decade. Exchange rates, particularly in Argentina, were exceptionally volatile, in many cases around a rapidly depreciating trend in nominal terms. The region has been particularly hard hit by the pandemic and in 2020, per capita GDP declined by 8.4%. As in many other developing regions, exchange rates depreciated sharply. In countries such as Argentina, whose economy already faced structural challenges prior to the pandemic, the income contraction was even sharper. After initially making good progress in decreasing the prevalence of undernourishment in the region, it had started to increase again post 2015. The combined impact of economic recession, deteriorating financial conditions and value chain disruptions could have accelerated this trend, pushing a further 16 million people into extreme poverty in 2020 and thereby exacerbating food insecurity. The year-on-year increase in the prevalence of moderate to severe food insecurity in the Latin America and Caribbean region was larger than any other region in 2020. From a substantially reduced base, per capita GDP in the region is expected to recover by an annual average of 1.5% over the coming decade. This will enable average income levels to rise to USD 10 100 per capita by 2030, 22% below the global average. The average share of food in household expenditures is estimated to be around 13% in the period 2018-2020, implying that macro instability and food prices may have considerable impact on access to food in the region.¹²

Abundant in land and water, the region accounts for 13% of the global production value of agricultural and fish commodities and 17% of the net export value of such products. This share is set to increase further over the coming decade, underscoring the importance to the region of trade openness at a global level. Export demand will be the critical source of growth for the sector over the medium term.

Despite the importance of exports, the primary agriculture and fish sectors account for about 5% of Gross Domestic Product. This share could increase in the short term, given agricultures greater resilience to the imposition of economic restrictions resulting from the pandemic and the expanded role of its agricultural exports at a time when several countries outside the region constrained exports to ensure domestic supply. As for other regions, this share is anticipated to decline marginally in Latin America and Caribbean over the medium term.

2.7.2. Production

Agricultural and fish production in the Latin America and Caribbean region is projected to expand by 14% over the next ten years. Just under 60% of this growth is attributed to crop production, while about 37% is due to expansion of the livestock sector. Merely 3% originates from the development of fish output.

Despite the region's land abundance, intensification will be important to crop production expansion. Crop land use is projected to grow by 3%, while crop area harvested will grow by 5%, due to rising prevalence of double cropping. Of this 7.7 Mha growth in harvested area by 2030, nearly 53% and 23% are attributable to additional cultivation of soybeans and maize respectively. The region will remain the largest producer of

soybeans, with its global production share exceeding 54% by 2030, a minor increase from the base period. Average yields are expected to rise over the next ten years by around 10% for most major commodities and will account for a substantial share of production growth.

Livestock production growth will benefit from productivity gains and further intensification, with increased use of feed grains in production. Poultry production will account for almost 70% of growth in meat production by 2030, with bovine and pork production constituting 17% and 14% respectively. Despite short term increases in the early years of the outlook, feed grain prices will be favourable over the medium term, supporting expansion of poultry and pork production, both of which rely on intensive use of feed in production systems. Bovine meat expansion will essentially result from productivity gains and increased carcass weights, with herd numbers remaining almost unchanged by 2030.

Fish production will recover from a contraction over the past ten years to register growth of 5% by 2030. Output growth is almost exclusively attributable to the development of aquaculture in several countries across the region. Captured fisheries are expected to be volatile over the projection period, influenced by El Niño effects, which tend to affect fish (mainly anchoveta) used for the production fishmeal and fish oil.

GHG emissions are projected to grow marginally by 0.1% p.a. over the next decade. The bulk of this increase accrues from crop production, where emissions will increase by 4.4% over the ten-year period. Emissions from animal sources will remain fairly stable.

2.7.3. Consumption

Following a decline in 2020 & 2021 owing to the impact of the pandemic on purchasing power, per capita calorie intake is projected to rise in the medium term to reach 3074 kcal/day by 2030, a gain of 50 kcal/day from the base period 2018-20. Almost 57% of this increase is attributed to vegetal products, mainly cereals and vegetable oil. Sugar consumption will decline, in line with a longer term trend of reducing sugar intake in the region. Despite the decline, Latin America and the Caribbean will remain the largest sugar-consuming region in the world on a per capita basis. Initiatives such as improved labelling legislation have been imposed across the region in an effort to address the rising prevalence of overweight and obesity.

Per capita protein intake is expected to rise to 89 g/day by 2030, an increase over the period of 2.6 g/day. Animal products will contribute the bulk of the increase at almost 56%, with rising consumption of dairy products contributing the most to this increase. For its middle-income profile, the region's meat consumption is already high at almost 61 kg/year, almost double the average world level. However, per capita meat consumption is projected to rise by only 3.8% over the next decade, as consumers increase their intake of protein from other sources. Consumption of fish will rise by only 0.2 kg/capita, merely half of the growth observed over the past decade.

Increasing intensification of the livestock sector is expected to lead to an 18% increase in feed use over the period. Most of that increase will come from maize, whose feed use will expand by 21%, but protein meal is also projected to expand by 18%. This implies that maize and protein meal will constitute more than 85% of additional feed use between them.

The share of sugarcane output directed to ethanol production is set to decline marginally by 2030, a reversal of the trend observed over the past decade on the back of slowing demand growth globally. Nevertheless, ethanol production from the region is still expected to increase 4% by 2030 relative to the base period, to contribute 26% of global growth in ethanol production. Brazil, with its Renovabio program, is the biggest ethanol producer in the region and will remain an important contributor to the global market. The evolution of global energy and transportation sectors will remain a major uncertainty facing the region's biofuel sector.

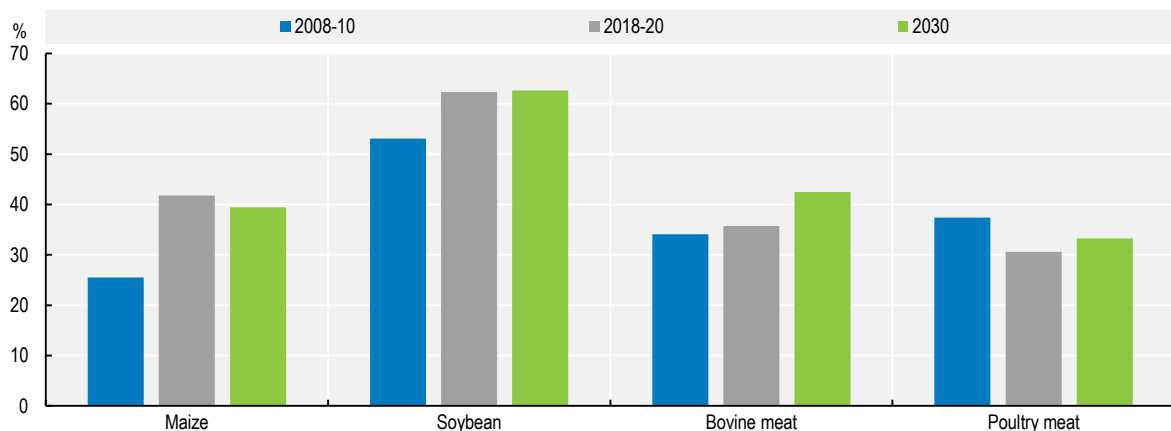
2.7.4. Trade

Trade is key to the success of the region's agriculture and fish sectors, making it less vulnerable to exogenous shocks and economic risks within the region. The share of output traded in the global market has also increased consistently in the past. Over the coming decade, the net value of exports from the region is projected to expand by 31%, which is only just more than half of the rate achieved over the past ten years. This reflects a significant slowdown in export growth from both Brazil and Argentina, which are the biggest exporters in the region. With exports of fruit and vegetables from countries such as Costa Rica and Ecuador remaining strong, the share of net export value in the Latin America and Caribbean region's agriculture and fish production value is set to reach 50% by 2030.

The region's expansion in supplies will allow it to remain an important global exporter of maize, soybean, beef, poultry, fish meal, fish oil, sugar and ethanol. With the exception of maize which declines and soybeans which stabilises, the region will grow its share in the global market for all of the aforementioned commodities. By 2030, it will account for 63% of global soybean exports, 56% of global sugar exports, 44% of global fish meal exports, 42% of global beef exports and 33% of global poultry and fish oil exports.

The extent of global openness to trade will have important consequences for the sector. Trade agreements and in particular trade relations between China and the United States will play an important role in affecting the region's trade profile. The finalisation of the EU-Mercosur Free Trade Agreement could expand trade opportunities and thereby support further growth in the agriculture and fish sectors of the region. While the benefits to the region of a trade orientated global market is clear, improved integration and expanded trade within the region will diversify market opportunities and therefore further bolster the sectors resilience.

Figure 2.24. Trends in export market shares of the Latin America and the Caribbean



Source: OECD/FAO (2021), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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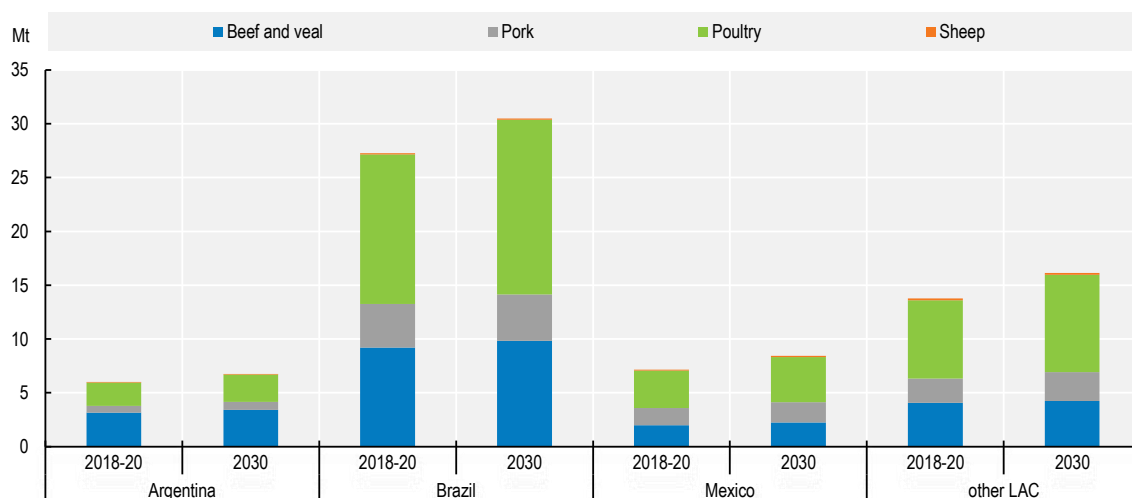
Figure 2.25. Change in area harvested and land use in Latin America and the Caribbean



Source: OECD/FAO (2021), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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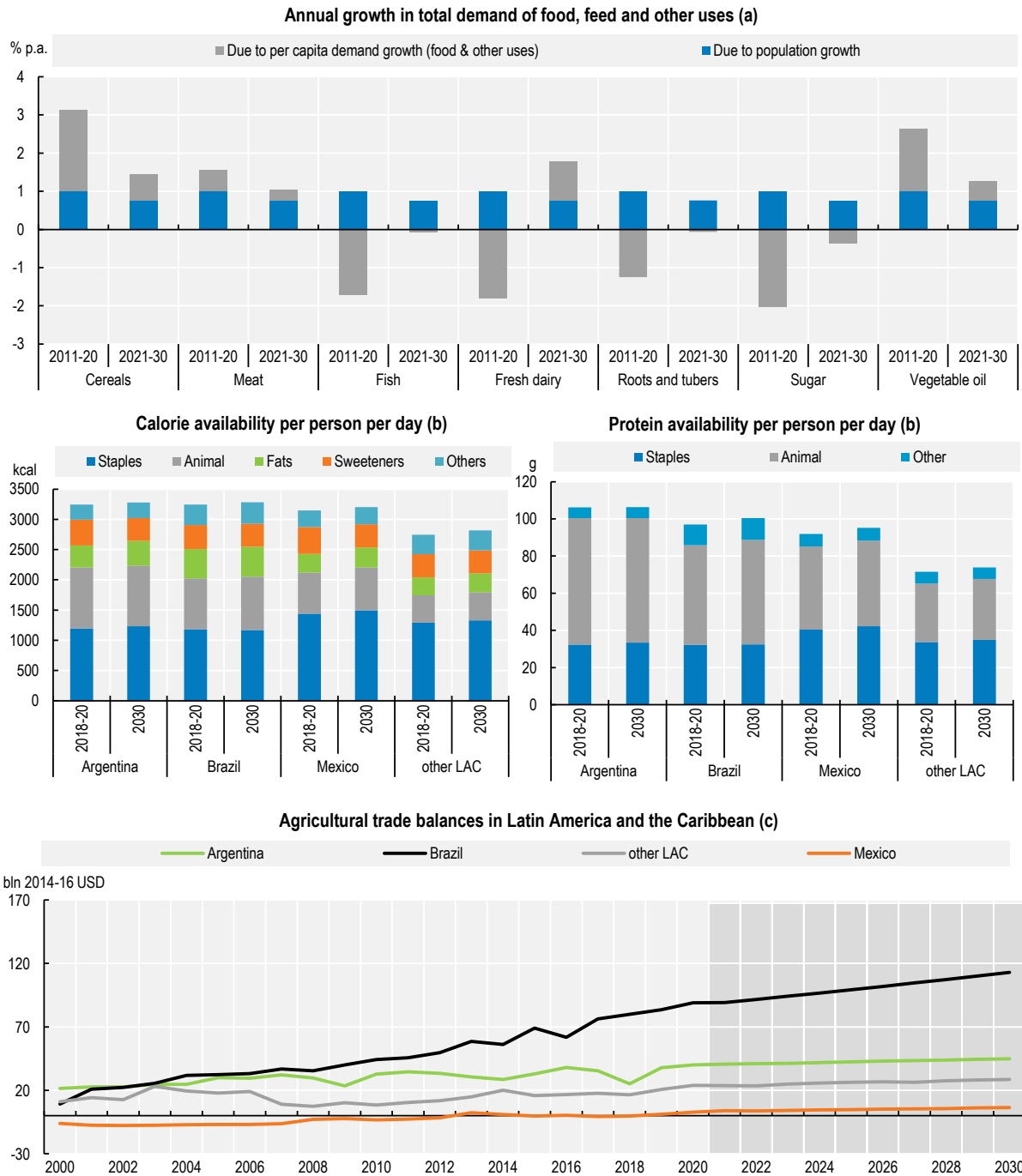
Figure 2.26. Livestock production in Latin America and the Caribbean



Source: OECD/FAO (2021), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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Figure 2.27. Demand for key commodities and food availability in Latin America and the Caribbean



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

Source: FAO (2021). FAOSTAT Value of Agricultural Production Database, <http://www.fao.org/faostat/en/#data/QV>; OECD/FAO (2021), "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: Latin America and Caribbean Region

	Average			%	Growth ²	
	2008-10	2018-20 (base)	2030	Base to 2030	2011-20	2021-30
Macro assumptions						
Population ('000)	583 047	646 387	704 425	8.98	1.00	0.76
Per capita GDP ¹ (kUSD)	9.16	9.18	10.10	10.01	-0.97	1.48
Production (bln USD)						
Net value of agricultural and fisheries ³	437.5	530.1	603.4	13.82	1.74	1.26
Net value of crop production ³	233.1	297.0	340.6	14.68	2.13	1.34
Net value of livestock production ³	157.9	187.3	214.5	14.53	1.61	1.24
Net value of fish production ³	46.6	45.9	48.4	5.41	-0.06	0.77
Quantity produced (kt)						
<i>Cereals</i>	174 515	276 504	316 084	14.31	3.88	1.47
<i>Pulses</i>	6 851	8 293	9 470	14.19	2.87	1.39
<i>Roots and tubers</i>	14 572	14 026	15 143	7.96	-0.35	0.81
<i>Oilseeds⁴</i>	5 179	6 091	6 714	10.23	2.15	1.20
<i>Meat</i>	45 072	54 202	61 837	14.09	1.69	1.21
<i>Dairy⁵</i>	8 893	9 812	11 688	19.12	0.38	1.65
<i>Fish</i>	16 589	16 376	17 270	5.46	-0.04	0.76
<i>Sugar</i>	55 170	55 457	63 685	14.84	-0.35	1.40
<i>Vegetable oil</i>	19 774	28 103	32 225	14.67	3.24	1.39
Biofuel production (mln L)						
<i>Biodiesel</i>	3352.36	8798.36	9415.10	7.01	5.28	1.05
<i>Ethanol</i>	29 634	38 512	40 075	4.06	4.57	1.26
Land use (kha)						
Total agricultural land use	693 627	712 729	718 220	0.77	0.27	0.07
Total land use for crop production ⁶	159 841	174 147	179 781	3.24	1.00	0.28
Total pasture land use ⁷	533 786	538 582	538 439	-0.03	0.05	0.00
GHG Emissions (Mt CO₂-eq)						
Total	878	935	941	0.66	0.67	0.06
Crop	97	116	121	4.35	1.67	0.27
Animal	756	788	789	0.05	0.47	0.03
Demand and food security						
Daily per capita caloric availability ⁸ (kcal)	2 919	3 024	3 074	1.66	0.29	0.25
Daily per capita protein availability ⁸ (g)	80.7	86.3	88.8	3.0	0.60	0.33
Per capita food availability (kg)						
<i>Staples⁹</i>	159.7	161.6	165.7	2.50	0.03	0.22
<i>Meat</i>	56.5	61.1	63.2	3.40	0.62	0.32
<i>Dairy⁵</i>	15.5	15.8	17.1	8.18	-0.36	0.80
<i>Fish</i>	8	9	9	3.40	0.73	0.44
<i>Sugar</i>	45	38	37	-3.50	-2.01	-0.37
<i>Vegetable oil</i>	18	19	21	7.19	0.40	0.73
Trade (bln USD)						
Net trade ³	80.7	140.0	192.9	37.81	..	..
Net value of exports ³	150.9	232.9	304.1	30.56	4.72	2.11
Net value of imports ³	70.2	92.9	111.2	19.64	3.15	1.79
Self-sufficiency ratio¹⁰						
<i>Cereals</i>	98.3	108.9	108	-0.6	0.88	0.05
<i>Meat</i>	110.8	111.6	112.7	1.05	0.15	0.17
<i>Sugar</i>	210.4	230.9	244	5.9	0.77	0.81
<i>Vegetable oil</i>	129.1	131.3	132.8	1.1	0.5	0.13

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

Source: OECD/FAO (2021), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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Notes

¹ Southeast Asia: Indonesia, Malaysia, Philippines, Thailand and Viet Nam. Other: Pakistan, Oceania and Other Developing Asia. Least Developed: Asia Least Developed. Developed: Australia, Japan, New Zealand, Korea. For mentioned regions, see Summary table for regional grouping of countries.

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

⁴ For mentioned regions, see Summary table for regional grouping of countries.

⁵ More detailed regional information may be found in *OECD-FAO Agricultural Outlook 2016-25*.

⁶ 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*.

⁷ 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.

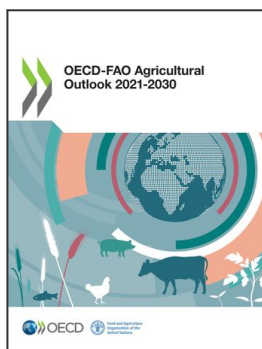
⁸ Source OECD-FAO interpolated for 2018-20 from the database of the Global Trade Analysis Project (GTAP) 2011, using food expenditure and GDP data used in this *Outlook*.

⁹ For mentioned regions, see summary table for regional grouping of countries.

¹⁰ 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*.

¹¹ Other LAC: Chile, Colombia, Paraguay, Peru and South and Central America and the Caribbean. For mentioned regions, see summary table for regional grouping of countries.

¹² 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*.



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