联合国粮食及农业组织 | Food and Agriculture Organization of the United Nations | Organisation des Nations Unies pour l'alimentation et l'agriculture | Продовольственная и сельскохозяйственная организация Объединенных Наций | Organización de las Naciones Unidas para la Alimentación y la Agricultura | منظمة الأغذية والزراعة للأمم المتحدة

COMMITTEE ON COMMODITY PROBLEMS

Seventy-fifth Session

Rome, 13–15 July 2022

MEDIUM-TERM AGRICULTURAL OUTLOOK 2022-31 AND EMERGING ISSUES

Executive Summary

This document provides an overview of the latest set of medium-term projections for global and national agricultural markets for the period 2022 to 2031. The projections cover consumption, production, trade, and prices for 25 agricultural products. Over the next decade, global food demand is projected to increase by 16 percent, driven by population growth and income gains. Most additional food demand is expected to originate in low and middle-income countries, while demand in high-income countries will be limited by slow population growth and saturated consumption for most foods. The projected production expansions are predominantly located in middle- and low-income countries in Asia, Africa and Latin America. Crop production growth is expected to be based mainly on yield improvements. In the livestock sector, productivity gains as well as significant herd enlargements are foreseen. International trade in agricultural commodities will remain essential for food security in importing countries, and to ensure rural livelihoods in exporting countries. Trade volumes are projected to be aligned with global production developments over the next decade. Efficiency gains in crop and livestock production will allow inflation-adjusted agricultural prices (or real prices) to resume their long-run declining paths after the 2022-23 marketing year, provided that there will be no further COVID-19 related restrictions to crucial economic activities or a widespread fallout from the war in Ukraine in the following years.

Suggested action by the Committee

The Committee is invited to note the information and medium-term projections presented in this document and provide guidance as deemed appropriate. In particular, the Committee is invited to:

- Review the medium-term projections and discuss their likely implications for global food systems in the context of food security and sustainability challenges.
- Advise on the usefulness of the projections to Member institutions and provide guidance and recommendations regarding possible future forward-looking analyses using the model.

Queries on the substantive content of the document may be addressed to:

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I. INTRODUCTION

1. The medium-term outlook provides a plausible scenario based on specific assumptions regarding the macroeconomic conditions, the agriculture and trade policy settings, weather conditions, longer-term productivity trends and international market developments. The projections presented in this document are based on the OECD-FAO Agricultural Outlook 2022-2031, which will be launched at the end of June 2022. The Outlook exercise brings together commodity, policy and country expertise of FAO and the Organisation for Economic Co-operation and Development (OECD), and collaborating Members of both organizations.

2. The report presents a consistent baseline scenario for the expected evolution of agricultural and fish markets at national, regional and global levels over the next decade (2022-2031). These are projections, not forecasts, presenting a plausible and consistent scenario of the medium-term outlook for agricultural commodities over the next 10 years.

3. The projections were finalised under the circumstances generated by the ongoing COVID-19 pandemic and the outbreak of the war in Ukraine in late February 2022. While the medium-term consequences of these shocks on agricultural and fish markets remain uncertain, their emerging short-term supply and demand impacts were incorporated into the projections.

II. STARTING SITUATION AND MACROECONOMIC ASSUMPTIONS

4. Global cereal markets were generally well supplied in 2021, owing to a record high cereal production, underpinned by greater maize and rice outputs, while wheat and barley supplies tightened following reduced harvests in major producing countries. Mostly reflecting the tight wheat and barley market conditions, strong maize demand, and high input and energy prices, global cereal prices strengthened throughout most of 2021, and were pushed up to an all-time high in March 2022, as conflict-related export disruptions in Ukraine put further pressure on wheat and coarse grain markets. Global rice production reached all-time highs in 2020 and 2021, largely thanks to output gains in Asia. The successive bumper harvest kept the international rice price stable while global rice utilization and stocks reached all-time highs and international trade grew. Global oilseed and derived product prices also strengthened since mid-2020 and hit record highs in early 2022, underpinned by constrained global supplies and resilient demand.

5. World meat output increased, mainly driven by the recovery of pig meat production in China. Constrained by multiple factors, including animal diseases and increased production costs, global meat export supplies from most large exporting countries were tight, while global demand was solid, leading to global meat price strengthening since mid-2020. World milk production increased only moderately in 2021, reflecting output contractions in Europe and Oceania. With tight supplies from leading exporting countries amidst robust import demand, especially from Asia, dairy prices have continued to trend upward since mid-2020. Aquaculture expanded and gained share in global aquatic food production in 2021, keeping pace with the rising demand, resulting in relatively stable prices.

6. World population is expected to grow from 7.8 billion people in 2021 to 8.6 billion people in 2031. Continually high growth rates are foreseen in Sub-Saharan Africa, the Near East and North Africa, while a population decline is projected for Europe.

7. After dropping by 4.6 percent in 2020, global per capita income recovered by 4.4 percent in 2021 and is expected to grow again by 2.4 percent in 2022 and 2.0 percent in 2023, before settling into its expected medium-term growth rate of about 1.8 percent per annum (p.a.) for the remaining years of the Outlook. The ongoing COVID-19 pandemic and the war in Ukraine are making especially the near term macro-economic situation very uncertain.

8. At 3.4 percent p.a. on average for the coming decade, consumer price inflation in industrialised countries is projected to be significantly higher than in the previous decade. Among several emerging economies, inflation is also expected to remain high, by contrast, in China the inflation rate should remain at 2 percent p.a.

III. PROJECTION HIGHLIGHTS

A. Consumption

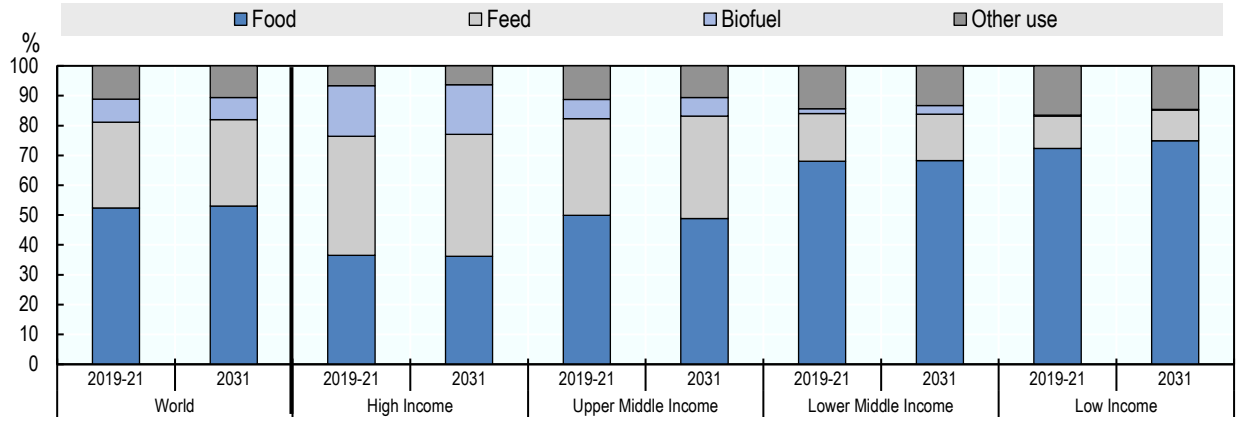
9. Global consumption of agricultural commodities (including intermediate and non-food uses) is projected to grow by 15 percent over the coming decade. Food remains the primary use of agricultural commodities; more than half of all agricultural and fish production[1] will be consumed directly as food in the coming decade. Feed is taking up about 29 percent of calories produced, while the remaining 18 percent are used as either biofuel, seed or raw products in industrial applications. No significant structural shifts in these patterns is expected over the coming decade.

10. The use patterns of agricultural commodities vary depending on the development status of countries (Figure 1). The food share in low-income countries is projected to rise to 75 percent by the end of the outlook period, as growth in domestic food demand outpaces the increase in domestic demand for feed and for renewable industrial raw products. The food share of the consumed calories is additionally elevated, because livestock products are increasingly imported from high-, upper- and lower-middle income countries. By contrast, the structure of demand for agricultural commodities in high-income countries favours further processing and direct food use accounts for only 36 percent of total consumption in 2031.

11. The feed use share is expected to expand particularly in upper-middle income countries. Main growth factors are the recovering Chinese pork sector, poultry and dairy production growth in other Asian countries and the export-driven growth in the Latin American meat sector, where countries are projected to further capitalise on their resources and competitiveness to capture the additional value of the livestock sector.

[1]Including crops, livestock products and fish, aggregated by calorie content.

Figure 1. Structure of agricultural commodity use



Note: The 38 individual countries and 11 regional aggregates in the baseline are classified into the four income groups according to their respective per-capita income in 2018. The applied thresholds are: low: < USD 1 550, lower-middle: < USD 3 895, upper-middle: < USD 13 000, high: > USD 13 000.

Food

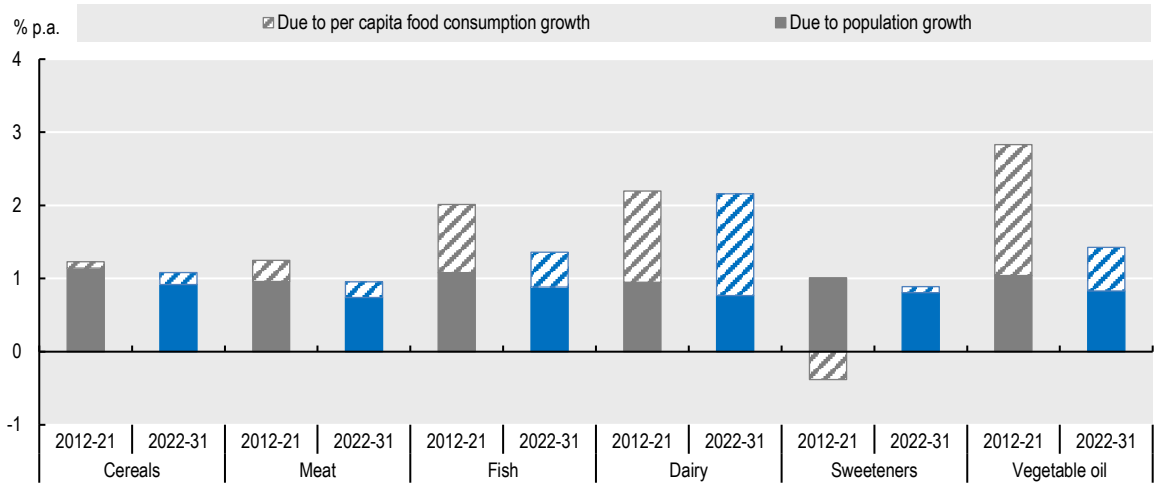
12. Globally, per-capita food consumption[2] is projected to grow by about 4 percent over the projection period, reaching just over 3 000 kcal/capita/day in 2031 (Figure 3). Fats and staples account for about 60 percent of the additional calories. Staples will remain the most significant food crop, maintaining their 50 percent share in the global food basket. In line with past developments, average per-capita consumption of protein is projected to increase by 4 percent to reach 87g/person/day in 2031.

13. The severe income losses caused by the COVID-19 pandemic had interrupted the growth of food consumption in 2020 and 2021. The pandemic caused a slight change in global dietary patterns and stagnation in total calorie intake growth. The per-capita consumption of vegetable oil and livestock products in low-income countries was affected most. The use of staple foods was less impacted, due to their much lower responsiveness to income fluctuations. Consumption growth is expected to resume in 2022, but due to the war in Ukraine this projection is highly uncertain.

14. The projected growth in global food consumption of main food groups over the coming decade differs in magnitude and the relative significance of per-capita consumption and population developments (Figure 2).

[2] Food consumption is expressed as average availability of total calories per person per day. It does not represent actual intake, as losses and waste are not deducted.

Figure 2. Average annual change in food consumption



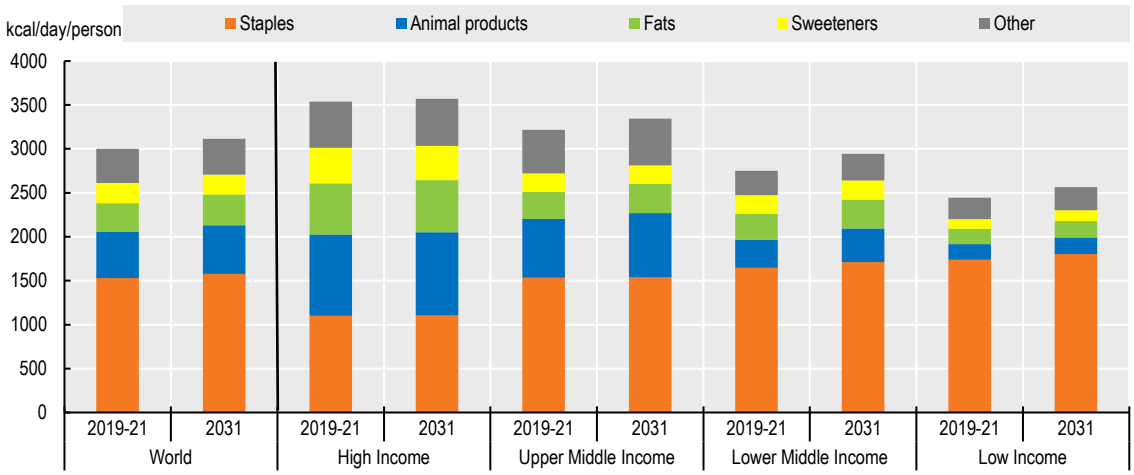
15. Per capita food consumption has levelled off in high-income countries, but ongoing income growth, changing consumer preferences and evolving demographics will lead to further substitution away from staples and sweeteners, towards higher-value food groups. Additional consumption is projected mostly for foods perceived as healthy, such as fruits, vegetables, pulses, poultry and cheese. The projected decline in per capita consumption of sweeteners reflects growing consumer concerns about the negative health effects of excessive sugar consumption. As many of these fruits and vegetables have to be imported by high-income countries, this offers market opportunities for low and middle income countries with export potential in these commodities.

16. In many upper-middle income countries the traditionally strong consumer preference for animal protein is expected to persist, 63 percent of the additional protein consumption will be from animal sources raising their share to 44 percent of total protein consumption by 2031. The projected income growth allows consumers to increase their per capita consumption of meat by 9 percent and fish by 10 percent by 2031.

17. Per capita food consumption is projected to increase by 7 percent in lower-middle income countries, the largest gain of all income groups, but due to low disposable income, staples and fats will still account for more than half of the expected calorie increase during the coming decade. Although consumers in these countries are projected to increase their consumption of animal protein by 19 percent, per capita intake remains considerably below consumption levels in the upper middle- and high-income countries. Consumption growth of higher value foods is often constrained by inefficient domestic supply chains for these products, which reduce affordability and limit availability to consumers.

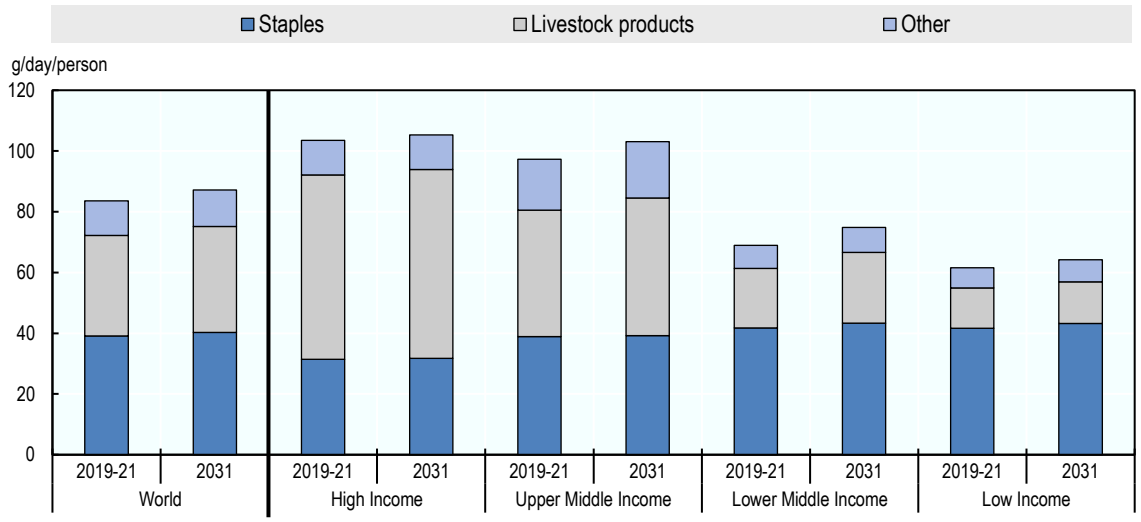
18. Average diets in low-income countries remain heavily based on staples. About 55 percent of the additional calories over the coming decade are still expected to come from staples, lowering their share only slightly to 70 percent of total calories consumed. The second most important source of additional calorie consumption will be fruits, vegetables and local mainstays such as plantains, accounting for 19 percent of the total increase. Growth in the consumption of livestock products and other high value foods will remain limited, due to income constraints.

Figure 3. Per capita calorie consumption



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. The 38 individual countries and 11 regional aggregates in the baseline are classified into the four income groups according to their respective per-capita income in 2018. The applied thresholds are: low: < USD 1 550, lower-middle: < USD 3 895, upper-middle: < USD 13 000, high: > USD 13 000. Staples include cereals, roots and tubers and pulses. Animal products include meat, dairy products (excluding butter), eggs and fish. Fats include butter and vegetable oil. Sweeteners include sugar and HFCS. The 'Other' category includes other crop and animal products.

Figure 4. Per capita protein consumption



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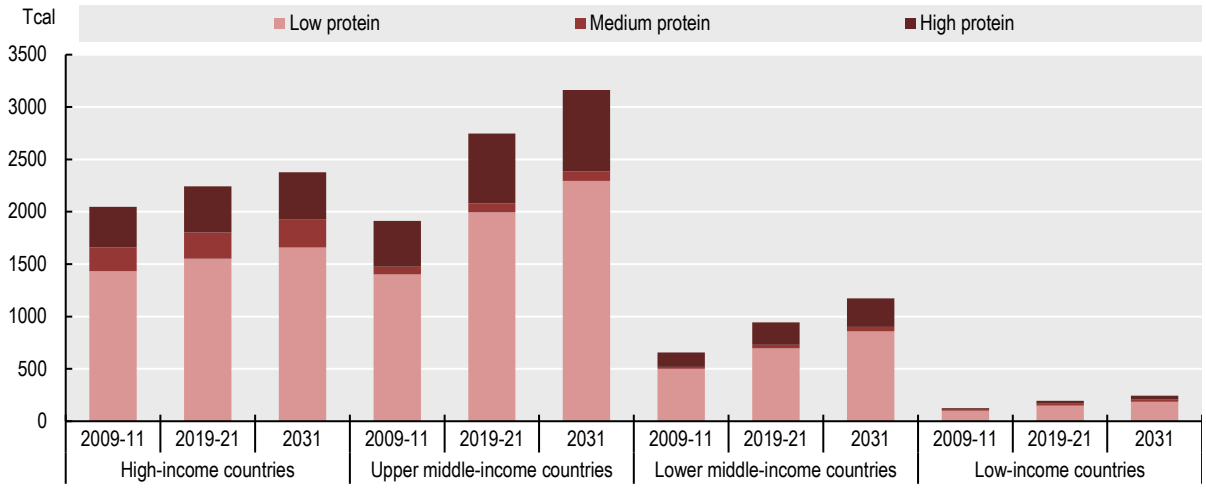
Feed

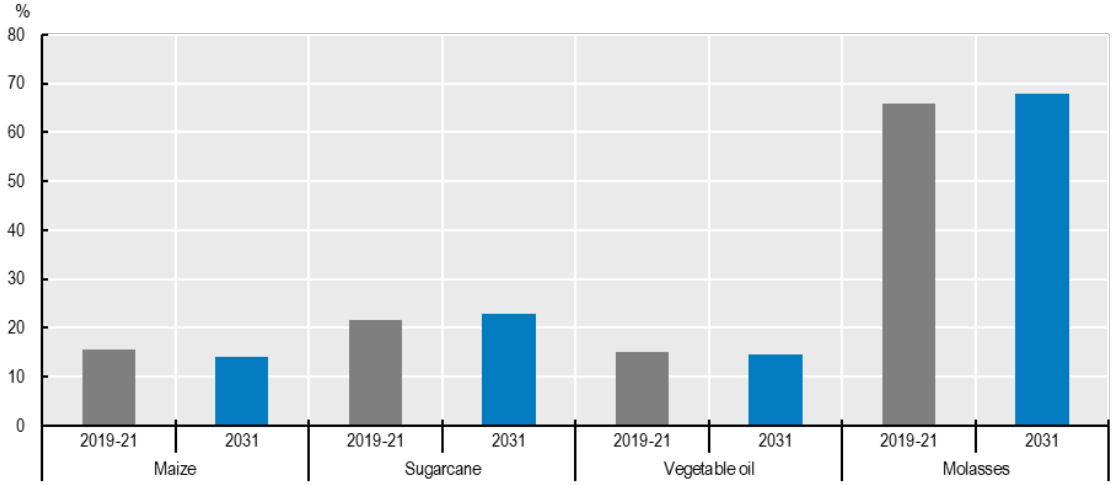
19. The ongoing evolution of nutrition patterns towards a higher share of foods from animal origin results in a larger amount of crops and other agricultural and fish products being used as feed. The total use of feed energy and protein will grow by about 14 percent by 2031. Projected developments in feed use will differ between country income groups, reflecting differences in structure and technology of their livestock sectors (Figure 5). Feed demand growth is mainly driven by the continuing expansion of the livestock herd and aquaculture production in low- and middle- income countries. The medium-term projections also assume a further intensification of livestock and fish production, mostly in order to accelerate the finishing process thus providing higher returns on fixed capital investments. This intensification is expected to result in a slightly higher share of high-protein feed in these countries. For high- and upper-middle income countries the composition of fed rations is expected to remain unchanged.

Figure 5. Structure of feed use



Note: Low protein feed includes maize, wheat, other coarse grains, rice, cereal brans, beet pulp, molasses, roots and tubers. Medium protein feed includes dried distilled grains, pulses, whey powder. High protein feed includes protein meal, fish meal, and skim milk powder.

Figure 6. Share of biofuel in total use



B. Production

20. Global agricultural production of major crops, livestock products and fish is projected to increase by 17 percent by 2031. Production growth will be predominantly located in middle- and low-income countries in Asia, Africa and Latin America (Figure 7). The expansion will be supported by productivity-increasing investments in agricultural infrastructure, the mobilization of additional production resources, more intense use of agricultural inputs, as well as investments into farm management, research and development.

21. Projected growth in Asian countries will be based on a strong expansion of the livestock sector, particularly the recovery of pork production after the end of the African swine fever (ASF) outbreak and the further expansion of the dairy sector in India and Pakistan. Growth in crop production is based on strong yield improvements, combined with the cultivation of additional land for cereals, particularly in India.

22. Strong production growth in Sub-Saharan Africa is to be underpinned by a combination of area expansion, changing crop mix and productivity gains from investments in locally adapted, improved crop varieties, and better management practices as well as herd expansion and intensification of poultry meat production. Growth in the Near East and North Africa is expected to be driven by higher crop intensity, substantial crop yield gains and growth in poultry meat production.

23. Production growth in North America and in Western Europe is expected to be limited, largely due to tighter regulations related to environmental sustainability and animal welfare.

Figure 7. Structure of global agricultural production

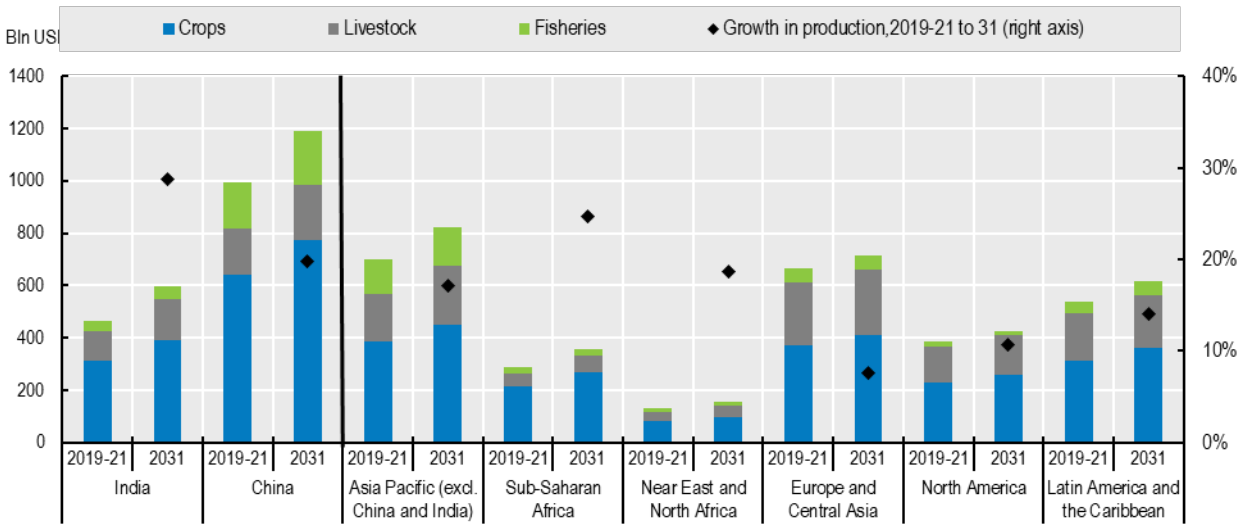
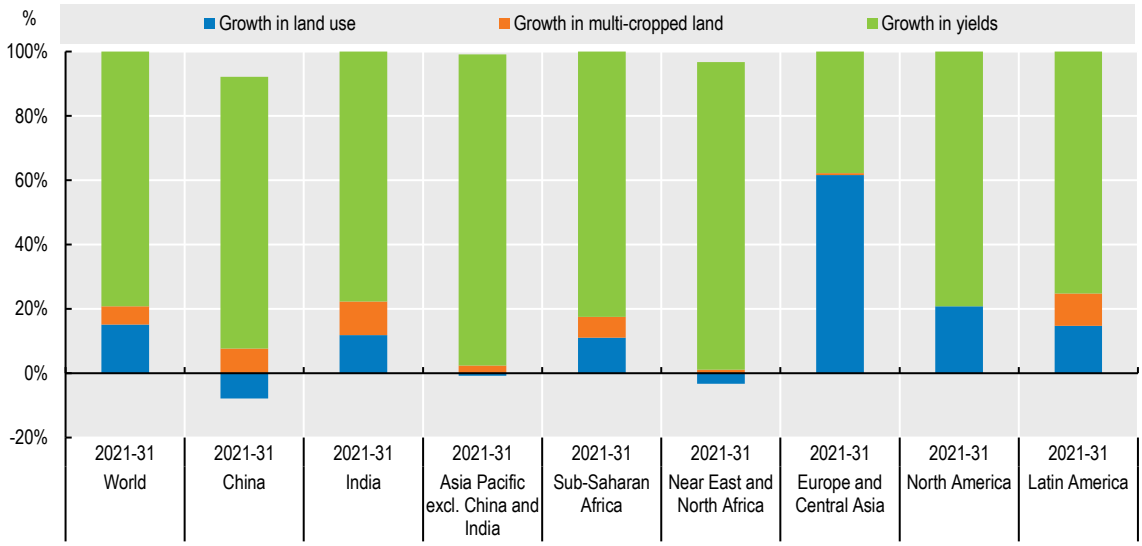


Figure 8. Sources of growth in crop production

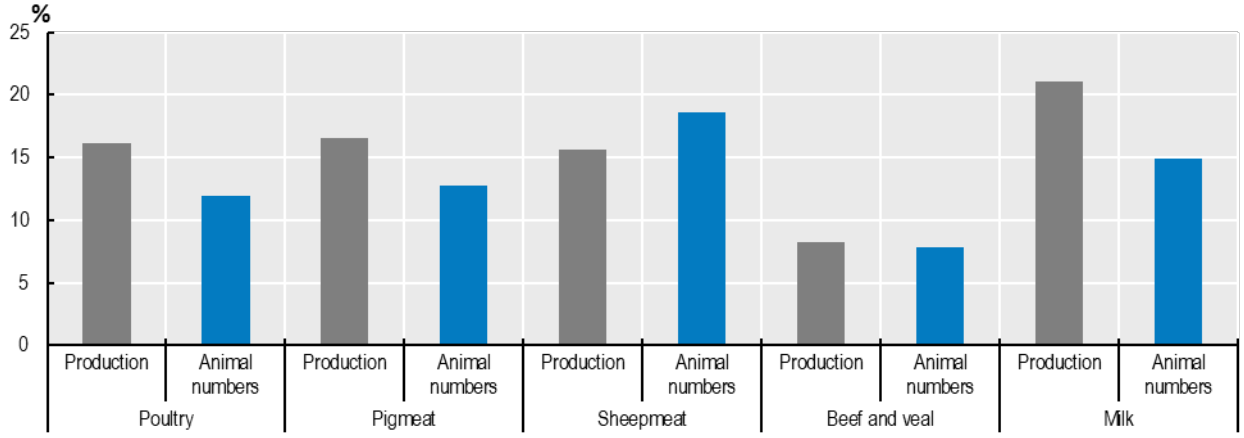


Note: Figure shows the decomposition of total production growth into growth in land use, land intensification through growth in multi-cropped land, and growth in yields. It covers the following crops: cotton, maize, other coarse grains, other oilseeds, pulses, rice, roots and tubers, soybean, sugarbeet, sugarcane, wheat and palm oil.

24. About 80 percent of global crop output growth over the next 10 years is attributed to yield improvements resulting from more intensive input use, investments in production technology and better cultivation practices. Cropland expansion is projected to account for 15 percent and further intensification of land use through multiple harvests per year will account for another 6 percent. The relative importance of increased productivity and cropland expansion will vary between regions and commodities, reflecting differences in availability and cost of land and other resources. Land use is projected to expand and intensify especially in Europe and Central Asia, Sub-Saharan Africa, Asia Pacific and in the Americas.

25. Over the outlook period, global livestock and fish production is expected to expand by 16 percent, supported by lower feed and stable product prices incentivising investments into additional production capacity and efficiency improvements, such as better genetics and more effective disease control (Figure 9). The productivity of production facilities is also expected to increase through more intense feeding practices to achieve higher slaughter weights and shorter finishing times. In addition to ongoing intensification, output will still expand significantly through herd enlargements. The extent and relative importance of intensive and extensive growth will vary by type of livestock commodity, as well as development status, resource endowments and countries' policies.

Figure 9. Growth in global livestock production and herds



Note: Dairy animals include cattle, goats, sheep, buffalos, camels.

26. Globally, milk production is estimated to grow by 21 percent, mainly on account of Asian countries, particularly India and Pakistan. Small ruminant milk production, especially in Africa, is also expected to expand significantly, mainly through herd enlargements. Meat production is projected to expand by 15 percent, mostly originating in emerging economies and low-income countries. Poultry production is expected to increase by almost 21 Mt, which accounts for slightly less than half of the projected increase in total meat output.

27. Over the outlook period, world production of aquatic food is projected to grow by 14 percent, to 203 Mt in 2031. Asia Pacific, the main producing region, will account for 78 percent of the global increase. Almost all of the additional aquatic food output originates from aquaculture, as capture fisheries remain heavily regulated.

28. Production projections suggest a growth in direct greenhouse gas (GHG) emissions of 6 percent by 2031, indicating a decline in the carbon intensity of agricultural production over time. Geographically, most of the increase is projected to occur in emerging and low-income regions due to higher output growth in sectors that are more emission intensive. Livestock production will account for most of the global GHG emission growth.

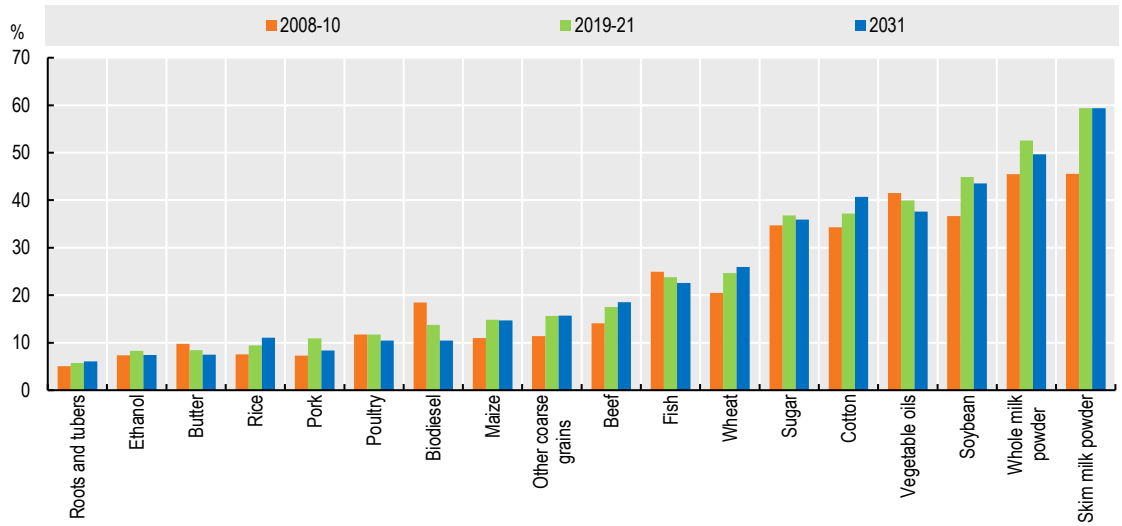
C. Trade

29. As patterns of consumption and production continue to evolve, global trade in agricultural products is expected to continue to increase over the coming decade. More food than ever will have to be shipped internationally in 2031 meaning more people will depend on well-functioning markets.

30. Highly traded commodities such as cotton, sugar, vegetable oils, soybeans and milk powders are mostly demanded for further processing by importing countries.

31. The share of production traded for the commodities covered in the Outlook has been gradually increasing over time, rising from an average of 15 percent in 2000, to 23 percent in 2019-21. This share is not expected to change significantly during the outlook period as no significant structural shifts in the global trade patterns are expected. Trade volumes are projected to be closely aligned to production in individual commodity markets (Figure 10). The projected increases in trade ratios reflect mostly strong demand growth in importing regions, e.g. African rice imports. Declining ratios may result either from weaker import demand, most evident in soybeans, or, as in the case of biodiesel, increasing domestic use in Indonesia combined with reduced imports by the European Union.

Figure 10. International trade as share of global production



32. The Americas are expected to consolidate their position as the world's largest exporter of agricultural commodities (Figure 11). Net exports out of the Latin America and Caribbean region, the world's prime exporter of agricultural commodities, are projected to increase by 17 percent between 2019-21 and 2031, while the expansion of shipments from North America, the second leading exporter, will slow to 10 percent. Main export products will still be cereals, soybeans, sugar, and meat.

33. The Europe and Central Asia region has also developed into a significant exporter of agricultural commodities in recent years, due to strong production growth in Russia and Ukraine. Based on the expected fundamental supply and demand conditions over the coming decade, net exports from the region are projected to almost double. However, the ongoing war in Ukraine is making these projections highly uncertain. Details were discussed in FAO's Information Note[3].

34. Net imports by the East Asia and Pacific region, are projected to stabilise over the coming decade, mostly because of the marked slow-down in Chinese imports, due to slow growth in its population, near saturation in per-capita food consumption for basic food commodities, and projected growth in its domestic agricultural production.

35. Net imports into Sub-Saharan Africa are expected to increase by 77 percent over the next decade, further increasing the share of food produced outside the region in total food consumption. Mainly the fast growing demand for rice, wheat, maize and soybeans has to be covered by imports. Land and water constraints, a lack of investments in agriculture, and fast population growth cause the expected 30 percent net import growth of basic foods in the Near East and North Africa, the largest importer of basic foods on a per-capita basis.

[3] The importance of Ukraine and the Russian Federation for global agricultural markets and the risks associated with the current conflict (fao.org). 25 March 2022. https://www.fao.org/3/cb9236en/cb9236en.pdf

Figure 11. Net trade of major agricultural commodities

Note: Net trade (exports minus imports) of commodities covered in the OECD-FAO Agricultural Outlook, measured at constant 2004-06 USD.

D. Prices

36. The outlook uses price quotations at major commodity exchanges or ports as global reference prices. The historical observations reflect both fundamental supply and demand conditions as well as short-term demand or supply shocks causing temporary price movements. As the effects of these shocks are largely unpredictable and cannot be incorporated into medium-term projections, prices in the outlook are assumed to converge to a path determined solely by demand and supply fundamentals.

37. Fundamentally, the expected demand for agricultural commodities is projected to be met by efficiency gains in production, which will let real agricultural prices return to a slightly declining medium-term-trend, provided the projected economic recovery from the COVID-19 pandemic will start in 2022, and there will be no further restrictions to crucial economic activities, or widespread fallout from the war in Ukraine in the following years.

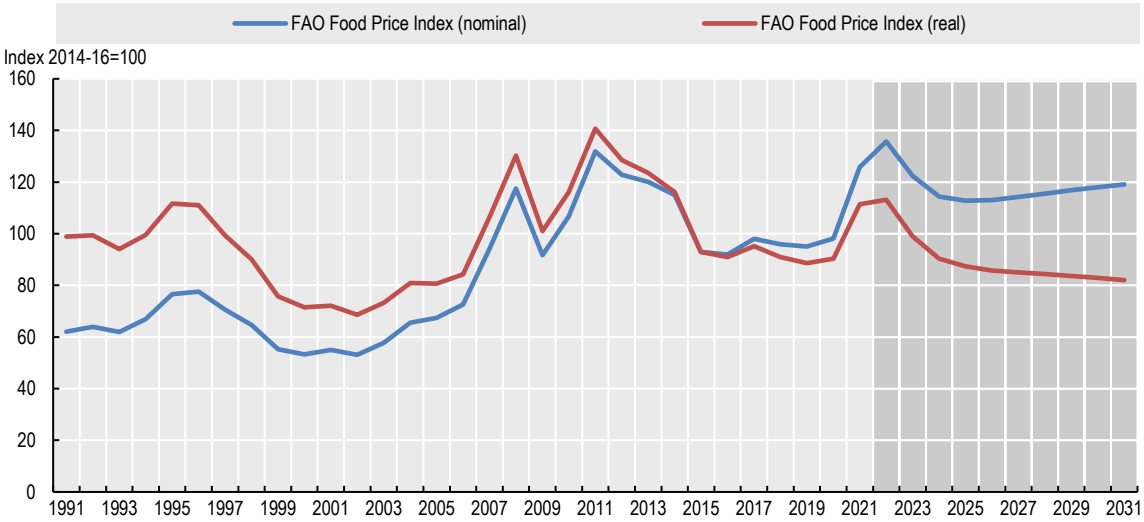
38. Due to strong global demand and a number of supply constraints, the FAO Food Price Index (FFPI) increased strongly in 2021 and is anticipated to peak in 2022. Based on the assumed restoration of global supply chains and normalisation of production and transportation costs, a significant price decline is projected until 2025. In real terms, the FFPI is projected to return to pre-COVID-19 levels by 2025 and to resume its slightly falling trend from 2026 onward.

39. Prices of wheat, and coarse grains increased strongly in 2021 and reached their highest levels of the last nine years, due to tight wheat and maize exports from the Black Sea region and other supply constraints, which are assumed to be temporary. The underlying global supply and demand conditions point to a significant price reduction in the near term.

40. Prices of soybean and other oilseeds also rallied in 2021, due to strong import demand, especially for soybeans in China, and are expected to start declining already during the first years of the Outlook, as production is expected to outpace demand. Sugar prices are projected to follow similar patterns. Real meat prices rebounded in 2021, not only reflecting higher demand following the economic recovery from the COVID-19 pandemic but also increased transportation and marketing costs. They are expected to remain high in the first years of the Outlook as higher feed costs limit the scope for expanding supply, whereas high packaging and transportation costs will impact on meat supply chains. Meat prices are projected to decline once supply chains stabilize and feed costs decrease (Figure 12). Both skimmed milk powder (SMP) and butter prices peaked in 2021 due to

robust demand and limited supply. They are expected to remain high in 2022 mainly due to high production costs and strong demand, the latter also affected by high vegetable oil prices. SMP and butter prices are expected to start decreasing thereafter and to resume their long-term declining trend as supplies respond to current price signals. Real fish prices rose in 2021 due to high demand at both household and food service levels, following the economic recovery from the COVID-19 pandemic, faced by a modest increase in supply. They are, however, projected to decline over the coming years due to supply foreseen increasing faster than demand.

Figure 12. FAO Food Price Index



Note: Historical data is based on the FFPI, which collects information on nominal agricultural commodity prices; these are projected forward using the OECD-FAO Agricultural Outlook baseline. Real values are obtained by deflating the FFPI by the US GDP deflator.

IV. USING THE MODEL FOR SCENARIO ANALYSIS

41. As part of the first FAO Agricultural Outlook for Europe and Central Asia, produced in collaboration with FAO's Regional Office for Europe and Central Asia (REU), the regional baseline projections were supplemented by counterfactual scenarios assessing the impact of dietary trends and crop productivity improvements. The analysis provides an assessment of global and regional market effects of higher crop yields in the region and a gradual replacement of staples with dairy products and poultry meat.

42. The baseline projections suggest that, without additional efforts, SDG 2 on Zero Hunger would not be achieved by 2030 and agricultural GHG emissions would continue to increase. A scenario was simulated to quantify the level of agricultural productivity growth required at the global level to eliminate hunger, while also putting the sector on track to contribute to limiting global warming to below two degrees by 2050, as agreed in the 2015 Paris Agreement on climate change. The scenario results suggest that a 28-percent productivity increase over the next decade would be required to simultaneously eliminate global hunger and put agriculture on track to contribute to the goal of reducing GHG emissions.

43. Several scenarios have been conducted using the Aglink-Cosimo modelling system to assess the impact of the war in Ukraine on international agricultural markets and global food security. The results indicate that prices for main cereals, particularly wheat, would increase further from their already elevated levels. Export shortfalls would be mitigated by the release of stocks in 2022/23 and a gradual production response by alternative producing countries in the medium term. Nevertheless, it is estimated that the world price increases for major staple foods would increase the undernourishment

risk of vulnerable populations, especially in North Africa and the Near East as well as in Sub-Saharan Africa.