

Regional outlook: North America

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

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

Background

High performing and resilient agro-food sector

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

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

Agriculture in North America is characterised by high input intensity, but in the decade up to 2019, estimated total factor productivity actually declined by 1%, after strong growth in the preceding decade due largely to capital investments.¹ Fertiliser use is high compared to most other regions, suggesting that rising

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

Food consumption per capita in the region is the highest of all. This is enabled by the highest per capita income (USD 54 588) and the highest urbanisation rate (83%), which affects both the level and composition of food intake. The COVID-19 pandemic and the measures imposed to curb its spread reduced per capita GDP in the region by 4.2% in 2020. Despite the first year-on-year increase in 2020 in the prevalence of food insecurity since 2014, the mature consumer base, combined with income support measures and subsequent stimulus packages meant the shock from the pandemic had a greater influence on the composition and distribution of food sales than on quantity consumed. With restaurant closures and reduced hospitality, food eaten away from home declined, while retail grocery sales increased, driving significant changes in the food supply chain. Pre-pandemic, half of American and 35% of Canadian food dollars were spent on food away from home (Saksena et al., 2018^[8]) (Canning, Weersink and Kelly, 2016^[9]). The shift in retail sales also included changes to the type of food and packaging sizes demanded. Adaptations to the food supply chain took time, resulting in increased waste in the short term, but it was able to return to near normal levels within a few months and is likely to be more resilient to future shocks as a result of this adaptation (Weersink et al., 2021^[10]).

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

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

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

the region is important, with Canada relying strongly on ethanol imports from the United States to fulfil its own blending mandate.

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

Production

Rising productivity driving higher output, on less land

Agricultural and fish production in North America is projected to continue expanding, albeit at a slower rate of 11% over the coming decade, relative to the past. Although prices are high in the short term, stable and in some cases declining real prices in the medium term, together with a strong US dollar, remain core drivers of slower expansion. Contrary to the past decade, growth is expected to be stronger in crop sectors, which will grow 13% by 2031 relative to 2019-21, whereas livestock and fish production are both projected to expand by only 7%.

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

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

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

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

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

Consumption

Consumer preferences likely to drive demand in the coming decade

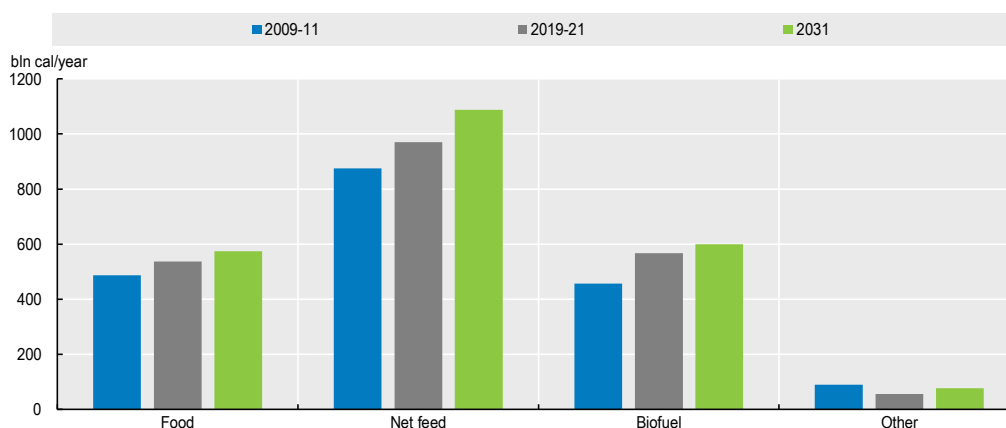
In the developed economies of Canada and the United States, changes in per capita food consumption are largely determined by changes in preferences, but these are projected to be minor. The effects of the pandemic may have induced a greater focus on healthy diets, which would have a marked influence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

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

Feed use in the region is significant, consuming more energy/calories than final food use (Figure **Error! No text of specified style in document.**1). Following increased livestock production, total feed use is projected to rise by 12% to 304 Mt by 2031, with the feed use share from maize (including distiller dried grains) rising slowly over time to 69%, while protein meal falls to 16%.

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

Figure Error! No text of specified style in document.1. Calories used in food, feed and other use in North America



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

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

Trade

Both exports and imports are set to increase

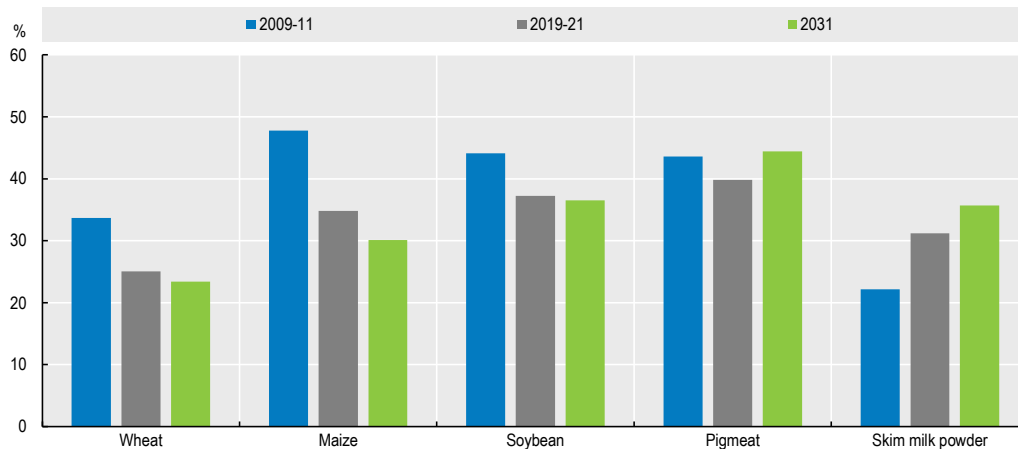
North America's agricultural trade surplus has declined by 27% over the past decade. This trend is set to prevail over the outlook period, with net imports into the region growing faster, at 1.6% p.a., than that of exports (1.0% p.a.). Both growth in imports and export are set to decelerate, reflecting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

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

The region has lost considerable trade share in recent times for maize, wheat and soybeans. In the case of maize, this trend is expected to continue, albeit at a slower rate, due to growing competition from Latin America and prior to the war, the Black Sea region. North America's share in global soybean exports is set to stabilise over the latter half of the outlook at around 37%. North America's share in the global ethanol trade is expected to stabilise at around 50%, whereas its share of global trade of both pig meat and Skim Milk Powder is set to rise (Figure 2).

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

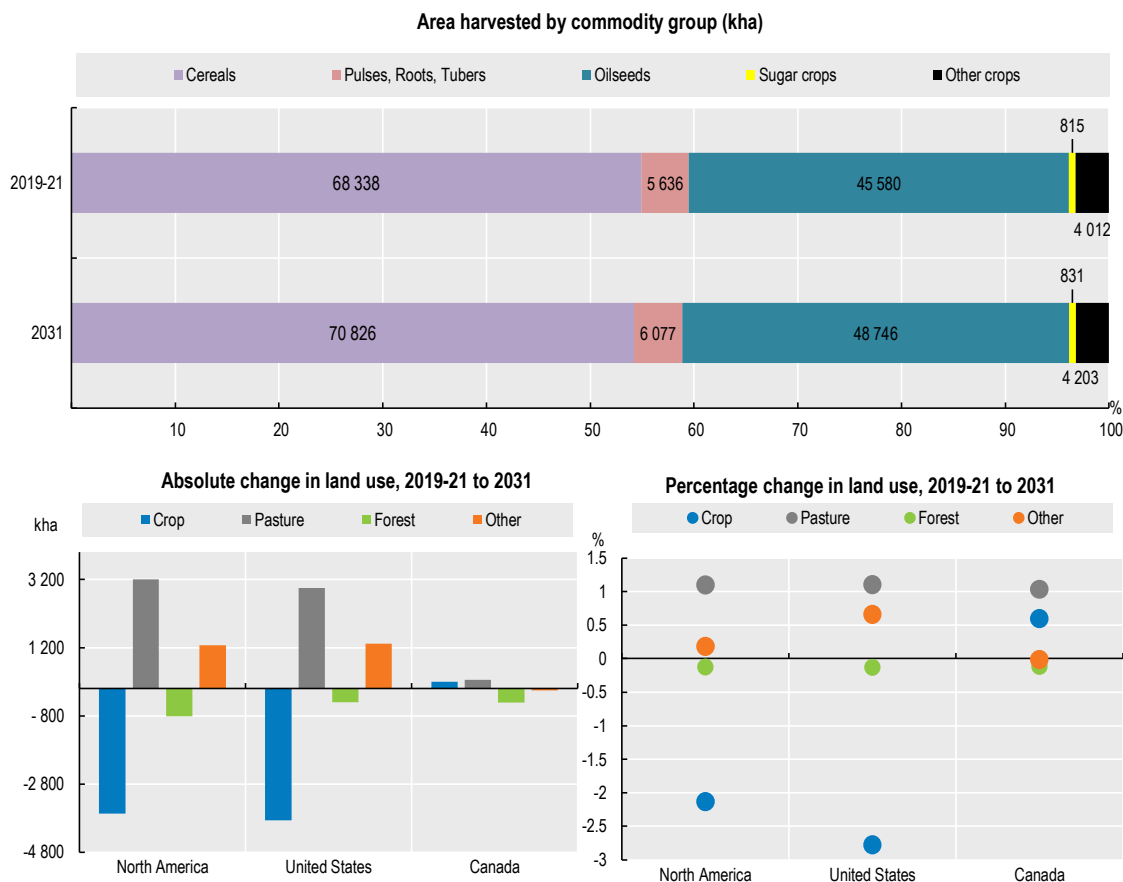
Figure 2. Trends in export market shares of selected commodities of North America



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

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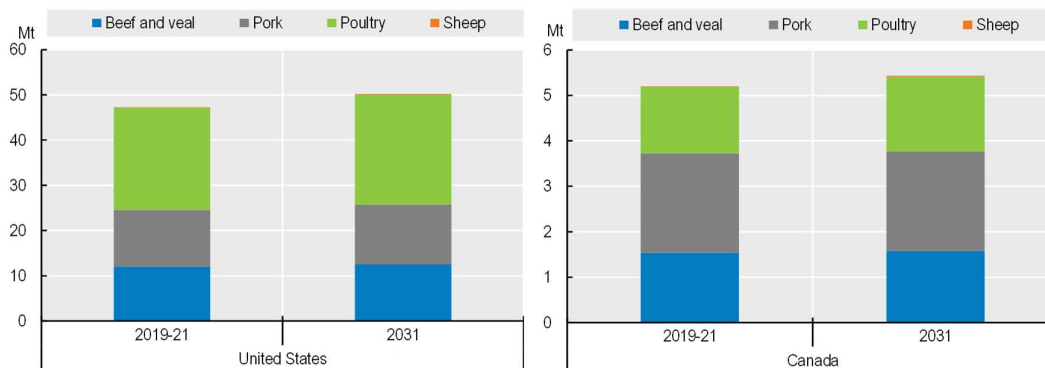
Figure 3. Change in area harvested and land use in North America



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

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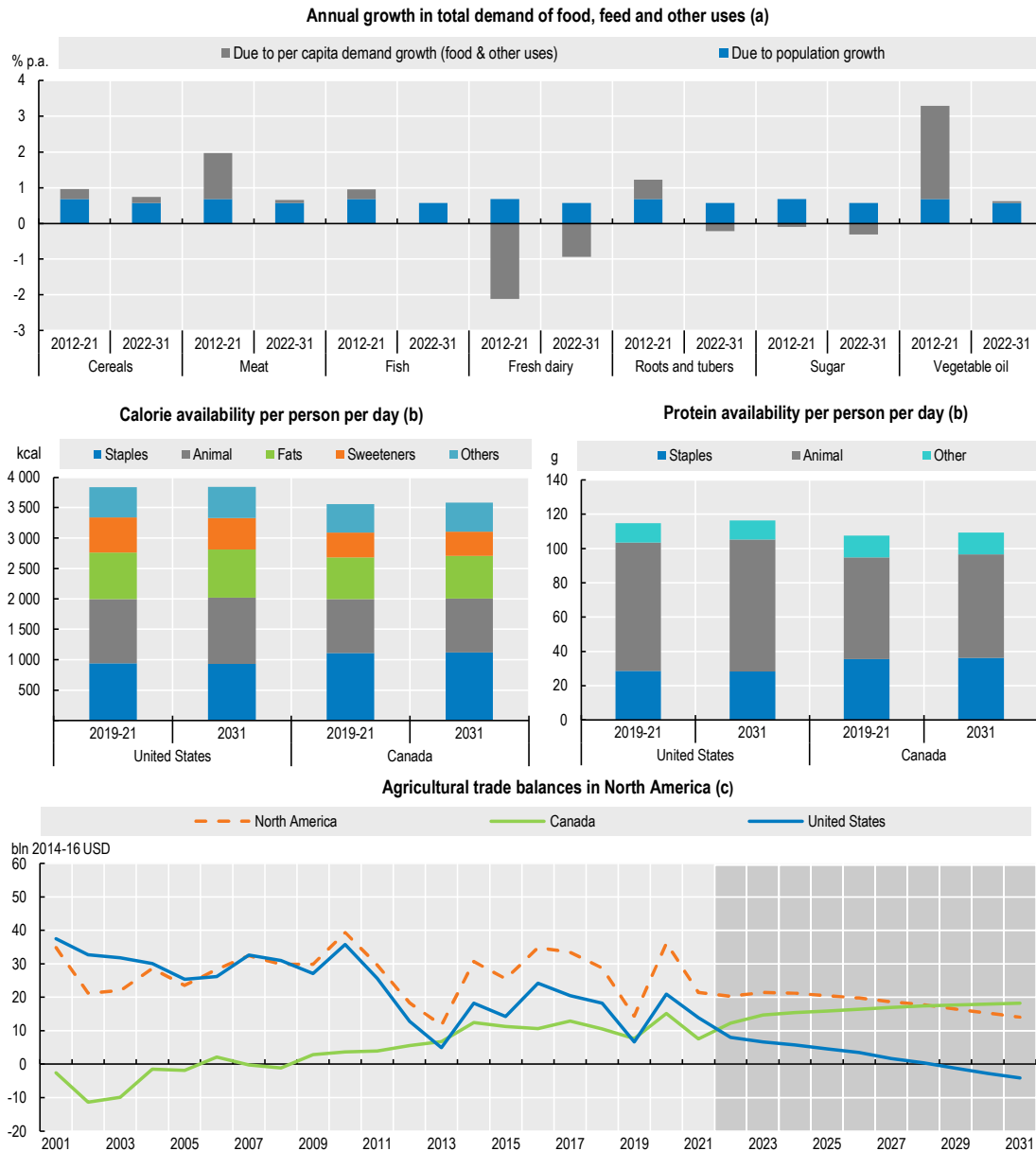
Figure 4. Livestock production in North America



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

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Figure 5. Demand for key commodities, food availability and agricultural trade balances in North America



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

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

Table 1. Regional indicators: North America

	Average			%	Growth ²	
	2009-11	2019-21 (base)	2031		Base to 2031	2012-21
Macro assumptions						
Population ('000)	343 112	368 735	392 615	6.48	0.68	0.56
Per capita GDP ¹ (kUSD)	48.41	54.59	63.54	16.40	1.18	1.13
Production (bln 2014-16 USD)						
Net value of agricultural and fisheries ³	339.9	385.4	426.3	10.61	1.35	0.71
Net value of crop production ³	204.8	228.5	258.6	13.17	0.96	0.72
Net value of livestock production ³	117.9	140.2	149.9	6.89	2.38	0.73
Net value of fish production ³	17.2	16.7	17.8	6.82	-1.23	0.52
Quantity produced (kt)						
<i>Cereals</i>	447 068	489 441	545 459	11.45	1.01	0.53
<i>Pulses</i>	7 415	9 620	11 491	19.45	1.40	1.52
<i>Roots and tubers</i>	4 995	5 636	5 897	4.65	0.88	0.28
<i>Oilseeds⁴</i>	16 806	21 508	27 191	26.42	0.47	0.99
<i>Meat</i>	45 565	52 514	55 591	5.86	1.99	0.65
<i>Dairy⁵</i>	11 859	14 227	16 108	13.23	1.80	1.14
<i>Fish</i>	6 139	5 961	6 362	6.73	-1.16	0.51
<i>Sugar</i>	6 950	7 609	8 616	13.23	0.89	0.44
<i>Vegetable oil</i>	13 564	18 243	19 959	9.41	3.10	1.11
Biofuel production (mln L)						
<i>Biodiesel</i>	2469.68	9283.36	9631.41	3.75	9.40	-1.28
<i>Ethanol</i>	50 338	60 172	63 721	5.90	1.34	0.21
Land use (kha)						
Total agricultural land use	465 270	463 768	463 304	-0.10	0.07	-0.01
Total land use for crop production ⁶	174 130	172 362	168 694	-2.13	0.13	-0.19
Total pasture land use ⁷	291 140	291 407	294 610	1.10	0.03	0.10
GHG Emissions (Mt CO₂-eq)						
Total	426	440	446	1.37	0.50	0.19
Crop	123	128	128	-0.53	-0.02	-0.09
Animal	278	280	285	1.51	0.57	0.29
Demand and food security						
Daily per capita caloric availability ⁸ (kcal)	3 680	3 808	3 822	0.35	0.55	0.07
Daily per capita protein availability ⁸ (g)	112.0	114.1	115.8	1.5	0.7	0.2
Per capita food availability (kg/year)						
<i>Staples⁹</i>	134.5	133.4	132.1	-0.99	0.09	-0.07
<i>Meat</i>	92.5	98.5	99.2	0.71	1.23	0.12
<i>Dairy⁵</i>	32.1	34.9	36.3	3.94	0.92	0.45
<i>Fish</i>	19.2	19.7	20.7	5.00	0.55	0.12
<i>Sugar</i>	31.9	30.6	30.0	-1.97	0.31	-0.31
<i>Vegetable oil</i>	35.4	39.4	41.6	5.63	1.14	0.63
Trade (bln 2014-16 USD)						
Net trade ³	33	24	14	-41.41
Value of exports ³	148	177	198	12.06	1.81	0.97
Value of imports ³	115	153	184	20.44	2.05	1.63
Self-sufficiency ratio¹⁰						
<i>Cereals</i>	125.3	130.6	126.5	-3.15	0.22	-0.07
<i>Meat</i>	115.8	115.9	114.8	-0.93	0.11	0.01
<i>Sugar</i>	62.1	68.5	71.5	4.29	0.83	0.01
<i>Vegetable oil</i>	102.1	94.9	97.1	2.41	-0.40	0.42

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

¹ (Fuglie, 2015_[12])(updated to 2019, USDA)