Food and Agriculture
Organization of the
United Nations

OECD-FAO Agricultural Outlook 2026-2035

OECD-FAO Agricultural Outlook 2026-2035

This work is published under the responsibility of the Secretary-General of the OECD and the Director-General of FAO. The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Member countries of the OECD, or of the Members of the Food and Agriculture Organization of the United Nations.

This document, as well as any designation employed and data and map included herein, do not imply the expression of any opinion whatsoever on the part of FAO or the OECD, and are without prejudice to the legal or constitutional status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area. Dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

The mention of specific companies or products of manufacturers, whether or not these have been patented, does not imply that these have been endorsed or recommended by OECD or FAO in preference to others of a similar nature that are not mentioned.

Please cite this publication as:
OECD/FAO (2026), *OECD-FAO Agricultural Outlook 2026-2035*, Paris and Rome, https://doi.org/10.1787/47874669-en.

ISBN 978-92-64-98094-5 (print)
ISBN 978-92-64-85071-2 (PDF)
ISBN 978-92-64-66852-2 (HTML)

OECD-FAO Agricultural Outlook
ISSN 1563-0447 (print)
ISSN 1999-1142 (online)

FAO
ISBN 978-92-5-140769-1 (print and PDF)

Photo credits: Cover design by © OECD and FAO.

Corrigenda to OECD publications may be found at: https://www.oecd.org/en/publications/support/corrigenda.html.

Foreword

The *OECD-FAO Agricultural Outlook 2026-2035* is a collaborative effort by the Organisation for Economic Co-operation and Development (OECD) and the Food and Agriculture Organization of the United Nations (FAO). Serving as a reference for forward-looking policy planning, the Outlook draws upon the expertise of both organisations, incorporating inputs from collaborating member countries and commodity organisations. It provides a comprehensive assessment of national, regional and global agricultural commodity markets over the next ten years. The *Outlook* uses the OECD-FAO Aglink-Cosimo model to ensure consistency and global equilibrium across all markets. Detailed methodology and model documentation are available online at www.agri-outlook.org.

This 22st joint edition of the *Agricultural Outlook* comprises three parts.

Part 1: Agricultural and food markets: Trends and prospects (Chapter 1) outlines key projections and insights on challenges facing agri-food systems over the coming decade. The chapter presents the recent developments in agricultural markets and underlying macroeconomic and policy assumptions (Section 1.1). It discusses the trends and prospects for prices and production (Section 1.2), consumption (Section 1.3), and trade (Section 1.4) This year, the Outlook emphasis on agricultural labour productivity and income variability among workers (Section 1.2.2).

Part 2: Commodity chapters describe recent market developments and medium-term projections for consumption, production, trade, and prices for the commodities covered in the Outlook. Each of the nine chapters — Cereals (Chapter 2), Oilseeds and oilseed products (Chapter 3), Sugar (Chapter 4), Meat (Chapter 5), Dairy and dairy products (Chapter 6), Fish and other aquatic products for human consumption (Chapter 7), Biofuels (Chapter 8), Cotton (Chapter 9), and Other products (Chapter 10) — concludes with a discussion of the main issues and uncertainties affecting markets over the next ten years.

Part 3: The Statistical Annex is available online as support material but not included in the printed version of the *Outlook*. The Statistical Annex presents projections for production, consumption, trade, and prices for agricultural commodities, fish, and biofuels, as well as macroeconomic and policy assumptions. Market evolution over the *Outlook* period is described using annual growth rates and data for the final year (2035) relative to a three-year base period (2023-25).

The *Agricultural Outlook* is prepared jointly by the OECD and FAO Secretariats.

At the OECD, the baseline projections and *Outlook* report were prepared by members of the Trade and Agriculture Directorate: Marcel Adenäuer (baseline coordinator), Asli Bokesoy, Fabiana Cerasa, Thomas Chatzopoulos, Armelle Elasri (publication co-ordinator), Hubertus Gay (acting Head of Division), Barbora Gilbert, Gaëlle Gouarin, Edith Laget (Outlook co-ordinator), Claude Nénert, Eszter Palotaï and Grégoire Tallard of the Agro-Food Trade and Markets Division. From the Agricultural Resources Policy Division, Jamie Ash contributed to the Dairy chapter, Claire Delpeuch and Will Symes to the Fish chapter, and Agnes Szuda to the Box 1.3 The OECD Global Forum on Agriculture 2025: Attracting New Farmers for the Future of Agriculture. The publication preparation and communication activities were provided by Caitlin Boros, Hilary Gaboriau and Cem Mehmethanoglu. The publication benefited from a messaging review by David Hallam, and language review by Jennifer Allain. Technical support in the preparation of the *Outlook* was provided by Marc Regnier and Eric Espinasse. Many other colleagues in the OECD Secretariat and member country delegations provided useful comments on earlier drafts of the report.

At the Food and Agriculture Organization of the United Nations, the baseline projections and Outlook report were prepared by members of the Markets and Trade Division (EST) under the leadership of Boubaker Ben-Belhassen (EST Division Director), with the overall guidance of Máximo Torero (FAO Chief Economist) and by the Economic and Social Development Stream Management team. The core projections team consisted of: Abdi Ali, Sergio René Araujo Enciso, Isabel Burgos, Giulia Caddeo, Holger Matthey (Team Leader), Svetlana Mladenovic and Wendkouni Jean-Baptiste Zongo. For fish, the team consisted of Pierre Charlebois, Adrienne Egger, Paul Lirette and Stefania Vannuccini (Team Leader) from the FAO Fisheries and Aquaculture Division. Advice on fishmeal and fish oil issues and historical data were provided by Enrico Bachis from the Marine Ingredients Organisation (IFFO). Macroeconomic projections benefited from the input by Oxford Economics. The sugar and cotton sections were contributed by Mamoun Amrouk, Fabio Palmeri and Sabine Altendorf, with data and technical advice by the International Sugar Organization (ISO) and Lorena Ruiz from the International Cotton Advisory Committee (ICAC). The section on bananas and major tropical fruits was prepared by Sabine Altendorf, with input from Giuseppe Bonavita and Pascal Liu. Commodity expertise was provided by Grace Maria Karumathy, Emanuele Marocco, Shirley Mustafa, Alexis Poullain, Monika Tothova (Team Leader), and Di Yang. Iryna Kobuta and Evelyne van Heck contributed Box 1.4. Key features of women's participation in agrifood markets and trade. Aikaterini Kavallari provided analytical support for the projection of agriculture value added. Research assistance and database preparation were provided by Maria Antip, David Bedford, Victoria Johnston, Yanyun Li, Lavinia Lucarelli, Emanuele Mazzini, and Marco Milo. This edition also benefited from comments made by various colleagues from FAO and member country institutions. The authors would like to thank Araceli Cardenas, Yongdong Fu, Jessica Mathewson, Ameneh Mostafapour, and Kimberly Sullivan for their invaluable assistance with publication and communication issues.

Finally, information and feedback provided by the International Cotton Advisory Committee, International Dairy Federation, International Fertilizer Association, International Grains Council, International Sugar Organization, Marine Ingredients Organisation (IFFO) and World Association of Beet and Cane Growers is gratefully acknowledged.

The complete *Agricultural Outlook*, including the fully documented *Outlook* database that includes historical data and projections, can be accessed through the OECD-FAO joint internet site: www.agri-outlook.org. Unless otherwise specified, figures are based on data from the OECD FAO Agricultural Outlook 2026-2035 database, accessible via the OECD Data Explorer: http://data-explorer.oecd.org/s/1hc.

The published *OECD-FAO Agricultural Outlook 2026-2035* is available on the OECD's website and FAO Document Repository.

Table of contents

FIGURES

TABLES

BOXES

Abbreviations and acronyms

AfCFTA	African Continental Free Trade Area
AFOLU	Agriculture, forestry and other land use
AI	Artificial intelligence
ASF	African swine fever
B35	Alternative diesel fuel consisting of regular petroleum diesel (65%) blended with biodiesel (35%)
B40	Alternative diesel fuel consisting of regular petroleum diesel (60%) blended with biodiesel (40%)
BBNJ	Agreement on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction
bln	Billion
bln L	Billion litres
bln t	Billion metric tonnes
CAP	Common Agricultural Policy (European Union)
CIF	Cost, insurance and freight
CMIA	Cotton Made in Africa
CPI	Consumer price index
CPO	Crude palm oil
CPTPP	Comprehensive and Progressive Agreement for Trans-Pacific Partnership
CV	Coefficient of variation
cwe	Carcass weight equivalent
DDG	Dried distiller’s grains
dw	Dry weight
E20	Fuel mixture composed of 20% ethanol and 80% gasoline
EJ	Exajoule
ENSO	El Niño-Southern Oscillation
EPA	Environmental Protection Agency (United States)
ERS	Economic Research Service of the United States Department for Agriculture
EU	European Union
est	Estimate
EVFTA	EU-Viet Nam Free Trade Agreement

EVs	Electric vehicles
FAO	Food and Agriculture Organization of the United Nations
FBS	Food balance sheet
FCR	Feed conversion ratio
FDI	Foreign direct investment
FLW	Food loss and waste
FMD	Foot-and-mouth disease
FOB	Free on board
FTA	Free trade agreement
g	Gramme
GDP	Gross domestic product
GHG	Greenhouse gas
GLOBIOM	Global Biosphere Management Model
GMO	Genetically modified organism
GSP	Generalized System of Preferences
GtCO2-eq	Giga tonnes of carbon dioxide equivalent
ha	Hectare
HFCS	High fructose corn syrup
HPAI	Highly pathogenic avian influenza
ICAC	International Cotton Advisory Committee
IDF	International Dairy Federation
IEA	International Energy Agency
IIASA	International Institute for Applied Systems Analysis
ILUC	Indirect land use change
IMF	International Monetary Fund
IPCC	Intergovernmental Panel on Climate Change
ISO	International Sugar Organization
kcal	Thousand calories
kg	Kilogramme
kha	Thousand hectares
kt	Thousand metric tonnes
LAC	Latin America and the Caribbean
lb	Pound (weight)
LDC	Least developed countries
LULUCF	Land Use, Land Use Change and Forestry
lwe	Live weight equivalent
MBM	Meat and Bone Meal
MDER	Minimum Dietary Energy Requirement

Mercosur	Mercado Común del Sur/Common Market of South America
Mha	Million hectares
Mn	Million
Mn L	Million litres
MPS	Market price support
Mt	Million metric tonnes
Mt CO2-eq	Million tonnes of carbon-dioxide equivalent
NENA	Near East and North Africa
NGO	Non-governmental organisation
NWS	New World screwworm
OECD	Organisation for Economic Co-operation and Development
p.a.	Per annum
PCE	Private consumption expenditure
PEF	Product environmental footprint
PoU	Prevalence of Undernourishment
PPP	Purchasing power parity
PSA	Partial stochastic analysis
PSE	Producer Support Estimate
RCS	Regenerative Cotton Standard
RED	Renewable Energy Directive (European Union)
RFS/RFS2	Renewable Fuels Standard in the United States, part of the Energy Policy Act
rtc	Ready to cook
rwe	Edible retail weight equivalent
SAF	Sustainable aviation fuel
SDG	Sustainable Development Goals
SIT	Sterile insect technique
SMP	Skimmed milk powder
SPS	Sanitary and phyto sanitary measures (WTO agreement)
SSA	Sub-Saharan Africa
SSB	Sugar-sweetened beverage
t	Metric tonne
t/ha	Metric tonne/hectare
tq	Tel quel basis
TRQ	Tariff rate quota
TR4	Banana Fusarium Wilt Tropical Race 4 disease
UN	United Nations
US	United States
USDA	United States Department of Agriculture

WFP	World Food Programme
WHO	World Health Organization
WMP	Whole milk powder
WOAH	World Organisation for Animal Health (previously OIE)
WTO	World Trade Organization

Currencies

ARS	Argentinean peso
AUD	Australian dollars
BRL	Brazilian real
CAD	Canadian dollar
CHF	Swiss franc
CLP	Chilean peso
COP	Columbian peso
CNY	Chinese yuan renminbi
EGP	Egyptian pound
EUR	Euro (Europe)
GBP	British pound sterling
IDR	Indonesian rupiah
INR	Indian rupee
JPY	Japanese yen
KRW	Korean won
MXN	Mexican peso
MYR	Malaysian ringgit
NZD	New Zealand dollar
PEN	Peruvian sol
PKR	Pakistani rupee
RUB	Russian ruble
SAR	Saudi riyal
THB	Thai baht
UAH	Ukrainian grivna
USD	US dollar
ZAR	South African rand

Key messages

- Thanks to productivity gains, average gross per capita agricultural incomes are expected to increase by 9% over the next decade, despite rising input costs and broadly stable real agricultural prices.
- Given the inherent volatility of agricultural markets, there is a one-in-four chance that gross agricultural income per worker in 2035 will be at least 12% lower than the projected baseline level and in low-income countries, the decline could exceed 20%.
- Real international agricultural commodity prices are projected to remain broadly stable at or below current levels over the next decade.
- While productivity gains are expected to account for the bulk of agricultural production growth over the next decade, some expansion of crop areas and livestock numbers will still be necessary, leading to a 6.5% increase in direct greenhouse gas emissions.
- Consumers in lower middle-income countries are expected to further diversify their diets, particularly by increasing the share of livestock products consumed as part of rising living standards.
- Multilateral co-operation and rules-based international agricultural trade remain vital for resilient global food security, accessible and affordable healthy diets, and stable farm incomes.

Executive Summary

The *OECD–FAO Agricultural Outlook 2026-2035* provides a comprehensive assessment of the ten-year prospects for agricultural commodity and aquatic animal food markets at national, regional, and global levels. Jointly produced by the OECD and FAO, in collaboration with their Members and international commodity organisations, the Outlook serves as a forward-looking reference to support evidence-based policy planning. This 22nd edition examines the evolving landscape of global agriculture in the face of economic, societal and environmental challenges.

While this edition of the Outlook uses data up until 2025 as the basis for projections, economic disruptions associated with the 2026 conflict in the Middle East are impacting agricultural markets. The Aglink-Cosimo model, used to formulate the Outlook's regular projections, was employed to assess the impact of a slowdown in global economic growth as well as higher energy and fertiliser costs. Results show that the projected reduction in fertiliser use decreases cereal production, especially in low-income countries, leading to a weakening of agrifood system performance. Associated income losses and higher food prices would also force households in lower-income countries to reduce food consumption and shift towards cheaper food items, while households in higher-income countries will generally maintain their dietary patterns, reflecting greater resilience.

Thanks to productivity gains, average gross per capita agricultural incomes are expected to increase by 9% over the next decade, despite rising input costs and broadly stable real agricultural prices. This increase equates to a global average of agricultural labour productivity (an indicator for real gross agricultural income per worker) of USD 3 800 per farm worker. However, this global average masks wide geographical differences and markedly different speeds of growth across income groups. In 2023-2025, average agricultural labour productivity in high-income countries is estimated at just over USD 21 100 and is projected to reach USD 22 155 by 2035. The highest levels of output per agricultural worker are found in North America, Western Europe, and Oceania (Australia and New Zealand). Farms in these countries typically cultivate large areas with relatively low labour input, highly mechanised production systems and significant financial commitments. While this boosts productivity, it also exposes these operations to considerable liquidity risks given the inherent volatility of agricultural revenues.

Many middle-income nations in Latin America, Eastern Europe, and East and Central Asia regions are in a transitional phase, moving out of labour-intensive agricultural production toward more commercialised and capital-intensive activities and technologies. Over the projection period, increasing mechanisation in these countries is expected to improve land use intensity and the efficiency and timeliness of farm operations such as planting and harvesting. It also facilitates the reallocation of labour within agriculture and to off-farm activities, offering strong potential to raise rural incomes. However, realising these gains also depends on enabling conditions and sound governance that reduce market distortions and support participation in agrifood value chains, particularly through better access to inputs, infrastructure and marketing.

Agricultural workers in low-income regions within sub-Saharan Africa and South Asia currently earn, on average, about USD 930 per year, a figure projected to rise only modestly to around USD 1 100 during the Outlook period. Structural challenges persist, including widespread small-scale subsistence farming characterised by highly labour-intensive products and limited mechanisation, restricted market access, and reliance on staple crops or extensive livestock. These conditions remain inadequate for alleviating rural poverty. There is an urgent need for comprehensive investments in increasing labour productivity and alternative employment opportunities to enable rural populations to rise out of poverty and enhance food security and nutrition.

Given the inherent volatility of agricultural markets, there is a one-in-four chance that gross agricultural income per worker in 2035 will be at least 12% lower than the projected baseline level and in low-income countries, the decline could exceed 20%. Although baseline projections point to an increase of about 9% in average gross agricultural incomes per worker by 2035, maintaining the historical variability of key income drivers leaves a 25% probability that income could fall below today's level by the end of the projection period. Policies should support resilience and diversification strategies to minimise the negative impacts from risks, while still enabling farmers to benefit from opportunities.

Real international agricultural commodity prices are projected to remain broadly stable at or below current levels over the next decade. This Outlook reflects anticipated ongoing productivity gains and typical weather patterns, which contribute to lower marginal production costs for most agricultural commodities. These projections are supported by underlying structural factors and long-term trends, which are expected to maintain stability over the forecast period. This does not preclude variability around these projected price paths, as historical experience demonstrates that episodes of volatility and temporary price spikes can interrupt longer term trends. Such variability has been associated with a range of shocks, from the oil crises of the 1970s and the global financial and food crises of the late 2000s and early 2010s, to the recent pandemic and geopolitical conflicts, including the 2026 Middle East conflict.

While productivity gains are expected to account for the bulk of agricultural production growth over the next decade, some expansion of crop areas and livestock numbers will still be necessary, leading to a 6.5% increase in direct greenhouse gas emissions. Livestock are expected to account for about 77% of this increase, reflecting growing animal herds, while synthetic fertilisers contribute a further 23% through higher nitrous oxide emissions. The policy challenge is to accelerate sustainable productivity growth and close technology gaps, enabling emissions to grow more slowly or even decline relative to current values. This must be achieved while ensuring global food security and better nutrition outcomes for a growing population with evolving dietary preferences.

Consumers in lower middle-income countries are expected to further diversify their diets, particularly by increasing the share of livestock products consumed as part of rising living standards. Southeast Asia will account for an estimated 39% of global consumption growth by 2035, as population expansion induces higher total demand while urbanisation and income gains diversify dietary patterns away from staple foods toward higher shares of livestock and fish products. Despite ongoing societal initiatives aimed at promoting healthier diets, excessive food consumption is likely to continue in wealthier countries. In contrast, low-income countries, particularly in sub-Saharan Africa, are expected to continue to lag behind in food security and nutrition due to low household incomes and broader macroeconomic constraints that limit investment in local production and the ability to finance food imports. Persistent inefficiencies in food supply chains lead to high food losses and limit the availability of affordable and nutritious food, making productivity growth and well-functioning trade fundamental to prevent sustained increases in food prices.

Multilateral co-operation and rules-based international agricultural trade remain vital for resilient global food security, accessible and affordable healthy diets, and stable farm incomes. Agricultural product markets in low-income countries remain limited by insufficient transport infrastructure, inadequate storage facilities, suboptimal trade facilitation processes, and technological gaps. These factors hinder both farmers and consumers from maximising growth opportunities at domestic and international levels. Investments in infrastructure and technologies are needed to improve market access if countries, especially low-income countries, are to capitalise on these opportunities.

1 Agricultural and food markets: Trends and prospects

This chapter presents the main findings on prices, production, consumption, and trade of agricultural and aquatic food commodities covered in the OECD-FAO Agricultural Outlook, as well as developments in key sectoral indicators over the 2026-2035 period. It summarises a baseline scenario for the next decade based on specific assumptions about macroeconomic conditions, productivity trends, weather, consumer preferences, and agriculture and trade policies. Real international agricultural prices are projected to remain broadly stable, as productivity gains are expected to keep pace with rising demand. Production growth is driven primarily by improvements in productivity. At the same time, rising incomes in middle-income countries are expected to support a gradual shift towards livestock products, with some increase in feed demand. International trade will continue to play a central role in balancing regional supply and demand. In the context of the 2026 Middle East conflict, the chapter also presents a supplementary scenario analysis comparing the baseline outlook for 2026-2027 with an adverse scenario characterised by a significant slowdown in global economic growth and elevated energy prices. The chapter further analyses trends in gross agricultural income per worker, highlighting both expected improvements and the persistent volatility that characterises farm incomes.

The *OECD-FAO Agricultural Outlook* is the result of a collaborative effort of the Organisation for Economic Co-operation and Development (OECD) and the Food and Agriculture Organization of the United Nations (FAO). This year's report presents a consistent baseline scenario for the evolution of agricultural commodity and fish markets at national, regional, and global levels for the period 2026 to 2035.

The baseline projections are based on structured expert inputs. These projections are influenced by current market conditions as well as assumptions about macroeconomic, demographic, and policy developments as introduced in Section 1.1. The OECD-FAO Aglink-Cosimo model, which links sectors and countries covered in the Outlook, ensures consistency and global equilibrium across all markets. In light of the increased uncertainty surrounding energy and agricultural input costs following the 2026 Middle East conflict, a scenario analysis was conducted using the Aglink-Cosimo model to assess the risks associated with higher energy and fertiliser costs; the results are also presented in this section.

This year, the Outlook has a special focus on agricultural labour productivity, an indicator used as a proxy for gross agricultural income per worker. To better reflect this thematic focus, prices and production are discussed together in section 1.2 of this Trends and Prospects chapter under the heading "Agricultural Commodity Prices, Labour Productivity and Production: Projected evolution to 2035". A new indicator measuring agricultural labour productivity defined as agricultural gross domestic product divided by the number of agricultural workers is introduced in subsection 1.2.2 and used to analyse potential future income variability and draw some policy inferences.

1.1. Recent developments and assumptions in agricultural markets

Figure 1.1 provides information on the current commodity situation. Due to differences in marketing years across commodities, data are presented for either the 2025 calendar year or the 2025/26 marketing year, as appropriate. These figures establish the starting point of the baseline scenario generating 2026-2035 projections.

Figure 1.1. Market conditions for key commodities

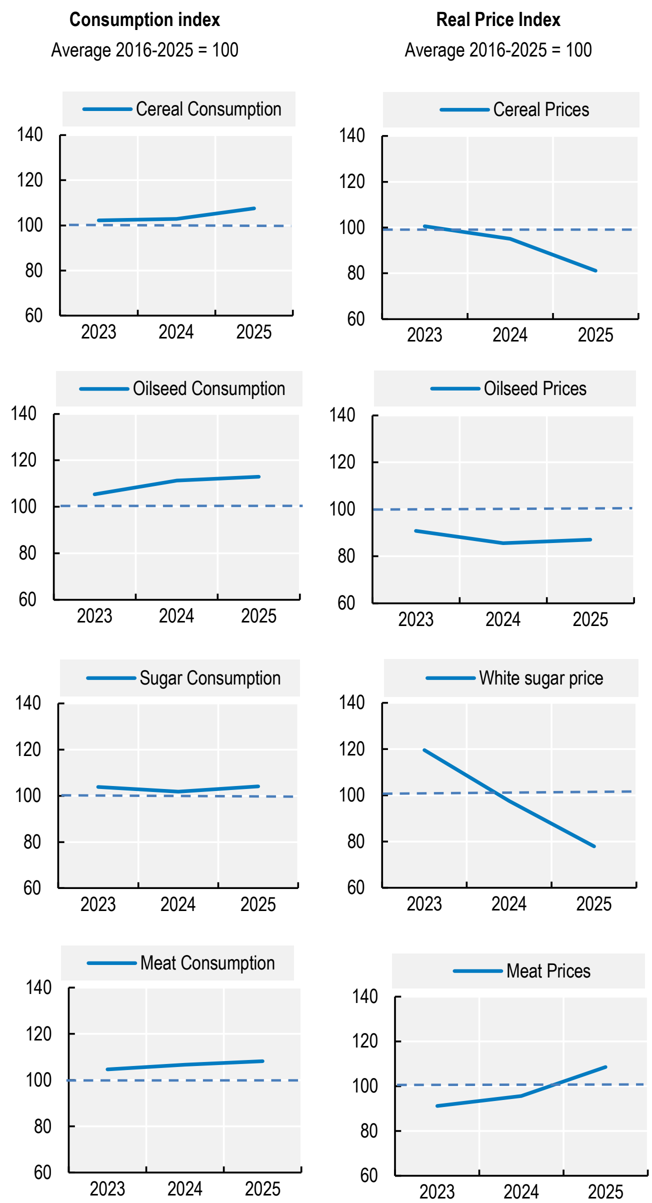
Current market conditions

Cereals: International maize and wheat prices eased early in the 2025/26 marketing year, but later came under upward pressure, supported by solid maize export demand and weather-related disruptions in some key wheat-exporting regions, despite overall ample supplies. Prices of other coarse grains also edged higher amid strong feed demand and tighter export availabilities. After declining in 2025 following successive bumper harvests and the removal of export restrictions in India, rice prices are expected to recover in 2026 amid improving supply conditions and robust global demand. Overall, global cereal markets remain well supplied despite crop-specific regional differences.

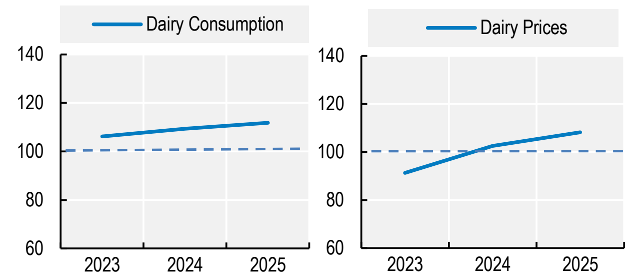
Oilseeds: Soybean prices edged up in 2025/26 but remained below long-term averages, largely supported by robust crushing demand from the biofuel sector. Global soybean production in 2025/26 is expected to remain close to record high levels. International protein meal prices rebounded somewhat in 2025/26 but remained relatively subdued on ample global availability. Meanwhile, international vegetable oil prices strengthened further driven by continued strong demand, including for biomass-based diesel, and tight palm oil output from major producing countries.

Sugar: Real international prices of white sugar are projected to ease in 2025/26 despite a notable month on month increase in March, reflecting expectations of ample global sugar supplies in the current season. Global sugar consumption is rising modestly, mainly supported by growth in Africa and Asia.

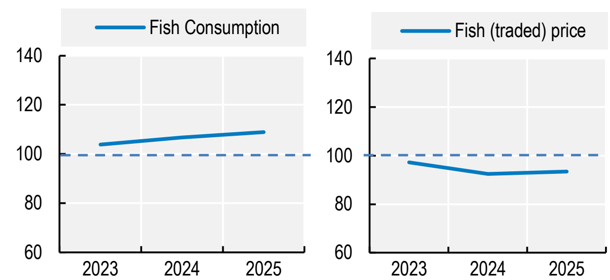
Meat: In 2025, global meat prices increased due to strong import demand and tight bovine and ovine supplies, partly offset by lower poultry and pig meat prices from higher availabilities. Consumption rose slightly, driven by poultry and pig meat, while ruminant meat remained stable. Per capita consumption increased the most for poultry supporting continued substitution from ruminant meats towards poultry in many markets.



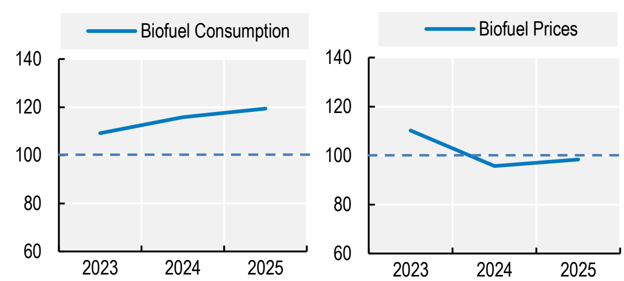
Dairy: International dairy prices trended upwards during 2024 and the first half of 2025, supported by resilient import demand and firm butterfat markets. Prices generally eased from mid-2025, reflecting increased milk production, improved export availabilities among major exporters, as well as anticipated continued supply expansion. Global dairy consumption is expected to continue expanding, mainly supported by population growth and changing dietary preferences associated with economic growth.



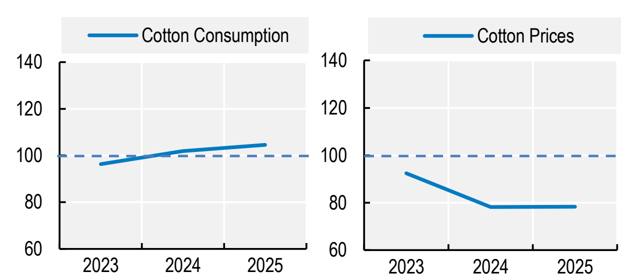
Fish and other aquatic products: In 2025, global consumption of fish and other aquatic products for food uses continued its gradual rise, driven primarily by increased food demand, while growth in non-food uses remained slower. International fish prices rebounded in 2025, following declines in 2023 abd 2024.



Biofuels: Global biofuel consumption has grown steadily, averaging 3.5% annually over the past decade. In 2025, this trend continued with prices continuing to decrease due to lower crude oil and feedstock prices, favorable tax policies, and strong economic incentives.



Cotton: In the 2025/26 season, global consumption is projected to remain subdued, while production is expected to increase slightly. International cotton prices have trended downward since the beginning of the current season, reflecting favourable global production prospects and ample exportable supplies.



Note: All time series are indexed to the 2016-2025 average (=100). Consumption denotes the quantity of commodities, expressed in primary equivalent terms, acquired by economic agents through market transactions for final and intermediate uses, including losses and waste. Where reference is made to a specific end use, a qualifying term (such as food consumption or feed consumption) is applied. Price indices are weighted by the average global production value of the past decade as measured at real international prices. More information on market conditions and evolutions by commodity can be found in the commodity snapshot in the Annex and the online commodity chapters.

StatLink https://stat.link/cuwzrh

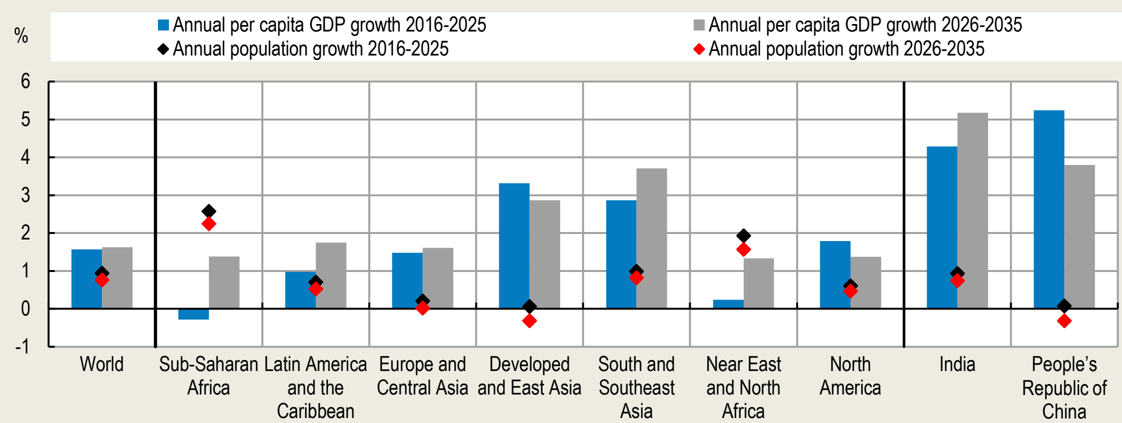
The baseline scenario generating 2026-2035 projections incorporates the commodity, policy, and country expertise of the OECD and the FAO, as well as input from collaborating member countries and international commodity bodies. The baseline projections discussed in this section are based on data and policies in place as of December 2025. Box 1.1 outlines the macroeconomic and policy trends expected to influence the evolution of agricultural markets over the next ten years.

Box 1.1. Macroeconomic assumptions and policy environment

A stable economic growth but a slowing pace of global population growth with regional differences

Projections of economic indicators are based on the latest forecasts published by the IMF *World Economic Outlook* from October 2025, complemented by longer-term projections from Oxford Economics and the OECD *Economic Outlook* released in December 2025. Global annual per capita income growth was 1.8% in 2025 and is expected to fall to 1.6% in 2026. Emerging Asian economies are expected to generate the fastest growth (Figure 1.2). Based on the assumptions from the 2024 revision of the UN *World Population Prospects*, global population growth is projected to grow by 0.8% per year, reaching 8.8 billion by 2035. However, growth will vary significantly across regions, with the fastest increases in sub-Saharan Africa (2.2% p.a.) India will remain the most populous country and the People's Republic of China (hereafter "China")'s population will decline slightly.

Figure 1.2. Annual GDP per capita and population growth rates



Note: Aggregated regional GDP figures are calculated using exchange rate-based rather than purchasing power parity (PPP) weights.

After high inflation rates in 2022 and 2023 across most countries, rates have been declining globally, in part reflecting falling commodity prices and the lagged effects of tighter monetary policies. Disinflation is expected to continue in 2026, although some exceptions will remain including China, Pakistan, Malaysia, South Africa, and India. Over the medium term, inflation rates are expected to decrease further, stabilising at levels below 10% in all countries after 2026.

The global reference oil price used in the Outlook has been set to reflect the conflict in the Persian Gulf in early 2026 and the resulting disruption to trade through the Strait of Hormuz, a key maritime corridor linking Gulf energy producers with global markets. After steadily declining from a peak of USD 101/barrel in 2022 to USD 68/barrel in 2025, oil price is projected to temporarily increase to USD 75/barrel in 2026. The effect is expected to diminish, and overall economic growth should remain largely unaffected over the medium term.

Existing policies are held constant in the baseline

Policies play an important role in agricultural, biofuel, and fisheries markets, and policy reforms usually trigger changes in market structures. The Outlook assumes current policies will remain in place and that no new policies are enacted. Only free trade agreements that have been ratified up to the end of December 2025 are considered in the Outlook.

Projections remain subject to considerable uncertainty, particularly due to geopolitical tensions, energy market volatility, and fluctuations in input costs. Following the outbreak of the conflict in the Middle East in the early months of 2026, increased uncertainty surrounding energy and agricultural input costs has added pressure on global agrifood systems. Against this backdrop, several analyses have been conducted to assess how disruptions to energy markets, fertiliser supply chains, and strategic trade routes such as the Strait of Hormuz could affect agrifood systems (FAO, 2026[1]; OECD, 2026[2]).

Using the Aglink-Cosimo partial equilibrium model, this Outlook includes a scenario analysis to examine the risks posed by higher energy and fertiliser costs. The analysis compares a baseline projection for 2026-2035 with an adverse scenario based on the IMF's Spring 2026 World Economic Outlook (IMF, 2026[3]). In the adverse scenario, weaker economic growth and higher input costs reduce the performance of the global agrifood system, particularly in 2026-2027. These factors lead to higher production costs and slower income growth, which together have a stronger negative impact on food security in low-income countries. The scenario analysis assesses how these macroeconomic changes and higher input costs affect agricultural production, consumption patterns, diet composition, food stocks, and the overall resilience of the food system. The detailed results are presented in Box 1.2.

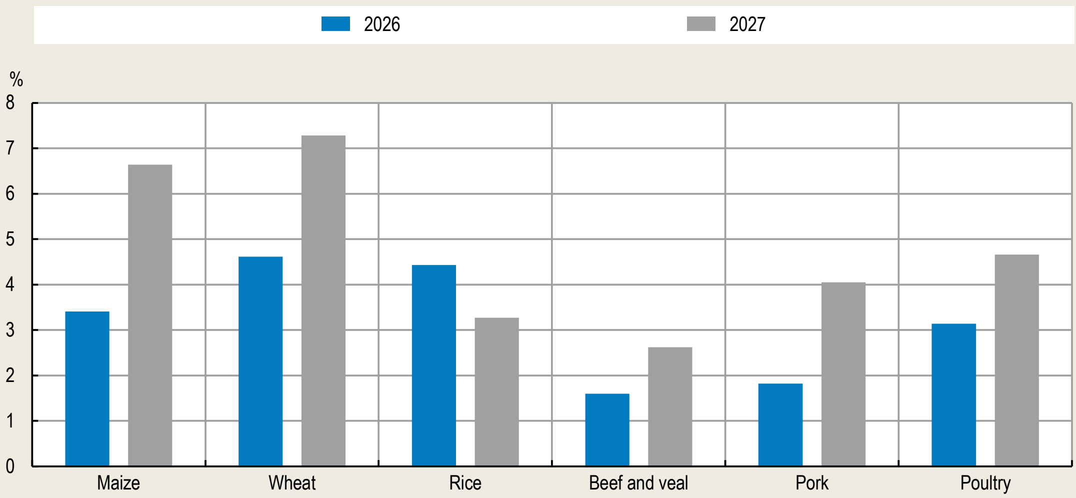
Compared to the baseline, the adverse scenario leads to a broad weakening of agrifood system performance in 2026-2027, with impacts transmitted through higher input costs and lower income growth. While higher income countries are largely able to absorb these shocks through trade adjustments and stock use to maintain stable consumption, low-income countries face a systemic deterioration in food security, with significant and multidimensional risks driven by interacting constraints on supply, access, and utilisation. Availability risks stem from fertiliser driven reductions in crop yields and production, which are larger than in any other income group. Access risks arise from slower income growth combined with higher food prices, limiting households' ability to purchase food and constraining the capacity to increase imports. Diet quality risks emerge from a shift away from nutrient dense animal source foods toward staples, reducing dietary diversity and potentially worsening nutritional outcomes. Stability risks are heightened by declining stocks and greater exposure to external shocks, given limited buffering capacity. These factors reinforce each other: reduced production increases reliance on imports, but constrained purchasing power limits access; at the same time, higher prices force households to adjust diets toward lower cost, less diverse food baskets.

Box 1.2. Adverse Scenario: Implications for the Agrifood Outlook in 2026-2027

This supplementary analysis contrasts the Spring 2026 IMF World Economic Outlook "Adverse Scenario" (IMF, 2026[3]) with the baseline presented for the period 2026-2027. The "Adverse Scenario" is characterised by a significant slowdown in global economic growth and energy prices elevated about 33% above baseline levels in 2026 and around 10% in 2027, which increase production costs across agricultural systems. As a result, real fertiliser prices are projected to rise above baseline levels by 29% in 2026 and 17% in 2027. These developments translate into reduced fertiliser use, weaker demand growth, and adjustments in production, trade, and consumption patterns across all regions.

Real global reference prices increase across all major commodities, reflecting higher production costs, particularly for energy, fertilisers, and feed, combined with persistently inelastic food demand. While price increases are already projected for 2026, they strengthen further in 2027, indicating a continued pass through of elevated input costs into market prices. The effect is broad based, affecting both crops and livestock products, and underscores how limited demand responsiveness amplifies cost driven price pressures in global food markets (Figure 1.3).

Figure 1.3. Deviations from baseline in real international agricultural commodity prices



While the magnitude of the effects varies by income group, the scenario broadly projects lower agricultural output, tighter food markets, and increasing pressures on food security, with the most pronounced effects in low-income countries.

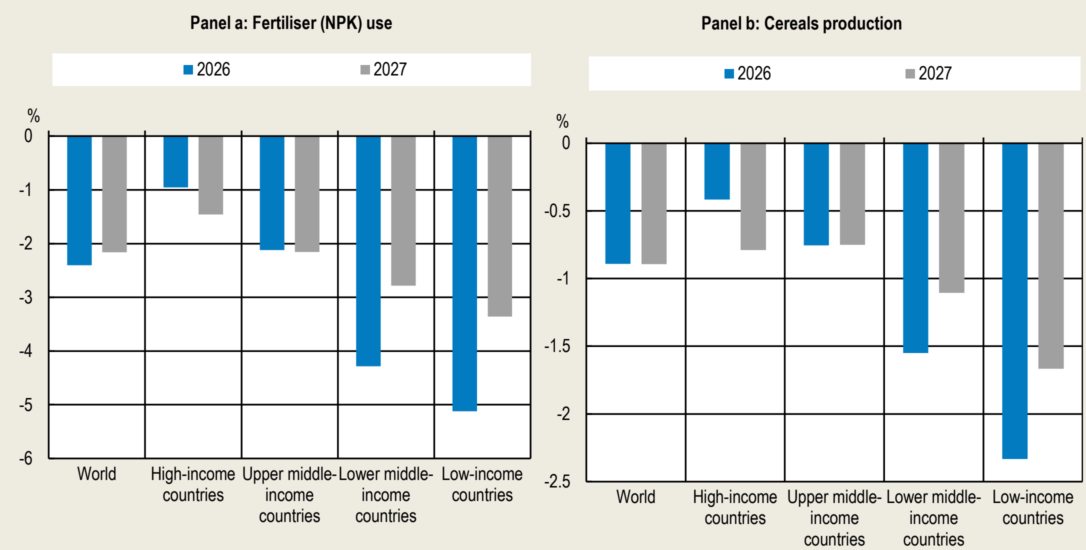
Macroeconomic and input cost transmission

Relative to the baseline, the scenario implies a marked slowdown in economic activity. This affects agrifood systems through two principal channels: reduced demand growth and higher production costs. Elevated energy prices increase fertiliser costs, reducing its use across all income groups, though to varying degrees (Figure 1.4 panel a). Fertiliser use declines markedly in both low-income countries (5.1% in 2026 and 3.4% in 2027) and lower middle-income countries (4.3% and 2.8%). In upper middle- and high-income countries, reductions are smaller (around 2% or less), reflecting greater resilience and adjustment capacity.

Production impacts: Concentration of losses in crops

Across income groups, the adverse scenario reduces cereal production most sharply in low-income countries, where output declines by about 2.3% in 2026 and 1.7% in 2027 (Figure 1.4 panel b). These losses reflect strong yield reductions linked to lower fertiliser use. In lower middle-income countries, declines are smaller, generally around 1-2%, due to higher baseline input efficiency. Upper middle- and high-income countries experience only marginal reductions, of less than 1%. Overall, the results highlight a clear asymmetry, with low-income countries bearing the largest cereal production losses under the adverse scenario.

Figure 1.4. Deviations from baseline in fertiliser (NPK) use (panel a) and cereals production (panel b)



Trade adjustments: Uneven capacity to buffer shocks

Trade plays a central role in offsetting domestic supply shocks, but the capacity to rely on external markets varies significantly by income group. In low-income countries, reduced crop production leads to an increase in net imports of staple foods (e.g. cereals net imports rise by +3.5% in 2026 and +1.1% in 2027), while weaker income growth constrains the ability to finance imports amid rising international commodity prices. As a result, trade only partially compensates for domestic shortfalls. In lower middle-income countries, the adjustment is more effective. Net imports of cereals increase more strongly (+7% and +5%), supported by rising import volumes and greater purchasing capacity. Upper middle-income countries and high-income countries also adjust through trade, but with greater resilience, rebalancing supply and demand without major domestic disruptions.

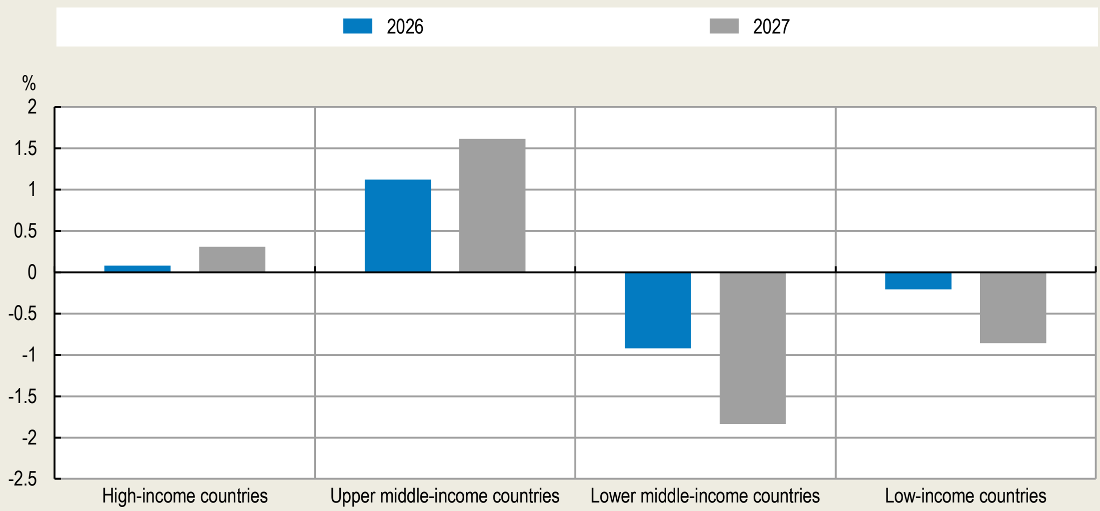
Consumption and diet composition: Divergence across income groups

The scenario leads to declining or stagnating food consumption across all income groups, but the nature of the adjustment differs markedly. In low-income countries, reduced income growth and higher food prices drive broad consumption declines, with larger reductions in per capita consumption of animal source foods (0.8% and 1.4%) than in staple (e.g. cereals 0.7% and 1.1%), pointing to a shift toward cheaper diets.

In lower middle-income countries, consumption remains relatively resilient, with staple food consumption broadly stable and only moderate declines in animal-source products in 2027. In upper middle-income countries and high-income countries, consumption levels remain largely unchanged with no significant dietary shift, underscoring the role of income levels in buffering price shocks and maintaining dietary quality.

Real basic food expenditure per capita falls in poorer countries, as income losses and higher prices force households to reduce consumption volumes and shift toward cheaper food baskets (Figure 1.5). In contrast, households in richer countries absorb the shock more easily, maintaining consumption despite lower real incomes, reflecting greater resilience.

Figure 1.5. Deviations from baseline in basic food expenditures



Stocks and system resilience

Stock levels decline across all income groups in the scenario, reflecting efforts to smooth supply and demand imbalances. However, the implications differ. In low-income countries, stock drawdowns (around 3% to 4%) reduce already limited buffers, increasing vulnerability to further shocks. In contrast, upper middle-income countries and high-income countries use stocks more effectively to stabilise markets, with similar or larger drawdowns (up to 4%) but without compromising food availability.

Another important source of uncertainty relates to sanitary and phytosanitary risks, particularly animal disease outbreaks. These events can significantly disrupt trade in animal products by triggering import restrictions, export bans, and precautionary domestic measures that may persist over many years. Outbreaks such as avian influenza or African swine fever can lead to sudden supply shortages in affected regions and reshape global trade patterns. While the immediate impacts are production losses, these shocks can increase price volatility and place more pressure on food systems.

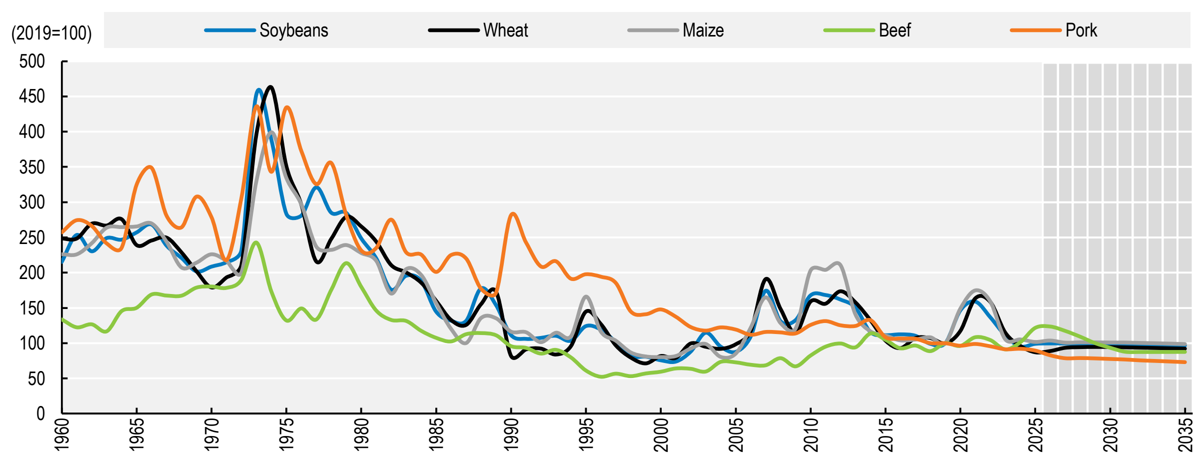
1.2. Agricultural Commodity Prices, Labour Productivity and Production: projected evolution to 2035

1.2.1. Continued long-term decline in real global agricultural commodity prices hinges on sustained investments into productivity improvements

Agricultural commodity markets remain inherently uncertain given their dependency on natural production conditions, macroeconomic and policy developments and geopolitical tensions. A volatile supply is met by an increasingly price inelastic global food demand, especially in upper middle- and high-income countries, where even small supply disruptions can trigger disproportionately large price responses. Near term risks to commodity price stability remain elevated due to the 2026 Middle East conflict, which has disrupted energy and fertiliser trade through the Strait of Hormuz. In this context, international commodity price projections for 2026 in the Outlook reflect heightened uncertainty and high input cost pressures.

In the later years of the projection period, international agricultural commodity price projections reflect underlying structural factors and are anchored in long-term trends. Real international agricultural commodity prices are projected to remain broadly stable at or below current levels over the next decade, consistent with assumptions of ongoing productivity improvements and normal weather conditions[1], which lower the marginal cost of production for most agricultural commodities (Figure 1.6). This does not preclude variability around these projected price paths, as historical experience demonstrates that episodes of volatility and temporary price spikes can interrupt longer term trends. Such variability is illustrated by the repeated price spikes shown in Figure 1.6, associated with a range of shocks, from the oil crises of the 1970s and the global financial and food crises of the late 2000s and early 2010s, to the recent pandemic and geopolitical conflicts.

Figure 1.6. Long-term evolution of commodity prices, in real terms



Note: Historical data for soybeans, wheat, maize and beef from World Bank, "World Commodity Price Data" (1960-1989). Historical data for pork from USDA QuickStats (1960-1989).

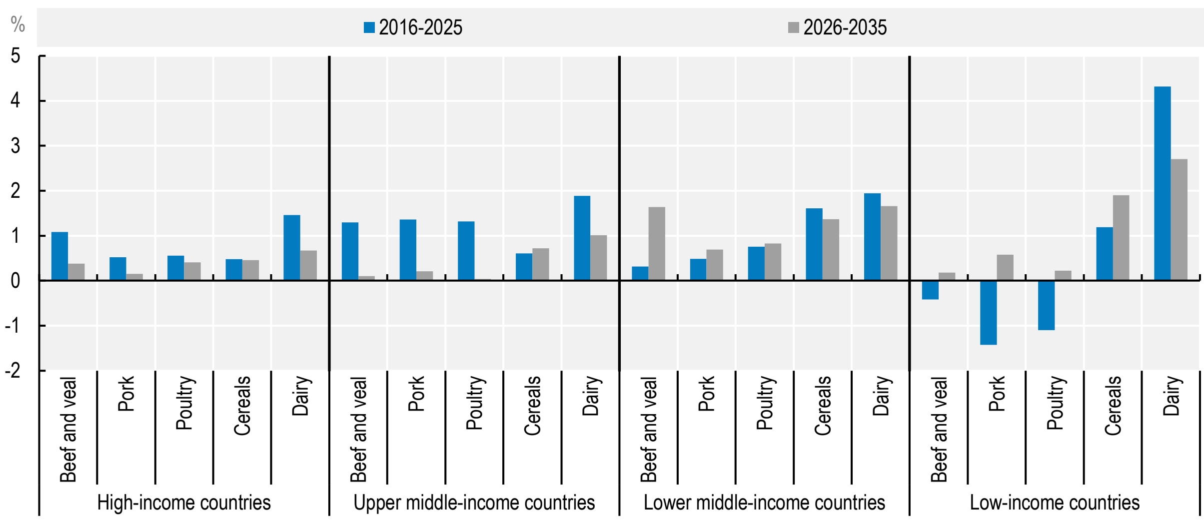
The global reference price for beef and veal reached a four-decade high in 2025 and is expected to remain elevated in the near-term as limited animal inventories and herd rebuilding constrain supply growth. Strong underlying demand further supports prices, reflecting population growth, rising incomes and a sustained preference for animal-source foods in many emerging and high-income markets. This is particularly evident in major beef exporting countries such as Brazil, Canada and the United States, where herd rebuilding is projected to begin in the early years of the Outlook period following earlier liquidation cycles linked to drought conditions and weak profitability. Real beef and veal prices are projected to peak during 2026 before declining over the medium-term as herd rebuilding progresses and supply growth gradually catches up with demand.

It is important to recognise that the transmission of price signals between international markets and local producers and consumers varies widely across countries. Factors such as transport and logistics costs, exchange rate movements, trade policies, and the degree of integration of domestic markets into global value chains all shape whether – and to what extent –price signals are passed between markets. For example, high transport costs can dampen price transmission between different markets, while fluctuations in the value of local currencies can either amplify or offset international price signals.

While current disruptions in the Strait of Hormuz are expected to translate into higher input costs for farmers worldwide and, with a lag, into higher global agricultural commodity prices, the immediate effects of the conflict are likely to be felt primarily in domestic food markets. These effects are expected to materialise through higher transportation and processing costs, increased demand pressure from biofuel markets, and potential tightening of monetary policies should countries raise key interest rates to contain inflation. The most immediate impacts are likely to be observed in fertiliser- and grain-importing countries in sub-Saharan

Africa and the Near East and North Africa. Understanding these transmission channels is critical for policymakers seeking to stabilise local food prices and safeguard food security in the context of the current conflict.

Figure 1.7. Average annual yield growth of major commodities



Note: Yields are calculated as total quantity produced divided by area harvested for crops, and livestock inventory for animal commodities

In a context of flat or declining real agricultural commodity prices, improvements in land and herd productivity – such as higher crop yields, improved livestock marketing rates and increased carcass weights – as well as the ability to manage rising input costs, will be critical to translating farmers' decisions and natural resources into higher production and ultimately sustainable net farm incomes. Continued investments in biotechnology, mechanisation and precision agriculture are therefore fundamental to achieving the productivity gains underpinning the projected trends in real agricultural commodity prices. In the absence of such investments, marginal farm operations may struggle to achieve the necessary productivity improvements, undermining farm incomes, increasing pressure on farming households and accelerating farm exit.

Assuming a continued transition towards more intensive production systems in low- and middle-income economies, the projections indicate that around 73% of global crop production growth will be driven by yield improvements, with a further 9% attributable to land use intensification. Similarly, a substantial share of growth in livestock and fish production is expected to stem from productivity gains, although herd expansion is also projected to contribute. Gradual adoption of improved seed and animal breeding techniques, better feeding and farm management practices, increased use of fertilisers and other chemical inputs, and enhanced access to veterinary services are expected to increase land and herd productivity over time, particularly in low- and middle-income countries.

Figure 1.4 presents the average annual change in yields for selected commodities across four country groups distinguished by income levels. Yields are defined as total production divided by area harvested for crops and by livestock inventory for animal products. Stronger yield growth is projected for cereals and dairy in low-income countries, and for beef, cereals and dairy in lower middle-income countries, with annual growth rates ranging from 1 to 3% over the next decade. However, these gains generally start from a low productivity base, and achieving sustained yield improvements remains challenging, particularly in low-income countries, where recurring adverse growing conditions and animal diseases have constrained yields in recent years. In higher income countries, yield growth is expected to remain at or below 0.5% p.a. for most commodities, except for dairy in upper middle-income countries, where yields are projected to grow by around 1.0% p.a. over the next decade. Farmers in higher income countries already operate close to their technological frontier, making further gains increasingly difficult and costly to achieve.

Despite the projected stronger productivity growth in many low- and middle-income countries, land and herd productivity levels are expected to remain below their technical potential, with significant disparities relative to high-income countries persisting over the medium term. While these gaps can be partly explained by differences in agro-ecological conditions, the limited access to finance, modern farming technologies, skilled labour and advanced agronomic inputs, they keep farmers in these regions operating significantly below their technological frontier. Meeting future food demand without further expansion of herd sizes and croplands, and consequently the sector's environmental footprint, will therefore require narrowing existing technology gaps on currently cultivated land and reared herds, more broadly through the sustainable intensification of agricultural systems.

1.2.2. Thematic focus: developments in agricultural labour productivity and income variability

To achieve long-term food security and nutrition, food systems face the challenge of delivering three outcomes in synergy: healthier diets, viable livelihoods for farmers and rural communities, and sustainable resource use. This thematic section addresses the social dimension of this challenge, an important area supported by the work of both organisations delivering this Outlook. Box 1.2 describes a recent OECD initiative to support livelihoods to enhance agriculture's attractiveness to new farmers. Given the multidimensional nature of social issues in agriculture and the limitations of relevant data, it is important to clearly delimit the scope of what can realistically be reported in the Outlook. Accordingly, this section focuses on farm labour productivity, using a newly developed indicator.

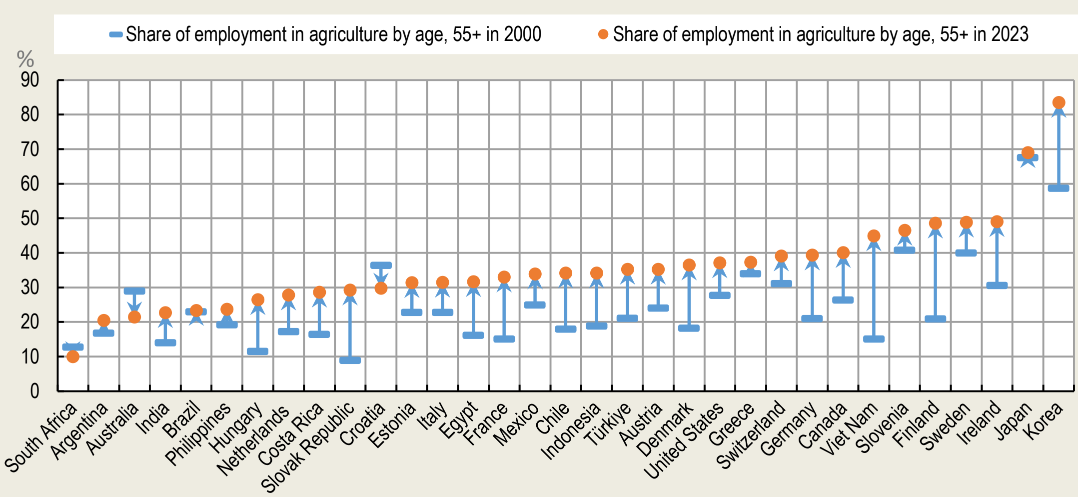
Labour productivity generally refers to the amount of economic value generated per worker over a given period of time. For this Outlook, agricultural labour productivity is calculated by dividing the sector's real GDP by the total number of agricultural workers. Agricultural GDP projections are derived by extending input-output components from the Global Trade Analysis Project (GTAP), a global general equilibrium modelling framework used to represent the structure of the world economy, with relevant behavioural and market variables from the Aglink-Cosimo model. Agricultural employment data are sourced from ILOSTAT, the International Labour Organization's global database of labour statistics which compiles data from national labour force surveys, official statistical sources, and modelled estimates. In ILOSTAT, employment refers to a headcount measure of persons engaged in work for at least one hour during a reference period, consistent with the international definition of employment; it is therefore not adjusted for hours worked or converted into full-time equivalents. Forward-looking employment estimates are produced using a statistical approach that captures how employment evolves with changes in rural population (size driver) from the United Nations World Urbanization Prospects 2025 and per-capita income projections (structural-change driver) from the IMF and Oxford Economics.

The constructed agricultural labour productivity is a gross measure of value added per worker and does not distinguish between skilled and unskilled workers. As a result, it may mask important compositional differences in the workforce and may not necessarily translate into net farm income or household welfare. Increases in labour productivity often reflect reduced labour input per hectare due to mechanisation and capital deepening. However, such gains also entail higher capital costs, including investment expenditures, depreciation, and debt servicing, which are not netted out in GDP-based productivity measures. Moreover, this indicator does not account for the role of agricultural supports, which can significantly influence farm income independently of productivity levels. In highly mechanised agricultural systems, productivity gains are therefore closely linked to the substitution of labour with machinery, shifting returns from labour to capital. Under certain conditions, this substitution may increase financial vulnerability, particularly when high capital costs coincide with price downturns or rising input costs. Instances of farm exit and bankruptcy linked to excessive or poorly timed capital investment underscore the importance of interpreting labour productivity as an indicator of structural transformation rather than as a direct measure for household income.

Box 1.3. The OECD Global Forum on Agriculture 2025: Attracting New Farmers for the Future of Agriculture

The Global Forum on Agriculture (GFA) is an annual platform for international dialogue on agricultural policy which brings together farmers, policymakers and experts. In 2025 it focused on enhancing agriculture's attractiveness to new farmers. The aging farming population (Figure 1.8), variable skill sets, market shocks and environmental pressures challenge the sector's future. New entrants are more likely to adopt modern technologies and bring innovation and new skills (Campi et al., 2024[4]), which can help overcome the challenges food systems face. However, barriers such as inadequate access to land, finance, social and advisory services, bureaucratic complexities and knowledge gaps hamper their entry. Young people, women and Indigenous Peoples may face even bigger hurdles (Dabkienė, 2025[5]; Agriculture and Agri-Food Canada, 2021[6]; Coopmans et al., 2021[7]). Fluctuating farm income levels can also deter new farmers, alongside rising risks due to increasing extreme or volatile weather patterns, the expected lower quality of life and the demanding nature of work.

Figure 1.8. Share of employment in agriculture above 55 years old



Note: In countries where the indicators are missing in 2000 or in 2023, the nearest available year is shown.
Source: (OECD, 2025[2]) based on data from FAOSTAT Employment indicators: Agriculture and agrifood systems

StatLink https://stat.link/fnewyt

GFA 2025 discussed several ways to attract new farmers. Improving farmers' income and the sector's profitability by boosting innovation for sustainable productivity growth is key. Policies need to go beyond fiscal support, facilitating access to land, credit and advisory services, promoting agricultural training and education, cultivating peer support networks and mentoring, and reducing administrative burden. As perceptions of farming often rely on outdated clichés, there is a need for a new, inspiring narrative, showing the innovation and entrepreneurial opportunities in agriculture. Progress towards social sustainability needs coordinated policy action beyond agriculture and farm income to include education, social, tax, pension and labour policy. As entry and exit are linked, policies supporting retirement and succession planning matter. Improving well-being in rural areas, ensuring access to health care, education and cultural services, providing adequate social insurance, child, elderly and disability care, and enhancing working conditions are key to for making farming an attractive career.

Farmer testimonials at GFA 2025 (Szuda and Antón, 2025[8]) highlighted that the sector's transformation is already underway. New entrants already bring innovation and entrepreneurial skills, and digitalisation attracts new talent. While family succession remains important, an increasing share of entrants come from non-agricultural families or transition into farming after non-agricultural employment, although this trend is not uniform across countries. Emerging "mixed livelihoods" combining farming and non-farming activities have been observed in some contexts, with reported potential to diversify income sources, buffer against income fluctuation and open new opportunities.

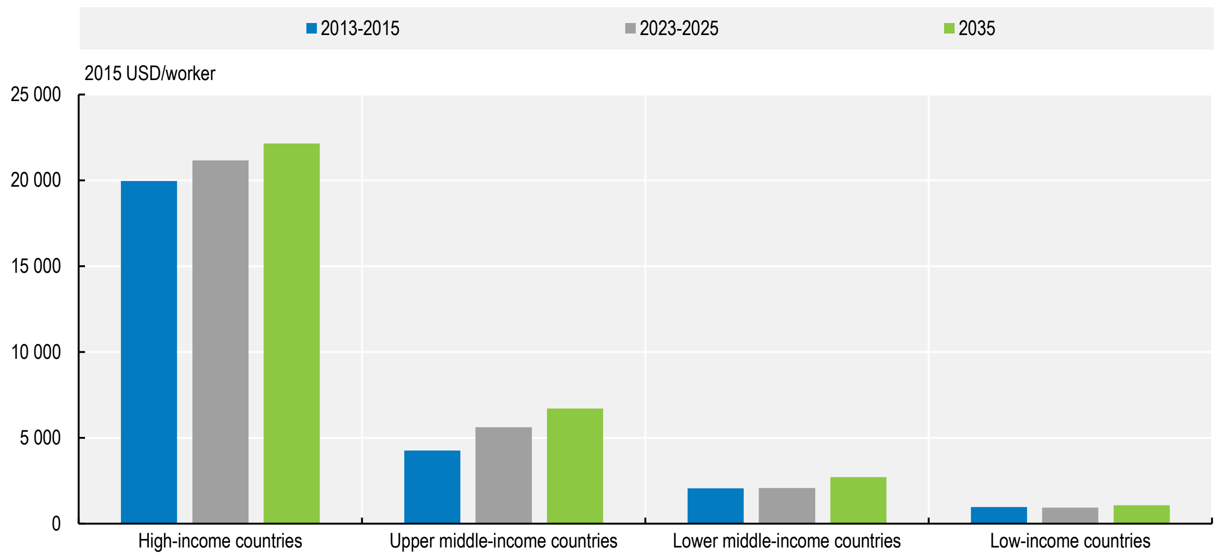
Source: (OECD, 2025[9])

The highest levels of GDP per agricultural worker are found in high-income countries of North America, Western Europe, and Oceania (Australia and New Zealand). These countries benefit from high land-to-labour ratios, capital-intensive production systems, and widespread adoption of technology. Major middle-income countries in Latin America, Eastern Europe and East and Central Asia occupy an intermediate position, reflecting their transition towards highly commercialised, capital-intensive systems. At the lower end of the distribution, low-income countries in sub-Saharan Africa and South Asia continue to face structural constraints, including the persistence of smallholder systems with limited market integration, low capital endowment, and heavy dependence on a narrow range of staple crops or extensive livestock; conditions that are insufficient to lift rural households out of poverty. Nevertheless, several of these countries are experiencing notable improvements in agricultural labour productivity, reflecting an ongoing transition from subsistence-oriented agriculture toward more commercial production systems.

Agricultural labour productivity exhibits the widest cross-country differences of any economic sector, making it a central factor in understanding global income inequality (Gollin, Lagakos and Waugh, 2014[10]). In the base period, real agricultural GDP per sectoral worker in high-income countries is estimated at just over USD 21 000, compared with just under USD 1 000 in low-income countries (Figure 1.9). These gaps underscore the deep structural heterogeneity that continues to characterise global agricultural systems.

Over the next decade, agricultural labour productivity is projected to continue rising across all income groups, though at markedly different speeds. Lower middle-income countries are expected to record the fastest growth, with agricultural labour productivity projected to increase by nearly 30% by 2035, followed by upper middle-income countries (19%) and low-income countries (17%). These trends reflect ongoing structural transformation and gradual increases in capital use across these country groups. In contrast, growth in high-income countries is expected to slow substantially, with average output per worker increasing by just over 5% by 2035. Despite these improvements, absolute differences between income groups remain large, and the gap between high- and low-income countries, while narrowing slightly, continues to reflect long standing structural differences.

Figure 1.9. Average agricultural labour productivity



Note: Agricultural labour productivity is computed as agricultural GDP (constant 2015 US dollars), over number of workers in agriculture.
Source: OECD-FAO calculations based on ILO (ILOSTAT database).

Assumed improvements in crop yields, livestock marketing rates, and carcass weights play a role in shaping projected labour productivity developments across income groups. These technical indicators represent the primary channels through which biological potential and managerial decisions are transformed into marketable output and, ultimately, income per worker. High-income countries have already achieved high land productivity and well-optimised livestock systems, including marketing strategies that maximise returns to capital and minimise labour bottlenecks, leaving limited room for further gains. Middle-income countries, by contrast, are experiencing rapid improvements in land and herd productivity as they transition toward fully commercial, more capital-intensive production systems. In low-income countries, progress remains constrained by limited input use and mechanisation, managerial challenges, and high exposure to climate and market shocks. Marketing decisions, for example, are often reactive rather than strategic, with animals sold under duress due to drought or immediate financial need, rather than at optimal slaughter weights or favourable prices. This adversarial link between household income stress and livestock management undermines the contribution of livestock to stable farm income and limits gains in labour productivity.

Improvements in crop yields, marketing rates, and carcass weights alone are insufficient to sustainably raise agricultural labour productivity. In low- and middle-income countries, where rural households typically have abundant labour and few alternative employment opportunities, a narrow focus on returns per unit of land or animal risks overlooking the income and welfare of the labour engaged in production. By contrast, in high-income countries, agricultural labour is relatively scarce and often costly, as rural households depend less on farming and have greater access to off-farm employment. In this context, the efficient use of labour becomes a binding constraint. More broadly, across all income groups, total household income depends not only on operational returns but also on labour productivity and opportunities in the wider labour market. Rural households often have abundant labour and limited capital and hence farmers' incomes depend more directly on how efficiently their labour is used, including the scope for off-farm employment, than on biological gains alone. More broadly, shifts toward capital-intensive agriculture are typically driven by economy-wide development that raises labour costs and agricultural income growth tends to follow overall economic transformation rather than lead it. Thus, while technical productivity improvements remain important, policies that enable farmers to enhance labour efficiency – through mechanisation and automation, improved managerial decision-making, risk-mitigation tools, and opportunities for off-farm work – provide a more reliable pathway to income growth and are ultimately more decisive for lifting rural households out of poverty.

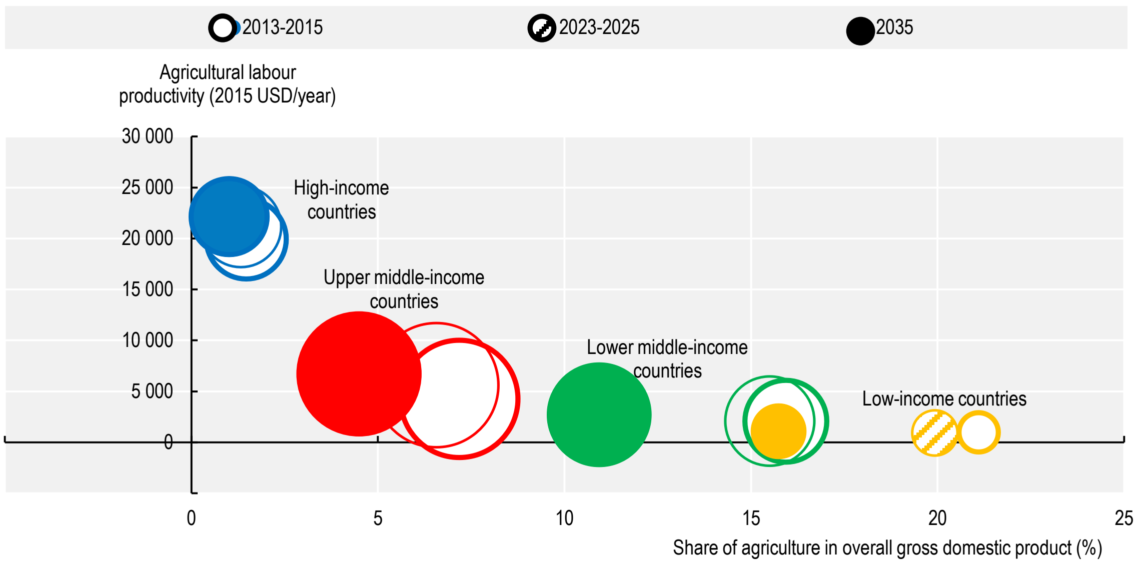
At the same time, caution is warranted, as mechanisation-driven labour displacement in agriculture can generate transitional employment pressures and welfare risks where non-agricultural job creation does not keep pace, particularly when displaced labour is absorbed mainly into low-productivity or precarious informal activities. Although labour has gradually shifted out of agriculture in many low- and lower-income countries, it has often moved into low-productivity or precarious informal employment rather than into higher-productivity sectors, thereby limiting aggregate productivity gains (Deudibe et al., 2020[11]; Mensah et al., 2022[12]). In some cases, such dynamics may also reflect policy choices and political developments that actively promote structural change in agriculture, for example through support to mechanisation or input use, without being matched by sufficient job creation and productivity growth in non-agricultural sectors. Since conditions vary widely across countries, depending on market access, non-farm opportunities, infrastructure, and institutions, labour reallocation alone is unlikely to deliver broad-based income growth by 2035. Raising agricultural productivity itself must therefore remain central to structural transformation strategies in these contexts (Gollin, 2023[13]).

Recent analytical work also suggests that productivity growth alone is unlikely to deliver inclusive rural transformation. A broader agrifood systems perspective is needed, one that considers the diversity of employment opportunities beyond primary agriculture, the resilience of rural livelihoods, and the quality of jobs created along food value chains. New FAO-led evidence shows that agrifood systems account for a large and heterogeneous share of employment globally, underscoring the importance of combining farm productivity gains with inclusive non-farm job creation, stronger rural-urban linkages, and policies that support resilience under climate, demographic, and social change (Davis et al., 2024[14]; Schneider et al., 2024[15]; Davis et al., 2026[16]).

Figure 1.10 shows the share of agriculture in total GDP on the horizontal axis and agricultural labour productivity (agricultural GDP per worker) on the vertical axis, with bubble size representing the overall size of agricultural GDP. The chart reveals a very clear structural pattern: countries with a larger agricultural share, especially low- and lower middle-income countries, tend to exhibit much lower labour productivity. In these countries, agriculture employs a large share of resources and contributes a sizeable portion of national value added yet each agricultural worker generates relatively little value. This contrasts sharply with high-income countries on the left, where agriculture represents only a small share of GDP but productivity per worker is high. Upper middle-income countries sit between these poles and trace a gradual shift over time toward lower agricultural GDP shares and higher productivity, consistent with ongoing structural and technological transformation.

The Outlook shows that low-income countries continue to rely on agriculture (around one-fifth of GDP in the base period, slightly lower by 2035) with output per worker at just under real USD 1 100 by 2035, underscoring slow progress in poverty reduction and continued vulnerability to shocks in natural and economic conditions. Lower middle-income countries are projected to register strong productivity gains to 2035 while becoming relatively less reliant on agriculture (around one-tenth of GDP by 2035), indicating significant scope for catch up as investment, technology adoption and market integration deepen. Nevertheless, average agricultural labour productivity reaches only about USD 2 700 per worker in these countries, indicating that substantial gaps also persist and that further improvements will be needed.

Figure 1.10. Share of agriculture in overall gross domestic product versus agricultural labour productivity



Note: The size of the bubbles presents total agricultural GDP. Agricultural labour productivity is computed as agricultural labour GDP over number of workers in agriculture.
Source: OECD-FAO calculations based on ILO (ILOSTAT database).

StatLink https://stat.link/027bz3

These patterns have clear implications for policymakers and international development partners: in lower income countries where agriculture remains the backbone of the economy, raising agricultural labour productivity is one of the most powerful levers to accelerate poverty reduction and strengthen food security. Achieving this will require a package of productivity enhancing measures such as improved access to investment capital to mechanise production, quality inputs and advisory services, better rural infrastructure and logistics, and more resilient production systems, complemented by expanded opportunities for off farm employment. Together, these actions can support agrifood system transformation and help ensure that productivity gains translate into higher incomes and significant reductions in hunger and poverty.

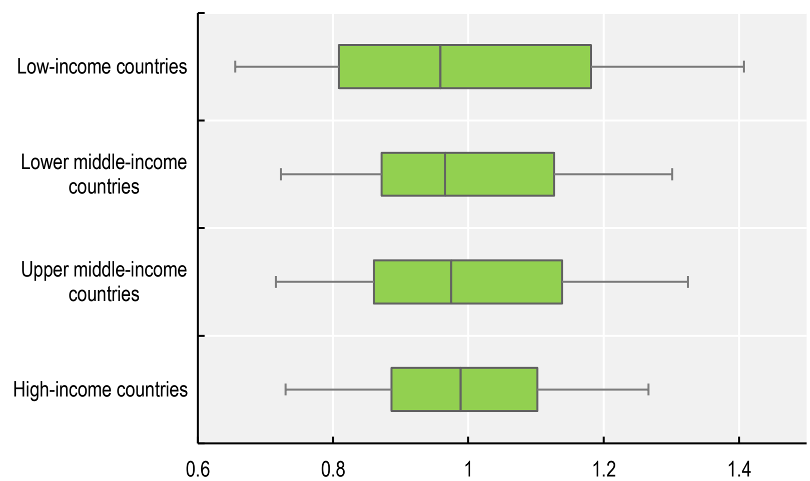
The baseline projections presented in this Outlook reflect the interplay of fundamental supply and demand factors under expected weather and yield trends, and specific macroeconomic and policy assumptions. While the Outlook is based on the best information available, there is an unavoidable degree of uncertainty attached to the projections and underlying assumptions, which eventually results in variability around the baseline projection. Swings in prices and costs are inherent in agriculture, leading to income instability which discourages investment and entry of new, younger farmers essential to achieve higher productivity. Exogenous shocks including extreme weather events, energy price hikes, livestock disease outbreaks, trade policy shifts, geopolitical developments and conflict add to this instability.

To assess how such variability may affect outcomes over the next ten years, a statistical exercise was conducted using observed fluctuations in gross agricultural income per worker between 2000 and 2025, at both country and regional levels. This historical variability, reflecting the combined effect of various simultaneous shocks to income drivers, was then projected forward for the 2026-2035 period. Figure 1.11 presents the results using boxplot distributions, illustrating the potential dispersion of income outcomes across country income groups. Each box represents the interquartile range of real gross agricultural income per worker normalised by the average (25^{th} to 75^{th} percentiles), encompassing 50% of observations around the median. The horizontal lines, also called whiskers, extend from the upper quartile to the 95th percentile and from the lower quartile to the 5th percentile, excluding outliers. The median corresponds to the Outlook baseline projections at the income group level.

The analysis indicates that variability is more pronounced in low-income countries compared to other country. If historical variability were to persist over the projection period, at the global level there would be a 25% probability that income per worker falls more than 12% below baseline levels in every year to 2035. In low-income countries, this potential decline could exceed 20%, surpassing the projected 17% baseline increase. This implies roughly a one-in-four probability that incomes could fall below current levels by 2035, highlighting these countries' greater vulnerability to economic volatility.

Given the inherent volatility of agricultural incomes, productivity-enhancing investments will need to strengthen resilience to reduce risks and attract new entrants into modernised production systems. Policies should therefore support resilience and diversification strategies that mitigate downside risks while enabling farmers to benefit from favourable market conditions. Governments should invest on an enabling environment that promotes stakeholders' awareness and co-operation for resilience: investing on knowledge and information that allow farmers manage their risks; facilitating the development of market tools to transfer risks such as insurance and futures markets; focusing government support on infrequent but catastrophic events.

Figure 1.11. Variability of real gross agricultural income per worker



Note: The boxes show the interquartile range of real gross agricultural income per worker around the median normalised by the average (25th percentiles and 75th percentiles) while the lines extending from the boxes indicate the 5th percentiles and 95th percentiles.
Source: OECD-FAO calculations based on ILO (ILOSTAT database).

StatLink https://stat.link/1yvkcn

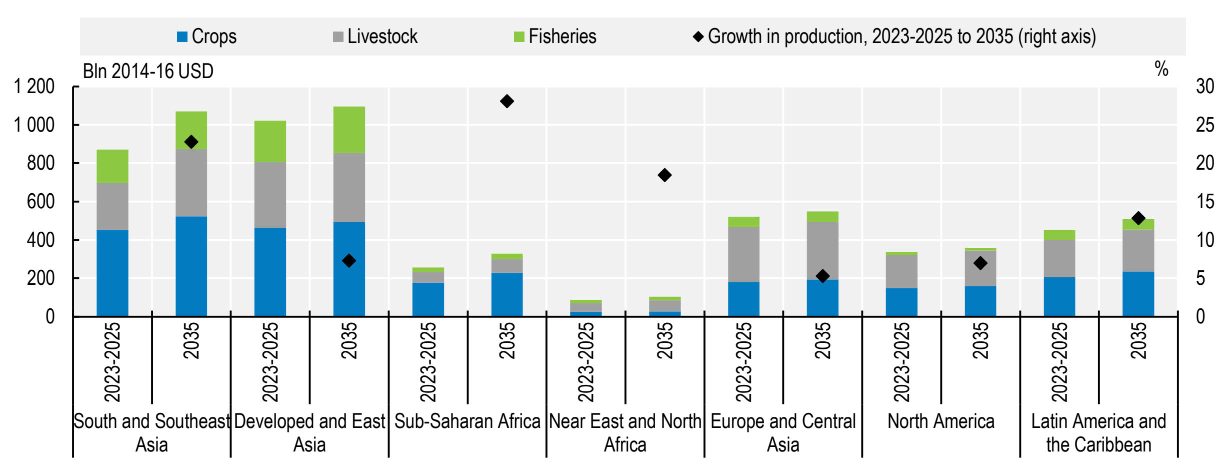
1.2.3. Global agricultural production growth led by livestock and middle-income countries

Over the next decade, the gross value of agricultural production (in constant USD) for commodities covered in the Outlook is projected to increase by 13.3%, reaching USD 4.01 trillion by 2035. Livestock production is expected to lead this growth, expanding by 15.1%, followed by crops (12.5%) and fish and other aquatic foods (11.0%). Middle-income countries in the Asia-Pacific, sub-Saharan Africa, and Latin America and the Caribbean regions are projected to remain the primary sources of global agricultural expansion (Figure 1.12), accounting for 80.3% of global output growth, up from 78.4% in the previous decade. These projected trends in low- and middle-income economies reflect ongoing agricultural development and greater scope for productivity gains.

The Asia Pacific region is expected to contribute an estimated 57.5% of additional global output by 2035. India is projected to lead production growth in the region and globally, accounting for 25.6% of the global increase, with the milk sector driving the momentum. Despite a reduced contribution relative to the previous decade, China will still account for a substantial share of global agricultural production growth (13.9%, compared with 20.9% previously), supported in part by expanding beef output. In sub-Saharan Africa, agricultural production is expected to expand significantly, increasing its share of additional global output to 15.6%, up from 11.2% in the previous decade. Growth is expected across both crop and livestock sectors, supported by gradual improvements in land and herd productivity, as well as expansion of livestock herds and cultivated areas. Southeast Asia's contribution is also projected to rise markedly, from 6.5% in the previous decade to 10.4% in 2035. A sizeable share of global production growth (12.7%) is expected from the Latin America and Caribbean region, although its relative contribution is expected to be moderate. By contrast, production prospects in the industrialised regions of North America and Europe and Central Asia are expected to remain limited due to resource constraints and regulatory factors. Growth in the Europe and Central Asia region will be largely driven by countries in Eastern Europe and Central Asia.

The share of livestock in total agricultural production is projected to increase by about 1% globally, driven primarily by rising shares in middle-income countries in South and Southeast Asia and the Near East and North Africa. Growing domestic demand for animal source foods, reflecting population growth and rising incomes in these regions, is expected to stimulate increased investment in livestock production systems. This expansion is accompanied by a projected increase of 13.5% in global feed protein use, reflecting both higher livestock output and continued intensification of production systems. Even in regions such as Latin America and the Caribbean and sub-Saharan Africa, where the livestock share of total production is projected to remain broadly stable, strong overall growth in agricultural output is expected to include higher absolute levels of livestock production over the next decade.

Figure 1.12. Trends in global agricultural production



Note: Values are measured at constant United States dollars of the period 2014-2016.

1.2.4. Rising global agricultural and fish production, along with a shift towards higher animal production, is set to increase agricultural greenhouse gas emissions

Agriculture, forestry and other land use (AFOLU) account for approximately 22% of global anthropogenic GHG emissions. These emissions are broadly evenly divided between direct on farm emissions – primarily methane and nitrous oxide – and indirect CO_2 emissions from land use, land use change and forestry (LULUCF) associated with agricultural expansion. The Outlook focuses exclusively on direct emissions from on-farm production, which are based on historical data from FAOSTAT and projected following the Intergovernmental Panel on Climate Change (IPCC) Tier 1 methodology. This approach applies standard emission factors to key activity data, including livestock numbers, synthetic fertiliser application, and rice cultivation area. While higher tier methodologies that account for management practices and production systems would yield more precise estimates, their application is beyond the scope of this Outlook.

Using this basic approach, the Outlook shows that the projected overall expansion of global agricultural and fish production, partly driven by growth in animal herds and cropland, particularly in middle-income countries, will increase direct GHG emissions by 6.5% over the next decade. Most of the increase is expected to occur in South and Southeast Asia and sub-Saharan Africa, where ruminant herds are expanding (Figure 1.13). By 2035, direct agricultural GHG emissions in South and Southeast Asia and sub-Saharan Africa are projected to rise by 7.0% and 16.0%, respectively. In contrast, emissions in the Europe and Central Asia region are projected to decline by 0.9% over the next ten years, representing a continuation, albeit at a slower pace, of the reductions observed over the previous decade (3.4%), reflecting the continued implementation of environmental and climate policies in the region and structural changes in the sector.

Sub-Saharan Africa has a population more than three times larger than that of North America and currently holds over three times the beef cattle herd. However, its productivity, measured as output per animal, remains low, at roughly one tenth of the level observed in North America. Given the global nature of GHG emissions, prioritising low ruminant productivity regions for mitigation efforts could, in principle, yield substantial benefits by reducing the number of animals required to produce the same or greater quantities of animal source foods, thereby lowering methane emissions from enteric fermentation and manure management. However, ruminant production systems in the region are largely pastoralists who make efficient use of scarce and highly variable resources and play a critical role in supporting biodiversity, providing food and livelihoods, and reducing emissions through the sustainable management of rangelands. By strategically moving herds in response to seasonal conditions and forage availability, pastoralists enable vegetation recovery, maintain animal health, and reduce pressure on fragile soils and water resources, while also conserving indigenous livestock breeds adapted to harsh environments.

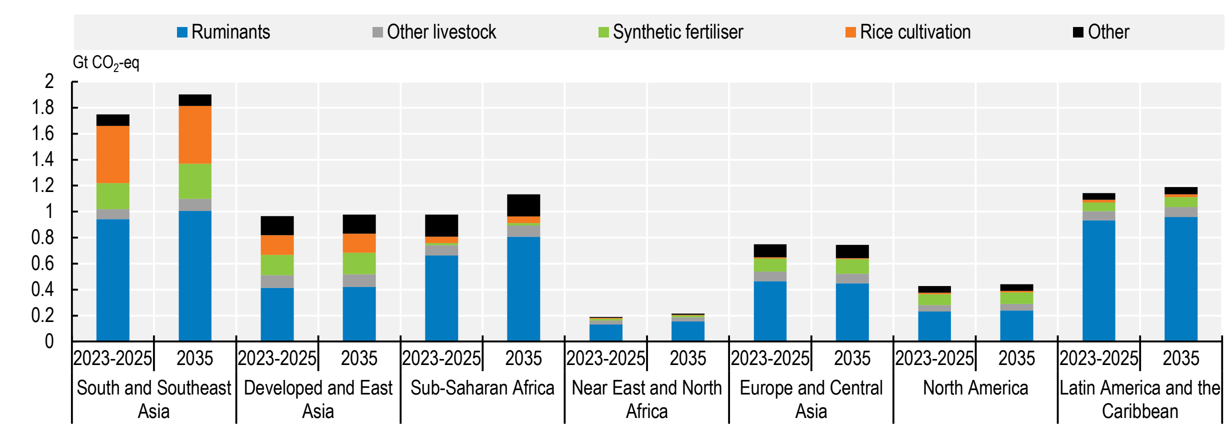
Efforts to reduce ruminant livestock emissions in the region should recognise these realities and avoid narrowly framed intensification pathways that rely on increased water use and external feed inputs, which may introduce new environmental and livelihood risks. Instead, sustainable and culturally sensitive improvements to pastoralist systems, such as better animal health, reduced losses, improved grazing management, and enhanced access to education, services, and markets, can raise productivity per animal while strengthening ecosystem resilience. Such approaches can improve rural livelihoods and reduce emissions without undermining the ecological functions of rangelands. At the same time, addressing agricultural emissions requires a balanced approach that considers not only production-side efficiency in low-income regions but also high levels of livestock products consumption in industrialised economies, which are contributing significantly to global agricultural GHG emissions.

Ruminant and other livestock production are projected to account for 76.6% of the global increase in direct agricultural GHG emissions, while application of synthetic fertilisers, another significant source of emissions due to nitrous oxide from fertiliser application, are expected to contribute 22.7%. The Outlook does not include GHG emissions associated with fertiliser production; accounting for these upstream emissions would approximately double the reported environmental footprint of fertiliser use. Rice cultivation represents another major source of direct agricultural GHG emissions, as irrigated paddy systems emit substantial amounts of methane. However, the projected growth in rice production is expected to be driven largely by yield improvements rather than an expansion of paddy areas, thereby limiting additional emissions from rice cultivation.

Given that production growth will largely be driven by productivity improvements rather than expansions in cultivated land and livestock herds, the carbon intensity of agricultural production is projected to decline across all regions over the coming decade. Sub-Saharan Africa and South Asia are expected to experience the most substantial decreases in GHG emissions intensity, the emissions produced per unit of output or activity, despite increasing levels of direct GHG emissions. This is because emissions reductions are generally easier to achieve in production systems with high initial emission intensities than in regions with higher yields where marginal opportunities for additional emissions reductions are more limited.

It is important to recognise that while direct GHG emissions constitute a key component of the environmental footprint of AFOLU, they represent only one dimension of the sector's overall sustainability performance. A more comprehensive assessment of agri-environmental outcomes would require consideration of additional factors, including impacts on water resources, soil health and biodiversity, as well as the sector's capacity for carbon sequestration and its contribution to environmental resilience. The sector is also highly exposed to extreme weather effects, particularly temperature and precipitation patterns which affect natural resources, productivity, and livelihoods. This is particularly important for vulnerable smallholders, for whom resilience is central to sustaining production and livelihoods. Building more resilient production systems will depend not only on technological change, but also on the adoption of practical coping strategies, including agroecological approaches, climate-smart agriculture, crop diversification, water harvesting, improved seed systems, community seed banks, and the use of indigenous and traditional knowledge. Risk management instruments and insurance mechanisms play an important role in strengthening adaptive capacity and reducing vulnerability to shocks.

Figure 1.13. Direct greenhouse gas emissions from crop and livestock production by activity



Note: Gt CO_2 eq: giga tonnes carbon dioxide equivalent. Estimates are based on historical time series from the FAOSTAT Climate Change: Agrifood systems emissions databases which are extended with the Outlook database. CO_2 equivalents are calculated using the global warming potential of each gas as reported in the IPCC Sixth Assessment Report (AR6). Emission types that are not related to any Outlook variable (organic soil cultivation and burning savannahs) are kept constant at their latest available value. The category "Other" includes direct GHG emissions from burning crop residues, burning savanna, crop residues, and cultivation of organic soils.
Source: FAOSTAT Emissions-Agriculture Database, http://www.fao.org/faostat/en/#data/GT, accessed December 2025; based on OECD-FAO calculations.

1.3. Consumption: Projected evolution for 2026-2035

1.3.1. Middle- and low-income economies underpin rising consumption of agricultural commodities

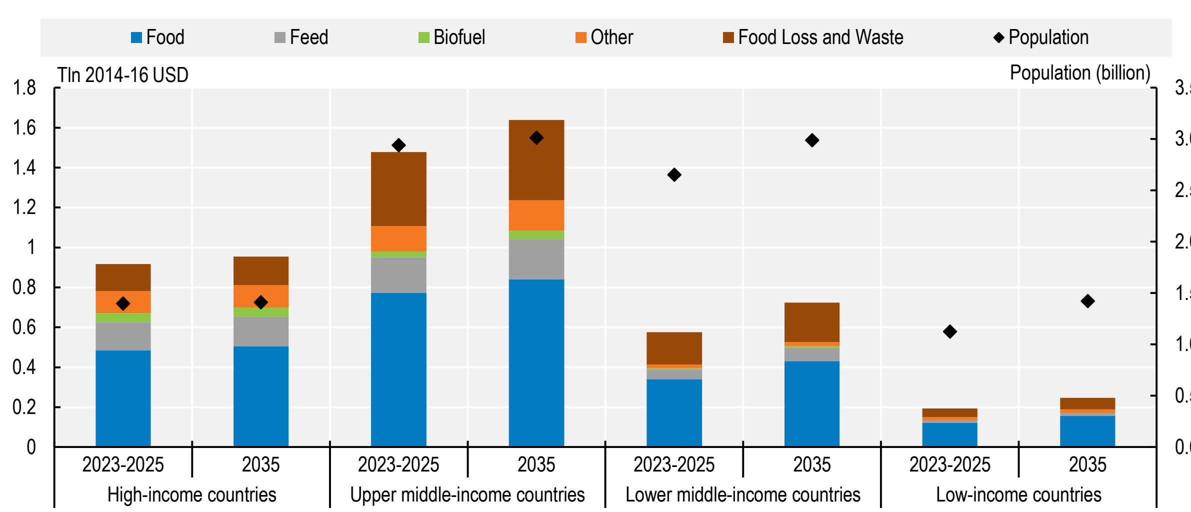
Over the coming decade, the value of overall consumption of agricultural commodities and fish products is projected to grow by 12.5%. This increase will be driven almost entirely by middle- and low-income countries where population growth expands total demand while, rising incomes, and rapid urbanisation are reshaping consumption patterns (Figure 1.14). Lower middle-income countries, particularly India and countries in Southeast Asia, will play a leading role, contributing an estimated 39% of global consumption growth by 2035, up from 32% in the previous decade. In contrast, China's contribution is expected to decline sharply to 13%, reflecting saturated per-capita food demand and a shrinking population.

As diets evolve in these regions, demand for food is shifting beyond staples toward more livestock and fish-based products. Growing domestic production of these commodities is expected to significantly boost demand for feed crops. As a result, a growing share of staple crops and oilseeds will be used for animal feed rather than direct human consumption. Nevertheless, food remains the primary use of agricultural commodities, accounting for roughly 42% of total consumption. In lower middle-income countries annual growth in feed demand will be the fastest, with 2.8% p.a. over the next decade. Feed demand growth in upper middle-income countries will be less pronounced compared to the previous decade because of stagnating livestock production.

Low-income countries, especially in sub-Saharan Africa, will also see strong demand growth, driven primarily by rapid population increases. However, consumption patterns in these regions will remain dominated by staple foods with feed demand growing only modestly relative to food demand, highlighting ongoing food security challenges.

Inefficiencies across the food supply chain remain a critical issue. In middle-income regions, limited access to technology, cold storage, and efficient transportation lead to significant food losses. In high-income countries, food waste is more closely linked to strict marketing standards, food safety practices, and consumer behavior.

Figure 1.14. Use of agricultural commodities by type and income group



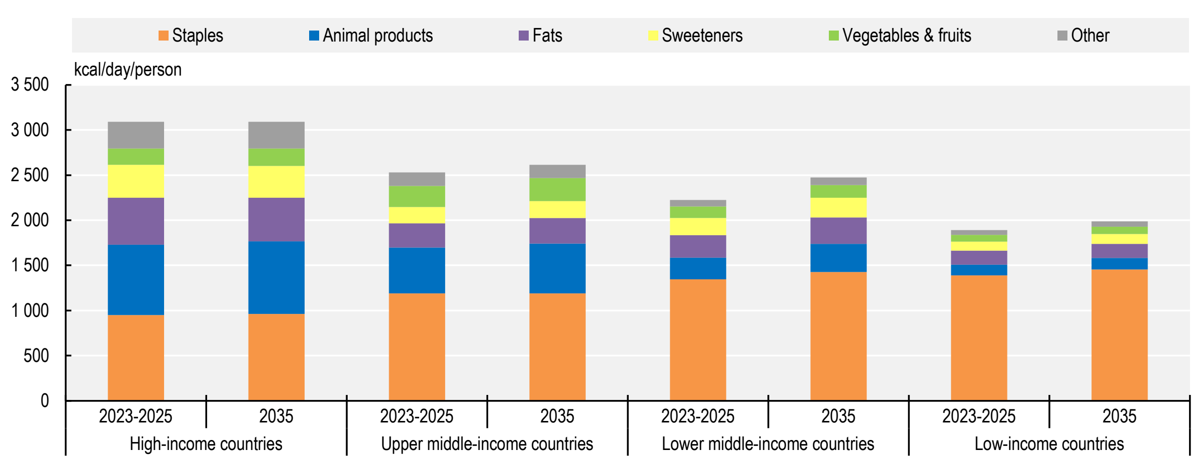
Note: Values are measured at constant United States dollars of the period 2014-2016.

1.3.2. As incomes grow, dietary patterns are expected to further diversify in middle-income countries over the next decade

Rising incomes and stable food prices due to expanding production are projected to lead to continued dietary diversification in middle-income countries over the next decade. Across all income groups, diets are expected to become more energy- and protein-rich, with the strongest changes occurring in lower and upper middle-income countries (Figure 1.15), where livestock products contribute significantly to these developments. In lower middle-income countries, diets are projected to continue evolving toward higher overall energy content and more diversified sources of nutrients, with a growing role of animal-source foods, while in upper middle-income countries these changes will gradually slow as diets approach more established patterns. In low-income countries, progress in improving the adequacy and diversity of diets will remain limited, constrained by modest gains in purchasing power. Meanwhile, in high-income countries, diets are expected to remain broadly unchanged in both composition and overall content.

As incomes rise, dietary patterns in low- and middle-income countries are shifting toward higher consumption of animal-source foods, including meat, dairy, and fish. This transition reflects both improving purchasing power and changing consumer preferences. In contrast, high-income countries are not expected to experience significant dietary shifts in the near term. Meat consumption remains broadly stable, with little evidence of a substantial move toward plant-based alternatives. Although such products are becoming more widely available, they still account for only a small share of total consumption. Recent declines in meat consumption, where observed, have been driven primarily by price fluctuations rather than lasting changes in consumer preferences. However, over the longer term, more noticeable shifts in dietary patterns may emerge as younger generations may adopt different food preferences.

Figure 1.15. Projected evolution of dietary patterns



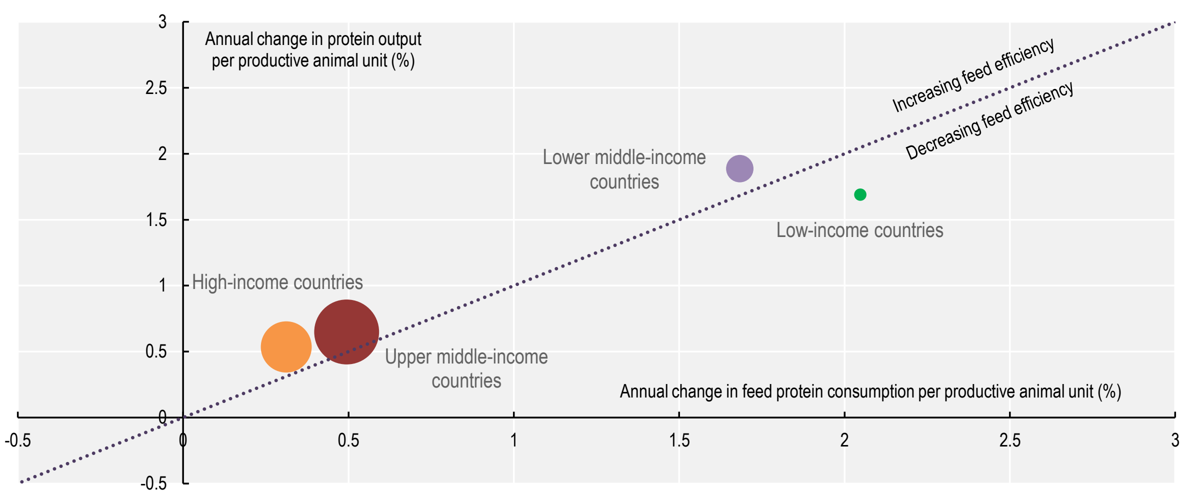
Note: Estimates are based on historical food supply time series from the FAOSTAT Food Balance Sheets database which are extended with the Outlook database and adjusted to account for estimated distributional and household wastes. Products not covered in the Outlook are extended by trends. Staples include cereals, roots and tubers and pulses. Animal products include meat, dairy products (excluding butter), eggs and aquatic animal foods. Fats include butter and vegetable oil. Sweeteners include sugar and HFCS. The category "Other" includes other crop and animal products.

While these projections point to continued average consumption growth, they largely reflect aggregate developments and may mask important distributional challenges, particularly in urban and peri-urban settings. A growing share of the population in low- and middle-income countries depends on market purchases for food and is therefore highly exposed to changes in food prices. In these contexts, households often rely on a limited set of staple foods and may face constraints in adjusting consumption patterns when prices rise. Projected increases in import dependence for basic food commodities in some regions, combined with rapidly expanding urban populations, may further heighten exposure to price volatility and external supply disruptions. As a result, increases in food prices can translate more directly into reduced food affordability and increased vulnerability for low-income urban households. Strengthening food security in these settings will therefore require greater attention to food affordability, including the role of price dynamics, market integration, and social protection systems.

1.3.3. Growing feed use is underpinned by herd expansions and increasing intensification of livestock and aquaculture production systems especially in middle-income countries

Global livestock production is projected to continue growing faster than herd sizes over the coming decade, reflecting improvements in productivity, particularly in lower middle-income countries. Expanding herds combined with more intensive feeding practices are expected to drive a 13.5% increase in global feed protein consumption. Feed efficiency is improving in most regions as animal protein output grows faster than feed input. In low-income countries, the transition from backyard production systems that are mostly based on scraps and waste to commercial operations using compound feed results in a higher measured feed per unit of output (Figure 1.16).

Figure 1.16. Annual changes in protein output and feed intake per productive animal unit in non-ruminant systems



Note: The size of the bubbles refers to the non-ruminant production (pig meat, poultry and eggs) in total protein during the base period 2023-2025.

StatLink https://stat.link/4to59j

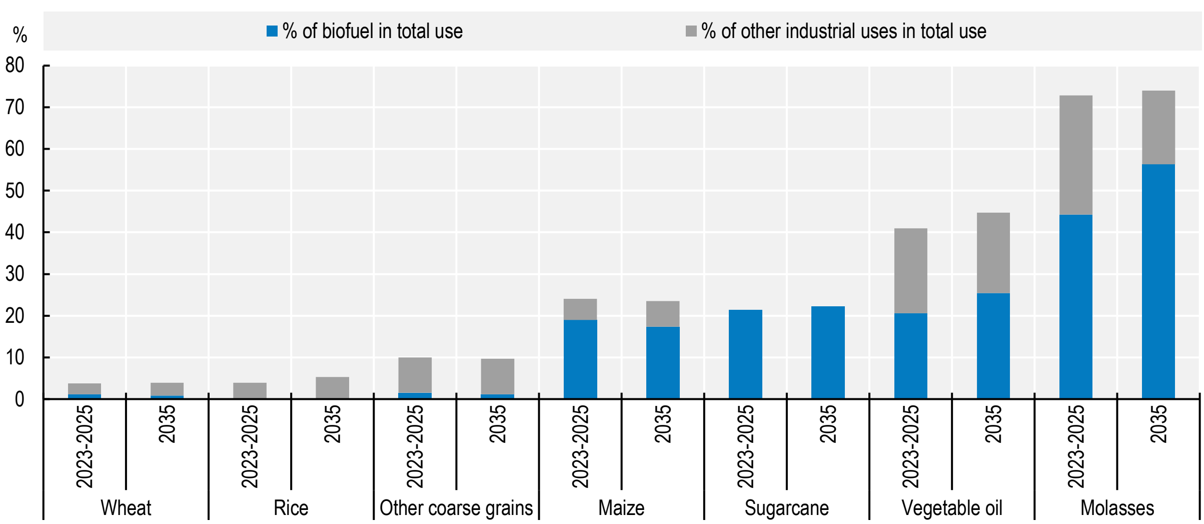
1.3.4. Emerging economies lead the expansion in biofuel use of primary agricultural commodities

Agricultural commodities are used beyond traditional food and feed purposes, with biofuels representing the most widespread non-food application. The value of global biofuel use is projected to grow at an average 1.3% p.a., driven by rising demand for transport fuel and supportive domestic policies. Most of this growth is expected to occur in middle-income countries, notably Brazil and India for ethanol and

Indonesia for biodiesel. In the United States, a shift toward renewable biodiesels over the next decade is likely to influence demand for vegetable oils and waste-based feedstocks.

Biofuel production relies on a variety of agricultural feedstocks, with maize dominating ethanol production and vegetable oils largely used for biodiesel. The share of biofuel in total use of agricultural commodities is expected to increase by 13.6% over the next ten years. Beyond biofuels, agricultural commodities are increasingly used for other non-food purposes, a share projected to grow by 26.0% over the projection period. These uses include industrial products, raw materials and electric energy generation, with demand patterns varying by feedstock and income level (Figure 1.17). While waste and dedicated energy crops are seen as having future potential, for example in sustainable aviation fuels, they are expected to remain niche sources over the medium term due to limited availability.

Figure 1.17. Share of biofuel and other industrial uses in total use of agricultural commodities



Beyond liquid biofuels, a growing number of countries are promoting the use of agricultural biomass in a wider range of bio-based products, industrial applications and circular value chains. Agricultural commodities are increasingly integrated into diversified bio-based industries. In the European Union, the renewed Bioeconomy Strategy (2025) identifies agricultural biomass as a key domestic resource for higher value-added applications, including bio-based materials, chemicals and biorefineries, while also emphasising a food-first principle and the importance of strengthening the use of secondary feedstocks, such as residues and by-products. These directions aim to strengthen linkages between farmers and industrial value chains. Similarly, Canada supports the development of bioplastics, biopharmaceuticals and other non-food applications, alongside investments in biofuel production capacity, notably through expanding canola crushing to meet rising demand for renewable diesel.

Several countries highlight the importance of residue valorisation and bio-based inputs as complementary pathways. In Brazil, bioeconomy policies have encouraged the use of agricultural and fisheries by-products to produce fuels, biomaterials and high-value compounds while also fostering the expansion of bio-inputs such as bio-fertilisers and biological nitrogen fixation in crop production. In the fisheries sector, a large share of processed output is now converted into products such as fishmeal, oils and bioactive ingredients, illustrating the scale of circular approaches. Other countries, such as Switzerland, prioritise the use of waste and residues for biogas and bioenergy, reflecting sustainability constraints on the use of primary crops.

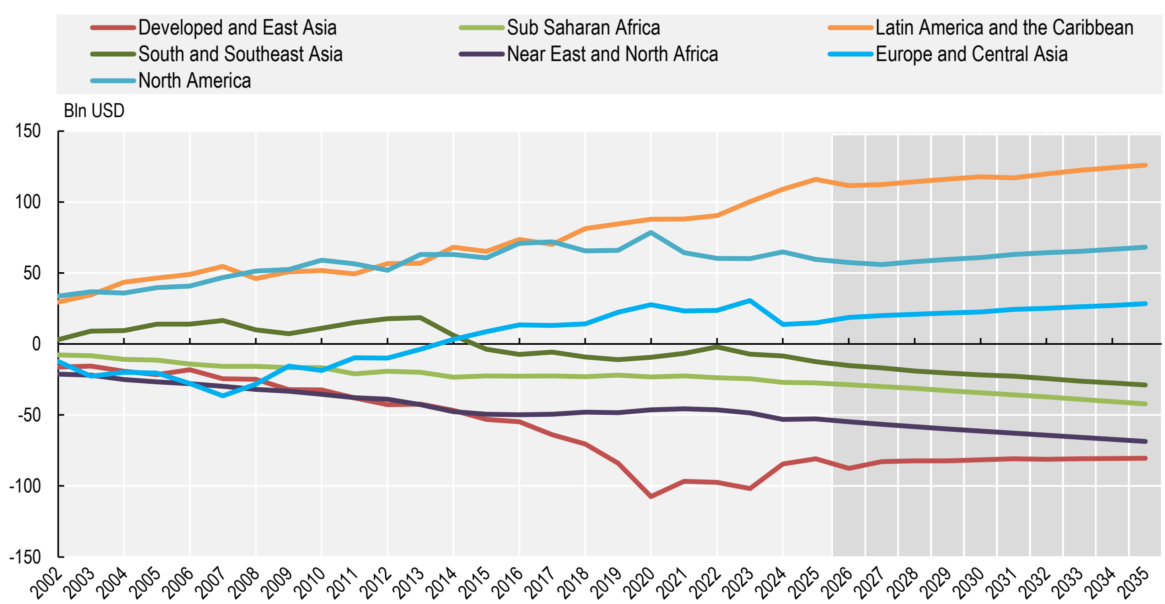
1.4. Trade: Projected evolution for 2026-2035

1.4.1. Trade flows between surplus and deficit regions are projected to grow

Global agri-food trade has expanded significantly over recent decades, particularly following the WTO Agreement on Agriculture (1995) and China's accession to the WTO (2001). The share of global agricultural production that is traded increased from 16% in 2000 to 22-23% today. Since 2019, this share has stabilised and is expected to remain broadly unchanged over the next decade as the impact of previous trade liberalization diminishes.

Figure 1.18 shows that export patterns are projected to remain concentrated, with Latin America maintaining its position as the world's primary exporter. This trend is largely influenced by Brazil, Argentina, and Paraguay. North America is projected to remain the second-largest exporter, with exports stabilising below their 2020 peak. The Europe and Central Asia region, which became a net exporter in 2014 following productivity gains and investment, particularly in the Black Sea region, is also expected to expand its trade surplus.

Figure 1.18. Net agricultural trade of main agricultural commodities by region, in constant value



Note: Net trade (exports minus imports) of commodities covered in the Agricultural Outlook, measured in constant 2014-2016 United States dollars.

At the same time, net imports are rising in regions with rapid population growth and expanding middle classes. South and Southeast Asia have shifted from being net exporters to being net importers due to increasing food demand notably in India, Indonesia, the Philippines, Malaysia, Thailand and Viet Nam, and coupled with the declining palm oil exports of the region. Sub-Saharan Africa is projected to increase net imports of basic food commodities by 55% by 2035 while the Near East and North Africa region is expected to see a 34% rise, reflecting strong population growth and limited domestic production capacity. In contrast, the net import position of developed countries and East Asia is expected to ease, largely due to slower demand growth in China.

Persistent surpluses and deficits mean regions are structurally linked through trade. Trade can offset local supply shortfalls to reduce variability in prices while the location of production in regions with a comparative advantage can lead to lower price levels. Trade also allows consumers access to a wider range of commodities beyond what can be produced domestically. However, trade also carries important systemic risks, including pressure on foreign exchange reserves and increased exposure to exchange rate shocks. Moreover, disruptions in major exporting countries due to adverse weather events or trade policy shifts can quickly transmit to importing countries.

1.4.2. Trade plays a key role in ensuring food security and farmer livelihoods

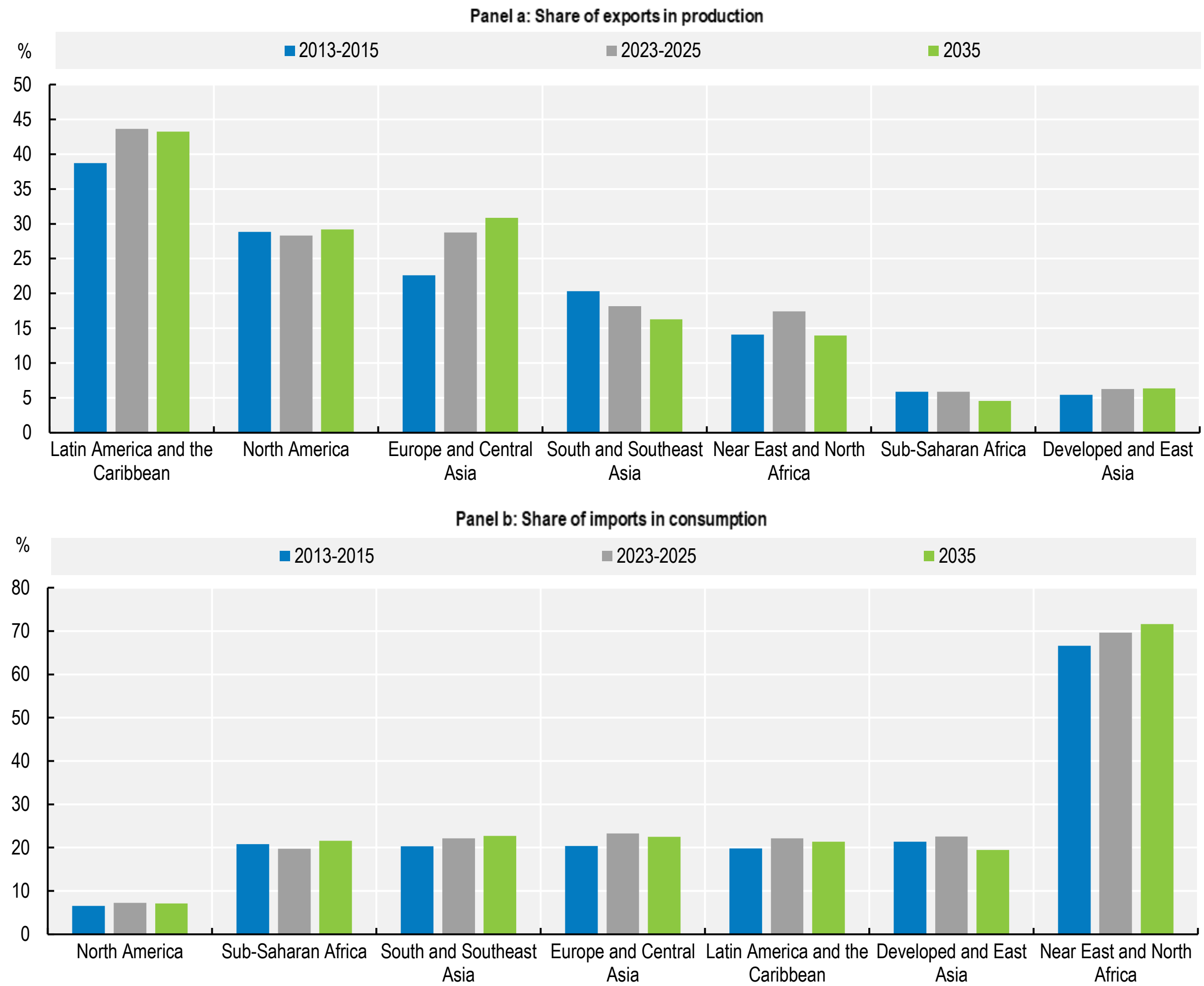
Despite periodic major disruptions, including COVID-19, geopolitical conflicts, and trade tensions, agri-food trade has proven highly resilient. It remains essential for balancing global food deficits and surpluses, stabilising prices, allowing the location of production in regions with comparative advantage, and providing consumers access to off-season and geographically diverse food items. With production often geographically separated from regions where demand is growing fastest, a well-functioning, rules-based trading system remains critical for global food security and rural livelihoods.

Figure 1.19 shows the share of exports in total production, and the share of imports in total consumption for selected regions. These indicators reveal important differences in the role of trade between regions.

Major producing regions such as North America, and Latin America and the Caribbean, exported 28% and 44% of their domestic production in calorie equivalents in 2023-25, respectively. In Latin America and the Caribbean, this share has increased since the previous decade but is projected to stabilise. A substantial increase in the share of exports in domestic production is also projected in Europe and Central Asia, from 23% in 2013-15 to 31% in 2035 (Figure 1.19, panel a). However, even large net exporting regions import a share of domestic consumption. In Latin America and the Caribbean, for example, imports account for about 22% of total consumption for commodities covered in the *Outlook* (Figure 1.19, panel b). This estimate includes intra-regional trade, which is significant in the region.

In Near East and North Africa, where population is growing strongly but where limited resources are an obstacle to production expansion, imports play a significant role in complementing domestic food and feed production. The share of imports in total consumption in calorie equivalent of agricultural commodities is expected to increase to reach 72% over the next decade. In sub-Saharan Africa, the share of imports in total consumption is lower, at 20% in 2023-25, but is expected to reach 22% by 2035 as the fast-growing domestic consumption will be increasingly met by global supplies (Figure 1.19, panel b).

Figure 1.19. Trade as a share of total production and consumption by region, in calorie equivalents



Note: Calculations using average calorie content of commodities included in the Outlook. Note that exports/imports include feed, and availability includes processing of commodities which may be re-exported.

1.4.3. Investments are needed in market access for countries, especially low- income countries, to capitalise on growing market opportunities.

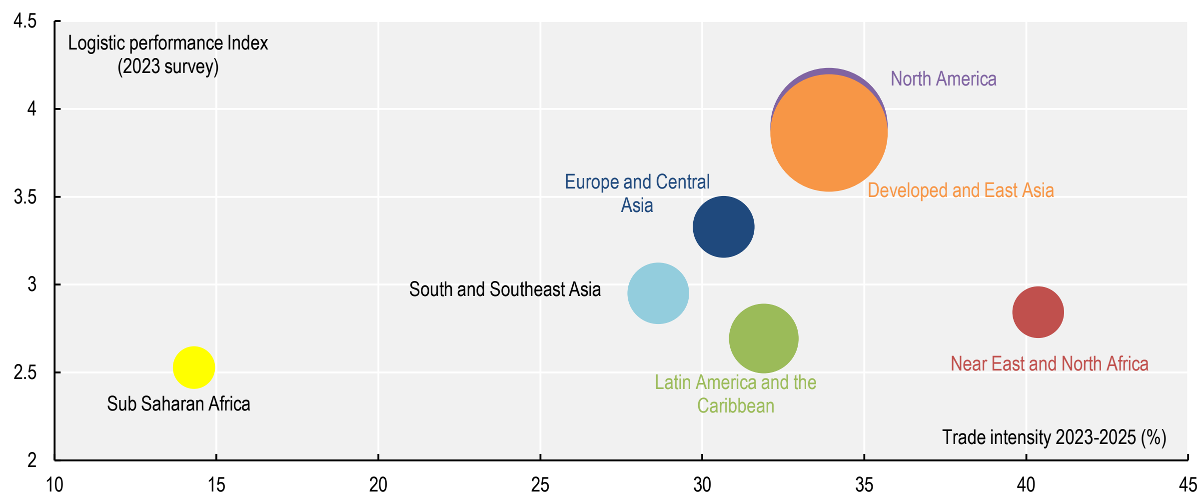
Projected production and consumption levels in low-income countries remain constrained by limited access to agri-food markets, preventing farmers from capitalising on local and global growth opportunities that could be unlocked through targeted public investment in infrastructure and technology. Figure 1.20 highlights important differences across regions in terms of trade intensity and market access, showing that countries with stronger connectivity tend to have higher levels of trade participation and more dynamic agri-food sectors.

In Figure 1.20, trade intensity is measured as the ratio of total trade (imports plus exports) to overall market size, defined as the sum of production and total domestic use. This captures the degree to which a country is integrated into global agri-food markets. Countries with higher trade intensity are more actively engaged in international exchange, either as exporters or importers or both.

Market access is proxied by the World Bank's logistic performance index (LPI) (World Bank, 2023[17]), which provides a comprehensive and internationally comparable measure of a country's logistics environment. The LPI captures key dimensions such as the quality of transport infrastructure, efficiency of customs procedures, reliability of supply chains, and ease of arranging shipments. This proxy for market access directly reflects the ability to move goods within and across borders and offers recent data with broad global coverage.

Sub-Saharan Africa is situated in the lower range of both trade intensity and logistics performance. This reflects structural barriers such as inadequate transport networks, limited storage capacity, and weak trade facilitation systems, all of which increase transaction costs and reduce competitiveness. As a result, farmers in these regions often remain disconnected from high-value markets, limiting their ability to respond to growing demand. These structural constraints also limit the region's ability to import food during supply shortfalls and restrict farmers' access to imported intermediate inputs such as feed, fertilisers, seeds, and energy that are essential for production. Targeted public investments are needed to improve connectivity and allow producers in low-income countries to better access markets and strengthen their role in global agri-food systems.

Figure 1.20. Trade intensity and market access



Note: Trade intensity is calculated as the sum of export and import over the sum of production and consumption in each region, all measured in constant 2014-2016 United States dollars. The World Bank Logistic Performance Index refers to the 2023 survey (1 low, and 5 high). The size of the bubbles represents total trade (export plus import) measured in constant 2014-2016 United States dollars.

StatLink https://stat.link/re3y67

In contrast, regions with strong logistics systems, such as major exporting regions of North America and Developed and East Asia, exhibit higher trade intensity and deeper integration into global markets. This integration supports both the efficient movement of surplus production to external markets and reliable access to imported food and production inputs, leaving these countries better positioned to stabilise supply, respond to shocks, and capture value from international trade.

While poor infrastructure, gaps in technology, and other structural constraints generally limit farmers in low- and middle-income countries from connecting with local, regional and global markets, these barriers are often unevenly distributed within rural communities. Women farmers, in particular, frequently face additional challenges in accessing land, inputs, finance, and markets. Recent empirical work documents persistent differences in agricultural labour productivity between women and men across African countries, while new global estimates show that women account for a substantial share of agrifood systems employment but remain disproportionately concentrated in more vulnerable forms of work (Piedrahita, Costa and Mane, 2025[18]; Costa et al., 2026[19]). The International Year of the Woman Farmer 2026 is an opportunity to highlight these constraints and raise awareness of the role of women in agri-food systems, as discussed in Box 1.4.

Box 1.4. Key features of women's participation in agrifood markets and trade

The fivefold expansion of global food and agricultural trade between 2000 and 2022 has increased employment and income opportunities across agrifood systems where women contribute substantially through production, processing, and trade activities that support households, communities and economies. Globally, agrifood systems employ 36% of working women and 38% of working men; in sub-Saharan Africa and southern Asia the shares for women rise to 66% and 71% respectively (FAO, 2023[20]). The United Nations declared 2026 as the International Year of the Woman Farmer. According to the FAO dedicated webpage (https://www.fao.org/woman-farmer-2026/en) "the Year spotlights the essential roles women play across agrifood systems, from production to trade", and their contribution "to food security, nutrition and economic resilience".

Participation of women and men across agrifood value chains remains uneven among producers, workers, traders, and enterprises. In many countries, women-led agribusinesses engage in local and domestic markets, trading lower-value products rather than higher-value products traded internationally. Similarly, participation in agrifood trade remains low among many small- and medium-sized enterprises (SMEs) and many of the underlying constraints affect both women- and men-led enterprises, especially in developing countries. High compliance costs, complex standards, limited access to market information, logistics and support services could reduce the likelihood of SME's entering export markets or moving into higher-value segments.

Women engaged in wage employment in agriculture earn 82 cents for every dollar earned by men. Equal opportunity for women and men to participate in agriculture and trade may contribute, over time, to gains in economic efficiency and food security. For example, closing productivity and wage gaps in agrifood systems could increase global gross domestic products by around 1%, and reduce the number of food-insecure people by about 45 million (FAO, 2023[20]).

From an outlook perspective, these gains are supportive of achieving the projected growth. The expansion of agricultural production, trade, and value addition envisaged in the OECD-FAO Agricultural Outlook assumes continued improvements in productivity, market integration, and supply side capacity, particularly in low- and middle-income countries. Realising these projections will require actions to removing barriers that constrain the productive potential of women farmers and traders.

Business development services, vocational training, and export promotion programmes can strengthen the capacity of firms, both women-led and men-led enterprises, to participate in trade. Tailored capacity development can further support compliance with international standards, stronger market linkages, and adaptation to changing market conditions. Effective progress requires coordinated action across sectoral policies and relevant institutions, backed by robust legal frameworks and institutional accountability.

Source: (FAO, 2025[21]).

References

Agriculture and Agri-Food Canada (2021), *What we heard report: Indigenous agriculture and agri-food in Canada: Perspectives, experiences and opportunities for the future*, https://agriculture.canada.ca/en/indigenous-peoples/what-we-heard-report-indigenous-agriculture-and-agri-food-canada. [6]

Campi, M. et al. (2024), "The evolving profile of new entrants in agriculture and the role of digital technologies", *OECD Food, Agriculture and Fisheries Papers*, No. 209, OECD Publishing, Paris, https://doi.org/10.1787/d15ea067-en. [4]

Coopmans, I. et al. (2021), "Understanding farm generational renewal and its influencing factors in Europe", *Journal of Rural Studies*, Vol. 86, pp. 398-409, https://doi.org/10.1016/j.jrurstud.2021.06.023. [7]

Costa, V. et al. (2026), "Global estimates of women's and men's employment in agrifood systems from 2000 to 2021", *Global Food Security*, Vol. 48, p. 100904, https://doi.org/10.1016/j.gfs.2026.100904. [19]

Dabkienė, V. (2025), "Gender, Women's Barriers and Innovation in Agriculture: A Systemic Literature Review", *European Countryside*, Vol. 17/1, pp. 1-26, https://doi.org/10.2478/euco-2025-0001. [5]

Davis, B. et al. (2024), "Whither the agricultural productivity-led model? Reconsidering resilient and inclusive rural transformation in the context of agrifood systems", *Global Food Security*, Vol. 43, p. 100812, https://doi.org/10.1016/j.gfs.2024.100812. [14]

Davis, B. et al. (2026), "A new estimate for global and country-level employment in agrifood systems", *World Development*, Vol. 203, p. 107296, https://doi.org/10.1016/j.worlddev.2025.107296. [16]

Deudibe, G. et al. (2020), *Structural Transformation in Sub-Saharan Africa*, World Bank, Washington, DC, https://doi.org/10.1596/33327. [11]

FAO (2026), *Global Agrifood Implications of the 2026 Conflict in the Middle East*, https://openknowledge.fao.org/handle/20.500.14283/cd8875en. [1]

FAO (2025), *Advancing women's participation in agrifood trade through inclusive policy*, https://openknowledge.fao.org/server/api/core/bitstreams/496e9c89-1551-445d-bcd7-1039acf67b54/content. [21]

FAO (2023), *The status of women in agrifood systems*, FAO, https://doi.org/10.4060/cc5343en. [20]

Gollin, D. (2023), "Agricultural productivity and structural transformation: evidence and questions for African development", *Oxford Development Studies*, Vol. 51/4, pp. 375-396, https://doi.org/10.1080/13600818.2023.2280638. [13]

Gollin, D., D. Lagakos and M. Waugh (2014), "Agricultural Productivity Differences across Countries", *American Economic Review*, Vol. 104/5, pp. 165-170, https://doi.org/10.1257/aer.104.5.165. [10]

IMF (2026), *World Economic Outlook: Global Economy in the Shadow of War*, https://www.imf.org/-/media/files/publications/weo/2026/april/english/text.pdf. [3]

Mensah, E. et al. (2022), "Structural Change, Productivity Growth and Labour Market Turbulence in Sub-Saharan Africa", *Journal of African Economies*, Vol. 32/3, pp. 175-208, https://doi.org/10.1093/jae/ejac010. [12]

OECD (2026), *The impact of the conflict in the Middle East on agricultural markets*, OECD Publishing, Paris, https://doi.org/10.1787/3324cfee-en. [2]

OECD (2025), *OECD Global Forum on Agriculture - Summary*, https://www.oecd.org/en/events/2025/10/oecd-global-forum-on-agriculture.html (accessed on 2026). [9]

Piedrahita, N., V. Costa and E. Mane (2025), "Gender gap in agricultural labour productivity: A comparison across African countries", *Global Food Security*, Vol. 46, p. 100872, https://doi.org/10.1016/j.gfs.2025.100872. [18]

Schneider, K. et al. (2024), "Resilient and inclusive rural transformation in sub-Saharan Africa under climate, demographic, and social change: Challenges and opportunities for income growth and job creation", *Global Food Security*, Vol. 43, p. 100815, https://doi.org/10.1016/j.gfs.2024.100815. [15]

Szuda, Á. and J. Antón (2025), *Who will feed the future? Four policy steps to secure the next generation of farmers*, https://www.oecd.org/en/blogs/2025/11/who-will-feed-the-future-four-policy-steps-to-secure-the-next-generation-of-farmers.html. [8]

World Bank (2023), *Logistics Performance Index*, https://lpi.worldbank.org/. [17]

Note

[1] Normal weather is defined as the set of baseline meteorological conditions used in the Outlook, derived from recent climatological averages of key variables such as temperature and precipitation over a multi-decadal reference period, and applied to represent typical growing conditions in the absence of weather shocks.

2 Cereals

This chapter describes market developments and medium-term projections for world cereal markets for the period 2026-2035. Projections cover consumption, production, trade and prices for wheat, rice, maize and other coarse grains. The chapter concludes with a discussion of the key risks and uncertainties which could have implications for world cereal markets over the next decade.

2.1. Projection highlights

Global cereal consumption is projected to expand, driven by a steady increase in food demand and on the account of a slower expansion in feed and biofuels uses. Food use grows broadly in line with population – particularly in Africa and Asia – with modest increases in per capita consumption, and is projected to account for 40% of total use by 2035. Feed use expands alongside livestock production, especially in middle-income countries, and is projected to represent 34% of total use by 2035. Wheat and rice remain the main cereals for food consumption, whereas maize and other coarse grains account for the bulk of feed use.

Global cereal production is projected to increase steadily, reaching a record 3.22 billion tonnes by 2035. Growth is mainly the result of yield improvements, while harvested areas expand only marginally. Average cereal yields are expected to rise, reflecting technological progress and improved production practices.

International trade is projected to expand, with the share of production traded globally rising from 17% at present to 18% by 2035. Import demand increases in regions where domestic production growth does not keep pace with consumption, particularly in least developed countries. Most countries in Africa and parts of Asia are expected to remain or become net cereal importers, as population and income growth outstrip domestic supply potential. The Americas and parts of Europe are projected to remain key net exporters of wheat, maize and other coarse grains, while Asian countries continue to dominate global rice exports.

In real terms, international cereal prices are projected to decline slightly over the medium term, as productivity gains and efficiency improvements offset upward cost pressures.

Cereal market projections remain subject to uncertainty over the coming decade. Weather variability, evolving policy frameworks, geopolitical tensions affecting energy and input markets, and changes in demand growth in low- and middle-income countries could alter consumption and production patterns, trade flows and price developments. In addition, domestic food price movements may diverge from international commodity price trends as processing, transport and other local cost components play an important role in shaping consumer prices.

2.2. Current market trends

Monthly maize prices remained relatively stable throughout 2025, ranging between USD 183 per tonne (t) and USD 221/t (US No. 2, yellow, FOB Gulf). Prices began to increase gradually from August 2025, reaching USD 211/t in February 2026, although they remained below year-on-year. This environment reflected comfortable global supply conditions following strong harvests and exports in major producing countries, particularly in the Americas.

Monthly wheat prices were more stable in 2025 than in recent years, ranging from USD 230/t to USD 264/t (US No. 2, HRW, FOB Gulf). Prices generally declined during the second half of 2025 and remained below year-on-year in February 2026. Ample export supplies from major producers, particularly in the Black Sea region, together with favourable harvest outcomes in several exporting countries, contributed to easing price pressures in global markets.

Monthly barley prices remained broadly stable throughout 2025 but increased from November onward due to strong demand for feed grains and tighter supply conditions in some exporting countries. As a result, prices reached USD 245/t (feed, FOB Rouen) in February 2026, above their year-earlier level.

Monthly rice prices followed a different trajectory. Having remained elevated during 2024, they declined steadily throughout 2025 reaching a nine-year monthly low in October. The decline was largely driven by the removal of export restrictions in India, which increased exportable supplies on global markets. Prices have begun to recover, reaching USD 392/t (FAO All Rice Price Index normalised to India 5%) in February 2026, as global demand remains robust, particularly in African markets.

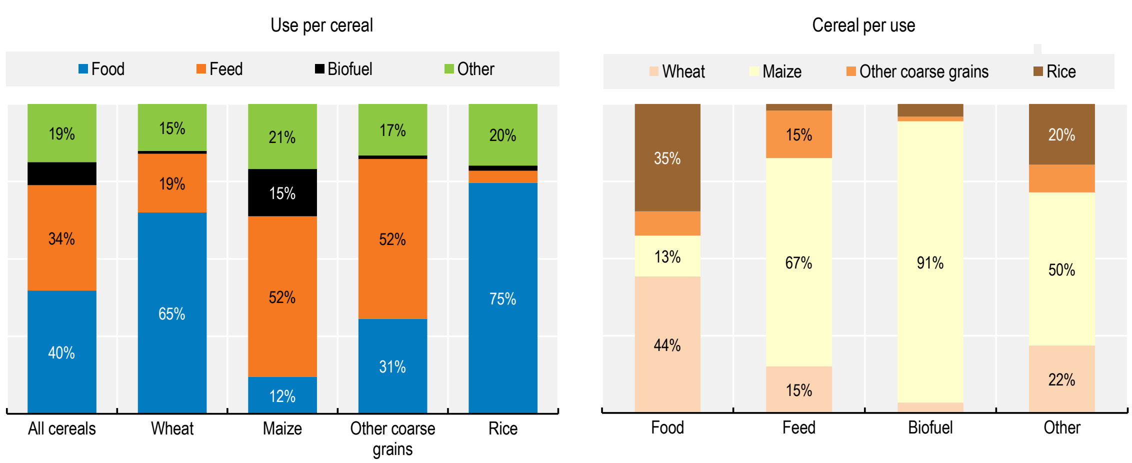
2.3. Market projections

2.3.1. Consumption

Asian countries will lead consumption growth

Global cereal consumption is projected to continue expanding over the coming decade driven by population growth, rising per-capita food demand, and increasing feed demand for livestock production. Food use will remain the dominant component of cereal demand, followed by feed use. By 2035, 40% of cereals are expected to be consumed directly as food, while about 34% will be used for animal feed, both increasing slightly from current levels. Biofuels and other industrial uses will account for the remaining quarter. These shares vary across cereal types: wheat and rice are primarily consumed as food, whereas maize and other coarse grains are mainly used as feed (Figure 2.1).

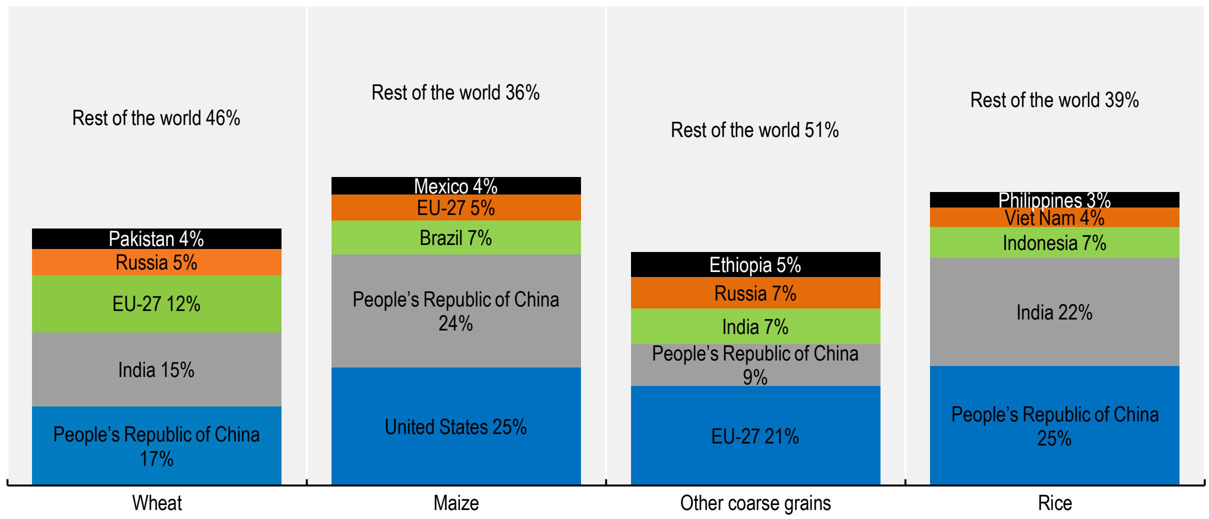
Figure 2.1. Global use of cereals in 2035



Between 49% and 64% of global cereal consumption is projected to occur in the five largest consuming countries for each commodity by 2035 (Figure 2.2), indicating a lower degree of concentration than for production. Total cereal use is projected to increase by 12% from the base period level to reach 3.25 billion tonnes (bln t) by 2035, with higher food and feed uses accounting for most of the growth. Asian countries are expected to account for more than half of the increase in global consumption. Food consumption is projected to grow broadly in line with population, while feed use growth will be driven by the expansion and intensification of livestock production.

Global wheat consumption is projected to increase by about 10% by 2035 relative to the base period. Food use will continue to dominate wheat consumption, accounting for about two-thirds of total use and increasing by around 59 million tonnes (Mt) globally. Growth in wheat consumption is expected to be somewhat slower than in the previous decade, reflecting slower growth in feed use. India and Pakistan together are expected to account for around one-third of the consumption increase, reflecting population and per-capita demand growth.

Figure 2.2. Global cereal demand concentration in 2035



Note: The presented numbers represent shares in world totals. Shares may not sum to 100% due to rounding.

In Asia, wheat remains a staple food for a large share of the population and is widely used in processed food products. In North Africa and sub-Saharan Africa, consumption is expanding beyond traditional consumers, driven by urbanisation, rising demand for processed foods and the competitive pricing of imported wheat relative to domestically produced staples. As a result, demand for milling-quality wheat used in baking and food processing is increasing, with supplies coming mainly from exporters in North America, Australia and the European Union. Growth in food use is expected to be led by countries in South Asia, North Africa and sub-Saharan Africa. By contrast, the use of wheat for ethanol production is projected to decline by about 15% relative to the base period.

Rice food consumption is expected to continue to grow over the projection period, although at a slower pace than in the previous decade. Growth is driven mainly by Asia and Africa and largely reflects population increases. On a per capita basis, small decreases in Asia and Latin America and the Caribbean are projected, while moderate increases in sub-Saharan Africa and other regions are foreseen (Table 2.1).

Table 2.1. Rice per capita food consumption by region

	kg/person/year		Growth rate (% p.a.)
	2023-2025 average	2035	
Africa	26.0	29.6	1.0
Asia	72.2	72.1	-0.1
Europe	6.8	7.0	0.3
Latin America and Caribbean	25.4	25.2	-0.2
North America	11.5	11.6	0.5
Oceania	19.0	20.4	0.6
World	50.7	50.8	-0.1

Notes: The last column displays the least-squares average annual growth rate, 2026-2035 (see the Glossary).

Maize consumption remains driven by feed demand, which is projected to increase more slowly than in the previous decade. Expanding livestock production – particularly in Asia – is expected to support increasing demand for feed grains. Feed use is projected to account for roughly half of total maize consumption by 2035, as in the base period, reaching 747 Mt (+103 Mt from the base period).

People's Republic of China (hereafter "China") will remain one of the largest consumers of maize, although expansion in use is expected to moderate. The rebuilding of pig herds after the African Swine Fever (ASF) outbreak has supported strong feed demand in recent years, but future expansion in the livestock sector is projected to be more gradual. In addition, improvements in feed efficiency and greater use of alternative feed ingredients – supported by government policies aimed at strengthening domestic feed self-sufficiency – are expected to further limit increases in maize use.

Food consumption of maize will continue to expand mainly in sub-Saharan Africa, where white maize remains a key staple crop, providing a significant share of daily caloric intake and thus remaining central to food security. Population growth in the region is expected to support continued increases in food use, broadly in line with the strong growth observed over the previous decade.

Globally, maize use for biofuel production is projected to increase more slowly than in the past decade, reflecting the maturity of ethanol markets in several major producing countries and slower growth in gasoline consumption in some regions. Brazil and India are expected to account for most of the increase in maize-based ethanol production over the projection period.

Consumption of other coarse grains – including barley, sorghum, rye, oats and millets – is projected to grow slightly faster than in the previous decade. Demand increases are expected to be concentrated in Africa, where these cereals are mainly used for food, and in Asia, where they are primarily used for feed. In high-income countries, consumption remains broadly stable. As a result, the share of other coarse grains used for food is projected to rise from about 27% in the base period to 31% by 2035, while the share used for feed declines from around 56% to 52%. In sub-Saharan Africa, millets remain an important staple crop due to its resilience to harsh climatic conditions and its adaptability to diverse agroecological environments. The brewing industry plays a significant role in the use of barley for human consumption, particularly in countries such as China, the United States, Brazil, Mexico and the European Union.

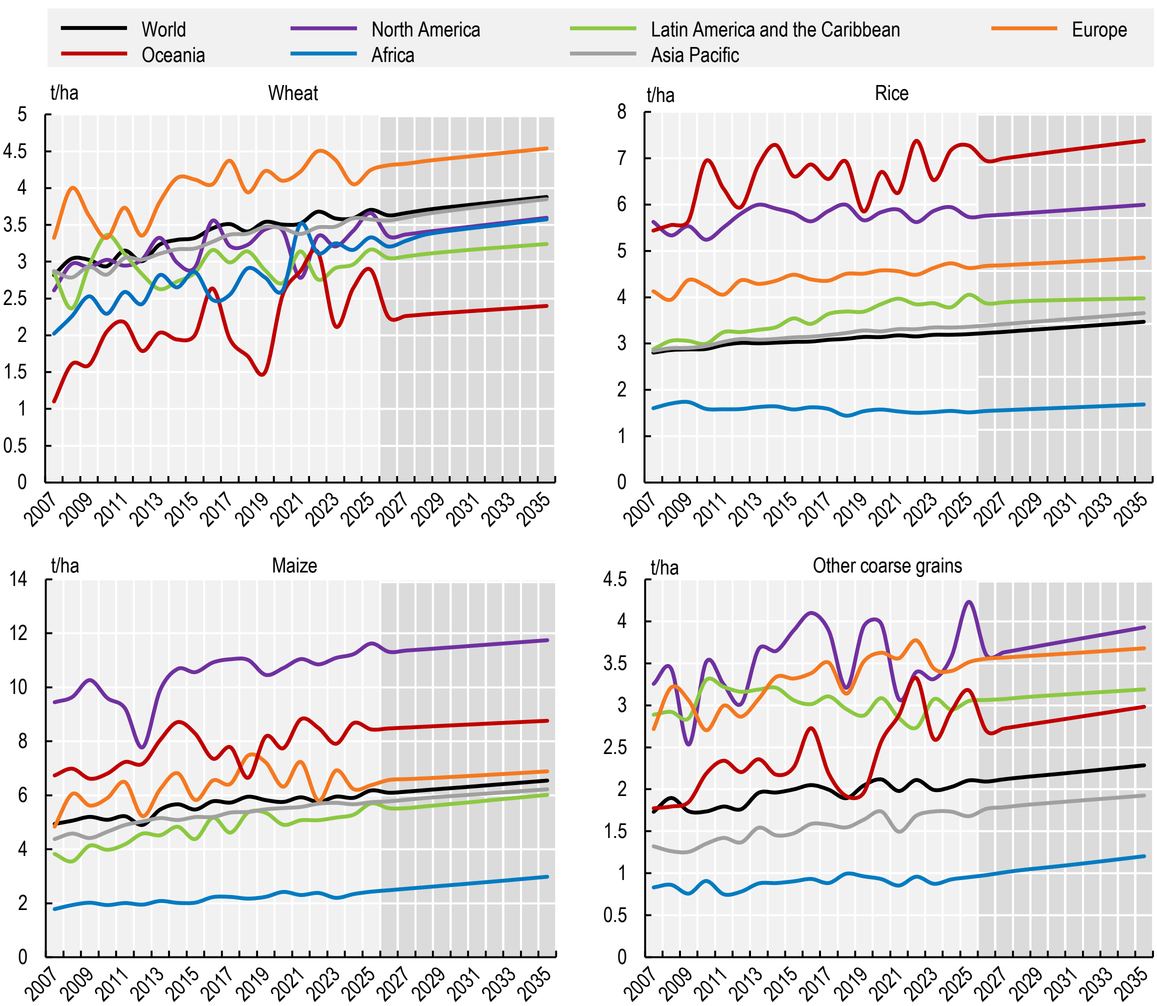
Cereals tend to have relatively low levels of food loss and waste compared to more perishable foods. Nevertheless, losses still occur along the supply chain, particularly during transport, storage and processing, while additional waste arises at the distribution and household levels. Total food loss and waste is assumed to remain broadly stable at current levels, around 14-15% of global cereal production, highlighting the importance of continued efforts to reduce losses through improved infrastructure, technological innovation and consumer awareness.

2.3.2. Production

Yield improvements sustain production growth

Global cereal production over the coming decade is expected to rely increasingly on productivity gains rather than expansion of cultivated land. Over the past decade, the global harvested area of cereals expanded by around 0.5% per annum (p.a.). In the coming decade, this growth is projected to slow markedly to about 0.1% p.a., adding around 15 million hectares (ha) to the base period level and bringing global harvested area to roughly 763 million ha by 2035. Latin America and the Caribbean together with Asia are expected to account for about 60% of this increase. In both regions, rising cropping intensity – particularly through double cropping – supports expansion, while some countries in Latin America bring additional land into cultivation and parts of Asia benefit from improvements in irrigation and land management. In Asia, India is projected to account for about one-third of the global increase in harvested area, mainly for wheat and rice. Globally, wheat and maize areas are expected to expand by about 2% and 4%, respectively, relative to the base period, while rice and other coarse grains area remaining broadly stable. Urbanisation and environmental policies are expected to limit further expansion of agricultural land, implying that future production growth will depend primarily on improvements in yields.

Figure 2.3. Regional cereal yields



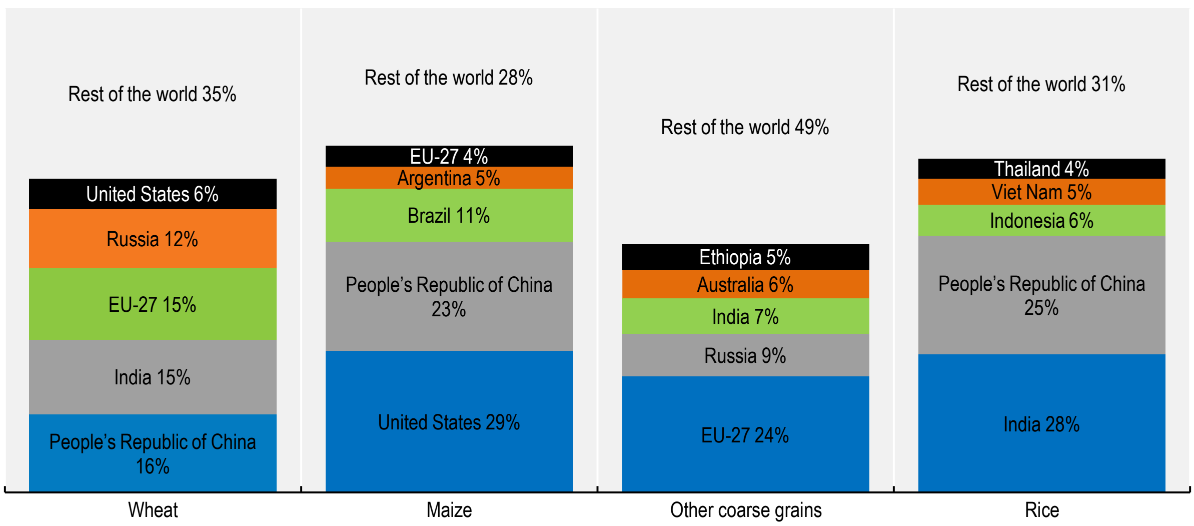
Note: The presented yields were calculated as total production divided by total harvested area in the corresponding region. In the rice panel, "Oceania" refers to Australia (i.e. Australia's rice yield is shown). Rice yields are expressed on a milled-rice basis.

Global average yields are projected to grow by around 0.9% p.a. in the next decade, slightly faster than in the previous decade, reaching 4.2 t/ha by 2035. Continued advances in crop genetics, improved farm management practices and more efficient input use are expected to support these productivity gains. Average yields are projected to reach about 3.9 t/ha for wheat, 6.5 t/ha for maize, 3.5 t/ha for rice and 2.3 t/ha for other coarse grains by 2035 (Figure 2.3).

Despite these improvements, significant regional disparities in productivity are expected to persist due to natural conditions as well as differences in production intensity and technology. In high-yielding regions, yield growth is slowing as marginal gains from existing technologies diminish and environmental constraints become more binding. In lower-yielding regions, progress is more uneven. Some countries benefit from rapid modernisation and increased investment in agricultural technology while others face structural constraints such as limited infrastructure, weak input markets and vulnerability to extreme weather conditions. As a result, limited convergence in yields between regions is expected over the projection period. Improving access to technologies, inputs, financing and knowledge will thus remain critical for equitable productivity gains and strengthening global food security.

Total cereal production is projected to reach 3.24 bln t in 2035. Reflecting differences in productivity growth and resource availability, cereal production in low- and lower middle-income countries is projected to expand twice as fast as in upper middle- and high-income countries. This faster growth reflects lower initial yield levels, which allow greater potential for catch-up, and increasing investment in agricultural development aimed at strengthening domestic food supplies. In higher income countries, production growth is expected to be more moderate because productivity levels are already high and opportunities for land expansion limited.

Figure 2.4. Global cereal production concentration in 2035



Note: The presented numbers represent shares in world totals. Shares may not sum to 100% due to rounding.

Between 51% and 72% of global cereal production is projected to occur in the five largest producing countries for each commodity by 2035, indicating a higher degree of concentration than observed for consumption (Figure 2.4). This concentration reflects uneven access to natural resources and variations in technological development, investment and policy support across countries. Regionally, Latin America and the Caribbean are projected to experience relatively strong production growth, supported by technological progress, improved infrastructure and expanding cropping systems. In Africa, cereal production is also expected to increase strongly, reflecting the commercialisation of agriculture which results in yield improvements alongside continued area expansion supported by stabilising investment incentives. In North America, production growth will mainly be driven by yield gains, as harvested area expands only modestly. In Europe, sustainability policies and land constraints are expected to keep harvested area broadly stable, with moderate yield improvements supporting production growth. Oceania and Asia are projected to see more moderate increases in production over the coming decade.

Global wheat production is projected to increase by 74 Mt from current levels to reach 877 Mt by 2035. India, one of the world's largest wheat producers, is projected to contribute a significant share of the global increase (29%), owing to both yield improvements and policies supporting modest expansion of harvested area. Production increases are also expected in Russian Federation (hereafter "Russia"), Argentina and Pakistan, together accounting for another 40% of the global expansion. By 2035, China, India and the European Union are projected to produce roughly two-thirds of global wheat output.

Global maize production is projected to increase by around 171 Mt from current levels to reach 1.43 bln t by 2035. The largest absolute increases relative to the base period are expected in Brazil, China and the United States. In Brazil, where second-crop maize production is closely linked to soybean rotations and responds strongly to global market signals, production growth is projected to exceed the global average growth. Maize production is also expected to grow relatively rapidly in sub-Saharan Africa as yields gradually improve and strong demand for local white maize provides investment incentives.

Global rice production is projected to increase by around 50 Mt from current levels to reach 601 Mt by 2035. Much of this growth is expected to originate from yield improvements in low- and lower middle-income countries. Asian countries, which dominate global rice production, will account for the bulk of the increase. India, projected to remain the world's largest rice producer, is expected to account for more than half of the global production expansion, followed by least developed Asia and sub-Saharan Africa. In China, rice production is projected to grow slowly, driven mainly by yield gains. At the same time, cultivated area is expected to decline gradually as production becomes more efficient and less productive land is withdrawn from cultivation. Reductions in rice area in China, Viet Nam, Brazil, and Pakistan are expected to be offset by expansion in India, Indonesia and Nigeria.

Global production of other coarse grains – including sorghum, barley, millets, rye, and oats – is projected to increase by around 35 Mt from current levels to reach 331 Mt by 2035. African countries are expected to contribute roughly half of this increase, reflecting the continued importance of these crops in local food systems and their adaptability to semi-arid environments. Sub-Saharan Africa, India, Ethiopia, and Nigeria are projected to contribute the largest increases in production. In contrast, production changes in major developed producers are expected to be modest, with stronger growth in Canada, more limited increases in the European Union, and slight declines in the United States.

2.3.3. Trade

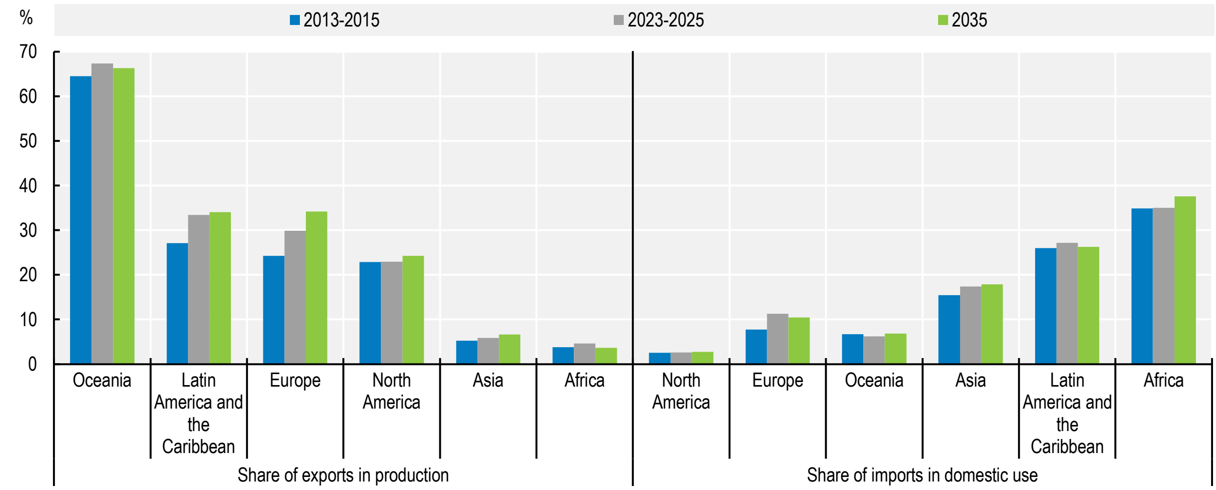
Moderate growth and shifting trade shares

International trade plays an important role in balancing regional differences between cereal production and consumption. During the base period, global cereal trade accounted for 17% of total production. This share is projected to increase to 18% by 2035 as demand in several import-dependent regions continues to outpace domestic production under the baseline assumptions.

The traditional pattern of the Americas and Europe supplying major importing regions in Asia and Africa is expected to persist (Figure 2.5). Economic development and urbanisation are increasing per capita food demand, while population growth and expanding livestock sectors are further raising cereal use in many importing regions. This growing demand is expected to be increasingly met by major exporting regions with competitive production systems and well-established export infrastructure.

Global wheat exports are projected to increase by about 31 Mt from the base period to reach 235 Mt by 2035. Export growth from the major suppliers is expected to slow compared with the previous decade as global demand growth moderates. Russia is projected to maintain its position as the world's largest wheat exporter, accounting for about one-quarter of global trade, with exports approaching 60 Mt by 2035. The European Union is expected to remain the second-largest exporter, with shipments exceeding 32 Mt. Canada and the United States are projected to remain competitive exporters and together account for around one-quarter of global wheat trade. Population growth and rising domestic consumption are expected to absorb most of the additional output in India, keeping its wheat trade balance only marginally negative by 2035.

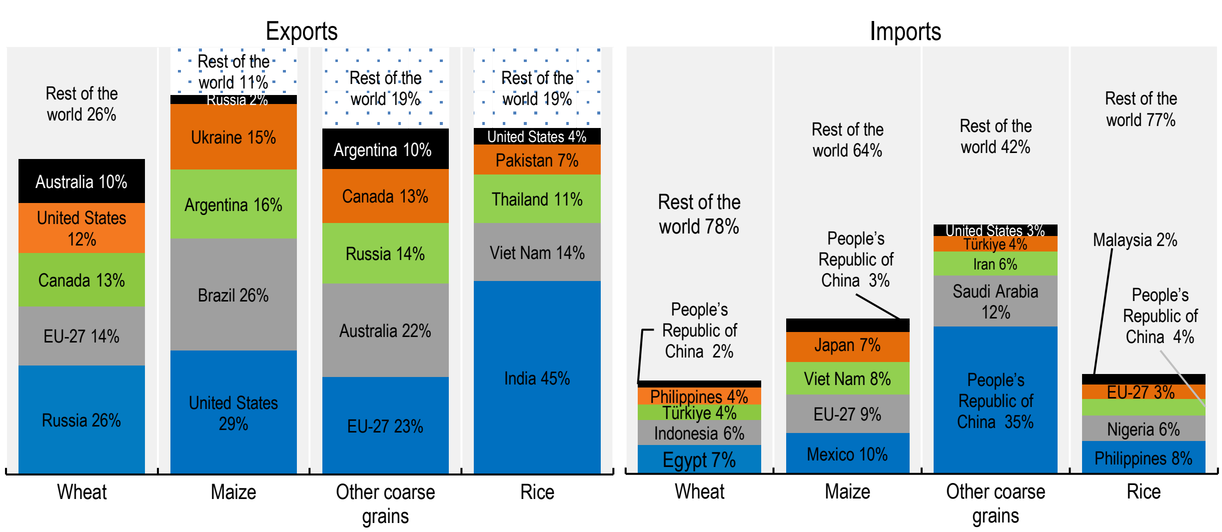
Figure 2.5. Cereal trade as a percentage of production and consumption



Note: The presented estimates include intra-trade except for the European Union.

Export markets remain partially segmented by wheat quality. The United States, Canada, Australia and the European Union are expected to remain important suppliers of higher protein wheat, particularly to Asian markets. Russia will continue to play a growing role in global wheat trade but is projected to remain particularly competitive in price-sensitive markets such as North Africa, sub-Saharan Africa and Western Asia. Import demand from North Africa and the Near East is projected to increase slightly as population growth and limited domestic production capacity sustain demand in international markets.

Figure 2.6. Global cereal trade concentration in 2035



Note: The presented numbers represent shares in world totals. Shares may not sum to 100% due to rounding.

Global maize exports are projected to increase by around 34 Mt from the base period to reach about 218 Mt by 2035. Global maize trade will remain highly concentrated, with the four largest exporters – the United States, Brazil, Argentina and Ukraine – accounting for about 90% of world exports (Figure 2.6). The United States is projected to remain the largest exporter, with export volumes continuing to grow. Brazil is expected to continue expanding its export presence as second-crop maize production linked to soybean rotations supports rising output, although a growing share of maize production is also expected to be used for ethanol production. Export growth from Brazil is projected to remain above the global average, although it will slow compared with the previous decade.

China's maize imports are projected to remain relatively low compared to recent years, fluctuating between 7 Mt and 13 Mt. While feed demand continues to grow to supply the domestic livestock sector, import volumes will remain dependent on domestic production levels, feed substitution, and policy decisions related to stock management and trade. In sub-Saharan Africa, maize production is expected to continue meeting most domestic food demand, leaving the region largely self-sufficient overall. White maize will remain a key staple food crop, while South Africa is projected to remain a key exporter and continue supplying mainly regional markets.

International trade in other coarse grains – primarily barley and sorghum – remains much less than that of wheat or maize. Global exports are projected to increase by around 9 Mt to reach about 55 Mt by 2035. The European Union, Russia and Canada are expected to account for most of this increase. Together with Australia and Argentina, these exporters are projected to account for about 81% of global exports by 2035. Import demand will remain concentrated in a relatively small number of markets. China, Saudi Arabia, countries in North Africa and the Near East, as well as the Islamic Republic of Iran, are projected to absorb about 70% of global imports.

Global rice trade will grow faster than other cereals in the coming decade, increasing by about 22 Mt to reach 81 Mt by 2035. Following the removal of export restrictions imposed in 2022 and 2023, India is projected to regain much of the export market share it temporarily lost, reinforcing its position as the world's largest rice exporter. Exports from the five largest rice exporters – India, Viet Nam, Thailand, Pakistan and the United States – are projected to become even more dominant. Their combined share of global exports is expected to rise from around 77% in the base period to about 81% by 2035, largely reflecting India's expanding role in global markets.

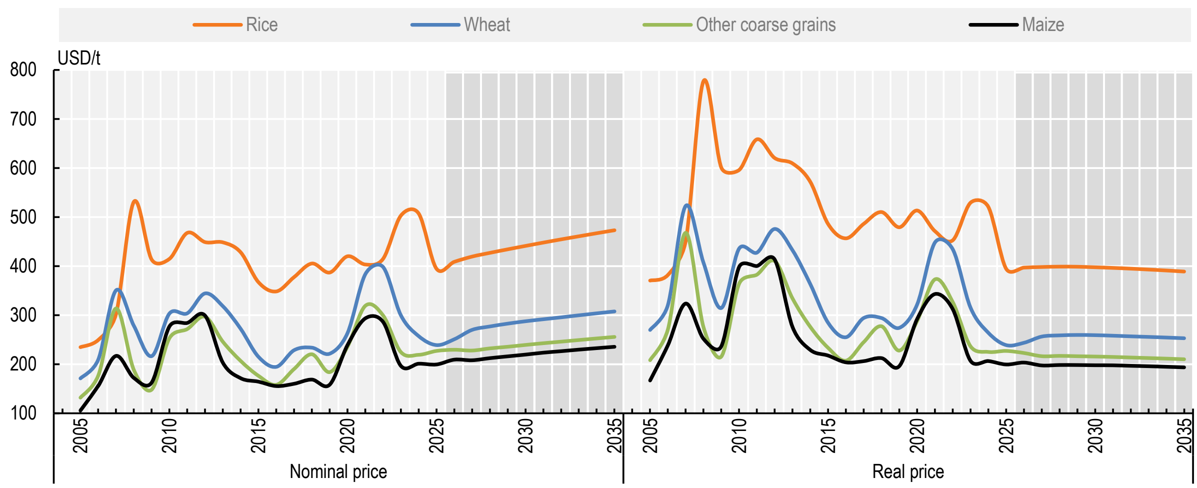
Historically, Indica rice has accounted for the bulk of rice traded internationally. Demand for other rice varieties, however, is expected to continue growing over the projection period. Import demand in African countries is projected to expand faster than the global average, as consumption growth continues to outpace domestic production. African countries are projected to increase their share of global rice imports from 35% currently to 45% by 2035, while Asia's share is expected to decline from 46% to 39%, despite continued growth in import volumes.

2.3.4. Prices

Nominal prices for cereals are projected to continue their upward medium-term trends (Figure 2.7). Wheat prices are expected to reach about 307 USD/t by 2035. Maize and other coarse grain prices are projected to reach around 236 USD/t and 256 USD/t, respectively. Rice prices are also expected to stabilise along their upward medium-term trend. The reference export price for milled rice is projected to reach about 473 USD/t by 2035, as export supplies are expected to gradually normalise following recent export restrictions, production expansions, and strong demand in sub-Saharan Africa and the Near East.

Cereal prices decline slightly when adjusting for inflation. Continued productivity improvements and expanding production are expected to keep supply growth broadly in line with global demand over the projection period, exerting mild downward pressure on real prices.

Figure 2.7. World cereal prices



Note: Wheat – US wheat, No.2 Hard Red Winter, FOB Gulf; maize – US maize, No.2 yellow, FOB Gulf; other coarse grains – France, feed barley, FOB Rouen; rice (milled) – FAO all rice price index normalised to India, indica high quality 5% broken average 2014-2016. Real prices are nominal world prices deflated by the US GDP deflator (2025=1). Prices refer to marketing years.

2.4. Risks and uncertainties

A more uncertain geopolitical, environmental and policy environment in the next decade?

Global cereal markets remain exposed to several sources of uncertainty that could influence supply, demand and prices over the coming years. Weather variability remains one of the most immediate risks for cereal production. The Outlook generally assumes on-trend production conditions, but extreme weather events or changes in weather patterns could quickly alter global supplies and prices.

Geopolitical tensions continue to pose risks for global cereal markets through their effects on energy and input costs. Fluctuations in global oil prices in early 2026 have heightened uncertainty around transport, energy, and fertiliser prices, which are closely linked to fuel markets. Such developments can raise production and shipping costs and would lead to alternative market projections.

Trade policy developments remain an important source of uncertainty. Broader policy frameworks – including sustainability-oriented agricultural and biofuel-support policies – could affect production costs, land use, feed demand, and the timing and scale of imports, contributing to variability in global supply and demand conditions.

Finally, policy developments in major consuming countries could also alter global demand patterns. China’s efforts to strengthen domestic grain self-sufficiency and reduce reliance on imports – through support for domestic production, feed efficiency and feed diversification – may affect its import demand for cereals and lead to shifts in global trade flows. Recent developments in alternative payment systems, including the increased use of local currencies in trade transactions, may help ease foreign exchange constraints for some countries but could also contribute to greater fragmentation of global markets. In such contexts, the stability and openness of the global trading system will remain essential for ensuring food security.

3 Oilseeds and oilseed products

This chapter describes market developments and medium-term projections for world oilseed markets for the period 2026-2035. Projections cover consumption, production, trade and prices for soybean, other oilseeds, protein meal and vegetable oil. The chapter concludes with a discussion of the key risks and uncertainties which could have implications for world oilseed markets over the next decade.

3.1. Projection highlights

Most oilseeds and oil crops (such as palm oil) are processed through crushing or pressing to produce protein meal and vegetable oil. Most production is used as protein meal in animal feed and a small share is fed in an unprocessed from. Around one-quarter of total output, by weight and mostly vegetable oil, is used for direct human food consumption. The primary industrial use of vegetable oil is as feedstock for biomass-based biodiesel production.

The use of protein meals as animal feed will align with the slower demand from key importers; People’s Republic of China (hereafter “China”) is expected to reduce its feed consumption considerably, driven by improved feed efficiency combined with efforts to achieve lower protein meal shares in livestock feed rations.

Global food demand growth for vegetable oil is expected to remain strong, mainly driven by rising disposable income and population growth in middle-income countries and population growth in low-income countries.

The industrial use of vegetable oil for biomass-based biodiesel, currently about 18% of global vegetable oil use, is projected to grow globally, especially in Indonesia, Brazil and the United States. In the European Union, demand for biodiesel is expected to increase in the short term but contract between 2028 and 2035.

Palm oil and rapeseed yields are projected to improve slightly, reversing a decline seen over the last decade in major producing regions. Soybean yields are expected to continue to increase over the medium term. Similarly, cultivated areas are also expected to increase, resulting in increasing oilseed and vegetable oil output.

The traded share of oilseeds and oilseed products is among the highest of all agricultural commodities due to the high geographical concentration of supply and globally dispersed demand. Over the Outlook period, more than 37% of global soybean production is projected to be traded, while vegetable oil exports are expected to account for about 32% of world production. This largely reflects the geographic concentration of production: soybeans are mainly produced in the Americas and palm oil in Southeast Asia.

Prices of vegetable oil and protein meal are expected to show different future developments, with vegetable oil prices projected to remain relatively stronger due to sustained demand growth. Protein meal prices are expected to be relatively flatter due to changing demand patterns.

Specific uncertainties for oilseeds and oilseed products are changing demand patterns and the likelihood for success in efforts to reverse the decline in productivity. In terms of feed demand for protein meal, China might reduce the protein meal share in its animal feed beyond currently anticipated levels. The expected recovery in palm oil yields across major producing countries hinges on substantial replanting investments, which in turn depend on sustained government support. Any reductions or delays in budget allocations could slow these investments, potentially shifting demand toward alternative vegetable oils. Furthermore, any change in the biomass-based diesel industry directly affects vegetable oil demand projections.

3.2. Current market trends

Nominal prices of oilseeds and oilmeals have fluctuated within narrow ranges, while global vegetable oil prices remained firm

In 2025/26, international prices for soybeans have remained subdued, mainly underpinned by ample global supplies. Rapeseed prices have also fluctuated within a narrow range due to favourable production outcomes in 2025. Meanwhile, world oilmeals quotations largely followed suit, pressured by sufficient global soymeal supplies. By contrast, international vegetable oil prices remained firm and appreciated recently, underpinned by protracted tight fundamentals. Rising crude oil prices also lent support to vegetable oil values at times.

Global soybean production in 2025/26 is expected to remain close to the record high of 430 million tonnes (Mt), mainly due to the continuing increase in Brazil, where generally favourable growing conditions coincided with continued area expansion. Following a higher than expected recovery in 2025, expansion in world palm oil production is anticipated to slow down in 2026, driven by expectations of rather modest yield growth in Indonesia and Malaysia.

3.3. Market projections

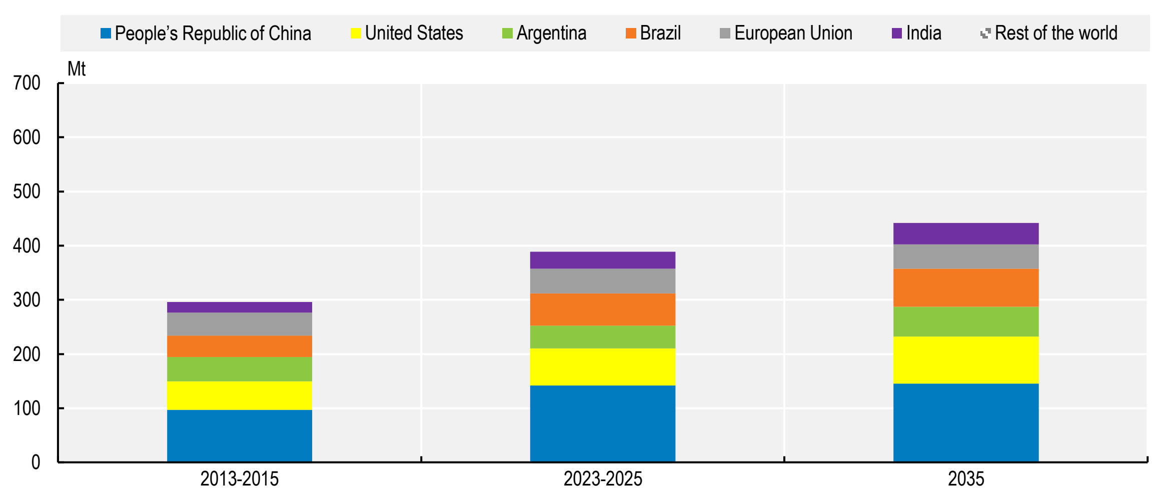
3.3.1. Oilseed crush and production of vegetable oils and protein meal

Slowing global oilseed crush and limited growth in palm oil production

Globally, the crushing of soybeans and other oilseeds into meal (cake) and oil dominates their total usage at around 90%. The demand for crush will increase slightly faster than that for other uses such as the direct food consumption of soybeans (including for meat and dairy replacements), groundnuts and sunflower.

The key determinants of the location of the crushing of oilseeds are transport costs, trade policies (e.g. different tariffs for oilseeds and products), acceptance of genetically modified crops, processing costs (e.g. labour and energy) and infrastructure (e.g. crushing facilities, ports and roads).

Figure 3.1. Oilseed crush by country or region



Soybean crush is projected to expand by 57 Mt over the Outlook period, considerably less than the 97 Mt in the previous decade. Most of the growth in soybean crush is expected to occur in Latin America in contrast to previous decade, when it mainly occurred in China. The global crush of other oilseeds is expected to grow in line with production over the Outlook period and to occur more often in the producing country and region: in China for rapeseed and groundnuts and in Russian Federation (hereafter "Russia") for sunflower seed, and Canada for rapeseed.

World production of protein meals from oilseed crush is dominated by soybean meal, which accounts for more than two-thirds of global production. Production is concentrated in a small group of countries led by

China, the United States, and Brazil (Figure 3.1). In China and the European Union, most protein meal production comes from the crushing of imported oilseeds, primarily soybeans from Brazil and the United States. In the other major producing countries – Argentina, Brazil, India and the United States – domestically produced soybeans and other oilseeds dominate the crushing to produce protein meal.

Global vegetable oil production includes the crush of oilseeds as well as the production from perennial oil plants, especially oil palm. Coconut oil and cottonseed oil complete the vegetable oil aggregate. Palm oil and palm kernels are joint products; palm kernels are crushed into palm kernel oil and meal. Coconut oil is mainly produced in the Philippines, Indonesia and Oceanic islands. Palm kernel oil and coconut oil have important industrial uses, such as ingredients in soaps, detergents and cosmetics. The production of cottonseed oil, a product derived from cottonseed, is concentrated in China, India, and Brazil (see Chapter 10).

Over the past decade, lobal palm oil output has outpaced the production of other vegetable oils. However, growth in palm oil production over the Outlook is expected to weaken due to increasing sustainability concerns and the aging of oil palm trees in Indonesia and Malaysia, which impact yield developments. These countries account for almost one-third of the world's vegetable oil production and for more than 80% of global palm oil production.

At the global level, palm oil supplies are projected to expand at an annual rate of 1.4%. Increasingly stringent environmental policies from the major importers (e.g. the European Union Regulation on Deforestation-free Products) of palm oil and sustainable agriculture norms are expected to slow the expansion of the oil palm area in Indonesia and Malaysia. This implies that production growth needs to come from productivity improvements, including an acceleration of replanting. Palm oil production in other countries is expected to expand more rapidly from a low base, mainly for domestic and regional markets. For example, Thailand is projected to produce 4 Mt by 2035, Colombia 2.2 Mt and Nigeria 1.9 Mt. Latin America and the Caribbean is the fastest growing and second-largest palm oil-producing region in the world, contributing around 7.5% of global output. In several Central American countries, niche palm oil production is developing with global sustainability certifications in place from the outset, positioning the region to eventually reach broader export markets.

3.3.2. Vegetable oil consumption

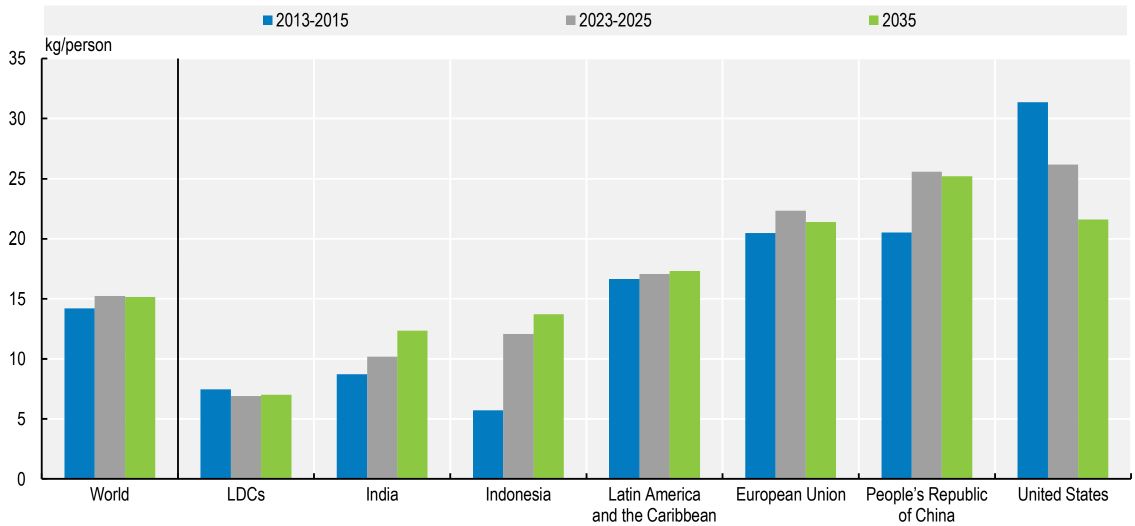
Per capita demand for vegetable oil for food is slowing as biodiesel use expands

The two dominant uses of vegetable oil are for food and food preparation (52%) and as biodiesel feedstock (18%). A considerable share of food use is for frying rather than direct consumption, which results in used cooking oil which can be used as feedstock for biodiesel production. Vegetable oils are also used for cosmetics, varnishes and increasingly in animal feed, especially for aquaculture.

Per capita consumption of vegetable oil for food is projected to increase marginally (0.1%). While food demand is increasing in lower middle-income and low-income countries, it is slowing in high-income countries. In emerging markets such as China (25 kg/capita) and Brazil (21 kg/capita), the consumption of vegetable oil for food is set to reach levels comparable to those of high-income countries (Figure 3.2).

India, the world's second-largest consumer and leading importer of vegetable oil, is projected to sustain a per capita food consumption growth of 1.7% p.a., reaching 12 kg/capita by 2035. This increase will be the result of imports of vegetable oil and increases in the crushing of increased domestic oilseed production.

Figure 3.2. Per capita food consumption of vegetable oil in selected countries



Note: LDC: least developed country.

As urbanisation and disposable income increase in low-income countries, dietary habits and traditional meal patterns are expected to shift towards greater consumption of processed foods that have a high content of vegetable oil. For least developed countries, per capita demand for vegetable oil is projected to expand to 7 kg/capita by 2035.

The global uptake of vegetable oil as feedstock for biodiesel is projected to increase faster at 2.1% p.a. over the next ten years, compared to the 7.0% p.a. increase over the previous decade when biofuel support policies took effect. The use of vegetable oil as feedstock for biodiesel depends on the policy setting (see Chapter 8) and the relative price development of vegetable oil and crude oil. In general, national targets for mandatory biodiesel consumption are expected to increase less than in previous years.

Indonesia and the United States will account for over 80% of the growth in the use of vegetable oil to produce biodiesel, with production reaching 22 Mt and 14 Mt, respectively, by 2035 due to supportive domestic policies. In the United States, renewable diesel is considered an advanced biofuel and is expected to contribute to the growth of the country's biodiesel production.

On the other hand, the use of vegetable oil as feedstock for biodiesel in the European Union is expected to retract by 1.9% p.a. driven by the gain of used oils, tallow, and other non-feed and non-food feedstocks in the production of biodiesel in the share of biodiesel production. Globally, the use of waste oils and tallow as feedstock for biomass-based diesel has boomed in the recent past, and is expected to continue to grow, but its share – which peaked at 25% in 2024 – is projected to decrease over the next ten years.

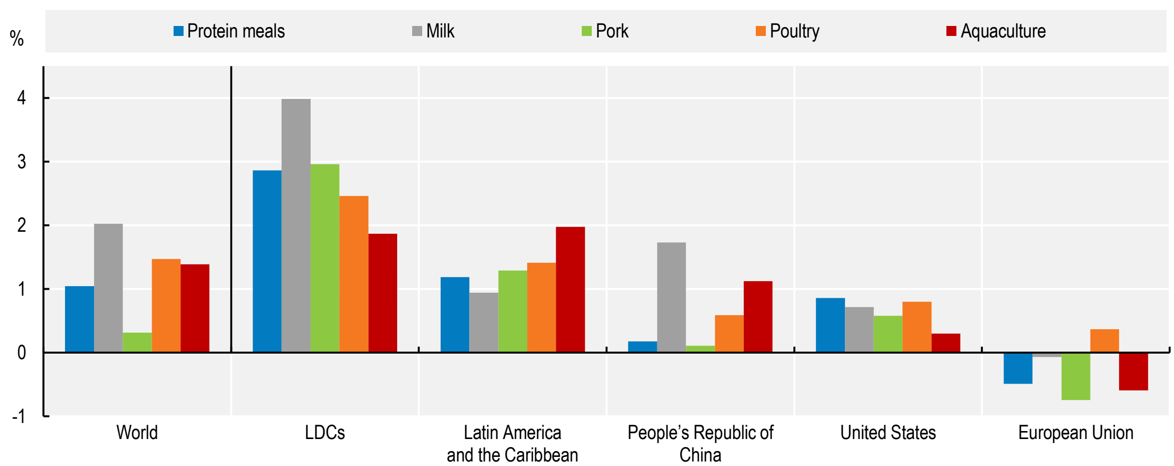
3.3.3. Protein meal consumption

Feed demand is slowing, shaped by developments in China

The protein meal content of soybeans is about 80% while for other oilseeds this share is 50-60%. Protein meal is almost exclusively used as feed and its consumption is projected to continue to grow at 1.0% p.a., considerably below the growth over the last decade (2.3% p.a.).

The link between feed use of protein meal and animal production is related to the intensification of animal production, which increases demand for protein meal. Greater feed efficiency leads to a reduction in protein feed per animal. Demand is also affected by the composition of animal husbandry and herd sizes. The link between animal production and protein meal consumption is associated with a country's level of economic development (Figure 3.3). Lower income countries, which rely on backyard production, consume less protein meal, whereas higher income economies, most of which employ intensive production systems, use higher amounts of protein meal. Because of a shift to more feed-intensive production systems in low-income countries in response to rapid urbanisation and increasing demand for animal products, growth in protein meal consumption tends to exceed growth in animal production.

Figure 3.3. Average annual growth in protein meal consumption and animal production (2026-2035)



Note: LDC: least developed country.

China accounts for around a quarter of global protein meal demand and, in turn, is shaping global demand. Growth in China's demand for compound feed is expected to be considerably slower than in the previous decade due to declining growth rates in animal production, especially pig meat, and the existing large share of compound feed-based production. The protein meal content in China's compound feed is expected to remain stable after its surge in the last decade, but continues to exceed current levels in the United States and the European Union.

In the United States and the European Union, where most animal production is compound feed-based, the consumption of protein meal is expected to move (grow or decline) at a rate similar to that of animal production. In the European Union, animal products, primarily poultry and dairy, are increasingly marketed by large retail chains as produced without feed from genetically modified crops, which also curbs demand for soybean meal. In the United States and the European Union where most animal production is compound feed-based, the consumption of protein meal is expected to move at a rate similar to that of animal production. This results in a growth in the United States and a decline in the European Union.

3.3.4. Oilseed production

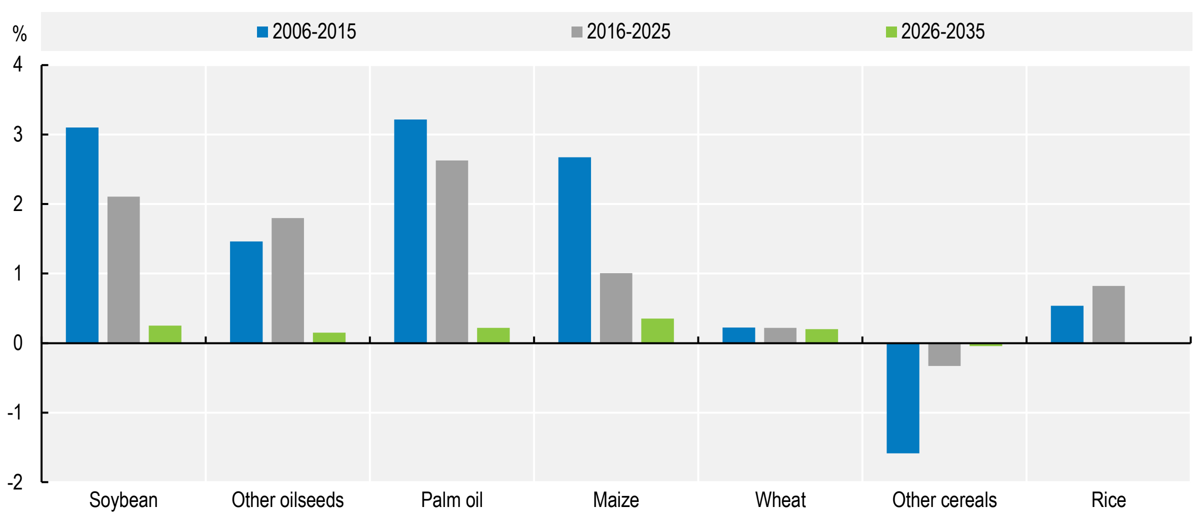
Challenges remain for palm oil and rapeseed yield growth

The production of soybeans is projected to grow by 0.9% p.a., compared to 2.3% p.a. over the last decade. Growth will be dominated by yield increases, accounting for about 70% of production growth. Soybeans have the advantage of growing fast, which allows for double cropping, especially in Latin America. Consequently, a considerable share of additional harvested area increase will result from double-cropping soybeans with wheat in Argentina and maize in Brazil.

Brazil is the largest producer of soybeans and production is expected to grow at 0.7% p.a. over the next decade – slightly stronger than the 0.5% p.a. in the United States, the second-largest producer, due to double cropping with maize. The production of soybeans is projected to grow strongly elsewhere in Latin America, with Argentina and Paraguay producing 56 Mt and 13 Mt, respectively, by 2035. Soybean production is expected to continue to increase in China in response to reduced policy support for the cultivation of cereals, but at a slower pace than in the previous decade (3.9% p.a. vs. 4.6% p.a., respectively). Soybean production is also expected to increase in Canada, India, Russia and Ukraine.

The production of other oilseeds (rapeseed, sunflower seed and groundnuts) will grow at the same pace of 1.0% p.a. compared to 2.3% p.a. over the previous ten years. China (a major producer of rapeseed and groundnuts) and the European Union (which mainly produces rapeseed and sunflower seeds) are the most important producers of other oilseeds, with a projected annual output of 43 Mt and 28 Mt, respectively, by 2035. Russia and Ukraine, major producers of rapeseed and leading producers of sunflower seed, are expected to increase their annual production of other oilseeds to 26 Mt and 19 Mt, respectively, by 2035. Canada, the largest exporter of rapeseed, is projected to increase its production of other oilseeds by 0.8% p.a., to reach 22 Mt by 2035.

Figure 3.4. Average annual change in harvested area for selected crops



Note: Usable data for palm oil area starts only from 2008.

In the past two decades, the harvested area of soybeans, other oilseeds and oil palms has increased faster than that of cereals (Figure 3.4). This growth has created pressure on other land uses and environmental resources. In the case of soybeans in Latin America, a considerable part of the expansion of harvested area is due to increasing double cropping of soybeans with maize or wheat. In the coming decade, the growth of harvested area of soybean, other oilseeds and oil palms is only expected to increase to a limited extent.

Soybean stocks are projected to remain unchanged over the next decade, with a stock-to-use ratio reaching around 15% by 2035, which is marginally higher than in the past decade. This implies a slightly greater buffer and more moderate price volatility in the event of harvest failures.

3.3.5. Trade

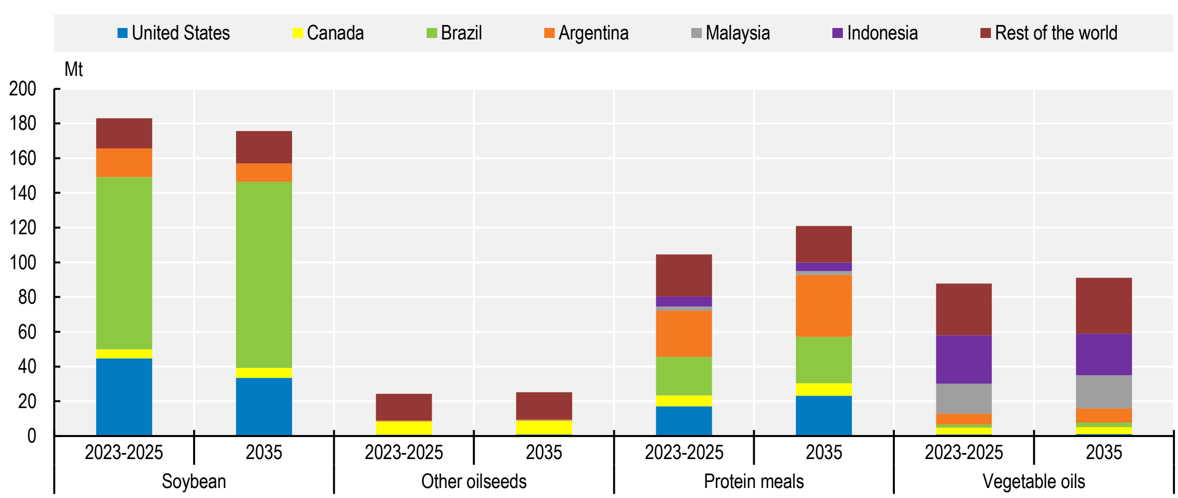
Trade is significant for oilseeds and products, but slowing down

During the base period, over 40% of world soybean production was traded internationally, a high share compared to other agricultural commodities. The expansion in global soybean trade is closely tied to the growth trend of soybean crush. In China, the volume of soybean crush and imports are projected to decrease considerably compared to the last decade. China accounts for about 56% of global imports, representing 98 Mt by 2035, down from 3% p.a. in the period 2016-2025.

Exports of soybeans originate predominately from Brazil and the United States. Brazil is the largest global exporter of soybeans, with steady growth in its export capacity, and is projected to account for 61% of total global exports of soybean by 2035 (Figure 3.5).

For other oilseeds, the internationally traded share of global production remains much lower at about 12% of world production, as the two largest producers – China and the European Union – are net importers. The main exporters are Canada, Australia and Ukraine, which are projected to account for 69% of world exports by 2035.

Figure 3.5. Exports of oilseeds and oilseed products by country



Vegetable oil exports, which amount to 33% of global vegetable oil production, continue to be dominated by a few players, namely Indonesia and Malaysia, which account for roughly half of total vegetable oil exports. However, the share of exports in production in Indonesia is projected to decline as domestic demand for food, oleochemicals and especially biodiesel uses is expected to grow. India is projected to continue its strong growth in imports at 1.4% p.a., reaching 21 Mt by 2035, to meet increasing demand driven by population growth, urbanisation and rising disposable incomes. At the same time, the Indian government is placing increasing emphasis on strengthening domestic agricultural capacity; these efforts focus on improving farming practices, enhancing support services for producers, and fostering conditions that enable more robust and resilient local production.

The projected growth in world trade of protein meal is 1.3% p.a. over the Outlook period. Argentina, with its clear export orientation, is expected to remain the largest meal exporter, followed by Brazil and the United States. The largest importer is the European Union, with imports expected to continue declining due to reduced domestic demand for protein meal. The majority (80%) of the global import growth in protein meal is projected to occur in Asia, and particularly Southeast Asia, driven by expanding animal production.

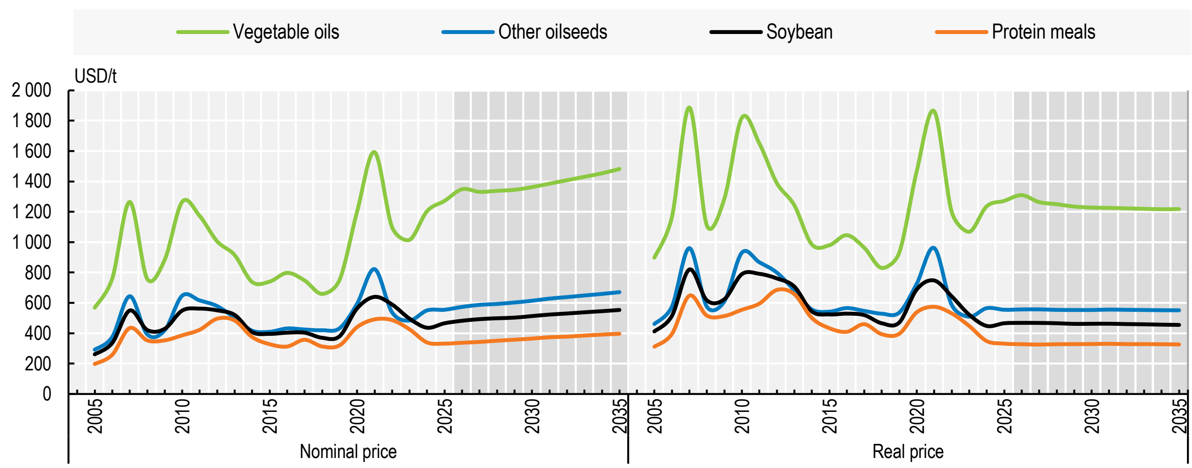
As the domestic crushing capacity in Asia is not expected to keep pace with rising demand, expansion of the livestock sector is expected to rely on imported feed.

3.3.6. Prices

Real prices will remain under pressure over the next decade

Oilseed and product prices are expected to increase slightly in nominal terms while declining in real terms following the long-term trend of agricultural commodity prices (Figure 3.6). The expected demand for vegetable oils slightly surpasses the demand for protein meal; the price gap between the products is expected to reflect this and remain stable. The expected increases in demand for vegetable oil will also favour other oilseed prices over soybeans as they contain higher shares of vegetable oil.

Figure 3.6. Evolution of world oilseed prices



Notes: Soybeans, US, c.i.f. Rotterdam; other oilseeds, rapeseed, Europe, c.i.f. Hamburg; protein meal, production weighted average price for soybean meal, sunflower meal and rapeseed meal, European port; vegetable oil, production weighted average price for palm oil, soybean oil, sunflower oil and rapeseed oil, European port. Real prices are nominal world prices deflated by the US GDP deflator (2025=1).

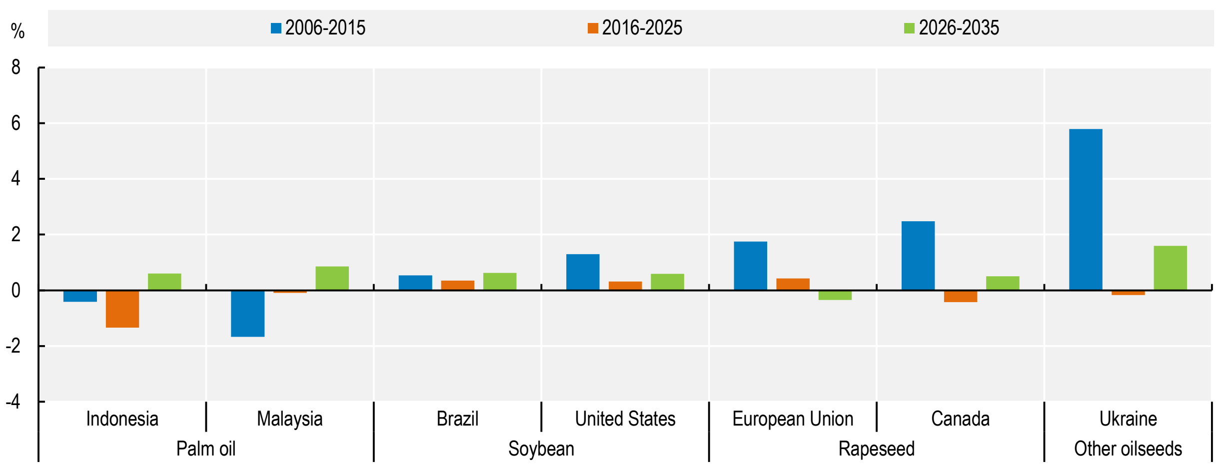
3.4. Risks and uncertainties

Environmental concerns influence global oilseed supply chains

The traded share of soybeans and vegetable oils production is considerably higher than other agricultural commodities (approximately 37% and 33%, respectively in 2035); therefore, these products are likely to be more affected by any changes in trade regimes. On the one hand, this could result in a shift of trade flows either due to more beneficial trade conditions in bilateral agreements or due to trade frictions and restrictions. On the other hand, the integration of environmental sustainability considerations into trade regulations could influence global oilseed and oilseed product trade. Palm oil and soybeans are often mentioned when the link between agriculture and deforestation is discussed. Both products are included in the European Union’s Deforestation Regulation of 2023 (Regulation (EU) 2023/1115) as relevant products alongside cattle, cocoa, coffee, rubber and wood. The impact on global soybean and palm oil trade remains uncertain but could impact global oilseed and oilseed product markets. In producing countries, several measures to address these deforestation concerns, including certification of deforestation free production, have been implemented and increase in relevance for trade.

Yields for major producers of palm oil and for some major suppliers of rapeseed have fallen or grown slowly during the last decade (Figure 3.7). There are many reasons for this development: a significant increase in production area so that less favourable land is used for production, reducing average yields; the ageing of oil palms as well as labour shortages has reduced yields; restrictions in the use of pesticides adversely affected average rapeseed yields in the European Union; and shifting weather patterns. It remains uncertain how this will play out over the coming decade.

Figure 3.7. Average annual yield growth for palm oil and oilseeds



The recovery in palm oil yields in Indonesia remains closely tied to substantial replanting efforts, which depend on government support. Any reduction or delay in public funding risks slowing these investments and could shift the demand towards alternative vegetable oils. At the same time, elevated vegetable oil prices might temper per capita consumption growth, contributing to a more subdued expansion in use.

Sustainability concerns will also influence the expansion of palm oil output as demand in developed countries favours deforestation-free oils and seeks sustainability certification for vegetable oil used as a biodiesel feedstock and, increasingly, for vegetable oils entering the food chain. However, there are concerns about competing certification schemes in Indonesia and Malaysia.

Biofuel policies in the United States, the European Union and Indonesia, the three largest users of biodiesel, remain a major source of uncertainty in the vegetable oil sector. In Indonesia, attaining the proposed 50% biodiesel mandate is doubtful given the need for government subsidies and possible medium-term supply constraints. In the United States, renewable diesel receives considerable support in some states (e.g. California) that show strong production growth rates. In the European Union, policy reforms, a reduction of overall diesel use and the emergence of second-generation biofuel technologies will likely prompt a shift away from crop-based feedstocks, especially vegetable oils. Globally, investments in and the uptake of sustainable aviation fuels and electric vehicles will be a decisive driver determining biofuel patterns in the next decade (Chapter 8). are expected to be a substantial use of biofuels but the timing of introduction remains largely uncertain.

China's demand for soybeans and protein meal depends largely on the evolution of its animal production sector. Over the next decade uncertainties persist, due to risks facing the meat market, such as outbreaks of animal diseases. In addition, evolving consumer preferences could shift animal protein intake towards other sources, reducing the demand for certain types of feed, including protein meals. Moreover, protein meals face competition from other feed components in the production of compound feed. Thus, changes in cereal prices will prompt adjustments in the balance between compound feed ingredients and might affect protein meal demand.

4 Sugar

This chapter describes market developments and medium-term projections for world sugar markets for the period 2026-2035. Projections cover consumption, production, trade and prices for sugar crops (sugar beet and sugarcane) and the sweetener complex, including raw sugar, white sugar, molasses and high fructose corn syrup. The chapter concludes with a discussion of the key risks and uncertainties which could have implications for world sugar markets over the next decade.

4.1. Projection highlights

Global sugar demand is projected to strengthen mainly in South and Southeastern Asia and Africa over the next decade, driven by population growth, rapid urbanisation and rising disposable incomes. Combined, these regions will account for virtually all of the world's consumption growth over the next decade. Demand growth in Africa and Asia is expected to be primarily driven by population expansion, with per capita sugar consumption projected to rise by 4% and 13%, respectively, although levels are projected to remain well below the level in high-income countries.

Across North America, Europe and parts of Latin America, consumption is anticipated to decline further. The combination of shrinking populations and shifting consumer preferences, supported by health-conscious policies such as sugar taxes and labelling laws, will continue to drive widespread product reformulation and curb consumption growth. In East Asia, demand will remain low in Japan due to cultural preferences, while in People's Republic of China (hereafter "China"), minimal growth is anticipated as government targets and urban health trends will shift consumption patterns.

On the supply side, Brazil and India will continue to dominate the global sugar market. Brazil is expected to further strengthen its leading position through operational efficiencies and expanded capacity while India is anticipated to increase output through agronomic improvements and higher sucrose recovery rates. Together, these two countries are expected to account for 42% of global sugar output, heavily impacting global price dynamics over the coming decade.

Sugarcane will maintain its dominance, providing over 85% of total sugar crop output, while the sugar beet sector faces a structural squeeze due to regulatory and environmental pressures, in Europe. Trends in sugar crop-based ethanol output in the two main producers, Brazil and India, will remain a dominant factor influencing global sugar supply.

The export market is remaining concentrated, with Brazil maintaining a dominant share (55% in 2035), followed by Thailand. In contrast, the import market remains highly diversified, with the most significant demand growth located in emerging economies across Africa and Asia, where domestic production remains limited. Raw sugar continues to account for about 60% of global sugar trade.

Sugar markets will remain subject to many uncertainties, mainly future demand dynamics in Asia and Africa and extreme weather-driven production risks. While a shift toward processed foods and confectionery products is anticipated, heightened health awareness together with stricter health regulations and sugar consumption taxes would alter demand projections. While a productivity recovery is anticipated in the baseline, it remains unclear if major producers can overcome recent extreme weather-driven yield declines. In addition, flexibility between sugar and ethanol production is a key uncertainty of the sugar sector, particularly in Brazil and India.

4.2. Current market trends

International sugar markets are likely to shift toward a production surplus in the 2025/26 (October/September) season, largely reflecting expectations of higher global output and only modest growth in world consumption.

Global sugar production in 2025/26 is expected to recover from the reduced level recorded in 2024/25. The increase will mainly be driven by a rebound in India following the weather-related decline in the previous season. Similarly, in Thailand, improved sugar recovery rates are expected to support higher production. Greater output is also anticipated in China, reflecting higher production of sugarcane and sugar beet. In Brazil, production is expected to remain broadly in line with the previous season's level. The final outcome will, however, depend on the progress of the harvest in key southern growing regions, which begins in April, and on the share of sugarcane allocated to sugar rather than ethanol production. These gains are likely to more than offset the lower output anticipated in the European Union due to reduced sugar beet plantings despite generally good yields.

World sugar consumption is expected to increase slightly in 2025/26 compared with the previous season, amid prospects for relatively steady global economic growth in 2026 and lower sugar prices. The expansion in consumption is expected to be largely supported by population-driven demand growth in Africa, while demand developments in Asia are expected to be underpinned by continued population growth and the food and beverage industry.

World sugar trade in 2025/26 is predicted to remain broadly in line with the previous year's level. On the export side, shipments from Brazil are projected to remain close to the level recorded in the previous season, while export availabilities from Thailand are anticipated to increase. By contrast, exports from the European Union are expected to be lower. On the demand side, imports by Indonesia are anticipated to increase, reinforcing its position as the world's largest importer together with China, while purchases by the United States are projected to decline significantly, reflecting increased domestic sugar production.

International prices of sugar have generally declined since the start of the 2025/26 season in October, reaching in February 2026 their lowest level since October 2020. The decline has been driven mainly by expectations of ample global sugar supplies in the current season.

4.3. Market projections

4.3.1. Consumption

Over the next ten years, global sugar consumption is projected to expand by 1% p.a. to reach 199 million tonnes (Mt) by 2035, largely driven by population growth. Global average per capita consumption is projected to increase only marginally, rising by about 2% compared with the base period (October 2023-September 2026). This global average masks significant regional differences, with consumption growth concentrated in Asia and Africa, while demand in other regions is expected to stagnate or decline.

Sugar, a fibre-free carbohydrate, is a common ingredient in numerous food and beverage products and represents a key source of energy in the human diet. However, high levels of sugar consumption are associated with health concerns. he World Health Organization therefore recommends that intake of free sugars (i.e. sugar added to foods during production or cooking as well as sugars present in honey, syrups and fruit juices) be limited to less than 10% of total daily energy intake. Over the next decade, per capita caloric sweetener consumption is expected to grow mainly in Asia. The largest increase will take place in the highly populated regions of South and Southeast Asia. Meanwhile, consumption in the Americas, Oceania and Europe is anticipated to stagnate or fall due to health concerns, new consumption taxes and product reformulations. These trends will be accompanied by consumption gaps in every region. (Figure 4.1). In sub-Saharan Africa, per capita consumption of sugar is projected to grow steadily but still remain significantly below more affluent regions.

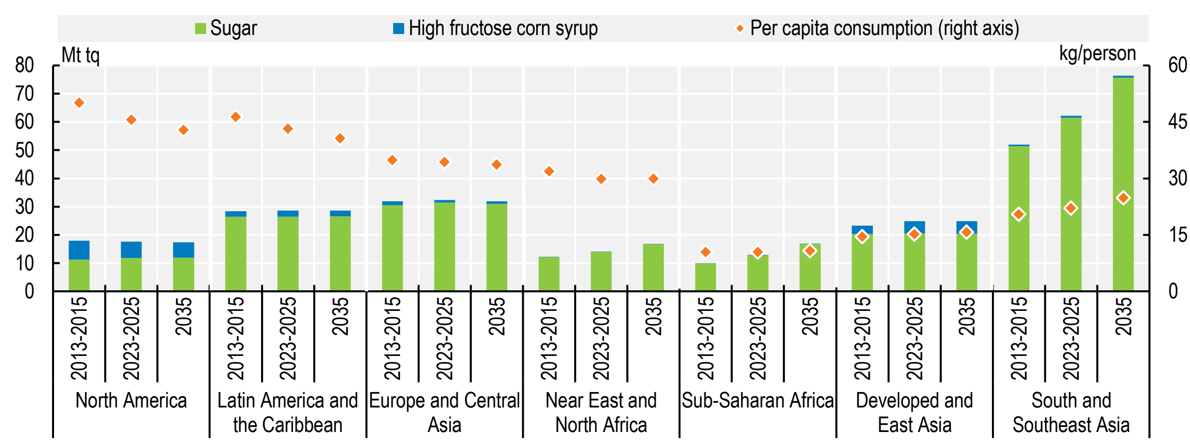
Consumption growth is mainly concentrated in Asia and Africa

With the projected rapid growth in population and income in Asia, and in population in Africa, the two regions are expected to account for virtually all of the increase in global demand compared to the reference period (October 2023-September 2025), at 76% and 28% of the world total growth, respectively, more than compensating for stagnant or declining demand in other regions. In both regions, per capita consumption is anticipated to remain significantly below the level in high-income countries by 2035.

In Asia, except for China, population growth, although slower than in the past decade, and income growth associated with stronger demand for processed food and beverage products are expected to sustain the increase over the next decade. India is expected to contribute the most to the overall increase in sugar consumption, followed by Indonesia and Pakistan then China and Viet Nam. Least developed countries in Asia will increase their per capita food consumption; however, they are projected to reach only 12 kg by 2035, remaining significantly below the regional average of 16 kg per annum. In China, the Food and Nutrition Development Guideline (2025-2030) officially limits added sugar to 25 g per day (9.1 kg/year) to curb rising consumption. To meet Healthy China 2030 rules, the food industry is lowering sugar in its recipes, specifically targeting urban youth who are the largest consumers. While new supermarkets are bringing more sugary products to rural areas, the national average is expected to stay steady (8.2 kg/capita) and remain lower than in neighbouring countries.

Across Africa, least developed sub-Saharan countries are foreseen to record only low growth in per capita consumption, reaching 9 kg in 2035, as income growth is not sufficient to drive significant dietary shifts toward higher consumption of high-value food items. In North Africa, consumption growth is projected to remain modest overall, varying across countries. Nevertheless, per capita consumption levels are expected to remain comparatively high, ranging from about 25 kg per year in the region's least developed countries to around 40 kg in other countries. In South Africa, the declining trend in per capita sugar consumption recorded in recent years – amid government measures to discourage its use, including the Sugar-Sweetened Beverage taxation and public health campaigns – is expected to persist over the next decade; with many food manufacturers reformulating their products to reduce sugar content.

Figure 4.1. Trends in total consumption of caloric sweeteners



Note: Data are expressed on a tel quel basis (tq).

Compared to other regions, Latin America currently exhibits the highest levels of caloric sweetener consumption. This sustained intake over the past 15 years has raised significant public health concerns, particularly regarding rising rates of obesity and chronic diseases. In response, a growing coalition of countries – including Chile, Colombia, Ecuador, Mexico and Peru – has adopted excise taxes on sugar-sweetened beverages, along with front-of-package warning labels, to curb soft drink consumption. Brazil has recently joined this trend by modifying its tax credit system to effectively increase the price of sugary concentrates. Argentina, meanwhile, has placed a particular emphasis on consumer transparency through the implementation of mandatory front-of-package warning labels. the region is projected to see a steady absolute decline in per capita sugar consumption through 2035 led by Brazil, Mexico, Argentina and Peru.

Europe is expected to remain the region with the highest per capita sugar consumption, despite a projected decline over the outlook period. For more than a decade, European countries have accelerated measures to curb excessive sugar consumption, pressuring the food industry to reformulate product recipes while guiding consumers toward healthier dietary choices. Over the next decade, as consumers become more diet conscious, the region will experience the biggest decline in consumption among the regions covered in this Outlook, reflecting a gradual reduction in the consumption of sugar-rich products. Nevertheless, average sugar consumption in Europe is expected to remain higher than in other regions; the decline is anticipated to be more pronounced in the European Union, a pattern also anticipated in the United Kingdom and Russian Federation (hereafter “Russia”). Conversely, per capita sugar consumption is expected to moderately increase in Ukraine and some other European countries, driven by economic recovery.

Minimal changes are expected in Japan, except for the decrease in volume due to population decline. Per capita consumption levels are projected to decline in high sugar-consuming countries such as Australia, New Zealand and Canada. In the United States, the decline will be less visible because manufacturers continue to use high fructose corn syrup (HFCS) in confectionery and processed goods.

The high fructose corn syrup market will stabilise

HFCS, the other caloric sweetener, is used primarily in beverages as a substitute for sugar. Unlike sugar, it is a liquid product and therefore less easily traded. Global consumption will remain the domain of a limited group of countries, with no major changes. The largest producer, the United States, will remain the main consumer but the debate surrounding whether HFCS poses a greater potential health risk than sugar is expected to continue, and the downward trend that started in the mid-2000s is expected to continue; by 2035, HFCS is foreseen to represent 33% of the caloric sweetener consumption compared to 35% during the base period. HFCS production in the United States is projected to slightly decline to 6.4 Mt. Mexico is the third-largest consumer and government efforts to reduce caloric sweetener consumption are expected to continue over the next ten years, leading to lower consumption of HFCS sweetened soft drinks.

In China, the world’s second-largest producer and consumer of HFCS, consumption will stay steady and low over the next decade, remaining far behind Japan and Korea (6 kg/capita) while still exceeding the European Union, where it remains uncompetitive at just 2.5 kg/capita.

4.3.2. Production

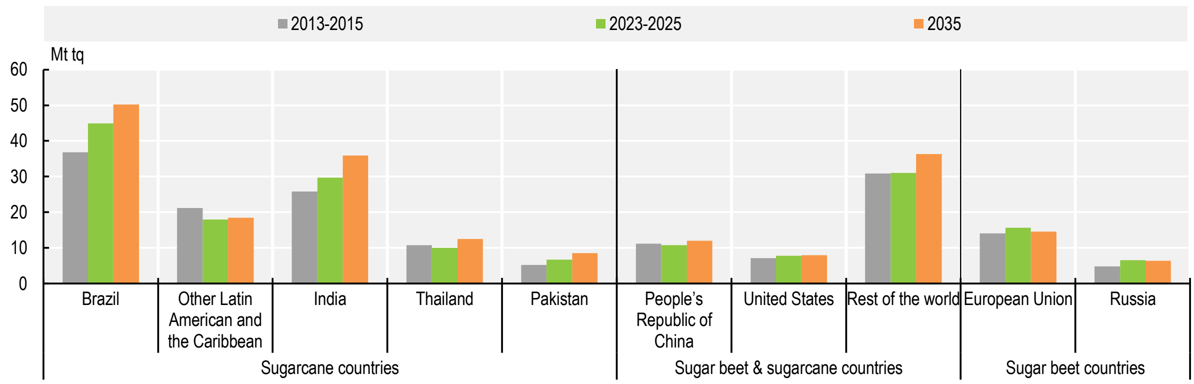
Sugar production is a capital-intensive sector, which requires substantial input costs, including energy for sugar beet and fertilisers in cane and beet to increase yield and sugar content. Remunerative domestic prices recorded in the early 2020s have encouraged investments in the sector and are expected to sustain further growth and development in the coming decade. Global sugar production is expected to increase by 12% over the Outlook period.

Expanded processing capacity underpins production growth

Global sugar production is expected to grow from 181 Mt during the base period to 203 Mt by 2035, 60% of the growth will come from Asia and 30% from Latin America (Figure 4.2).

Asia will remain the leading sugar-producing region. India, Thailand, Pakistan and China are expected to provide the largest shares of the region’s total sugar supply, increasing their sugar production, respectively, by 6.2 Mt, 2.5 Mt, 1.8 Mt and 1.2 Mt by 2035 compared to the base period. In India, sugar production is expected to grow at a slightly higher growth rate than in the past decade. In Thailand, Pakistan and China, governments are pursuing policy initiatives relevant to the sugar sector, including Thailand’s Bio-Circular-Green (BCG) model within a broader sustainability framework, Pakistan’s planned deregulation to enhance efficiency and capacity utilisation, and China’s subsidies for industrial upgrading.

Figure 4.2. Main sugar-producing countries/regions classified by sugar crop



Note: Data are expressed on a tel quel basis (tq).

Latin America is the second-largest sugar-producing region, with Brazil the world's leading supplier. Brazil's sugar production is anticipated to reach 50.2 Mt by 2035, capturing approximately 34% global market share. This growth is underpinned by recent investments in processing and crystallisation capacity, alongside an expanding corn-based ethanol sector. By fulfilling domestic fuel mandates, corn ethanol will complement sugarcane-based biofuel and effectively free up feedstock for increased sugar production.

Africa is also expected to contribute to the global sugar supply, with its share of production increasing mainly thanks to sub-Saharan countries, along with a rising contribution from Egypt, the continent's largest sugar producer. Government support measures and foreign investments are expected to contribute to increased sugar production. The availability of agro-ecologically suitable zones for sugarcane cultivation in sub-Saharan Africa, together with the potential for sugar beet area expansion in Egypt and scope for improvements in production efficiency.

Production in OECD Member countries is foreseen to continue to lose market shares. In 2035, the region will supply 20% of global production, compared to 22% in the base period. Although it will retain its position as the main producer of this regional market in 2035 (36%), the European Union's sugar production is expected to decline. Higher supply is foreseen in Mexico, where strategic investments in mechanisation and the adoption of high-sucrose cane varieties are expected to drive a production recovery (+0.9 Mt). In the Republic of Türkiye, sugar beet production growth (+0.6 Mt) is supported by government measures.

Yield improvements drive sugar production growth

Growth in global sugar production over the Outlook period is expected to be increasingly underpinned by higher yields rather than area expansion in the main sugarcane-producing countries. In particular, India, Brazil and Thailand are expected to see production gains reflecting improvements in varieties, agricultural management practices and higher sugar recovery rates.

Brazil will remain the world's leading sugarcane producer, but its growth strategy has shifted from land expansion to vertical yield optimisation. Driven by recent droughts, the sector is investing heavily in irrigation, biological pest controls and drought-resistant "super cane" varieties. With land availability constrained by competition from more profitable crops like soybeans and maize, production gains are expected to rely on better yields.

In India, the growth in sugarcane production is projected to stem mostly from higher crop yields, with only limited expansion in acreage. Government support measures play a crucial role in sustaining sugarcane production. These measures include setting fair and remunerative prices to ensure farmers receive adequate compensation and support for research and development of improved sugarcane varieties.

Additionally, the government collaborates closely with industry organisations, such as the Indian Sugar Mills Association, on issues affecting the development of the sugar sector. Similarly, sugarcane production in Thailand over the next decade is also expected to come mainly from higher yields, supported by government initiatives aimed at improving cultivation practices and sustainability, within broader policy frameworks such as the Bio-Circular-Green model. The cultivated area is anticipated to remain relatively stable, sustained by attractive farm-gate prices that incentivise farmers to continue sugarcane farming. In China, the government continues to drive sugarcane production by subsidising "virus-free" and high-sucrose seeds to boost yields, while using floor prices and high import tariffs – including the 2025 hikes on sugar syrups and sugar-containing premixes – to protect farmers. Despite these supports, growth through 2035 will remain moderate, as rising costs and competition for land from more profitable crops like citrus fruit limit further expansion.

Prospects are less robust for sugar beet. Processing this crop requires more energy and fertilisers to maximise yield and sugar content than the production of sugar from sugarcane and this may negatively impact industrial profit margins. Increases in beet production are anticipated mainly in Egypt, Türkiye, the United States and China, resulting in an overall increase of 1.3 Mt.

In Egypt, remunerative procurement prices, along with efforts to adopt improved seed varieties and expand sugar beet processing capacities are expected to boost sugar beet production. Notably, the Canal Sugar Factory, recognised as the world's largest beet sugar production facility, began operations in 2021 with an annual output capacity of 900 000 tonnes. These developments are projected to increase sugar beet production by 4.8 Mt compared to the base period.

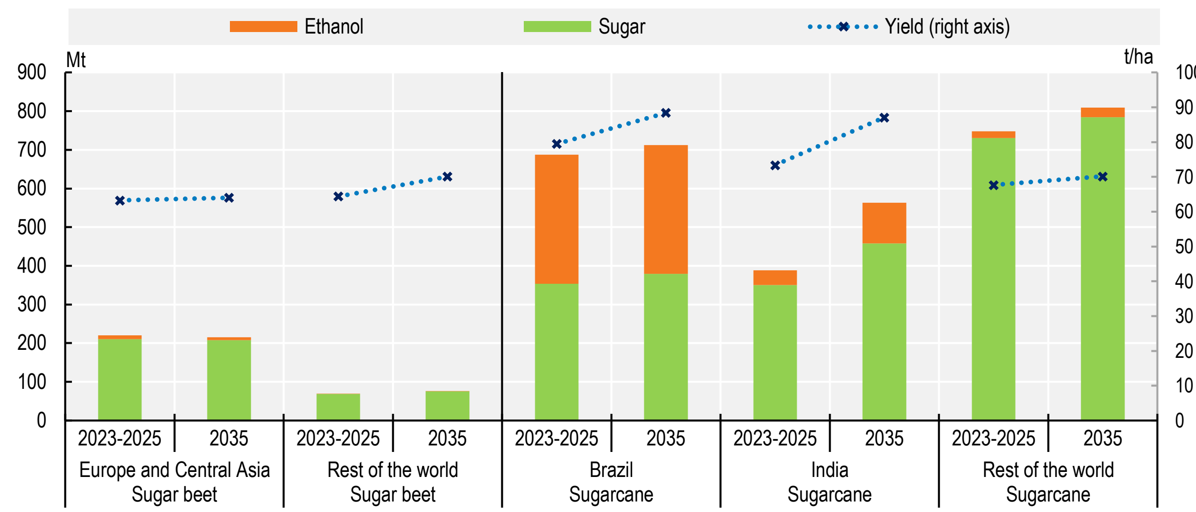
In the United States and China, higher yields will help the crop keep market shares, where both sugar crops are cultivated. Sugar beet production will account for 49% and 11% respectively, of the respective total national sugar crops.

In Europe, not much change is expected in Ukraine and Russia over the next decade. In the European Union, high input costs compared to other crops and stricter environmental legislation of plant protection products will encourage producers to switch to more profitable crops, with financially vulnerable producers likely to be among the first affected. In Türkiye, the world's fourth-largest producer of sugar beet after the European Union, Russia and the United States, sustained yield increases over the past decade driven by improved seed quality and modernised production practices are expected to support further growth in sugar production over the next decade.

Biofuel expansion intensifies competition for sugarcane

During the last decade, 81% of world sugar crops were used to produce sugar, but this share is expected to decline slightly to 80% by 2035. In the major sugarcane-producing countries, support for biofuel production will intensify competition between the main uses of sugarcane, sugar or ethanol, especially since factories often have the built-in option to switch from one to the other (Figure 4.3). In Brazil, the crop will continue to be used for sugar and ethanol, but the sugar share will slightly increase throughout the Outlook period, supported by the maturation of second-generation biofuels derived from non-food materials like bagasse and straw. In India, a growing share is expected to be allocated to ethanol over the Outlook period. In 2035, Brazil and India are expected to remain the main producers, with respectively 34% and 27% of the world's sugarcane, 25% and 18% of global sugar production, and 72% and 23% of global sugarcane-based ethanol production. Very little ethanol is produced directly from sugarcane in Thailand because molasses or cassava are mainly used. In contrast, producers in Argentina are ambitiously expanding the direct use of sugarcane juice for ethanol to take advantage of increasing domestic blending mandates.

Figure 4.3. Evolution of world sugar crop allocation and yields



4.3.3. Trade

Sugar trade to remain robust over the Outlook period

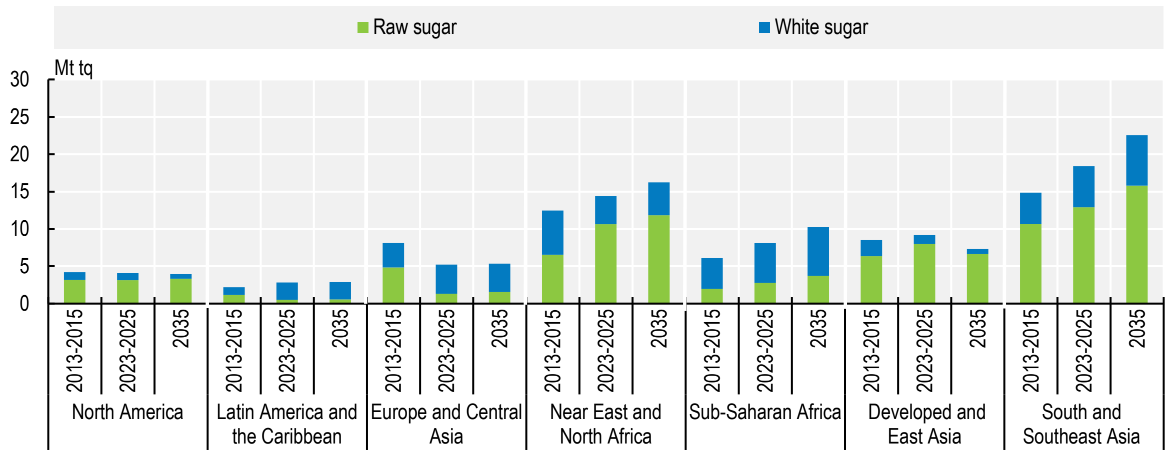
Sugar will remain a highly traded product. Most of the trade will continue to be made up of raw sugar, and its share is expected to rise slightly, from 62% in the base period to 63% by 2035. Raw sugar is usually shipped in bulk, like other basic commodities such as cereals or soybeans, and most of these shipments will continue to go to refineries for further processing (Figure 4.4). Intended for human consumption, refined sugar trade is more costly as it requires greater protection against moisture and contamination during handling and transport. As a result, refined sugar trade often tends to be more regional than raw sugar, though significant long-distance flows still occur.

During the last decade, imports supplied 36% of global sugar consumption. This share is expected to decline marginally by 2035 to 34%, reflecting strong demand but slightly improved domestic supply in some regions.

Asia and Africa are remaining the major importing regions, representing respectively 58% and 28% of global imports. Across Africa, higher domestic sugar production is expected to reduce the region's dependence on sugar imports, with the share of imports in consumption declining from 72% in the base period to a projected 69% in 2035. At the same time, moderate consumption growth in least developed sub-Saharan countries is expected to increase the share of imported white sugar for direct consumption. No significant changes are expected in Asia in terms of trade; imports of raw sugar will continue to increase, mainly driven by the key buyers – Indonesia and China – although China (included in the developed and East Asia aggregate) will reduce its imports by about 2 Mt. In Indonesia, a sustained increase in consumption is expected to be covered mainly by imports, which are projected to grow by 2.6% p.a. over the Outlook period.

In Latin America, sugar imports are anticipated to decline, largely due to Mexico's introduction of exceptionally high sugar import tariffs in November 2025, which are expected to curb imports and reduce the region's aggregate import needs. Elsewhere, little change is foreseen. In the United States, a traditionally sugar-deficit country, imports are expected to remain constrained.

Figure 4.4. Evolution of raw and white sugar imports by region



Note: Data are expressed on a tel quel basis (tq).

On the export side, sugar markets are projected to remain highly concentrated, and thus reliant on market developments in a small number of countries. By 2035, the two traditional key exporters are anticipated to account for two-thirds of the market: Brazil (72% of raw, 28% of white) and Thailand (10% of raw, 20% of white). Brazil will by far remain the world's leading global supplier of raw sugar, and, together with Thailand, one of the main suppliers of white sugar. Australia is expected to follow, supplying about 4.5% of the world sugar market in 2035, mainly in raw form. White sugar exports are more geographically diversified than raw sugar exports, as the white-sugar premium provides higher returns, encouraging some countries – particularly in the Middle East – to use their refining capacity to re-export white sugar.

Brazil serves distant export destinations and continues to face logistical bottlenecks at its ports at the beginning of the Outlook period. Given the country's strong profitability on international markets and the current tightness in global sugar supplies, investments in storage facilities, port capacity and vessel infrastructure are expected to continue. The lack of structural white-sugar supplies from Brazil – where exporters prioritise raw shipments through bulk terminals due to lower hygiene requirements – is projected to persist through 2035. Over the Outlook period, Brazilian sugar exports are anticipated to increase by 4.6 Mt, reaching 40 Mt in 2035, with white-sugar shipments rising from 14% during the base period to 19%.

Thailand's share of sugar exports is expected to increase from 11% with a volume of 7 Mt in the base period to 13% and reach 9.6 Mt by 2035. In India, sugar exports are projected to be cut almost in half, reflecting the government's strategy of meeting domestic needs while diverting more sugarcane toward the ethanol-blending programme.

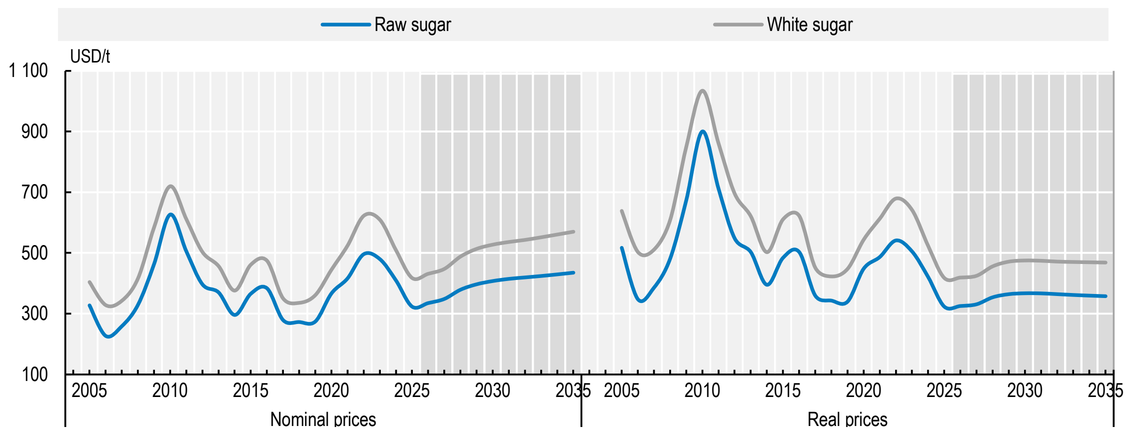
4.3.4. Prices

Prices will likely recover in the next few years then drop in real terms

At the start of the Outlook, prices are low, prompting farmers to begin shifting toward more profitable crops. Although the market is expected to tighten significantly in 2026, international sugar prices are likely to remain under pressure as stock releases in India and Thailand offset shrinking production. Over the rest of the Outlook period, real prices are projected to ease slightly, supported by continued productivity gains boosting export availabilities. However, this downward pressure will be partially offset by assumed stable real international crude oil prices following current increases which, combined with improvements in refining efficiency, are expected to incentivise the use of sugar crops for ethanol production, thereby providing some support to sugar prices (Figure 4.5).

The white sugar premium (the price difference between white and raw sugar) is expected to remain stable over the next few years before rising slightly in real terms over the Outlook period, reflecting the declining share of white sugar in total export availabilities.

Figure 4.5. Evolution of world sugar prices



Note: raw sugar nearby futures price, Intercontinental Exchange (ICE) contract No.11; white (refined) sugar nearby futures price, Intercontinental Exchange (ICE) contract No.5. Real sugar prices are nominal world prices deflated by the US GDP deflator (2025=1).

4.4. Risks and uncertainties

This Outlook yield projections assume normal weather conditions, with no climatic shocks, while accounting for a trend toward drier, or wetter, conditions, depending on area. Rising sugar yields supported by improved cane and beet varieties, better pest and disease control, more efficient irrigation or drainage systems, sound harvest practices, and improvements in sugar recovery rates, are anticipated. Adverse weather or slower yield growth could greatly impact output and prices, particularly due to the high concentration of sugar exporters and their geographical concentration in two main regions: Brazil and monsoon Asia. Similarly, any deviation of the white sugar premium from the assumed increase in this Outlook could also affect country decisions on refining capacity and delivery strategies. Furthermore, national policy shifts, input costs and the relative profitability of alternative crops remain key factors influencing growers' planting decisions. In addition, pest pressure could increase if extreme weather events intensify or if changes in plant protection practices reduce the effectiveness of pest control.

Growth in sugar consumption in Asia and Africa is expected to drive continued expansion in global demand. However, the sector is increasingly adapting to rising health awareness and a more health-oriented policy environment, prompting companies to innovate and reformulate their product portfolios. Consumption levels may diverge from current projections, given the uncertainty surrounding strong demand growth in emerging economies against the persistent downward trend in sugar use observed in many developed countries.

Sugar markets will remain potentially vulnerable to any disruptions in Brazil due to the extreme concentration of raw sugar supply, with the country accounting for 46% of global exports. This concentration is particularly problematic for large refineries in the Middle East and North Africa, which rely heavily on imported raw sugar, as well as for large importing markets such as China and Indonesia. This makes international trade highly sensitive to logistical bottlenecks at Brazilian ports, disruptions to trade routes, rising freight costs, yield shocks or shifts in Brazil's ethanol-to-sugar production ratio. In addition, heightened geopolitical tensions, particularly those affecting global shipping lanes, energy markets or trade flows, could further amplify these vulnerabilities and lead to additional supply chain disruptions.

If the European Commission were to include sugar in the EU Deforestation Regulation, large producers may need to ensure traceability across their production systems in order to preserve access to the European market. Some actors are already preparing for this possibility, with several large firms beginning to adopt satellite-based monitoring tools and digital platforms such as the Bonsucro ClimateCane Tracker. Smaller exporters in regions classified as "low risk", particularly emerging producers in Africa and Central America, could gain competitiveness and reshape trade patterns over the coming decade. This could exert upward pressure on sugar prices relative to current baseline projections if compliance requirements increase costs or limit supply from major exporters.

Given that 24% of global sugar crops are foreseen to be used for ethanol production in 2035 compared to 18% in the base period, including 52% of the domestic crop in Brazil, the relative price movements between crude oil and sugar remain a major source of uncertainty as they affect the competitiveness and profitability of sugar production relative to sugar crop-based ethanol production. In Brazil, when ethanol prices fall below 70% of the gasoline prices, ethanol becomes the more economical fuel choice for consumers. India has achieved the 20% ethanol blending target (E20) in the current ethanol supply year, running from November to October, five years ahead of the original 2030 target; this progress has been supported by sustained policy reforms and rapidly expanding distillation capacity, allowing greater flexibility in allocating sugarcane-derived feedstocks between sugar and ethanol production. The increase in use of sugarcane-derived feedstocks for ethanol production over the past decade highlights the evolving relationship between sugar production and ethanol supply, although recent developments also point to a growing role for alternative feedstocks. The extent to which sugarcane-derived feedstocks are diverted to ethanol production could influence the exportable availability of sugar and thereby affect global sugar market balances over the outlook period.

5 Meat

This chapter describes market developments and presents medium-term baseline projections for global meat markets for the period 2026-2035. Projections cover consumption, production, trade and prices for beef, pig meat, poultry and sheep meat. The chapter concludes with a discussion of the key risks and uncertainties that could have implications for world meat markets over the next decade.

5.1. Projection highlights

Meat consumption growth is projected to decelerate, reflecting shifts in demographic and dietary preferences. Global per capita consumption is expected to rise by about 0.7 kg in edible retail weight equivalent (rwe) over the outlook period. By 2035, it will reach nearly 30 kg rwe per capita. This growth is less than half the increase observed in the previous decade. In high-income countries, ageing populations, higher red meat prices and growing health, environmental and animal welfare concerns are expected to constrain further growth, although demand has remained resilient in some markets. In low- and middle-income countries, per capita consumption will remain well below levels in high-income countries.

Improvements in breeding efficiency and slaughter yields are projected to enhance environmental performance of meat production. Globally, increases in average slaughter weights are estimated to account for 3%, 10%, 10% and 28% of production growth in bovine, sheep, poultry and pig meat, respectively; the higher pig meat share reflects modest overall production growth. Despite these gains, global meat sector greenhouse gas (GHG) emissions are projected to rise by nearly 6% over the coming decade, reflecting continued growth in livestock numbers. Europe is the only region projected to record a decline (≈ -8%), mainly due to reductions in ruminant and pig output in the European Union.

People's Republic of China's (hereafter "China") changing role in global meat markets is expected to reconfigure trade flows. China's beef imports are projected to increase by about 500 thousand tonnes (kt) by 2035, even as its share of global meat imports declines due to rising pig meat self-sufficiency. At the same time, poultry exports are projected to expand beyond traditional destinations, supported by competitive pricing and compliance with import-market requirements. More broadly, evolving trade measures and market access conditions increasingly shape global meat flows.

Meat prices will continue to diverge across products while easing in real terms. In the short term, nominal ruminant meat prices strengthen as herd rebuilding constrains supply growth. In contrast, non-ruminant prices face less upward pressure as production expands more smoothly and import demand growth slows, particularly in China. Structural differences in biological cycles, productivity growth and cost structures remain central to price dynamics. Real prices are projected to decline, with larger decreases for pig and poultry meat than for beef and sheep meat.

Animal disease and pests, including parasitic infestations such as screwworm, highlight the need for strong biosecurity and co-ordinated trade management. Disease outbreaks can cause multiyear disruptions along the meat supply chain affecting production, trade and prices through culling, movement controls and export bans, as illustrated by recent developments related to New World screwworm in North America. Impacts are greater under broad rather than regionalised restrictions, and recovery is slower in ruminant systems due to longer biological cycles. Producers absorb a substantial share of economic losses, partly offset by government compensation. Prices can either increase or decrease depending on whether supply reductions or demand responses dominate. Considerable uncertainty thus prevails in international markets, with ongoing outbreaks reinforcing volatility in trade and supply.

5.2. Current market trends

Stronger import demand and tight ruminant supplies lifted global meat prices

In 2025, global meat production increased by 1.4%, reaching 375 million tonnes carcass-weight equivalent (Mt cwe). Poultry remained the main driver, despite continued outbreaks of highly pathogenic avian influenza (HPAI) in several regions, and pig meat output also increased, mainly in China. By contrast, bovine meat production declined, reflecting herd reductions in major producing countries, notably the United States, while sheep meat production contracted in Oceania. As a result, global consumption increased for poultry and pig meat, declined for bovine meat, and remained broadly stable for sheep meat.

World meat trade increased slightly in 2025, mainly on the account of poultry. HPAI-related restrictions on Brazil temporarily constrained exports, creating opportunities for China and Thailand to expand shipments, especially of processed products. In bovine meat markets, imports into the United States increased as domestic availability remained constrained during herd rebuilding. At the same time, Australia increased exports, supported by higher slaughter volumes, partly offsetting tight global supplies.

The Food and Agriculture Organization's (FAO) International Meat Price Index rose by 5% in 2025 although developments differed across meat types. Ovine and bovine prices increased strongly reaching new historical highs due to limited export supplies and robust demand. On the other hand, poultry and pig meat prices declined with higher supplies. Uncertainty related to animal disease developments and geopolitical tensions also contributed to market volatility.

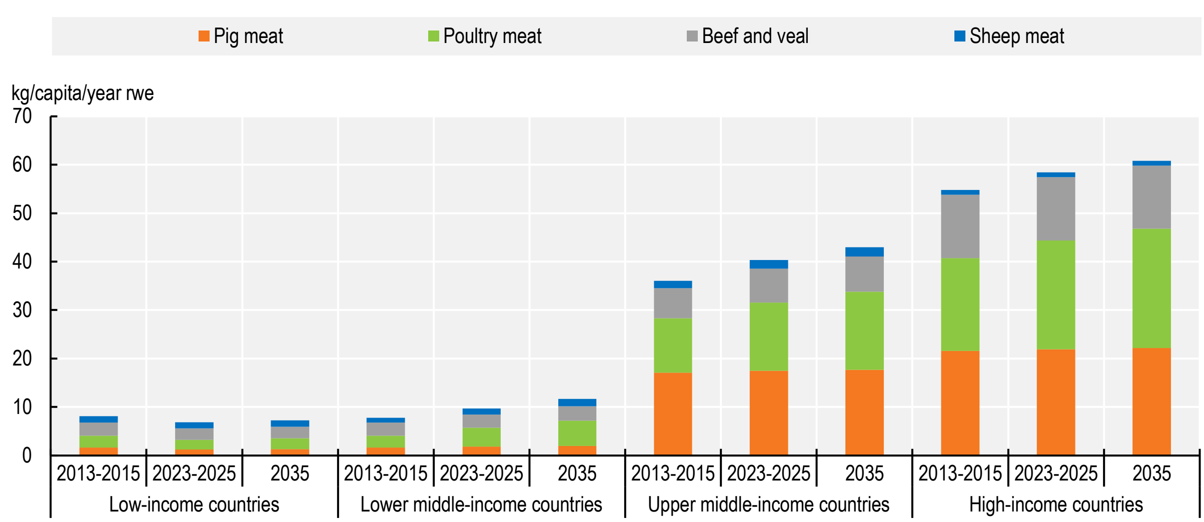
5.3. Market projections

5.3.1. Consumption

Global meat consumption continues to grow but at a slower pace

Global meat consumption is projected to reach around 412 Mt by 2035, a 12% increase from the base period. This growth reflects continued population growth, rising incomes and, in many emerging economies, increases in per capita consumption, supported by relatively moderate real meat prices compared to recent highs. However, the pace of per capita consumption growth is expected to slow (Figure 5.1) compared with the previous decade, as food consumption patterns stabilise, preferences evolve, and demographic trends shift in high- income regions. Most demand growth is expected in middle-income countries, while consumption in high-income countries slows.

Figure 5.1. Meat consumption growth



Note: rwe: retail weight equivalent.

As consumption levels in high-income countries have matured, demographic change and evolving dietary preferences contribute to slower per capita growth than in previous decades. Over the Outlook period, poultry, accounts by far, for the largest absolute increase in consumption, increasing by 29 Mt (+20%). Sheep meat also grows relatively quickly, rising by 3 Mt (+20%), while beef rises by 6 Mt (+8%), and pig meat by a more modest 6 Mt (+4%). Demand growth is concentrated in lower middle-income countries and upper middle-income countries, accounting for around 76% of the global increase. Excluding China and India, the largest absolute increases are projected in Indonesia, Pakistan, the Philippines and Viet Nam. In Africa, total meat consumption is projected to rise by about 32%, primarily reflecting rapid population growth. Per capita gains remain limited.

On a per capita basis, global average meat consumption is projected to increase by around 0.7 kg rwe over the outlook period, reaching approximately 30 kg per capita/year by 2035, less than half of the growth observed in the previous decade. In most high-income countries, where consumption levels are already high, per capita growth is projected to slow further. Relative prices remain a key determinant of protein choice (Gérard, 2025[1]), supporting continued substitution from ruminant meats towards poultry in many markets. Health (Richter et al., 2025[2]), environmental and animal welfare considerations are expected to continue to influence consumption patterns in some markets, contributing to gradual demand segmentation within those markets.

Poultry consumption is projected to reach 177 Mt ready-to-cook (rtc) by 2035, accounting for around two-thirds of the additional meat consumed globally over the Outlook period as the sector responds rapidly to demand. This reflects poultry's continued cost competitiveness and supply responsiveness, supported by short production cycles and continued improvements in feed conversion efficiency. Most additional demand is expected in Asia, Latin America, and the Middle East and North Africa.

Pig meat contributes 13% to global meat consumption growth. However, in per capita terms, consumption is projected to decline by around 4% relative to the base period (2023-2025), reflecting slow demand growth in high-income regions, particularly in the European Union, where environmental concerns and changing dietary preferences weigh on consumption. This global per capita decline reflects faster population growth in regions where pig meat is less commonly consumed. Animal disease outbreaks and biosecurity constraints may affect pig meat availability and prices in some regions, potentially moderating supply growth relative to poultry. The largest per capita gains are projected in Latin America (about +1.2 kg per capita/year rwe by 2035), supported by favourable relative pig meat-to-beef prices.

Beef consumption is projected to increase moderately at a rate of 8% over the Outlook period while average per capita consumption remains around 6 kg rwe per capita/year. In mature markets such as Europe, North America and Oceania, per capita consumption is projected to decline, reflecting persistently higher relative prices compared with other meats, alongside health and environmental considerations. By contrast, per capita consumption is projected to rise in parts of Asia and the Middle East, supported by income growth and diversification in protein consumption.

Sheep meat continues to account for a small share of global meat consumption. Its role remains significant in regions such as the Middle East and North Africa, where cultural and religious preferences limit substitution towards pig meat. Consumption remains rooted in traditional diets although relative prices and availability influence substitution towards other proteins.

5.3.2. Production

Productivity gains sustain meat production growth

World meat production is projected to increase by 12% over the Outlook period, equivalent to roughly 43 Mt cwe. More than half of the projected increase is expected in Asia, where population growth, rising incomes and continued urbanisation motivate and sustain investments into expansion and intensification of the sector. Poultry accounts for roughly two-thirds of this projected increase. Latin America will maintain its role as an important and expanding exporting region, supported by ample feed and land availability, continued productivity improvements, and competitive production costs. While Africa contributes a small share of global meat production in absolute terms, it continues to account for a relatively large share of global sheep meat and bovine production compared with other regions.

Biosecurity and animal disease management are becoming increasingly important determinants of global meat supply. Recurrent outbreaks of HPAI, African swine fever, foot and mouth disease, and other transboundary diseases have reinforced the importance of surveillance, vaccination strategies, and zoning or regionalisation to limit production losses and preserve market access (WOAH, 2025[3]). In some regions, strengthened biosecurity and disease prevention strategies have coincided with reductions in antimicrobial use in livestock production in recent years, although antimicrobial resistance remains a significant and persistent risk, particularly in intensive systems (WOAH, 2025[3]). While these measures can reduce epidemiological risk and support export continuity, they also raise compliance requirements and production costs. For small and mid-sized producers, upgrading facilities and practices can be financially prohibitive, contributing to sectoral consolidation and widening disparities in market access. Improved disease control can, therefore, support productivity gains and is increasingly a prerequisite for preserving farm incomes in a context of rising market volatility.

Meat production growth over the Outlook period, is supported by lower feed costs and productivity growth, particularly in poultry and pig systems. The fastest expansion is expected in upper middle-income countries, where rising demand for affordable animal protein sustains investments in domestic production capacity. Compared with ruminant systems, this expansion is more often met through local production, because poultry systems are less land-intensive, require lower upfront investment, and can be scaled rapidly through vertically integrated supply chains. In addition, their shorter biological cycles also allow producers to adjust supply more quickly than in bovine systems, which depends on longer herd rebuilding. These characteristics reinforce the role of poultry as a cost-efficient and responsive source of animal protein over the medium term.

Pig meat production is projected to expand throughout the Outlook period, driven by herd rebuilding in Latin American countries where production systems continue to be modernised and integrated into formal value chains. Overall, pig meat contributes around 13% of global production growth over the period. In parts of Asia, including Korea, the Philippines and Viet Nam, production systems are shifting from small-scale backyard operations towards more commercialised structures with stronger biosecurity.

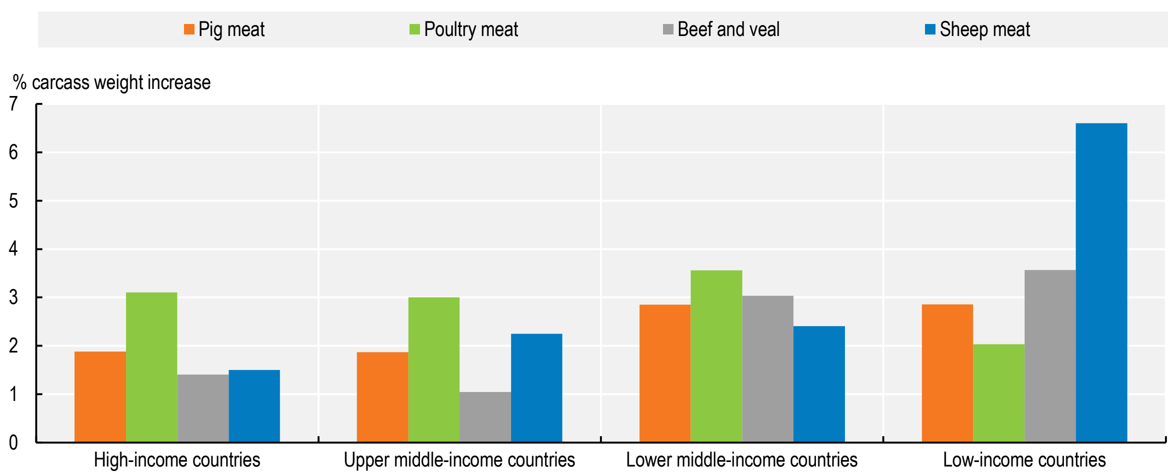
Global beef output is projected to reach 82 Mt cwe by 2035. Growth is mainly supported by gradual increases in carcass weights and improved herd management in several regions. China, India and Pakistan are expected to account for a significant share of the projected growth. China's production growth reflects continued investment in domestic supply capacity in response to strong domestic demand and favourable market incentives. India's buffalo meat exports are projected to expand further, particularly towards markets with specific Halal certification requirements, supported by improvement in processing capacity, cold chain infrastructure and cost competitiveness. In other major exporting countries such as Australia, Brazil, Canada and the United States, herd rebuilding is projected to start in the early years of the Outlook period, following earlier liquidation cycles linked to drought conditions and weak profitability.

Sheep meat production is projected to increase 17%, reaching nearly 22 Mt cwe. This increase reflects gradual flock rebuilding and improvements in lambing rates supported by favourable price conditions. China is projected to account for around 15% of the global increase, reflecting continued expansion of sheep production in response to rising domestic demand. In contrast, production in the European Union is projected to continue declining, with output increasingly concentrated in a limited number of Member states. In New Zealand, competition for land use, forestry expansion and evolving climate policy settings are expected to constrain flock expansion, placing a greater emphasis on productivity gains to sustain output. In Australia, flock composition continues to shift towards meat-oriented breeds, supporting higher carcass weights and reinforcing the sector's growing focus on lamb production relative to wool.

Efficiency improvements support production growth while limiting inventory expansion and environmental pressures

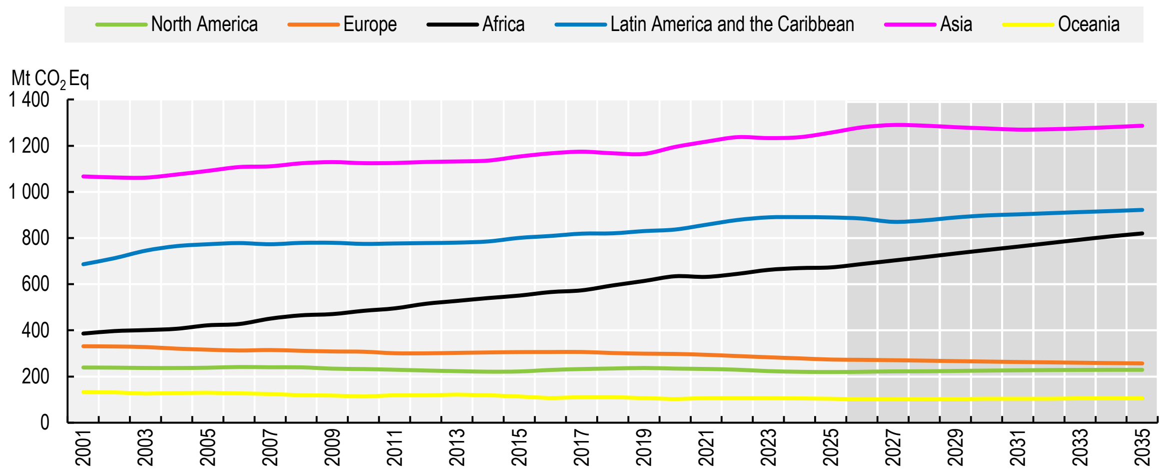
Livestock producers face rising input costs, volatile markets, disease risks and tightening environmental requirements. Many producers respond by improving productivity, diversifying income sources and adopting new technologies. Improvements in slaughter yields are projected across the industry, with the strongest gains in poultry systems, followed by moderate increases in the sheep and pig sectors. Gains in bovine systems remain comparatively limited (Figure 5.2). These improvements are particularly relevant in middle-income countries, where tighter production margins increase the importance of efficiency gains in maintaining profitability and supporting expansion. Digital technologies, including artificial intelligence applications (Box 5.1), are increasingly being used to improve productivity and support more efficient livestock management.

Figure 5.2. Carcass weight increase, 2035 vs. base period



GHG emissions from global meat production are projected to rise by 6% over the Outlook period. This increase remains below projected output growth, reflecting efficiency gains and a continued shift toward poultry production. Nevertheless, rising livestock numbers are expected to increase total sector emissions (Figure 5.3), with ruminant production remaining the largest contributor. Regional trends differ markedly. Emissions are projected to rise the most in Africa (+22%) and to fall in Europe (-8%), as ruminant production contracts. Reducing avoidable losses along meat supply chains, including improvements in cold-chain infrastructure and reductions in consumer food waste, could further moderate resource use and limit additional production expansion.

Figure 5.3. Meat-related emissions growth



Note: Mt CO2-eq: million tonnes carbon dioxide equivalent. Estimates are based on historical time series from the FAOSTAT Climate Change: Agrifood Systems Emissions Databases, which are extended with the Agricultural Outlook projections. CO_2 equivalents are calculated using the global warming potential of each gas, as reported in the IPCC Sixth Assessment Report.
Source: OECD calculations based on FAOSTAT-Emissions Totals, Statistical Division of the UN Food and Agriculture Organization (accessed December 2025). FAOSTAT Emissions-Agriculture Database, http://www.fao.org/faostat/en/#data/GT; based on OECD-FAO calculations.

Maintaining farm income and livelihood resilience remains an important consideration in the development of the meat sector. As noted by OECD/APO, multifactor productivity growth is a key driver of long-term economic performance and living standards (OECD/APO, 2022[4]). Productivity improvements can strengthen income stability by lowering production costs and improving efficiency, but they may also require additional investment and structural adjustment by producers. Improving livelihoods in agrifood systems depends not only on productivity growth, but also on broader structural conditions that shape resilience and access to opportunities, such as access to markets, infrastructure, investment capacity and the use of risk management tools. The ability of livestock producers to withstand volatility depends on factors such as investment capacity and the use of risk management tools. Indicators including income stability, diversification of production and income sources, and access to services remain important for evaluating the economic sustainability of livestock systems.

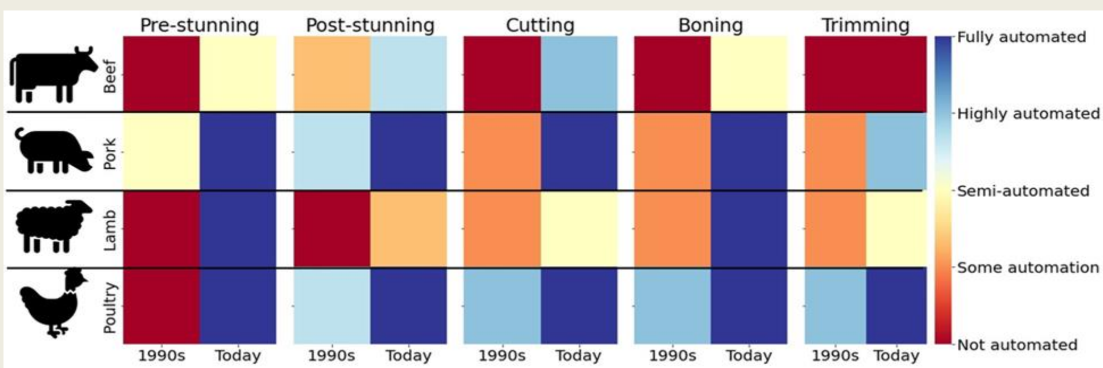
Box 5.1. Artificial intelligence applications in meat production and processing

Artificial intelligence (AI), automation and imaging systems are increasingly used across the meat value chain, from farm management, to processing and logistics supporting grading, food safety and automation. In this context, automation refers to machines performing repetitive tasks, imaging systems refer to technologies that capture and analyse visual information, while AI refers to software systems that analyse data and support predictive decision making or adaptive control, typically based on machine-learning models trained on large datasets (Wang and Li, 2024[5]) (Ranade and Malav, 2025[6]). AI is often integrated into automated systems, enabling them to adapt to biological variability, such as differences in carcass size and shape. While these technologies are often combined in practice, they perform distinct functions: imaging captures data, automation executes tasks, and AI supports analysis and decision making.

On farms, AI-enable precision systems are being developed and adopted in some contexts to support animal health monitoring and feeding management. These tools may support emissions mitigation, particularly in ruminant systems, by improving feed efficiency and reducing waste (Rosati, 2024[7]). AI-enabled precision livestock systems combine sensor data, imaging and machine-learning models to detect anomalies, predict disease and optimise feeding in real time. These systems can contribute to cost reduction and improved income stability, although outcomes depend on adoption costs, farm size and market conditions. Their development is particularly relevant in a sector facing labour shortages, carcass variability and increasing food safety requirements.

Automation is also expanding in processing, often supported by AI, though adoption remains uneven across species and regions. For example, Baboolall et al. (2020[8]) note that processors in the most technologically advanced regions in Europe were expected to reach high automation in 25% of facilities by 2023, up from 10% in 2019 (Romanov et al., 2022[9]). Figure 5.4 illustrates differences in automation intensity across major species and processing stages over time for the most commonly consumed meat types in Europe, based on the evidence reviewed by (André-Zarna et al., 2026[10]). The results should be interpreted as indicative of relative automation patterns in the systems covered by that study, rather than as a global estimate.

Figure 5.4. Automation in meat processing by species and processing stage



Notes: Heat map comparing automation levels in the 1990s and today for the most commonly consumed meat types in Europe, by species and stage. Pre-stunning refers to animal handling before stunning. Post-stunning refers to early carcass processing steps after stunning (e.g. bleeding and evisceration) and before cutting and preparation. Primary steps are generally more automated than secondary ones, such as cutting, boning and trimming; beef remains comparatively less automated due to greater carcass variability. Automation remains partial, particularly in secondary processing where manual operations continue to play a significant role.
Source: Adapted from Figure 3, André-Zarna et al. (2026[9]).

AI-powered computer vision is increasingly used for meat grading and quality evaluation through machine-learning models trained on image or spectral data. One study reports 96% accuracy in identifying carcass regions (Gonçalves et al., 2021[11]) while another finds a 0.95 correlation with expert marbling scores (Lee et al., 2022[12]). These findings suggest that, in specific experimental or commercial applications, AI can match human consistency. Automation in secondary processing, especially cutting and deboning, is increasingly supported by AI-based vision systems that enable real-time adaptation of operations. Robots with 3D cameras can identify cutting points and adjust in real time. In sheep processing trials, success rates ranged from 85% to 92% (Lyu et al., 2025[13]), improving workplace safety. Some automated systems also reach speeds exceeding manual cutting (Wang and Li, 2024[5]).

Imaging systems can detect bone fragments and unwanted material with high accuracy. One study found 93.3% accuracy for detecting bone in chicken breast (Lim et al., 2020[14]). AI systems are also increasingly used to inspect packaging, detect seal integrity and verify labelling compliance, and to identify contaminants such as metal, plastic or other foreign materials (Ranade and Malav, 2025[6]).

Combined with AI models and real-time data processing, these systems enable automated classification, anomaly detection and decision support along processing lines (Wang and Li, 2024[5]). When combined with Internet of Things[1] monitoring and digital data capture, these tools help reduce waste and improve food safety. This integration of automation and human judgment is often described as Meat Industry 5.0.[2] Robots handle repetitive tasks while humans operators retain responsibility for managing biological variability, hygiene or complex decisions are involved (André-Zarna et al., 2026[10]). This hybrid model improves safety, mitigates labour shortages and supports more stable output.

On farms, precision livestock systems monitor animal health, optimise feeding and detect stress early, improving resource use and productivity (Distante et al., 2025[15]; Bernabucci et al., 2025[16]). Compared with row crops, however, digitalisation in livestock production remains less advanced. Many tools remain in the pre-commercialisation or early diffusion stage, and evidence on adoption and impact, particularly environmental outcomes, remains limited (McFadden et al., 2022[17]). Recent syntheses of AI in precision livestock farming highlight strong progress in animal recognition and health or welfare monitoring but note that environmental and sustainability applications are under-represented. Precision feeding and monitoring could, therefore, be priority areas to reduce emissions intensity (e.g. methane per kilogramme of beef), alongside gains in productivity (Distante et al., 2025[15]). Most of these systems currently act as decision support tools, flagging abnormal patterns and prompting management responses.

In distribution, digital traceability and cold chain monitoring can improve transparency and facilitate product recalls, although adoption remains uneven (Mohammed et al., 2023[18]; Rajput et al., 2025[19]).

Reviews of digital agriculture find that AI-based systems can improve productivity, reduce costs and mortality, and support farm efficiency and livelihoods (Papadopoulos et al., 2025[20]). However, evidence of long-term income gains remains limited, and benefits vary with adoption costs, access to technology and market conditions (McFadden et al., 2022[17]).

Overall, these technologies can support productivity across the meat value chain and contribute to more reliable yields, although their impacts remain context-specific. Digital technologies, including AI, are becoming an increasingly important component of resilient meat production and are expected to play an increasing role in productivity and risk management, where adoption costs, data availability and technical capacity allow.

Notes: 1) Internet of Things refers to connected sensors that collect real-time data on temperature, hygiene, location or equipment performance. 2) Meat Industry 1.0 refers to early mechanisation from the late 19th to the mid-20th century. Meat Industry 2.0 mirrors the adoption of mass production principles through the 1980s. Meat Industry 3.0 marks the introduction of digital control systems and early automation. Meat Industry 4.0 includes smart and connected systems such as sensors, Internet of Things devices, 3D vision and data-driven decision tools. Meat Industry 5.0 builds on these technologies and focuses on human robot collaboration, flexibility, sustainability and resilience.

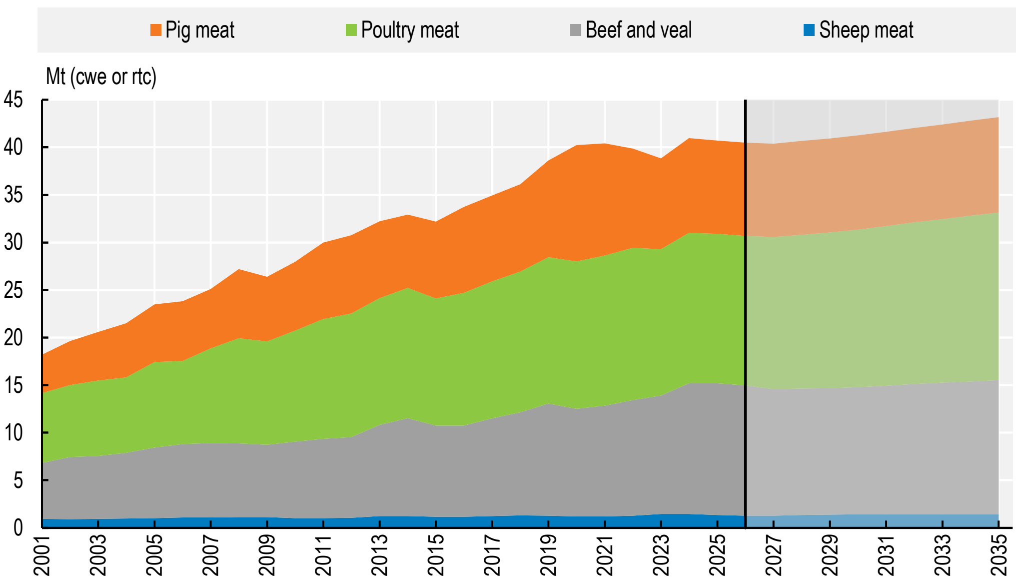
5.3.3. Trade

Global meat trade expands amid shifting supply and demand regional dynamics

Global meat trade is projected to expand at a slower pace than in the previous decade, reflecting production recoveries and more balanced consumption growth (Figure 5.5). Structural changes in major markets continue to shape global trade flows. In particular, China's strategy to strengthen domestic animal protein production is influencing its import demand patterns, specifically including increasing pig meat self-sufficiency to reduce its reliance on imports. However, beef import demand will remain structurally significant, maintaining China's role as a key destination for major exporters. Underlying demand conditions continue to support substantial trade volumes over the Outlook period.

The European Commission's EU Agricultural Outlook (European Commission, 2025[21]) baseline, used as a key input into these projections, includes only trade agreements ratified by the end of October 2025; the EU-Mercosur Agreement is, therefore, not reflected in the current projections. Under the negotiated text, additional beef market access would be phased in through tariff-rate quotas for fresh and frozen beef. Given the limited scale of the agreed TRQs relative to current trade flows and production, modelling indicates that, once implemented, the impact on EU beef imports and cattle-sector incomes would be modest, with small positive economy-wide effects (Gohin and Matthews, 2025[22]).

Figure 5.5. Global meat exports to 2035



Note: cwe: carcass weight equivalent; rtc: ready to cook.

Brazil, the European Union and the United States remain the largest exporters of meat, together accounting for more than half of world exports by 2035. However, EU export volumes are projected to decline by around 3% over the Outlook period as structural cost pressures weigh on competitiveness. Australia and Canada are projected to rank fourth and fifth among global exporters, although their export volumes remain considerably smaller than those of the three largest exporters. Export growth is strongest in Argentina, China, Thailand and the Republic of Türkiye, supported by productivity gains, feed availability and competitive cost structures, and sustained demand in emerging markets.

China remains a central driver of global meat trade dynamics. Efforts to strengthen domestic animal protein production are increasing pig meat self-sufficiency and reducing imports, while beef import demand remains structurally significant, maintaining China as a key destination for major exporters. At the same time, China has recently transitioned from a net importer to a net exporter of poultry. It is projected to expand its net export position over the Outlook period, becoming the world's fifth-largest poultry exporter behind Thailand, supported by rising production capacity, competitive pricing and improved compliance with importing-market requirements. This shift also consistent with moderating domestic demand growth as population growth slows and income responsiveness weakens at higher income levels. In several cases, disease-related supply adjustments in other regions and shifts in sourcing patterns further reinforce export expansion.

Australia and New Zealand are projected to maintain their leading positions in global sheep meat exports, targeting higher value markets in Europe and North America. In Australia, export growth is expected to be driven by a continued shift toward more profitable lighter lambs and the phase-out of live sheep exports by sea, scheduled to conclude by 2028 under existing legislation. New Zealand sheep meat exports are projected to remain stable as land use gradually shifts away from sheep production toward alternative uses, partly offset by ongoing productivity gains. In the European Union, production is projected to decline modestly, while export volumes stabilise after earlier contraction, reflecting ageing producer demographics, structural cost and competitiveness pressures. At the same time, tight global red meat supplies and rising incomes in parts of the Middle East and Indonesia are expected to sustain import demand for lamb, supporting trade prospects despite limited scope for rapid flock expansion in Oceania.

5.3.4. Prices

Ruminant prices remain firmer than non-ruminant prices

World reference meat prices are projected to evolve unevenly in nominal terms over the Outlook period (Figure 5.6). Beef and sheep meat prices are expected to strengthen in the early years as herd rebuilding and limited ruminant inventories constrain market availability in major producing regions. By contrast, pig meat and poultry meat prices face less upward pressure as shorter production cycles, faster productivity gains and greater feed-conversion efficiency support faster supply adjustment alongside weaker import demand growth in key markets, including China. Historical nominal price trends over 2000-2025 show that ruminant meats, particularly beef, have increased more rapidly than non-ruminant meats, reflecting tighter supply conditions and lower productivity growth in ruminant production systems.

In real terms (deflated by the US GDP deflator), international reference meat prices are projected to ease from current high levels over the medium term. This adjustment reflects lower real feed costs as global grain and oilseed markets stabilise, together with ongoing efficiency gains in livestock production systems. Energy costs remain an important input into feed production and energy price fluctuations can raise costs in agriculture directly through fuel and indirectly through chemicals and fertiliser (World Bank, 2024[23]). For beef and sheep meat, real prices are projected to peak during 2026 before declining as herd rebuilding progresses and supply growth resumes. By 2035, real beef and sheep meat prices are projected to decline by approximately 16% and 6%, respectively, relative to an unusually elevated 2023-2025 base period that was characterised by tight global supplies and cyclical herd contraction.

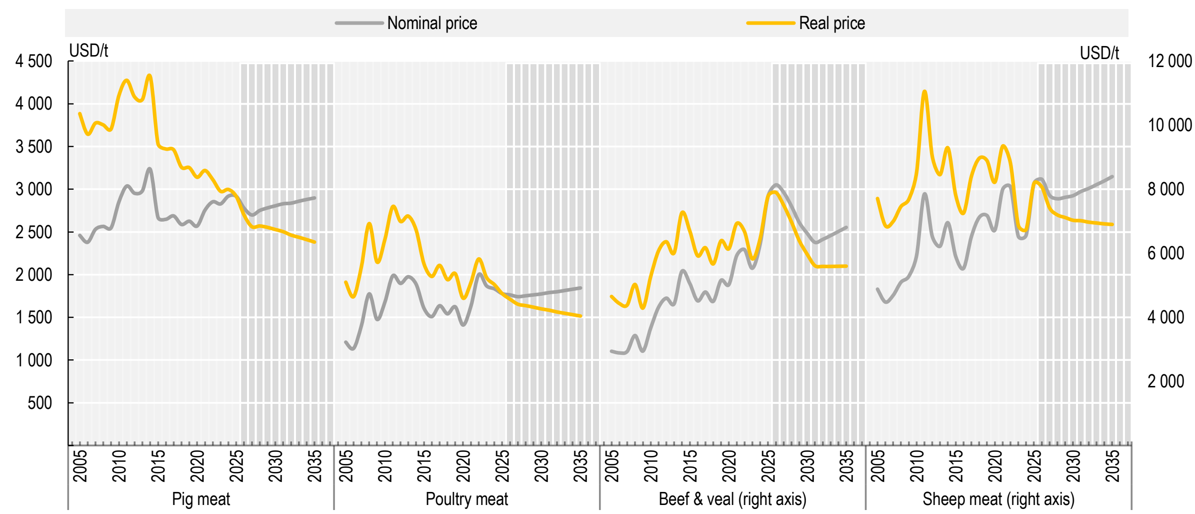
Real prices for pig meat and poultry meat are expected to decline more markedly, reaching levels around 20% below the base period average by 2035. This largely reflects faster productivity growth. The resulting widening in the real price gap between ruminant and non-ruminant meats reinforces the relative affordability of pig meat and poultry and supports gradual substitution away from higher priced ruminant meats.

These projections extend the longer-term divergence observed between ruminant and non-ruminant meat prices. Slower productivity gains, greater land requirements, and biological constraints in cattle and sheep production contribute to relatively higher production costs for ruminant meats. By contrast, the pig and poultry sectors benefit from sustained productivity improvements and higher feed conversion efficiency, which support lower production costs and exert downward pressure on real prices. Shorter production cycles in these sectors also allow supply to adjust more rapidly to market conditions. Evidence from the IPCC and the FAO assessments indicates that ruminant production is generally more emissions- and resource-intensive than pork or poultry, reinforcing the structural cost differences between these production systems and FAO assessments (FAO, 2023[24]).

At the consumer level, the transmission of international reference price developments to retail prices varies across countries and income groups. Where value-added components such as processing, transport, retail and food services account for a growing share of final food prices, retail prices become less sensitive to changes in primary agricultural prices. As the farm share of food expenditure declines, changes in producer prices translate into smaller percentage changes in retail prices because non-agricultural costs account for a larger share of the final price structure (Chen et al., 2025[25]).

Overall, real price developments are projected to moderate from recent highs, but ruminant markets remain more firmly underpinned by slower productivity growth and rising environmental costs. Non-ruminant markets benefit from faster productivity growth and more elastic supply response, while increasing value-chain costs continue to dampen the transmission of commodity price movements to consumers.

Figure 5.6. Price trends for ruminant and non-ruminant meats



Note: Real prices are nominal world prices deflated by the US GDP deflator (2025=1). United States: meat of swine (fresh, chilled or frozen), FOB export unit value, USD/t pw, Brazil: meat and edible offal of poultry (fresh, chilled or frozen), FOB export unit value, USD/t pw, Australia: 90CL boneless beef, FOB export prices to the United States, USD/t pw, New Zealand: lamb average FOB export value, USD/t pw.

5.4. Risks and uncertainties

Biosecurity and extreme weather risks shape uncertainty in meat markets

Meat markets are exposed to a set of inter-related uncertainties operating through biological, weather-related, regulatory, macroeconomic and demand-side channels linked to evolving consumer preferences, purchasing power and substitution across sources of protein. While these sources of uncertainty have long been present, recent developments suggest that several are becoming more persistent or wide-reaching, increasing the likelihood of recurrent disruptions rather than isolated shocks and adding volatility around baseline trajectories. Recent World Bank analysis indicates that the 2020s could be among the most volatile decades for commodity prices. (World Bank, 2025[26]).

Animal diseases and pests remain the biggest risk for meat markets, while baseline projections generally assume normal endemic conditions, with the capacity to disrupt production, trade flows and broader market dynamics simultaneously (WOAH, 2025[3]). Recent outbreaks of HPAI, African swine fever (ASF) and other transboundary diseases have illustrated these risks. Examples include the ASF outbreak in China in 2019 which reduced supply and drove a sharp increase in pork prices, while subsequent recovery and supply expansion later pushed prices down (Jongeneel, Gonzalez-Martinez and Hoste, 2020[27]), the 2022-2023 HPAI episode with poultry in the United States and HPAI with poultry in Brazil in May 2025. Each have had large impact on markets and illustrates how even a limited outbreak in a major exporting country can reverberate through international markets. Padilla, Baker and MacLaughlin (2025[28]) estimate that HPAI-related trade significantly reduced poultry export values, with greater impacts when restrictions were applied at broader geographic scales. Beyond direct production losses, disease shocks propagate through supply chains via movement controls, precautionary culling and compliance costs (Kappes et al., 2023[29]).

Extreme weather and changing weather patterns further increase epidemiological uncertainty by altering vector ranges and disease persistence (IPCC, 2023[30]). The increasing frequency and geographic spread of outbreaks, as documented by the World Organisation for Animal Health, raise the probability that medium-term market outcomes deviate from smooth baseline trajectories.

The Outlook assumes normal animal health conditions over the projection period. However, the recent New World screwworm outbreak is partially reflected in the baseline through a temporary disruption to Mexican live-cattle exports, followed by a return to normal trade flows by 2027. The potential implications of a more prolonged sanitary disruption are illustrated by an Aglink-Cosimo model scenario (see Box 5.2), allowing the sensitivity of beef markets to alternative disease outcomes to be assessed.

Box 5.2. New World screwworm outbreak in Mexico: An illustrative scenario of potential market impacts

Context

New World screwworm (NWS) is a parasitic fly whose larvae infest wounds and natural body orifices in livestock, causing myiasis, a parasitic infestation in which fly larvae feed on the living tissue of animals, which can lead to severe or sometimes fatal infections. The parasite spreads through animal movements and requires co-ordinated eradication programmes combining surveillance, movement controls and sterile insect technique (SIT).[1] NWS re-emerged in Central America and southern Mexico in 2024, prompting enhanced surveillance and sanitary control measures by Mexican animal health authorities (SENASICA).[2] Scientific assessments indicate that the re-emergence of NWS in Mexico may affect livestock production and cattle trade within North America, where Mexico is a supplier of feeder cattle to the United States (Valdez-Espinoza et al., 2025[31]). Because NWS is transmitted through infested wounds in live animals, sanitary measures primarily affect movements of live cattle rather than trade in processed meat, making live animal exports particularly vulnerable to sanitary restrictions.

History

Historical experience shows that eradication can require prolonged control efforts.[3] NWS was progressively eradicated from Mexico and the United States through co-ordinated SIT campaigns from the 1950s to the late 1980s before the barrier zone was pushed to Central America. The duration of eradication programmes depends on factors such as the geographic extent of infestations; livestock density; animal movements; and the scale of sterile insect releases, producer behaviour and, particularly, incentives for early detection and reporting. These precedents support treating NWS as a potentially prolonged sanitary disruption rather than a short-lived shock in forward-looking market scenarios.[4] Recent plans in the United States to establish a new sterile fly production facility by 2027 to reinforce the regional SIT programme highlight the need for sustained eradication capacity across North and Central America.[5]

Scenario

To illustrate the potential implications of a prolonged sanitary disruption affecting live cattle trade, a simple scenario was simulated using the Aglink-Cosimo model and compared with the baseline projections from the 2025 Outlook, which are used here as the reference scenario. The scenario assumes a prolonged suspension of live cattle exports from Mexico to the United States associated with screwworm control measures. Since these exports consist largely of feeder cattle rather than finished animals, the disruption is interpreted as a reallocation of the finishing stage from the United States to Mexico. Animals that would otherwise be exported for finishing in US feedlots are instead retained, fed and finished to slaughter weight in Mexico. Market adjustment, therefore, occurs through changes in feeding, slaughter and trade patterns rather than through an immediate one-for-one increase in market-ready beef supply. Because feeder cattle must first be finished before slaughter, the resulting increase in domestic beef production reflects a medium-term reallocation of finishing and slaughter activities rather than an immediate conversion of feeder exports into beef output.

Compared with the 2025 baseline, the scenario results, expressed as average impacts over the full 10-year projection period, indicate that Mexico's gross indigenous beef production would be about 6% above the baseline. Meat imports would be 11% lower, live cattle exports 100% lower, meat exports 18% higher, domestic consumption 2.5% higher and domestic producer prices 5% lower. These results reflect medium-term adjustments within the production system rather than immediate changes in market outcomes.

Interpretation

This illustrative scenario shows how animal disease outbreaks can influence market outcomes through sanitary measures affecting livestock movements and trade. In the case of NWS, restrictions primarily affect live animal movements rather than trade in processed meat. As a result, trade and movement controls can reshape domestic market balances by shifting finishing and slaughter activities across countries. The scenario, therefore, provides an indication of how markets might adjust if sanitary disruptions associated with screwworm control measures were to persist.

Notes: 1. https://www.usda.gov/sites/default/files/documents/nws-visit-policy-brief.pdf.
2. https://www.gob.mx/senasica/documentos/mexico-strengthens-actions-to-contain-the-advance-of-the-new-world-screwworm?state=published. 3. https://www.aphis.usda.gov/sites/default/files/nws-historical-economic-impact.pdf. 4. https://www.aphis.usda.gov/sites/default/files/screwworm_rrg.pdf. 5. https://www.usda.gov/about-usda/news/press-releases/2026/03/09/usda-and-us-army-corps-engineers-advance-new-world-screwworm-preparedness-new-texas-sterile-fly.

Weather-related shocks constitute an additional source of uncertainty for meat markets, primarily through their impact on feed availability, production costs and farm productivity. While changing weather conditions may improve pasture and forage conditions in some areas, drought, heat stress and rainfall variability are expected to weigh more heavily on grazing-based livestock systems, particularly for beef and sheep production. Recent scientific assessments indicate that extreme weather events have become more frequent and intense in many agricultural systems, with adverse impacts on crop yields, pasture conditions and animal health, particularly in tropical and subtropical regions (IPCC, 2023[30]). These shocks can lead to higher feed costs, constrain herd and flock expansion, disrupt pasture availability, and reduce productivity through heat-related stress (World Bank, 2024[23]).

Environmental and sustainability-related policy developments introduce additional uncertainty for the meat sector, particularly with respect to production costs and market access. Policies aimed at reducing GHG emissions, limiting land-use change or strengthening sustainability standards may require adjustments in production systems and investment. However, the timing, design and stringency of such measures remain uncertain, and implementation may vary across regions and over time, complicating medium-term planning (IPCC, 2023[30]).

Macroeconomic conditions and input cost volatility remain important sources of uncertainty. Feed and energy costs are a large share of production costs and can change quickly with weather outcomes, geopolitical tensions and commodity cycles. ABARES (2025[32]) notes that the global economic outlook has become more uncertain, partly because policy changes could affect inflation, trade and growth. Shifts in trade policy settings and broader economic conditions can affect livestock producers through costs and financing conditions while also influencing consumer purchasing power and substitution across animal protein sources, especially where demand growth is already moderate. Trade policy and sanitary measures add another layer of risk, as non-tariff requirements, disease-related restrictions and evolving sustainability standards can increase trade costs and compliance burdens for exporters. (FAO, 2024[33]).

Although supplier diversification can improve resilience, repeated trade disruptions can raise adjustment costs and reduce predictability in global meat trade.

Demand-side uncertainty is also influenced by evolving consumer preferences and policy discussions related to health, environment and animal welfare. Although survey-based evidence suggests growing intentions to reduce meat consumption for health or environmental reasons, these intentions are only partially reflected in observed dietary behaviour. Relative prices, income constraints and convenience remain dominant determinants of protein choice, limiting the pace of structural demand shifts (Kappes et al., 2023[29]). If consumer behaviour differs from the assumptions of this Outlook, the projections would change accordingly.

Taken together, these uncertainties highlight a meat sector increasingly exposed to interacting biological, weather-related, regulatory and economic risks. While the Outlook baseline reflects average expected developments under current assumptions, actual outcomes will exhibit greater volatility. Strengthening biosecurity, improving resilience to extreme weather shocks and maintaining transparent, rules-based trade frameworks remain key to mitigating downside risks over the medium term.

References

ABARES (2025), *Agricultural Commodities Report: March Quarter 2025*, Australian Bureau of Agricultural and Resource Economics and Sciences, Department of Agriculture, Fisheries and Forestry, Canberra, https://doi.org/10.25814/kd0j-7k19. [32]

André-Zarna, C. et al. (2026), "Meat Industry 5.0: A review of technological approaches and robotic systems in the meat processing industry", *Trends in Food Science & Technology*, Vol. 167, p. 105439, https://doi.org/10.1016/j.tifs.2025.105439. [10]

Baboolall, D. et al. (2020), *Achieving Optimal Yields and Efficiency in European Meat Processing*, McKinsey & Company, https://www.mckinsey.com/industries/agriculture/our-insights/achieving-optimal-yields-and-efficiency-in-european-meat-processing. [8]

Bernabucci, G. et al. (2025), "Precision livestock farming: An overview on the application in extensive systems", *Italian Journal of Animal Science*, Vol. 24/1, pp. 859-884, https://doi.org/10.1080/1828051x.2025.2480821. [16]

Chen, D. et al. (2025), "Future food prices will become less sensitive to agricultural market prices and mitigation costs", *Nature Food*, Vol. 6/1, pp. 85-96, https://doi.org/10.1038/s43016-024-01099-3. [25]

Distante, D. et al. (2025), "Artificial intelligence applied to precision livestock farming: A tertiary study", *Smart Agricultural Technology*, Vol. 11, p. 100889, https://doi.org/10.1016/j.atech.2025.100889. [15]

European Commission (2025), *EU Agricultural Outlook, 2025-2035*, DG Agriculture and Rural Development, European Commission, Brussels, https://webgate.ec.europa.eu/circabc-ewpp/d/d/workspace/SpacesStore/e4c347aa-1303-44c5-868a-d63e2f46c185/download. [21]

FAO (2024), *The State of Agricultural Commodity Markets 2024*, Food and Agriculture Organization, Rome, https://doi.org/10.4060/cd2144en. [33]

FAO (2023), *Pathways Towards Lower Emissions*, Food and Agriculture Organization, Rome, https://doi.org/10.4060/cc9029en. [24]

Gérard, M. (2025), "Majority of French people are in favor of eating less meat, but better", *Le Monde*, https://www.lemonde.fr/en/environment/article/2025/03/18/majority-of-french-people-are-in-favor-of-eating-less-meat-but-better_6739271_114.html. [1]

Gohin, A. and A. Matthews (2025), "The European Union-Mercosur Association Agreement: Implications for the EU livestock sector", *Journal of Agricultural Economics*, Vol. 77/1, pp. 25-35, https://doi.org/10.1111/1477-9552.70010. [22]

Gonçalves, D. et al. (2021), "Carcass image segmentation using CNN-based methods", *Information Processing in Agriculture*, Vol. 8/4, pp. 560-572, https://doi.org/10.1016/j.inpa.2020.11.004. [11]

IPCC (2023), *Climate Change 2022: Mitigation of Climate Change: Working Group III Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, https://doi.org/10.1017/9781009157926. [30]

Jongeneel, R., A. Gonzalez-Martinez and R. Hoste (2020), “An Uncertain Fate for the EU Pig Sector: Potential Consequences of the 2019 African Swine Fever Outbreak in East Asia”, *EuroChoices*, Vol. 20/1, pp. 22-29, https://doi.org/10.1111/1746-692x.12274. [27]

Kappes, A. et al. (2023), “Livestock health and disease economics: A scoping review of selected literature”, *Frontiers in Veterinary Science*, Vol. 10, https://doi.org/10.3389/fvets.2023.1168649. [29]

Lee, H. et al. (2022), “MSENet: Marbling score estimation network for automated assessment of Korean beef”, *Meat Science*, Vol. 188, p. 108784, https://doi.org/10.1016/j.meatsci.2022.108784. [12]

Lim, J. et al. (2020), “Non-destructive detection of bone fragments embedded in meat using hyperspectral reflectance imaging technique”, *Sensors*, Vol. 20/14, p. 4038, https://doi.org/10.3390/s20144038. [14]

Lyu, Y. et al. (2025), “A review of robotic and automated systems in meat processing”, *Frontiers in Robotics and AI*, Vol. 12, https://doi.org/10.3389/frobt.2025.1578318. [13]

McFadden, J. et al. (2022), “The digitalisation of agriculture: A literature review and emerging policy issues”, *OECD Food, Agriculture and Fisheries Papers*, No. 176, OECD Publishing, Paris, https://doi.org/10.1787/285cc27d-en. [17]

Mohammed, A. et al. (2023), “Blockchain adoption in food supply chains: A systematic literature review on enablers, benefits, and barriers”, *IEEE Access*, Vol. 11, pp. 14236-14255, https://doi.org/10.1109/access.2023.3236666. [18]

OECD/APO (2022), *Identifying the Main Drivers of Productivity Growth: A Literature Review*, OECD Publishing, Paris, https://doi.org/10.1787/00435b80-en. [4]

Padilla, S., Q. Baker and M. MacLachlan (2025), “The impact of HPAI trade restrictions on U.S. poultry exports in 2022-23”, *Applied Economic Perspectives and Policy*, Vol. 47/3, pp. 933-948, https://doi.org/10.1002/aepp.13504. [28]

Papadopoulos, G. et al. (2025), “Economic and environmental benefits of digital agricultural technological solutions in livestock farming: A review”, *Smart Agricultural Technology*, Vol. 10, p. 100783, https://doi.org/10.1016/j.atech.2025.100783. [20]

Rajput, D. et al. (2025), “Blockchain technology in the food supply chain: A way towards circular economy and sustainability”, *Sustainable Food Technology*, Vol. 3/4, pp. 930-946, https://doi.org/10.1039/d5fb00065c. [19]

Ranade, A. and O. Malav (2025), “Role of Artificial Intelligence in Meat Production and Processing”, *International Journal of Livestock Research*, Vol. 6/15, pp. 9-18, https://ijlr.org/ojs_journal/index.php/ijlr/article/view/1767. [6]

Richter, A. et al. (2025), “Reducing meat consumption: Results from a German survey on attitudes, behaviour and willingness to change among adults”, *PLoS ONE*, https://doi.org/10.1371/journal.pone.0328346. [2]

Romanov, D. et al. (2022), “Towards human-robot collaboration in meat processing: Challenges and possibilities”, *Journal of Food Engineering*, Vol. 331, p. 111117, https://doi.org/10.1016/j.jfoodeng.2022.111117. [9]

Rosati, A. (2024), “Guiding principles of AI: Application in animal husbandry and other considerations”, *Animal Frontiers*, Vol. 14/6, pp. 3-10, https://doi.org/10.1093/af/vfae045. [7]

Valdez-Espinoza, U. et al. (2025), “The reemergence of the New World screwworm and its potential distribution in North America”, *Scientific Reports*, Vol. 15/1, https://doi.org/10.1038/s41598-025-04804-9. [31]

Wang, M. and X. Li (2024), “Application of artificial intelligence techniques in meat processing: A review”, *Journal of Food Process Engineering*, Vol. 47/3, https://doi.org/10.1111/jfpe.14590. [5]

WOAH (2025), *State of the World’s Animal Health Report*, World Organisation for Animal Health, Paris, https://doi.org/10.20506/woah.3586. [3]

World Bank (2025), *Commodity Markets Outlook, April 2025*, World Bank, Washington, DC, https://doi.org/10.1596/43036. [26]

World Bank (2024), *Commodity Markets Outlook, October 2024*, World Bank, Washington, DC, https://doi.org/10.1596/42219. [23]

6 Dairy and dairy products

This chapter describes market developments and medium-term projections for world dairy markets for the period 2026-2035. Projections cover consumption, production, trade and prices for milk, fresh dairy products, butter, cheese, skimmed milk powder and whole milk powder. The chapter concludes with a discussion of the key risks and uncertainties which could have implications for world dairy markets over the next decade.

6.1. Projection highlights

Dairy products continue to be highly valued by consumers as a key component of a healthy, balanced and nutritious diet. As income and population increase, more dairy products are expected to be consumed globally over the medium term.

Asia, particularly India and Pakistan, will continue to have the strongest growth in consumption of fresh dairy products. Further increases are expected in Europe and North America where cheese consumption is already high.

Global milk production is expected to grow steadily, primarily supported by higher yields per animal. World milk production (81% cow milk; 16% buffalo milk; and 3% for goat, sheep and camel milk combined) is projected to grow at 2.0% p.a. over the next decade, sustained by increasing yields per animal, with growth in the dairy herd expected to be moderate.

More than half of the growth in milk production is anticipated to come from India. On the other hand, the milk production in the European Union, the second-largest producer, is expected to remain at current levels.

Environmental and health concerns are shaping the projections for the dairy sector. Dairy production contributes to overall greenhouse gas (GHG) emissions and nitrogen pollution. In some high-income countries, environmental constraints are resulting in a shift in production systems and reductions in dairy herd populations.

Only a small share of milk (less than 7%) is traded internationally, mainly in the form of processed dairy products. Although milk production in the three major dairy exporters –the European Union, New Zealand and the United States – is expected to increase only modestly, their exports are projected to jointly account for nearly 70% of global dairy exports.

The gap between butter and skimmed milk powder prices is expected to persist throughout the projection period. This development is attributed to a relatively stronger demand for milk fat compared to non-fat milk solids on the international market. While improvements in feeding technology and genetics increase the milk solids content of milk, the proportions of fat and non-fat solid contents change only very slowly.

The dairy sector faces several uncertainties. Animal diseases are not assumed to constrain production significantly, but they could cause supply disruptions as in recent disease outbreaks in dairy cattle. Higher levels of technology adoption could also support greater improvements in milk yields and production than expected.

6.2. Current market trends

Dairy and milk prices increased in 2025 driven by higher butter prices

The Food and Agriculture Organization’s Dairy Price Index increased in 2025, reflecting strong price gains in the first half of the year, driven primarily by cheese, whole milk powder and butter, the latter reaching a record high in June. In comparison, skimmed milk powder prices rose only marginally. Prices declined in the second half of 2025, due to higher than anticipated global milk production in major exporting countries. The price spread between the fat and non-fat components of milk continues to characterise global dairy markets due to persistent high demand for milk fats.

World milk production grew 2.1% in 2025 to 1 005 million tonnes (Mt). Production increased by 3% in India and Pakistan to reach 255 Mt and 69 Mt, respectively, with little impact on the world dairy market as they export only marginal quantities of milk and dairy products. Milk production also increased among the three major exporters (New Zealand, the United States and the European Union) in 2025.

World dairy trade expanded modestly in 2025, increasing by around 1%. Growth was concentrated in a limited number of countries, including some major importers of dairy products: People’s Republic of China (hereafter “China”) and Saudi Arabia. However, other major importers of dairy products – Algeria, Iraq and Mexico – decreased their imports. Going forward, of the major exporters, the United States would be a beneficiary of any additional export demand due to constrained production growth in the European Union and New Zealand.

6.3. Market projections

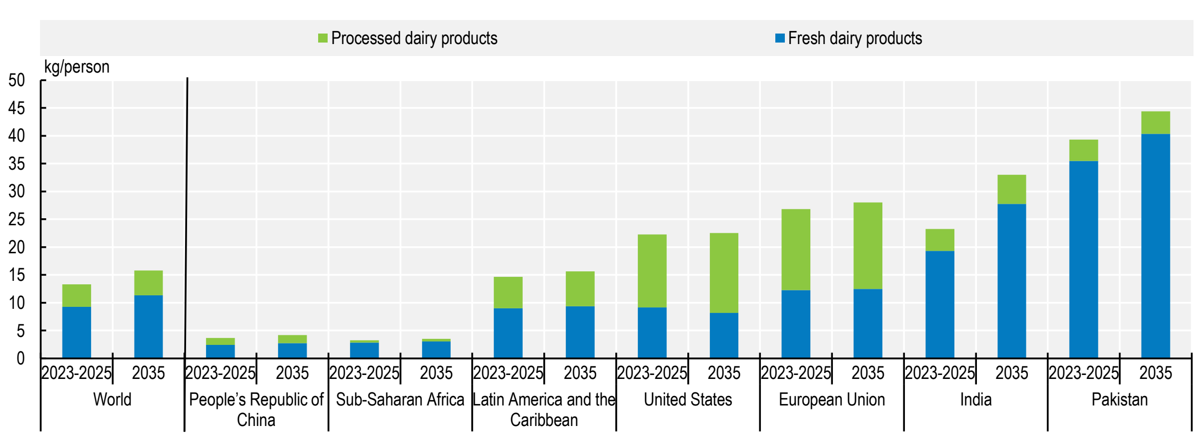
6.3.1. Consumption

Strong demand in India and Pakistan is leading increased global dairy consumption

Although milk is a highly perishable product which must be processed shortly after collection, most milk is consumed in the form of fresh dairy products,[1] including those fermented and pasteurised. The share of fresh dairy products in global consumption is expected to increase over the next decade due to stronger consumption growth in India and Pakistan, which in turn is driven by income, urbanisation and population growth. World per capita consumption of fresh dairy products is anticipated to grow by 1.9% p.a. over the coming decade, primarily due to higher per capita income growth.

Dairy consumption per capita (in terms of milk solids) varies widely across countries (Figure 6.1), driven by differing income levels and regional preferences. The most significant growth is expected in India and Pakistan, where milk solids consumption is expected to increase to 33 kg and 44 kg per capita by 2035, respectively. The average fresh dairy consumption per capita in China is significantly lower than in the European Union and North America. In low-income and lower middle-income countries, most of the production is consumed in the form of fresh dairy products, a preference which is expected to persist over the next decade.

Figure 6.1. Per capita consumption of processed and fresh dairy products in milk solids



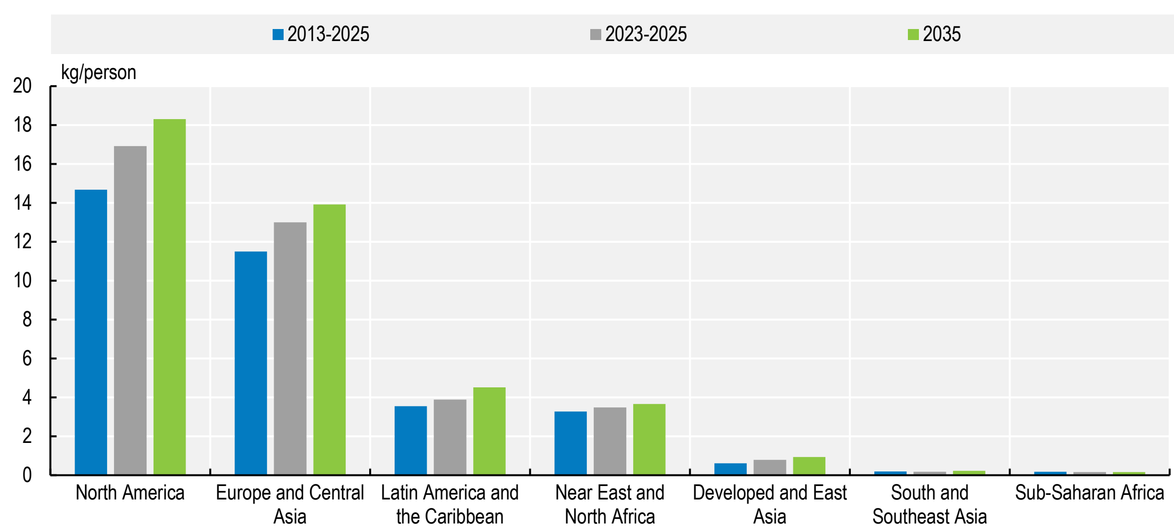
Note: Milk solids are calculated by adding the amount of fat and non-fat solids for each product. Processed dairy products include butter, cheese, skim milk powder and whole milk powder.

In high-income countries, overall per capita demand for fresh dairy products is declining but the composition of demand has been shifting over recent years in favour of dairy fat such as full-fat drinking milk and cream. Plant-based dairy replacements are available and compete more with fresh dairy products than with processed dairy products.

The share of processed dairy products, especially cheese, in overall consumption of milk solids is expected to be closely related to incomes, with variations due to local preferences, dietary constraints and urbanisation. The largest share of total cheese consumption, the second most consumed dairy product, occurs in Europe and North America, where per capita consumption is expected to continue to increase over the projection period (Figure 6.2). Considerable cheese consumption in emerging markets is linked to the consumption of pizza and burgers. Butter consumption has seen a recovery in North America and Southeast Asia due to shifting preferences. In addition, per capita consumption of butter, especially in the form of ghee, continues to increase from already high levels in India and Pakistan, although consumption of processed dairy remains low.

The dominant use of skimmed milk powder (SMP) and WMP will continue to be in the manufacturing sector, notably in confectionery, infant formula and bakery products. A small share of dairy products, especially SMP and whey powder, are used in animal feed. Whey powders are gaining prominence globally because of their use in the processing of nutritional products, especially of clinical, infant and elderly preparations and as an important alternative for reconstituted fresh dairy products, such as milk and yogurt especially in Africa and other regions with limited milk production.

Figure 6.2. Per capita consumption of cheese in selected regions



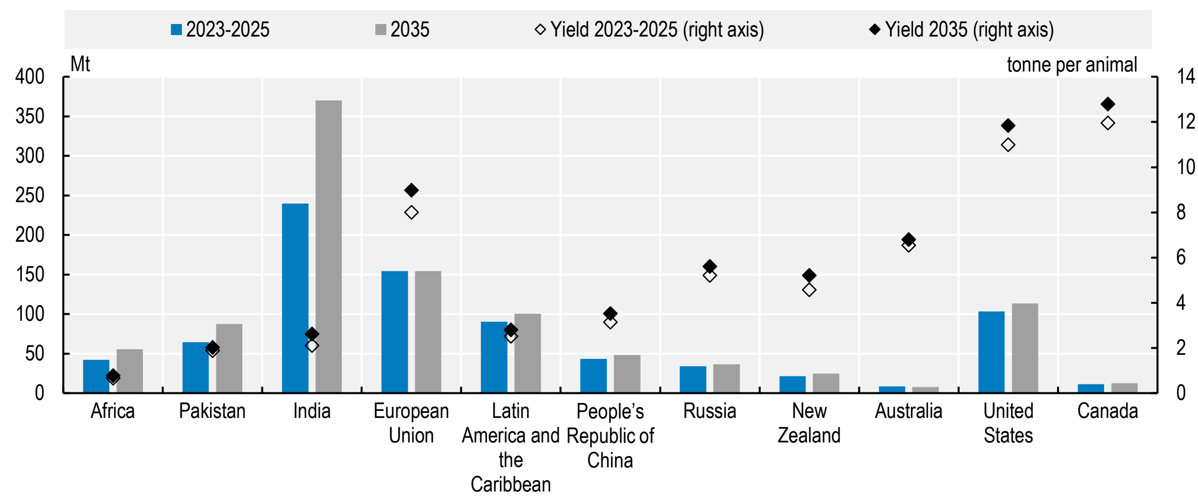
6.3.2. Production

Greater efficiency in milk production through yield improvements

World milk production is projected to grow at 2.0% p.a. (to 1 223 Mt by 2035) over the next decade, faster than most other major agricultural commodities. Growth in the number of cows is expected to be low in milk-exporting countries such as New Zealand and the United States, moderate in China and sub-Saharan Africa, and strong in major milk-producing countries such as India and Pakistan and parts of Central and Southeast Asia –where yields are low. Herds of other milking animals (sheep and goats) are expected to exhibit strong growth in sub-Saharan Africa, the Near East, India and Pakistan. Total milk yields across the world are expected to grow steadily and to contribute more to production increases than herd growth over the next decade. This yield growth will be achieved through optimising milk production systems, improved animal health, greater feed efficiencies and improved genetics.

India is the largest producer of milk and is expected to achieve continuing strong production growth (Figure 6.3). Production predominantly comes from cows and buffaloes and is based on small operations connected to co-operatives for processing and distribution. This integration into wider supply chains is important for the value added by the dairy sector in India. Growth is expected to come from more milking cows and buffaloes as well as from yield increases.

Figure 6.3. Milk production and yield in selected countries and regions



Note: The yield is calculated per cow/buffalo.

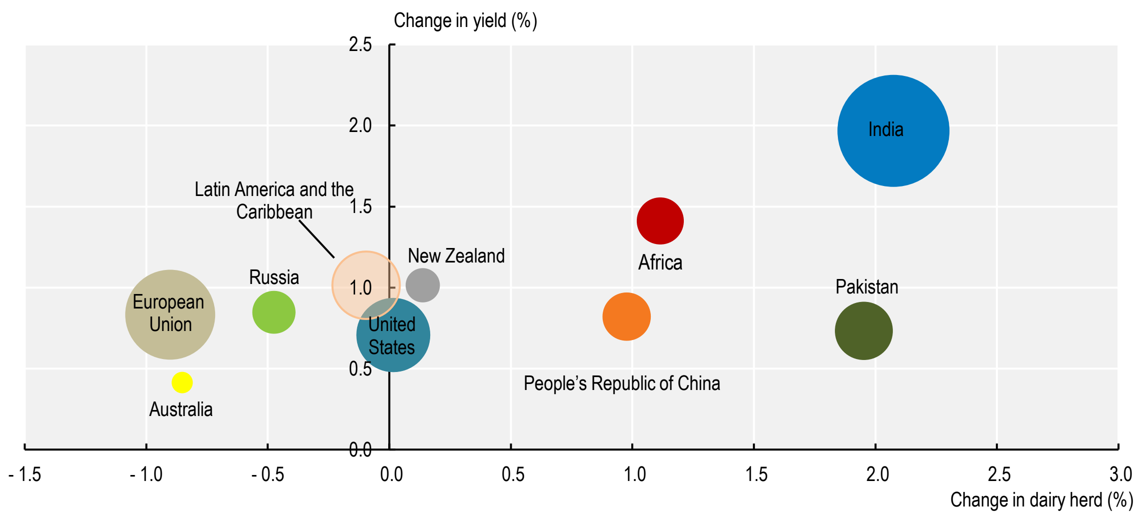
Production in the European Union is projected to stagnate, with fewer dairy cows and slower yield growth. Production originates from a mix of grass- and feed-based production systems. A growing share of milk is expected to be organic or from other non-conventional production systems. At present, more than 10% of dairy cows are within, but not limited to, organic systems located in Austria, Denmark, Greece, Latvia and Sweden. France, Germany and Italy have also seen an increase in organic dairy production. Organic dairy farms, which have lower yields and incur higher production costs than conventional production systems, can be more profitable than conventional dairy farms, however, they have a long establishment period where likelihood of exiting organic production increases (Hirsch et al., 2026[1]).

The average yield per cow in North America is the highest in the world, as their share of grass-based production is low, and feeding is focused on achieving high yields from specialised dairy herds. Dairy herds in Canada and the United States are expected to remain largely unchanged and production growth to originate from further yield increases. As domestic demand is projected to remain stronger for milk fats, the United States will continue to expand SMP production, partly for export.

Although New Zealand's share in world milk production is only 2%, it is the most export-orientated country. After expanding strongly, milk output growth has slowed down in recent years and is projected to grow at 1.0% p.a. over the next decade. Milk production is mainly grass-based and yields are considerably lower than in North America and Europe. However, the cost efficiency of grass management allows New Zealand to be competitive by focusing on milk yields per hectare. While the main constraining factors for growth are land availability, a shift to more feed-based production systems is unlikely.

Strong production growth is expected in Africa, mostly due to larger herds (Figure 6.4). These will usually have low yields and a considerable share of milk production will come from goats and sheep. Most cows, goats and sheep graze, and are used for other purposes, including meat production, traction and as capital assets (savings). Herd growth is supported by current pasture, resulting in more intensive use, which may lead to local over-grazing. Over the projection period, about 17% of the global dairy cow and buffalo population is projected to be in Africa and to account for around 4% of world milk production.

Figure 6.4. Annual changes in inventories of dairy herd and yields between 2026 and 2035



Note: The size of the bubbles refers to the total cow milk production in the base period 2023-2025.

StatLink https://stat.link/qb3g1i

Globally, around 25% of milk will be further processed into products such as butter, cheese, SMP, WMP or whey powder in the coming decade. However, there are notable regional differences. In high-income countries, a high proportion of milk produced is transformed into dairy products, whereas in low- and lower middle-income countries most milk production is consumed as fresh dairy products. There is significant direct food demand for butter and cheese in Europe and North America, which account for a large share of consumption. SMP and WMP are largely produced for trade and use in the food processing sector.

6.3.3. Trade

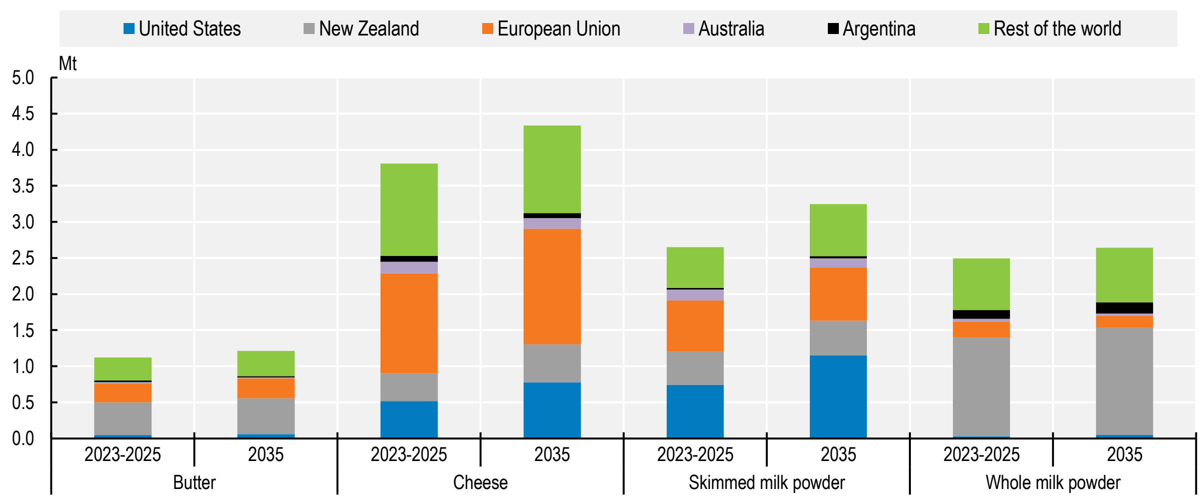
Milk is traded internationally mainly in the form of processed dairy products

Most dairy products are domestically consumed. Only a small share (less than 7%) of world milk production is traded internationally, primarily due to its perishability and high water content (more than 85%). Around 50% of world production of WMP and SMP is traded since these products are often produced only to store and trade milk over longer time periods or distances. Fresh dairy products such as fermented milk products are traded in small amounts between neighbouring countries – between Canada and the United States or between the European Union and Switzerland, for example. One exception is imports of liquid milk by China from the European Union and New Zealand, made possible by ultra-high temperature milk and cream products capable of being shipped long distances, and in some cases, favourable Chinese freight rates.

World dairy trade is projected to expand over the next decade to reach 13.7 Mt in 2035, 11% higher than during the base period. Most of this growth will originate in the European Union, the United States, and New Zealand. These three exporters are projected to jointly account for around 67% of cheese, 64% of

WMP, 69% of butter and 73% of SMP exports in 2035 (Figure 6.5). In addition, the United States expected to increase market share more than the European Union and New Zealand. While Australia has lost market shares, it remains a notable exporter of cheese and SMP. Argentina is also an important exporter of WMP and is projected to account for 6% of world exports by 2035. In recent years, Belarus has become an important exporter, orienting its exports primarily to the Russian market due to the Russian embargo as of 2015 on several major dairy-exporting countries.

Figure 6.5. Exports of dairy products by region



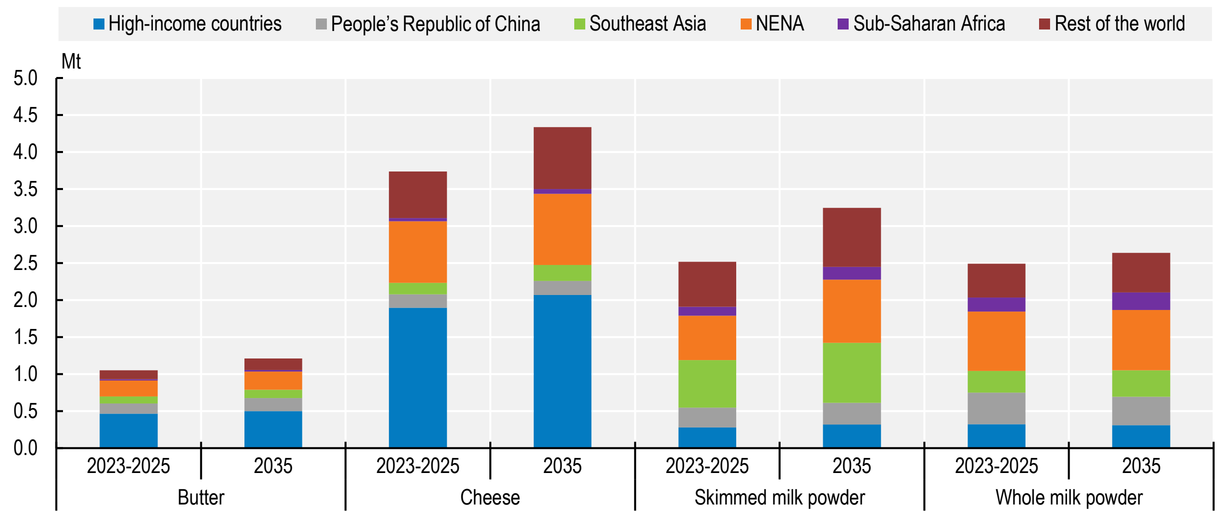
The European Union will continue to be the main world cheese exporter, followed by the United States and New Zealand. The United Kingdom, Russian Federation (hereafter "Russia"), Japan, Mexico and Saudi Arabia are projected to be the top five cheese importers in 2035. Since consumers value variety, these countries are often also exporters of cheese and international trade is expected to offer more choices of cheeses in the domestic markets.

New Zealand remains the primary source for butter and WMP on the international market, and its market shares are projected to be around 41% and 56%, respectively, by 2035. China is the principal importer of WMP from New Zealand. The expected growth in domestic milk production in China will limit the growth in WMP imports.

The United States is expected to be the most dynamic large exporter over the next decade and to expand SMP exports especially. This would require growth in drying capacity beyond current investments. SMP imports are dispersed globally as it is often the easiest dairy product to trade for use in food processing.

Imports are spread more widely across countries, with the dominant destinations for all dairy products being the Near East and North Africa, high-income countries, Southeast Asia, and China (Figure 6.6). China is expected to continue to be the world's major dairy importer. WMP imports into China are projected to represent 15% of global imports in 2035, a 2.7 percentage point drop from the base period. Africa is expected to increase its imports of WMP considerably over the next ten years. Per capita consumption of dairy products in China is relatively low compared to traditional markets, but there have been significant increases in demand over the past decade, with growth projected to continue. Most of its dairy imports are sourced from Oceania, although in recent years the European Union has increased its exports of butter and SMP to China.

Figure 6.6. Imports of dairy products by region



Note: NENA stands for Near East and North Africa. Saudi Arabia is included in NENA and therefore subtracted from high-income countries. Southeast Asia contains Indonesia, Malaysia, Philippines, Thailand and Viet Nam.

The global whey powder market is growing, driven by rising demand for diets high in protein and animal feeding. Trade of whey powder is expected to increase over the medium term, with China the top import market, mainly for animal feed additives. The European Union is projected to remain the dominant exporter of whey powder, which together with the United States accounts for almost 60% of world exports.

While some regions, such as India and Pakistan, are self-sufficient, total dairy consumption in Africa, Southeast Asian countries, and the Near East and North Africa region is projected to grow faster than production, leading to an increase in dairy imports. As liquid milk is expensive to trade because of its high volume/value ratio, this additional demand growth is expected to be met by milk powders, where water is added for final consumption or further processing. Imports by the Near East and North Africa region are expected to originate primarily from the European Union, while the United States and Oceania are expected to be the main suppliers of powders to Southeast Asia.

6.3.4. Prices

Nominal international dairy prices will gradually and slightly increase

International dairy prices are prices of processed products from the main exporters in Oceania and Europe. The two main reference prices are butter and SMP, where butter is the reference for milk fat and SMP for other milk solids. Milk fat and other milk solids together account for about 13% of the overall weight of milk, the remainder being water.

Dairy prices declined in the latter half of 2025 as the market corrected due to higher than anticipated global milk production in major exporting countries. In 2026, butter and SMP prices are foreseen to increase slightly in nominal terms and this increase is expected to continue over the projection period. The gap between the price of milk fat and non-fat milk solids is expected to remain a defining feature over the coming decade and considerably different levels between processed dairy products are maintained (Figure 6.7). World prices for WMP and cheese are expected to be affected by butter and SMP price trends, in line with the respective content of fat and non-fat solids.

Figure 6.7. Dairy product prices

Note: Butter, FOB export price, 82% butterfat, Oceania; skimmed milk powder, FOB export price, non-fat dry milk, 1.25% butterfat, Oceania; whole milk powder, FOB export price, 26% butterfat, Oceania; cheese, FOB export price, cheddar cheese, 39% moisture, Oceania. Real prices are nominal world prices deflated by the US GDP deflator (2025=1).

Since 2015, increased demand for milk fat has resulted in the price of butter increasing considerably more than SMP, with a price gap emerging between the two products. The price of butter is expected to continue to be supported by stronger demand for milk fat compared to other milk solids on the international market. This reflects underlying differences in demand patterns, with non-fat solids often associated with more price-sensitive import demand while demand for milk fats – particularly in high-income markets – tending to show relatively more stable consumption patterns. Although improvements in feeding technology and genetics increase the milk solids content of milk, the fat and non-fat solid components of milk changes only very slowly. Of the major exporters, the fat content of milk grew the fastest in the United States at 0.4% per year over the last decade, while growth in milk fat was slower in the European Union. In New Zealand, the annual growth rate for milk fat content was close to zero.

The strong historical volatility of international dairy prices stems from its small trade share, the dominance of a few exporters and a widely restrictive trade policy environment. Most domestic markets are only loosely connected to those international dairy prices as fresh dairy products dominate consumption, and only a small share of milk is processed compared to that which is fermented or pasteurised.

6.4. Risks and uncertainties

Environmental and health concerns are becoming more significant

More restrictive environmental legislation than currently assumed in the Outlook could have a strong impact on the dairy production projections. GHG emissions from dairy activities make up a significant share of total emissions in some countries, like Ireland and New Zealand, and more stringent environmental policies and initiatives could affect the level and nature of dairy production to curb such emissions. The growing trend towards sustainable practices such as those related to water access and manure management are associated areas where policy changes could impact dairy production. Nevertheless, stricter environmental legislation could also lead to innovative solutions that improve the sector’s long-term competitiveness. Overall, the global level of GHG emissions from dairy production will largely depend on efficiency gains in India and other countries with high cattle populations and extensive production. In addition, extreme weather events, already experienced in some countries and regions, could aggravate the viability of milk production in the affected countries.

Plant-based dairy alternatives (e.g. soybean, almond, rice and oat drinks) have increased in popularity in many regions, especially in North America, Europe and East Asia. Available replacements have continued to expand beyond the more traditional options, branching into various sources from nuts, legumes and other crops. Key drivers of the expansion include consumer health concerns, awareness of the environmental impact of dairy production and lactose intolerance. The growth rates of plant-based replacements for dairy products are strong, albeit from a low base. The growth of plant-based dairy alternatives could be either considerably faster than included here or limited, which would result in a changing demand for dairy products.

High protein products have increased in popularity, particularly in North America and Europe. This increase in demand for high protein products such as yoghurt and cottage cheese is driven by consumer interest in health and fitness. In recent years, the growth rate of high protein products has been strong. The growth of high protein products may differ to what is assumed in the outlook depending on whether demand for high protein products grows significantly faster or is constrained more than anticipated.

Technology adoption could support greater improvements in production. Farmers have access to a wide range of technologies that can support improved milk yields and production including automatic milking systems, real time animal monitoring and decision support tools. Adoption of these technologies by major exporters is becoming more standard due to factors such as labour scarcity, lifestyle considerations and farm succession challenges. Higher levels of adoption could support greater increases in milk yields and milk production than expected in the outlook.

Dairy trade flows could substantially deviate from these projections due to changes in the trade environment. Modifications to existing trade agreements or the creation of new ones could affect dairy demand and trade flows. India and Pakistan, the big dairy consuming countries, are not expected to integrate into the international dairy market as domestic production is projected to expand fast enough to respond to growing domestic demand. New Zealand concluded free trade agreement negotiations with India in 2025, which includes tariff phase-outs for dairy-based products like infant formula but largely excludes dairy;[2] similarly the EU-India free trade agreement concluded in 2026 excludes dairy.[3]

Another challenge the sector faces is the risk of disease outbreak. Recent outbreaks are a reminder of this threat: new outbreaks of lumpy skin disease were reported in the European Union in 2025 and 2026;[4] in the United States, about 1 100 cases of avian influenza in 19 states were reported from March 2024 to December 2025.[5] The risk of disease outbreaks has also been highlighted by three foot and mouth disease outbreaks in the European Union in 2026.[6] As the world is increasingly inter-connected through trade, including the trans-boundary movement of animals, animal disease could rapidly spread across borders and disrupt dairy industry growth, which however, is not assumed to affect the industry in the Outlook.

References

Hirsch, S. et al. (2026), “Profitability and exit decisions of organic dairy farmers in the EU”, *Food Policy*, Vol. 139, p. 103034, https://doi.org/10.1016/j.foodpol.2026.103034. [1]

Notes

[1] Fresh dairy products contain all dairy products and milk which are not included in processed products (butter, cheese, skimmed milk powder, whole milk powder, whey powder and, in a few cases, casein). The quantities are in cow milk equivalent.

[2] For the key outcomes of the New Zealand-India FTA, see: https://www.mfat.govt.nz/en/trade/free-trade-agreements/free-trade-agreements-concluded-but-not-in-force/new-zealand-india-free-trade-agreement/key-outcomes.

[3] EU-India Free Trade Agreement – EU agri-food exports: https://policy.trade.ec.europa.eu/eu-trade-relationships-country-and-region/countries-and-regions/india/eu-india-agreements/factsheet-eu-india-free-trade-agreement-eu-agri-food-exports_en.

[4] https://food.ec.europa.eu/animals/animal-diseases/diseases-and-control-measures/lsd_en.

[5] https://www.aphis.usda.gov/livestock-poultry-disease/avian/avian-influenza/hpai-detections/hpai-confirmed-cases-livestock.

[6] https://food.ec.europa.eu/animals/animal-diseases/diseases-and-control-measures/foot-and-mouth-disease_en.

7 Fish and other aquatic products for human consumption

This chapter describes market developments and medium-term projections for world fish and aquatic products markets for the period 2026-2035. Projections cover consumption, production, trade and prices. The chapter concludes with a discussion of the key risks and uncertainties which could have implications for world fish and other aquatic products markets over the next decade.

7.1. Projection highlights

By 2035, global consumption of aquatic animal products for food is projected to rise faster than non-food uses, driven mainly by Asia. Consumption in Europe is projected to experience a modest decline.

Global apparent per capita consumption of aquatic animal foods is projected to rise, reaching 21.9 kg live weight equivalent (lwe) by 2035, up from 21.4 kg in 2023-2025. Africa and Europe are the only regions where per capita consumption is projected to decline slightly.

Aquaculture will continue to drive the expansion of global fisheries and aquaculture production, which is projected to reach 216 million tonnes (Mt) by 2035.

Global exports of aquatic animal foods will continue to grow but at a slower pace than in the previous decade, with Africa being the only region where exports are not projected to increase, reflecting increased domestic demand.

Global prices of fish and other aquatic products are all projected to decline in real terms by 2035 due to slower growth in demand. However, slower aquaculture production growth and limited capture fisheries expansion are expected to moderate the extent of price declines.

Fisheries and aquaculture face **numerous uncertainties from changing environmental conditions, shifting policies and regulations, and evolving consumer demand.** Resilience will depend on innovation, adaptation and effective management, with impacts varying across regions.

7.2. Current market trends

Global fisheries and aquaculture production rose to about 199 Mt in 2025, driven primarily by aquaculture growth, especially in People's Republic of China (hereafter "China"). Capture fisheries expanded more moderately, with increases recorded in most regions.[1]

The volume of global trade in aquatic animal food products remained broadly stable in 2025, with lower imports in Europe partly offset by increases in Africa and the Americas. Fishmeal exports continued to increase for the second year in a row in 2025, mainly driven by higher exports from Peru.

The Food and Agriculture Organization's Fish Price Index rose by 3.5% over 2025, reaching its lowest point in July before rebounding in the second half of the year. This marked the first annual increase since the 2022 price surge.

7.3. Market projections

7.3.1. Consumption

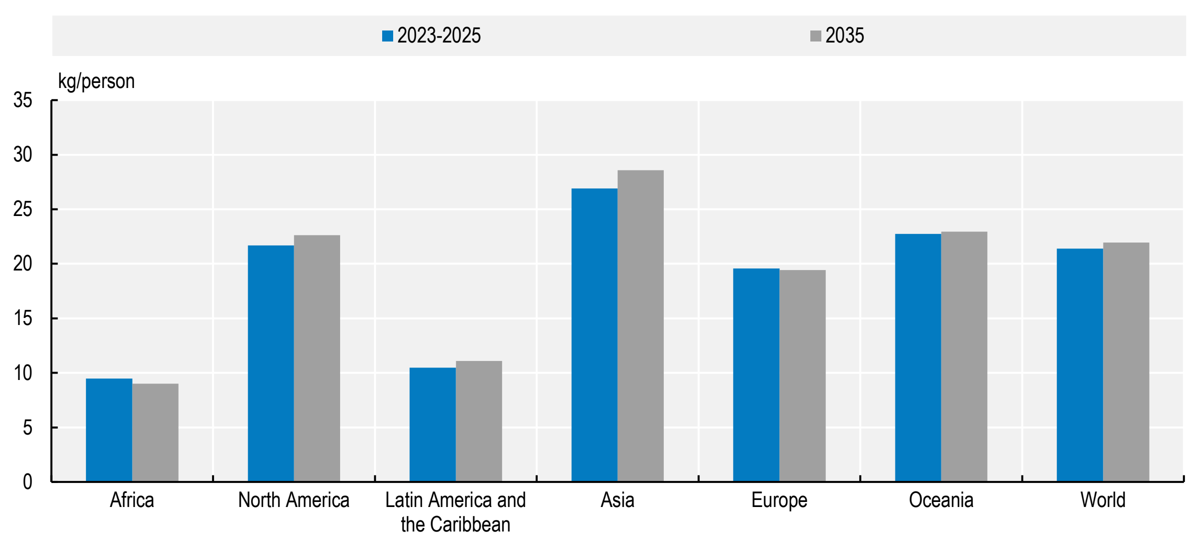
Asia is projected to account for most of the additional consumption of fish and other aquatic products

Fisheries and aquaculture production is used predominantly for human consumption. While a share is diverted to non-food uses, mainly to produce fishmeal and fish oil, this portion remains limited, with 90% of production projected to be consumed as food by 2035, compared to 89% in the base period (average of 2023-2025). Aquaculture will play an increasing role in meeting this demand, accounting for 62% of products destined for human consumption, compared to 59% in the base period.

Focusing on food uses, global demand for aquatic animal foods is projected to increase by 12% over the next decade, largely driven by population growth. Total apparent consumption is expected to reach 194 Mt lwe by 2035, an increase of 20 Mt compared with the base period. Total apparent consumption is projected to expand in all regions except Europe, where modest declines in both per capita consumption and population will constrain growth. Asia will remain the main source of additional demand and is projected to account for 75% of global apparent consumption by 2035, with China alone representing 39% of the global total. Africa, meanwhile, is expected to record the fastest growth, with consumption rising by 20% by 2035, nearly double the global average growth rate.

Global per capita apparent consumption of aquatic animal foods is projected to average 21.9 kg lwe by 2035, up 2.6% from 21.4 kg in the base period (Figure 7.1). This represents a much slower increase than in the previous decade, when per capita consumption grew by 12%. Per capita consumption is expected to rise in Asia, the Americas and Oceania but decline in Africa and Europe. In Africa, per capita consumption is projected to fall from 9.5 kg in the base period to 9.0 kg by 2035, largely because population growth is expected to outpace increases in supply. While consumption per capita is projected to rise in North Africa, the decline is expected to be particularly pronounced in sub-Saharan Africa. This trend is especially concerning given that the region already has the highest prevalence of undernourishment globally and aquatic animal foods provide a higher share of animal protein intake than the global average.

Figure 7.1. Per capita consumption of fish and other aquatic animal products by region



Note: Expressed in live weight equivalent.

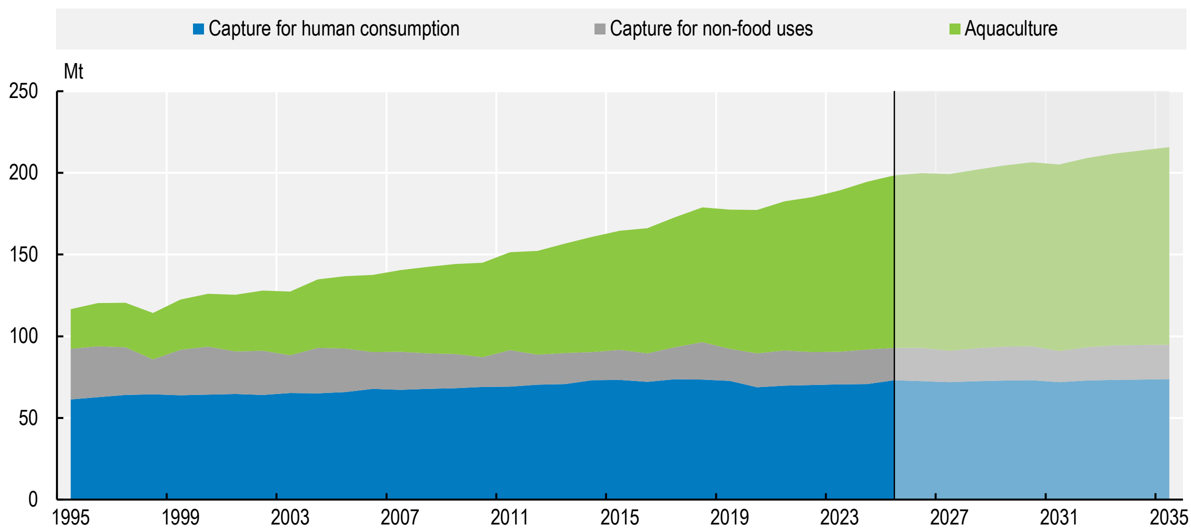
Fishmeal and fish oil are projected to represent 86% of the 21 Mt lwe of fish and other aquatic products used for non-food uses in 2035. The remainder will serve other non-food uses such as ornamental fish, fingerlings and fry, bait, pharmaceutical inputs, or as direct feed for farming. By 2035, 85% of fishmeal and 54% of fish oil is projected to be consumed as aquaculture feeds. While fishmeal is primarily used by the aquaculture sector, the faster growth of aquaculture relative to fishmeal production globally is driving increased use of oilseed meals in aquaculture feed. By 2035, oilseed meal use in aquaculture is projected to rise by 26%, reaching 11 Mt, while fishmeal use is expected to increase by 20% to 5.3 Mt. China will remain the dominant consumer of fishmeal, accounting for 43% of the total by 2035. In contrast, fish oil consumption is less concentrated, with the European Union, Norway and Chile together projected to account for 41% of global use.

7.3.2. Production

Aquaculture continues to drive global fisheries and aquaculture production growth despite slowing expansion

Global fisheries and aquaculture production is projected to increase from 194 Mt lwe in the base period to 216 Mt by 2035. Although total volume continues to grow, the rate and absolute increase are slowing, with production projected to expand by 11% (+22 Mt) over the next decade, compared with a 24% (+38 Mt) rise in the previous decade (Figure 7.2). Aquaculture remains the main driver of growth, even as its expansion decelerates, and is projected to account for 56% of global fisheries and aquaculture production by 2035, up from 53% in the base period.

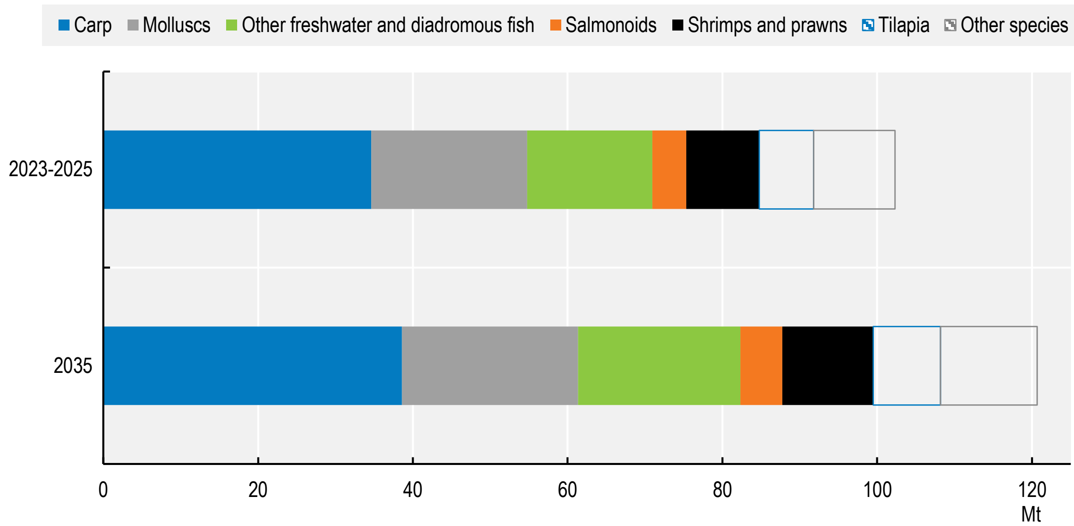
Figure 7.2. World capture fisheries and aquaculture production of aquatic animals



Note: Expressed in live weight equivalent.

Global aquaculture production is projected to reach 121 Mt by 2035, a 18% increase from the base period, compared with 51% growth in the previous decade. The slowdown reflects diminishing opportunities for expansion at the global level, driven by stricter environmental regulations and the limited availability of new, high-quality sites for production. Asia will continue to dominate, accounting for 88% of global aquaculture production, though its +17% growth rate is expected to be among the slowest globally, along with Europe (+14%). In contrast, Africa and the Americas are projected to experience the fastest expansion, with growth rates of +37% and +24%, respectively. China will remain the largest aquaculture producer, with its share slightly decreasing to 55%, reflecting faster growth in other producers such as India and Viet Nam. Despite growth occurring across nearly all countries and regions, the overall distribution of aquaculture production will remain highly concentrated in Asia.

Figure 7.3. World aquaculture production of aquatic animals by main species group



Note: Expressed in live weight equivalent.

Across all major farmed species groups, aquaculture production is projected to continue rising, though growth will be slower over the next decade than in the previous one. Species group shares are expected to remain broadly stable, with minor changes: carp's share is set to decline slightly to 32% as demand shifts toward a wider variety of species while other freshwater species, shrimps and prawns, and tilapia are projected to increase modestly (Figure 7.3). By 2035, molluscs are projected to account for 19% of global aquaculture production, other freshwater and diadromous species such as catfish and pangas for 17%, shrimps and prawns for 10%, tilapia for 7%, and salmonoids for 4%.

Global capture fisheries production is projected to reach 95 Mt by 2035, representing an increase of 3.4% relative to the base period, compared with 2.5% growth in the previous decade. Growth will be driven by improved fisheries management, technological advances, and reductions in discards and waste, though short-term dips may occur, such as the anticipated El Niño-Southern Oscillation (ENSO) events in 2027 and 2031, which are projected to reduce catches in South America by about 2 Mt. Africa and the Americas are projected to be responsible for most of the additional production, with growth of 9% and 7%, respectively, over the Outlook period. Asia is projected to experience slower growth than the global average, at 0.9% over the same period. Nevertheless, Asia will continue to account for just over half of global capture fisheries production by 2035, with the Americas, Europe, Africa and Oceania following with 19%, 15%, 12% and 2%, respectively. China will remain the top producing country, contributing approximately 14% to global capture fisheries production by 2035.

Over the next decade, the quantity of capture fisheries production reduced to fishmeal and fish oil is projected to increase by 6.0%, a much slower pace than the 13% growth observed over the previous decade. By 2035, the volumes used for producing fishmeal and fish oil are projected to fluctuate between 16.0 Mt and 18.2 Mt, influenced by ENSO variability. Global production of fishmeal is projected to reach 6.3 Mt by 2035, representing a 16% increase compared to the base period, which was particularly low due to a sharp fall in Peruvian fishmeal production in 2023. The slower growth in volumes used for fishmeal production also reflects the rising use of by-products and processing residues, which are expected to account for 30% of total fishmeal output by 2035, up from 25% in the base period. Peru will remain the largest producer of fishmeal, accounting for 18% of global output by 2035. Global production of fish oil is projected to reach 1.5 Mt by 2035, up 6% from the base period. This slower growth reflects slower gains in the use of by-products, which are projected to remain stable at 54% by 2035. Chile is projected to remain the largest producer of fish oil over the outlook period.

7.3.3. Trade

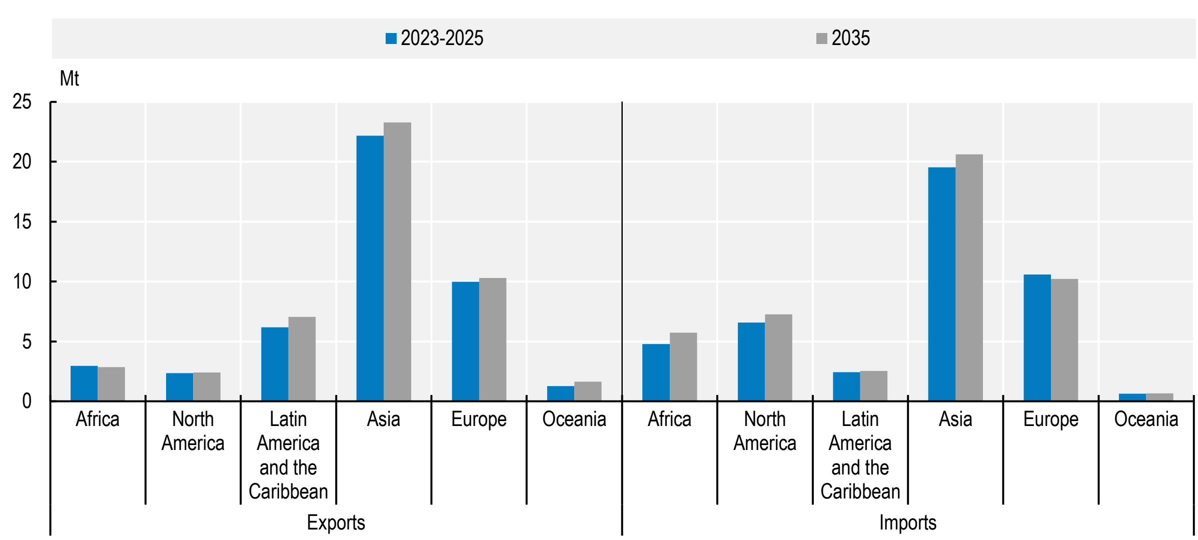
Aquatic trade is projected to expand more slowly, with Asia remaining dominant

International trade will continue to play a critical role in the sector, however growth in aquatic trade has been slower than the expansion of fisheries and aquaculture production over the last two decades and is projected to remain so over the coming decade. Rising consumption; improvements in storage, preservation and transportation technologies; and the continued liberalisation of trade policies have supported the development of complex global supply chains. By 2035, around 35% of total fisheries and aquaculture production is projected to enter international trade (31% excluding intra-EU trade). Part of this trade reflects repeated exchanges of products at different stages of processing among countries.

Global exports of aquatic animal foods are projected to reach 47.5 Mt lwe by 2035, an increase of 5.7% compared with the base period. This represents a clear slowdown relative to the 15% growth recorded during the previous decade. This deceleration reflects several factors, including high transport costs, slower expansion of capture fisheries and aquaculture production, and a growing preference in some key countries to meet domestic demand through local production.

Asia will remain the largest exporter of aquatic animal foods over the Outlook period, accounting for 49% of global exports, followed by Europe (22%), the Americas (20%), Africa (6%) and Oceania (3%) (Figure 7.4). Africa is the only region in which exports are projected to decline (-4.0%) over the next decade, reflecting strong domestic demand. China and Viet Nam are projected to account for 17% and 11%, respectively, of global trade by 2035.

Figure 7.4. Import and export volumes of fish and other aquatic animal products for human consumption, by region



Note: Expressed in live weight equivalent.

Asia will also continue to be the largest importing region, accounting for 44% of global imports of aquatic animal foods by 2035. This occurs despite declining import volumes in China, where domestic production is increasingly oriented toward local consumer preferences amid a shrinking population. In contrast, Africa is expected to record the strongest import growth (+20%), followed by the Americas (+9%), reflecting rising demand which cannot be met by domestic production.

Global fishmeal exports are projected to increase by 10% relative to the base period, reaching 4.0 Mt (product weight) by 2035. Peru is expected to remain by far the leading exporter and to record one of the strongest growth rates over the Outlook period, largely reflecting a rebound from the unusually low export levels observed in 2023, i.e. the first year of the base period. China is set to further consolidate its position as the dominant global importer, accounting for 53% of total fishmeal imports by 2035, up from 49% in the base period, driven by increasing feed demand from its expanding aquaculture sector. Consequently, import volumes are projected to decline in several traditional European markets.

Fish oil exports are projected to grow by about 16% by 2035 to 1.2 Mt (product weight). The Americas (led by Peru and Chile), Europe (primarily the European Union and Norway) and Asia (notably Viet Nam) are projected to remain the main exporting regions, accounting for 35%, 31% and 29% of global fish oil exports, respectively, by 2035. On the import side, Europe, led by the European Union and Norway, will remain the top importing region, accounting for 47% of global fish oil imports by 2035.

7.3.4. Prices

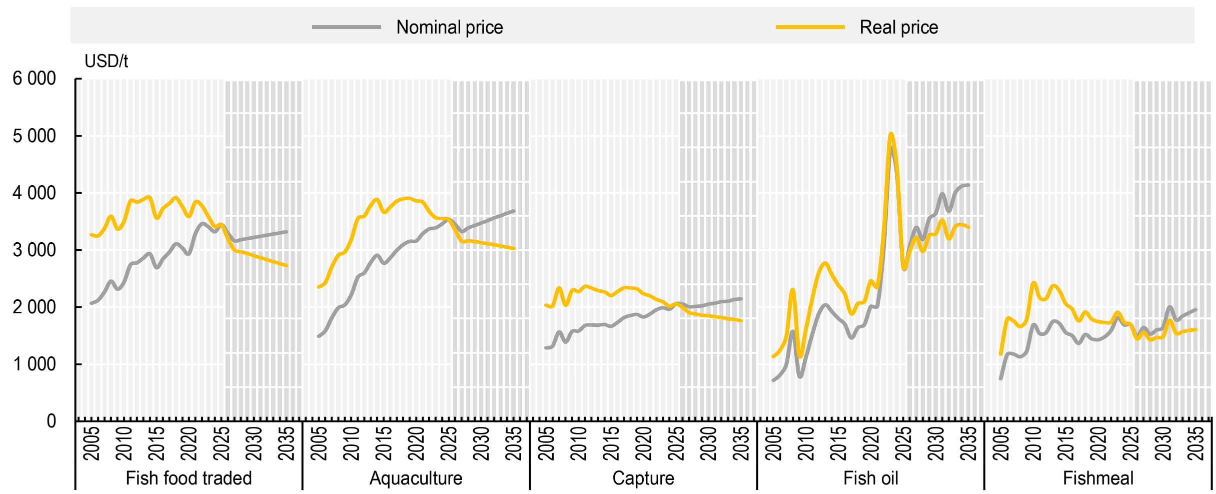
Real prices of fish and other aquatic products are expected to decline, which will be mitigated by a slowing of production growth

Overall, real prices of all fish and other aquatic products are expected to decline over the projection period, even where nominal prices are broadly flat or still edging up. Moreover, the decline in real prices is expected to be larger in the projection period than the previous decade across all products except fishmeal (Figure 7.5). The evolution of prices is consistent with the continued increase in production that is expected over the projection period, in all groups.

The real aquaculture price is expected to fall 15% over the projection period compared to the 2023-2025 average, which is a bigger decline than was seen in the previous decade (-6.4%). Overall, aquaculture prices grew rapidly after 2000 but have declined since their peak in 2019. The relatively rapid decline is expected to continue until 2027 before stabilising somewhat in the rest of the projection period. This price trend is consistent with the supply Outlook: world aquaculture production was 51% higher in 2025 than the 2013-2015 average, but is projected to be only 18% higher in 2035 than the 2023-2025 average. Production growth continues to push real aquaculture prices down, but the slowdown in aquaculture output growth compared with the previous decade is expected to mitigate the rate of decline after 2027.

In real terms, capture fisheries prices are projected to decline 14% below the 2023-2025 average by 2035. This is a greater price decline than was seen in the previous decade (-8.7%) and is driven by increased production growth in the projection period (3.4% compared to 2.5% in the previous decade). The broader price series of traded fish products is weaker still with the real price falling by 22% below the 2023-2025 average over the projection period. This suggests that the combined effect of continuing aquaculture and capture growth and ongoing competition from other protein sources (notably chicken and pig meat) is putting downward pressure on fish prices.

Figure 7.5. World fish and other aquatic animal product prices



Note: Fish food traded: world unit value of trade (sum of exports and imports) of fish and other aquatic animal foods. Aquaculture: FAO world unit value of aquaculture fisheries production of aquatic animals (live weight basis). Capture: FAO estimated value of world ex-vessel value of capture fisheries production of aquatic animals excluding for reduction. Fishmeal: 64-65% protein, Hamburg, Germany. Fish oil: N.W. Europe. Real price: US GDP deflator and base year = 2025.

Fish oil and fishmeal are best interpreted together because both depend heavily on the marine-ingredient market. In the fish oil market, the 2023-2024 spike reflected reduced Peruvian anchoveta availability under ENSO-related disruption, while the recovery in Peruvian catches helped normalise market conditions by 2025. Consequently, fish oil prices peaked before 2025 and are expected to return historic trends over the projection period, with the real fish oil price projected to decline 16% by 2035. Fishmeal prices follow a similar trajectory, albeit with smaller variations than fish oil. Overall, the real prices of fishmeal are expected to decline 10% over the projection period. The downward pressure on fishmeal prices is the result of competition from other protein meals – which are projected to become relatively cheaper up to 2035 – and the slowing of aquaculture production growth reducing demand growth. However, despite the overall decline, prices are expected to rise slowly after 2030, albeit with some volatility from ENSO-linked production impacts.

7.4. Risks and uncertainties

Several sources of uncertainty should be considered when interpreting the projection results, namely the ongoing impacts of fisheries and aquaculture management and policies, weather variability, disturbances to international trade, and multilateral governance under the World Trade Organization (WTO) Fisheries Subsidies Agreement (FSA) and the Agreement on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction (BBNJ). All these factors will individually and collectively impact patterns of production, trade and consumption of fish and other aquatic products over the projection period, but the nature and extent of these impacts is hard to predict.

While the proportion of fish stocks that are overfished or that fail to meet management standards has been increasing over time at a global scale, the global figures hide some important regional variations (OECD, 2025[1]; Sharma et al., 2025[2]). In many areas, there is considerable investment in improving management systems and rehabilitating fish stocks that have historically been overfished and, consequently, the production from capture fisheries is expected to increase over the projection period. However, the speed with which improved management leads to increased fishing opportunities is highly variable and hard to predict, with some species recovering much faster than expected (e.g. Pacific blue-fin tuna, *Thunnus orientalis*) while others will recover much slower (e.g. Atlantic cod, *Gadus morhua* (Blöcker et al., 2023[3]). Consequently, this creates uncertainty around the speed and extent of capture production growth and the downstream impacts on prices and trade.

Domestic policy developments add uncertainty to aquaculture production projections and, consequently, to price and trade outcomes. First, the implementation of China's 15th Five-Year Plan (2026-2030) will impact aquaculture production, given the country's importance to global production; however, the nature and extent of these impacts are uncertain. Second, relevant policy changes in other major producers (e.g. Chile, Indonesia, Norway and Thailand) could impact aquaculture production during the projection period.

Weather variability is expected to affect fisheries and aquaculture, but uncertainty remains regarding its impact on aquatic production. Key drivers include more frequent and intense extreme weather events, marine heatwaves, ocean warming and acidification, sea level rise, and shifting precipitation patterns (IPCC, 2023[4]; FAO, 2022[5]; Barange et al., 2018[6]). These pressures can disrupt production systems in the short to medium term and alter ecosystem productivity, species distribution and recruitment dynamics. Projections indicate more frequent and intense extreme El Niño and La Niña events. This may result in stronger rainfall variability, deeper droughts and shifts in precipitation patterns, further affecting marine and inland aquatic systems and associated production (IPCC, 2023[4]; FAO, 2024[7]). Weather variability also introduces policy-related uncertainty, as measures to reduce emissions and adapt to impacts may change how fisheries and aquaculture operate, including the species exploited, fishing and fish farming infrastructure and technology, the structure of fleets, and locations of production.

The global governance environment also introduces uncertainty into the projections presented in this chapter. Aquatic products are highly traded commodities, with the different stages of the value chain (production, processing and consumption) often located in different countries, making the sector susceptible to changes in the global trading environment. Emerging tensions around international trading regimes and challenges to the cross-border movement of aquatic products, and the implementation pace of new trade agreements could significantly impact trade, prices, and the distribution of production and consumption. The complex nature of international aquatic trade combined with the current context of global trade governance creates uncertainty in the projections, especially given the scale and speed of changes in recent years. Further (and relatedly), changes in the global economy, such as recession, could impact patterns of consumption of aquatic foods, especially the high value and luxury products, which also tend to be highly traded, introducing further uncertainty in the projections.

Finally, two specific international policy processes may impact fisheries production and trade over the coming decade, namely the WTO Fisheries Subsidies Agreement and the BBNJ Agreement. The WTO Fisheries Subsidies Agreement, which entered into force in September 2025, establishes for the first time binding multilateral disciplines on subsidies granted to marine fisheries. It also mandates a second round of negotiations to develop more comprehensive subsidy disciplines, to be concluded within four years. Should that process not be completed within the stipulated time frame, the agreement may be terminated, or WTO members could decide collectively on how to proceed. Given that this deadline falls within the projection period, the pace and outcome of those negotiations may affect how global aquatic production and trade, including its main players, evolve over time. The BBNJ Agreement could also be important to global fisheries, despite not directly addressing fisheries in the text of the agreement itself. Instead, the uncertainty for the projections comes from how the BBNJ Agreement interacts with and impacts existing governance mechanisms for high-seas fisheries (e.g. regional fisheries management organisations/arrangements). While the BBNJ Agreement will influence how fisheries operate in areas beyond national jurisdiction, the interpretation and operationalisation of its provisions are still evolving and as such it cannot be discounted when interpreting the projection results (FAO, 2024[8]).

References

Barange, M. et al. (eds.) (2018), "Impacts of climate change on fisheries and aquaculture: Synthesis of current knowledge, adaptation and mitigation options", *FAO Fisheries and Aquaculture Technical Papers*, No. 627, Food and Agriculture Organization, Rome, https://openknowledge.fao.org/handle/20.500.14283/i9705en. [6]

Blöcker, A. et al. (2023), "Regime shift dynamics, tipping points and the success of fisheries management", *Scientific Reports*, Vol. 13/1, https://doi.org/10.1038/s41598-022-27104-y. [3]

FAO (2024), *Fisheries and the BBNJ Agreement: A Guide: The Agreement Under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction (BBNJ Agreement)*, Food and Agriculture Organization, Rome, https://doi.org/10.4060/cd7986en. [8]

FAO (2024), *The State of World Fisheries and Aquaculture 2024: Blue Transformation in Action*, Food and Agriculture Organization, Rome, https://doi.org/10.4060/cd0683en. [7]

FAO (2022), *The State of World Fisheries and Aquaculture 2022: Towards Blue Transformation*, Food and Agriculture Organization, Rome, https://doi.org/10.4060/cc0461en. [5]

IPCC (2023), *Climate Change 2023: Synthesis Report: Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, Core writing team, H. Lee and J. Romero (eds.), Intergovernmental Panel on Climate Change, Geneva, https://doi.org/10.59327/IPCC/AR6-9789291691647. [4]

OECD (2025), *OECD Review of Fisheries 2025*, OECD Publishing, Paris, https://doi.org/10.1787/560cd8fc-en. [1]

Sharma, R. et al. (eds.) (2025), "Review of the state of world marine fishery resources – 2025", *FAO Fisheries and Aquaculture Technical Papers*, No. 721, Food and Agriculture Organization, Rome, https://doi.org/10.4060/cd5538en. [2]

Note

[1] The term "fish and other aquatic products" refers to fish, crustaceans, molluscs and other aquatic animals, but excludes aquatic mammals, crocodiles, caimans, alligators and aquatic plants

8 Biofuels

This chapter describes market developments and medium-term projections for world biofuel markets for the period 2026-2035. Projections cover consumption, production, trade and prices for ethanol and biomass-based diesel (including classical biodiesel, which accounts for the largest share of the complex, renewable diesel and sustainable aviation fuel, the latter two being drop-in fuels that can replace petroleum-based fuels). The chapter concludes with a discussion of the key risks and uncertainties which could have implications for world biofuel markets over the next decade.

8.1. Projection highlights

Biofuels continue to play an important role as a renewable alternative to fossil fuels in transport, with global demand for biofuels expected to grow 1.4% annually over the next decade.

Growth in biofuel production is projected to originate mainly in middle-income countries. The 3% annual growth will be driven by increasing transport fuel demand, energy security considerations, fiscal goals, and emissions reduction commitments, with Brazil, Indonesia, and India leading the expansion.

In high-income countries, biofuel growth is projected to slow due to decreasing fuel demand as electric vehicle (EV) adoption speeds up and policy incentives are weakening. This holds particularly for the European Union, where biofuel use is expected to decrease. In the United States, the focus has shifted towards biomass-based diesel linked to fuel and aviation fuel targets and a 1.5% annual increase in demand is projected. Under Canada's Clean Fuel Regulations, biofuels use has experienced strong increases in the recent past and is projected to increase further by 2% per year.

Biofuel trade is expected to remain well under 10% of the global market volume. Countries with strong domestic production capacity, such as Brazil and Indonesia, will likely meet their own rising demand, limiting the expansion of global biofuel trade, but the E20 target against rising total fuel demand might lead to an increase of the net deficit of ethanol in India.

First-generation biofuels will continue to dominate the market, with ethanol largely produced from maize and sugar and biodiesel primarily from vegetable oils such as soybean, rapeseed and palm oil. The use of waste oils and tallow as feedstock for biomass-based diesel boomed in the recent past, and is expected to continue to grow, but its share, which peaked at 25% in 2024, is projected to decrease over the next 10 years.

The future of biofuel market expansion depends on complex policies, with increasing interest in advanced biofuels and sustainable aviation fuel. However, achieving commercial production quantities remains challenging due to high investment costs. Sustainable feedstock supply will be critical as biofuels integrate into circular economy models in agriculture.

Biofuel prices were still low in 2025, but higher than in 2024, particularly biomass-based diesel, as vegetable oil feedstock prices were strong. In real term, ethanol and biomass-based diesel prices are projected to decline, wherefore government support will remain necessary to offset higher production costs of biofuels compared to fossil fuels.

8.2. Current market trends

Global biofuel consumption has recorded solid growth over the past decade, averaging 3.5% p.a. dominated by the growth of biomass-based diesel with an annual growth rate of 8%. In 2025, this upward trend continued, but more evenly distributed between ethanol and biomass-based diesel. Indonesia, where a B35 blending rate was reached in 2025, contributed the most to global growth of biomass-based diesel demand.

The United States recorded a drop in biomass-based diesel demand in 2025, mainly due to a large amount of granted small refinery exemptions as well as the transition from biomass-based diesel tax credit to the generally less valuable 45Z tax credit in 2025.[1]

Governments across the globe have continued to support biofuel adoption through favourable policies, subsidies and mandates, viewing biofuels as a critical tool for enhancing energy security and reducing greenhouse gas (GHG) emissions. Additionally, technological advancements and increased investments in biofuel infrastructure have further contributed to market growth.

8.3. Market projections

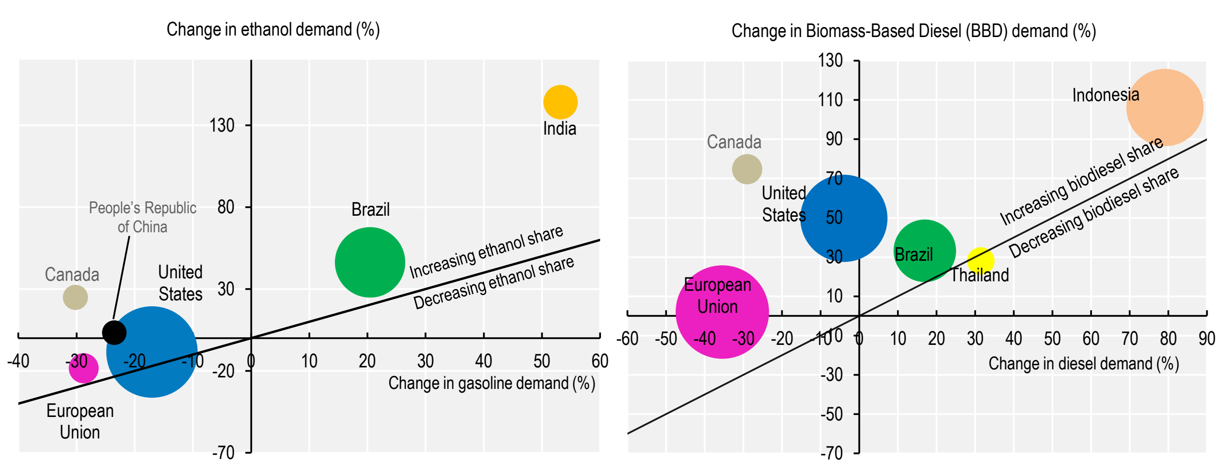
8.3.1. Consumption and production

Bulk of additional biofuel supply and demand located in Asian countries

Biofuel supply and demand projections are largely influenced by the future trajectory of overall fuel consumption, particularly because many biofuel mandates are set as a percentage of total fuel use. This Outlook relies on the main-case scenario in the International Energy Agency's *World Energy Outlook 2025* as the primary source for global fuel demand projections, which are primarily based on assumptions regarding how economic growth translates into transport fuel demand and other oil-derived goods. They also account for substitution effects, such as the increasing prevalence of EVs, improvements in vehicle fuel efficiency and the impact of international competition in the petrochemical sector. However, broader policy impacts, such as the European Union's Fit-for-55 legislation, are not included in these projections. At the global level, these projections indicate that demand for gasoline-type fuels will decline at an average annual rate of 0.31% over the next decade, while diesel consumption is expected to grow modestly by 0.9% a year. The projected decline in total fuel use is concentrated in high-income countries, whereas in most other regions, overall fuel demand is anticipated to rise (Figure 8.1).

This Outlook expects a slower growth rate of biofuel consumption and production globally, both projected at 1.4% p.a. during the projection period. This is three fifth of the growth observed in the previous decade, primarily as a result of declining total fuel use in high-income countries. While high-income countries have accounted for 40% of the growth in biofuels over the past ten years, this share is expected to drop to 10%, with 80% of the anticipated growth in biofuel demand expected to take place in emerging economies (Figure 8.2), notably India, Brazil and Indonesia. In 2025, 51% of ethanol supply and demand was located in high-income countries. However, it is anticipated that over the next decade, this share will decrease to 43%, with middle-income countries gaining prominence. A different pattern is observed for global biomass-based diesel, where consumption is primarily driven by the United States and Indonesia.

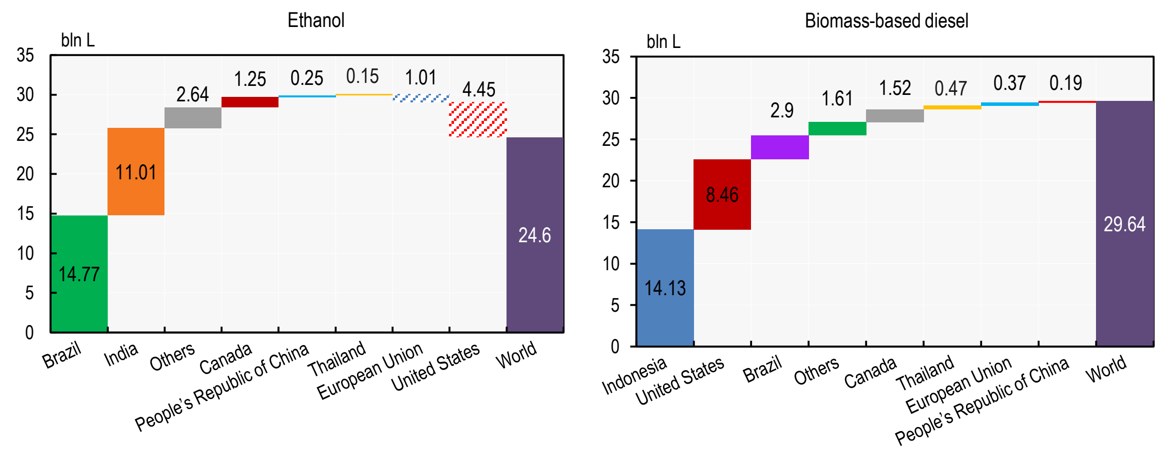
Figure 8.1. Biofuel demand trends in major regions, 2035 vs. base period 2023-25



Note: Shares calculated on demand quantities expressed in volume. The size of each bubble relates to the consumption volume of the respective biofuel in in the base period. Change in gasoline and diesel demand includes the biofuel components.

StatLink https://stat.link/3i0jok

Figure 8.2. Regional contribution of growth in biofuel consumption, 2035 vs. base period 2023-2025

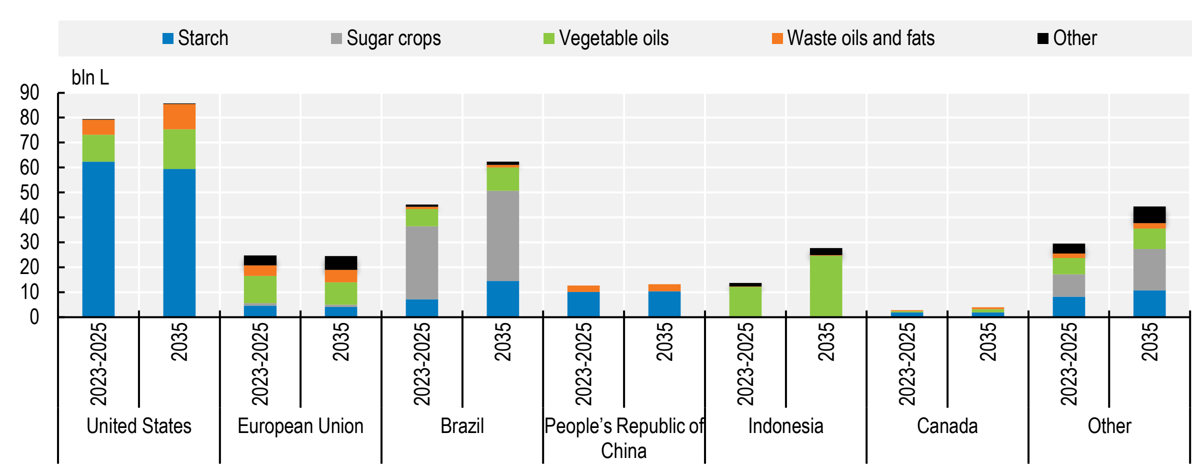


StatLink https://stat.link/gus10i

Global ethanol and biomass-based diesel production are projected to increase to 162.5 billion litres (bln L) and 99.0 bln L, respectively, by 2035. In the base period, ethanol's total feedstock will be made up of 61% maize, 22% sugar cane, 5% molasses and 2% wheat. The remaining 9% will be a mix of assorted grains, cassava and sugar beets. Biomass-based diesel's total feedstock consisted of 69% vegetable oil and 23% used cooking oils and tallow, which have recently grown in importance. The other 8% is made up of non-edible oils and other waste.

Despite the increasing scrutiny of the sustainability of biofuel production witnessed in many countries, and notwithstanding significant variations in feedstock composition, conventional (or food-related) feedstocks are expected to remain predominant in the industry (Figure 8.3). While cellulosic feedstocks – such as crop residues, dedicated energy crops or woody biomass – offer promising alternatives that avoid competition with food sources, these advanced feedstocks are not expected to experience a substantial increase in their share of total biofuel production.

Figure 8.3. World biofuel production from different feedstocks



United States

Biofuel policies in the United States are controlled federally by the Renewable Fuel Standard programme, the Inflation Reduction Act and various state policies. The programme mandates a specific annual volume of renewable fuels to be blended into conventional transportation fuels. In 2025, the Environmental Protection Agency proposed the level for renewable volume obligations for 2026 and 2027. As the final decision was still pending at the time this Outlook was produced, this proposal was taken into account.[2] Due to the decline in gasoline consumption projected by the International Energy Agency, due to better vehicle efficiency and an increase in the number of EVs, ethanol consumption is expected to decrease although the ethanol blend rate is expected to rise to 11% by 2035. However, petroleum refiner preference for renewable diesel in meeting the Environmental Protection Agency's mandates and infrastructure limitations will constrain the expansion in use of fuels with greater ethanol inclusion.

Maize is expected to continue to be the primary feedstock for ethanol production, comprising 99% of production by 2035. Meanwhile, capacity for cellulosic ethanol production from non-food sources is assumed to grow gradually over the projection period, albeit from a low initial level. Despite the United States retaining its position as the largest ethanol producer globally, its share is projected to decline from 44% to 37%. Biomass-based diesel production is projected to increase by 1.55% p.a. to account for 26% of global production in 2035. This growth is propelled by increased consumption of renewable diesel driven by rising targets in federal and state renewable fuel programmes, notably the low-carbon fuel standard in California.[3] Sustainable Aviation Fuel projects, however, have recently been stalling and since SAF targets are not binding, this Outlook assumes only limited growth in that segment.

The European Union

In the European Union, the Renewable Energy Directive (RED) serves as the legal framework governing the advancement of renewable energy across multiple sectors, including transport. Initially ratified in 2009, this directive has undergone two significant revisions: Directive (EU) 2018/2001 (RED II), and subsequently Directive (EU) 2023/2413 (RED III). Under the RED, specific targets are set for the share of renewable energy within total energy consumption for each European Member state. This target is set at a minimum of 42.5% binding at EU level by 2030 – but aiming for 45%. Regarding biofuels, the RED originally included mandates for the blending of biofuels into conventional fuels, aiming to reduce GHG emissions and dependency on fossil fuels. RED II and RED III impose limits for using feedstocks from food and feed crops, which restricts the expansion of agricultural feedstocks to be used in biofuel consumption. Moreover, biofuels have faced stricter sustainability criteria in response to concerns regarding their indirect land-use change (ILUC) effects, with clear rules defined to categorise high-risk ILUC feedstocks. Palm oil is the only feedstock that falls under the high-risk category under the current regulation but can be certified for low-risk ILUC under specific circumstances. Additionally, RED III raises the target for advanced biofuels from 3.5% to 5.5% by 2030. Supporting measures to reach this target include limitations on certain feedstocks, such as food crops, while incentivising the use of advanced biofuels derived from waste or residues.

The anticipated reduction in transport fuel use is expected to reduce ethanol and biomass-based diesel consumption by -0.71% p.a. The biomass-based diesel content of diesel fuel is expected to rise from 11% to 15%, while the ethanol share in gasoline is projected to slightly increase from 6.8% to 7.5%. Biomass-based diesel production is expected to decrease according to the reduction in total transport fuel and the share derived from palm oil is projected to decrease from 12% in the base period to 2.4% in 2035 due to sustainability concerns. The share of biomass-based diesel production from used cooking oils and fats is projected to increase from 24% to 28%.

Brazil

For years, Brazil has had a large fleet of flex-fuel vehicles capable of operating on gasohol (gasoline-ethanol blend) or pure hydrous ethanol. The ethanol blend rate in gasohol varies between 18% and 27%, influenced by the relative prices of sugar and ethanol, which influence the allocation of sugarcane between sugar and ethanol production. The mandated ethanol percentage has been set at 30% since 2025. Over the next ten years, this blending mandate is expected to increase to 35%. Including ethanol use in high blends, more than 50% of total gasoline fuel is covered by ethanol today and the Outlook expects this share to increase to 60% by 2035. The growth of biomass-based diesel's share in the Brazilian energy matrix has been driven by the mandatory blending with fossil diesel. Currently, the established percentage is 14%, which should increase to 15% in 2026, as approved by Brazil's National Energy Policy Council. A 15% blending mandate is assumed throughout the Outlook period.

Unlike the United States and the European Union, total fuel consumption of gasoline and diesel is expected to increase in Brazil over the next decade, suggesting potential growth in biofuel blending. Brazil is expected to maintain its position as the world's second-largest producer and consumer of fuel ethanol over the next decade. Ethanol consumption and production in Brazil are both projected to increase by 2.9% p.a., driven by the National Biofuels Policy (RenovaBio) programmes. Launched in 2017, these programmes play a pivotal role in fulfilling Brazil's commitments to reduce GHG emissions. While sugar cane is anticipated to remain the primary feedstock for ethanol production, maize usage has surged in recent years, rising from less than 0.5 bln L before 2017 to almost 8.2 bln L in 2025. The *Outlook* projects that maize will continue gaining ground in the feedstock mix, reaching 14.5 bln L by 2035.

Indonesia

The envisaged implementation of the B35 and B40 biomass-based diesel blends is intended to decrease national reliance on imported fossil fuels, stabilise palm oil prices, reduce greenhouse gas emissions, and reinforce the domestic economy by offering nearly half a million jobs within the sector.[4] In recent years, biomass-based diesel production has steadily increased due to a national biomass-based diesel programme, which provides support to biomass-based diesel producers. This programme is financed by levies imposed on exports of various products, including crude palm oil (CPO), used cooking oil and palm oil. The level of the export levies imposed is revised on a regular basis according to global market conditions and depends on a reference price. Recently, the CPO fund has been depleted. However, the Outlook assumes that producer prices will remain above USD 1 000 per tonne in nominal terms, enabling a partial replenishment of the fund. This replenishment would help subsidise domestic biomass-based diesel production, but it would also lead to higher consumer prices. Based on these assumptions, biomass-based diesel production in Indonesia is projected to increase to about 27.4 bln L by 2035.

India

India has accelerated its ethanol production expansion aiming to achieve E20 (ethanol 20% blend) by 2025. Ethanol production has increased significantly recently, with sugar cane and grains accounting for the bulk of the increase, rather than the traditional feedstock of molasses. The Outlook assumes sugar cane will consolidate as the primary feedstock, followed by molasses. Given the expanding gasoline demand, the blending target of E20 could be met in 2026. Ethanol production is expected to reach 19.2 bln L in 2035. The Outlook assumes that demand is driven by the current E20 target, but there is sufficient production capacity and feedstock availability to meet a higher blending rate. However, achieving this would require continuing support in the form of minimum support prices based on the feedstock, as well as tax credits. Moreover, motor vehicle engines would need to be adapted to higher blending rates. The government of India has recently established a partnership with Brazil to adopt innovative technology to implement higher blends. The limited supply of vegetable oil, for which India is a net importer, combined with high international prices, will remain the main constraint to any significant increase in biomass-based diesel production.

People's Republic of China

This Outlook assumes that the ethanol blending rate, which had been around 1.6% in recent years and increased to 2% in 2025, will increase to 2.5% in 2035. This increase offsets the projected decline in total gasoline usage leading ethanol consumption to increase modestly. Biomass-based diesel consumption, however, is projected to grow by 1.68% p.a. The Outlook assumes that only domestically produced feedstocks will be used.

Canada

The Canadian Clean Fuels Standard, which came into law in 2022, promotes further use of biofuel in Canada by increasing incentives for the development and adoption of renewable fuels, technologies and processes. The Clean Fuels Standard aims at a 15% reduction (below 2016 levels) in carbon intensity of transport fuels by 2030. Starting in January 2023, 10% renewable content in gasoline and 15% in diesel are required. Subsequently, biomass-based diesel consumption in Canada more than doubled between 2022 and 2025. Canada's third, and largest, renewable diesel plant began operation in July 2025, bringing capacity up from 1 bl L in 2024 to over 2 bln L in 2027. This Outlook assumes that this capacity will be fully utilised throughout the projection period, but that no additional capacity will be developed. Biomass-based diesel production surpassing 2 bln L is projected to lack behind consumption increase to 3.5 bln L. Ethanol consumption is expected to increase by 1.0 bln L and this increase is projected to be mainly covered by imports.

Argentina

In Argentina, the Biofuels Law of 2021 mandated a biomass-based diesel blending rate of 5% which can be reduced to 3% if high feedstock prices distort fuel prices. In June 2022, the government approved a resolution raising the biomass-based diesel mandate from B5 to B7.5, while also permitting temporary increases of up to B12.5 in the event of diesel shortages. Although biodiesel consumption fell to a record low in 2025, the Outlook assumes that Argentina maintains the B7.5 mandate throughout the projection period. With limited additional export possibilities, biomass-based diesel production is projected to stagnate over the next ten years.

The ethanol blending target has been maintained at 12% despite a push from bioethanol producers to increase it to 15%. The Outlook assumes the rate will remain fixed and ethanol fuel use is projected to increase by 1.8% p.a. following the increase in total gasoline use.

Thailand

Despite the targets set in the Alternative Energy Development Plan for sugar cane (and indirectly molasses) and cassava, limited domestic availability is expected to constrain biofuels production. In addition, stagnating demand for fossil fuels will limit increasing demand for ethanol. Blending is expected at 11% over the Outlook period, corresponding to a production increase to 1.6 bln L over the next decade. Biomass-based diesel demand is expected to be supported by the mandatory blending, with demand increasing to 2.1 bln L by 2035.

Colombia

Ethanol demand is projected to increase over the Outlook period in line with the recovery of gasoline demand. Over the medium term, the blending rate is projected to remain around 9%. Sugar cane will remain the principal feedstock, and by 2035, biofuel production is projected to use 23% of total sugarcane output, compared with 14% in the base period, thereby reinforcing ethanol's role as a key driver of the Colombian sugar cane sector. The biomass-based diesel blending rate has been about 12% and is expected to remain so over the projection period.

Other countries

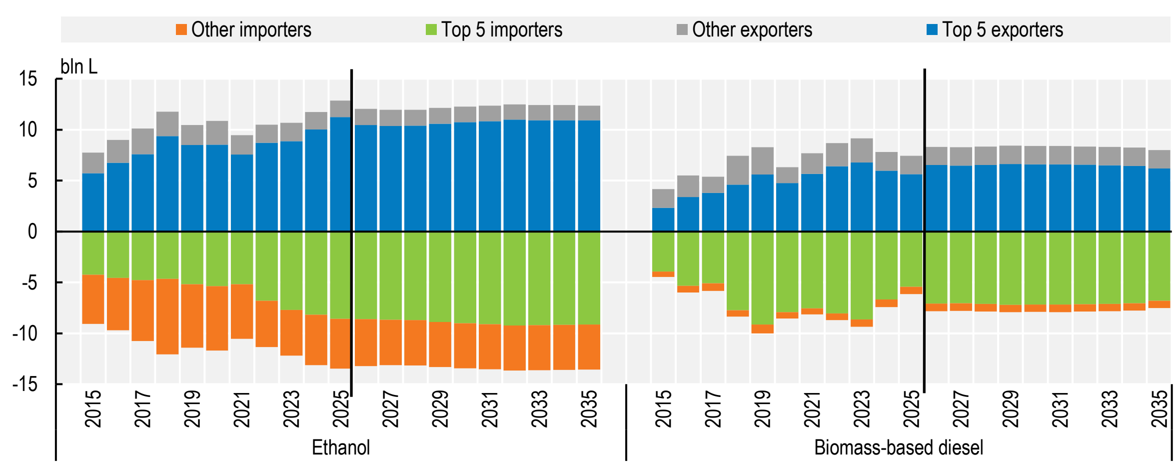
Other significant producers of ethanol include Paraguay, the Philippines and Peru, where production is projected to reach 0.7 bln L, 0.6 bln L and 0.3 bln L, respectively, by 2035. The blending rate in Paraguay is assumed to remain stable around 22% over the projection period given the limited supply of sugar cane, which cannot be entirely substituted by maize. Malaysia, the Philippines and Peru are also major biomass-based diesel producers, where production projections reach 1.6 bln L, 0.6 bln L and 0.2 bln L, respectively, by 2035. Other Asian countries, particularly Singapore, could increase production to reach around 0.9 bln L of biomass-based diesel from used cooking oil in 2035. Unlike most countries where biofuels are domestically used to reduce GHG emissions and national dependency on imported oil, production of biomass-based diesel in Singapore is largely for export.

8.3.2. Trade

Global biofuel trade is expected to remain constant

World ethanol trade is projected to marginally decrease from 12.8 bln L to 12.3 bln L by 2035, with total share of production decreasing from 8.9% to 7.6% by the end of the projection period. The United States and Brazil are expected to remain the main exporters of maize- and sugar cane-based ethanol. The export share of these two countries combined is expected to even increase from 75% today to 80% in 2035.

Figure 8.4. Biofuel trade dominated by a few global players



Note: Top five ethanol exporters in 2035: United States, Brazil, Pakistan, South Africa, Paraguay. Top five ethanol importers in 2035: Canada, Japan, India, United Kingdom, European Union. Top five Biomass-based diesel exporters in 2035: China, United States, European Union, Argentina, Malaysia. Top five Biomass-based diesel importers in 2035: European Union, Canada, United States, United Kingdom, China. Classification of biofuels by domestic policies can result in simultaneous exports and imports of biofuels in several countries.

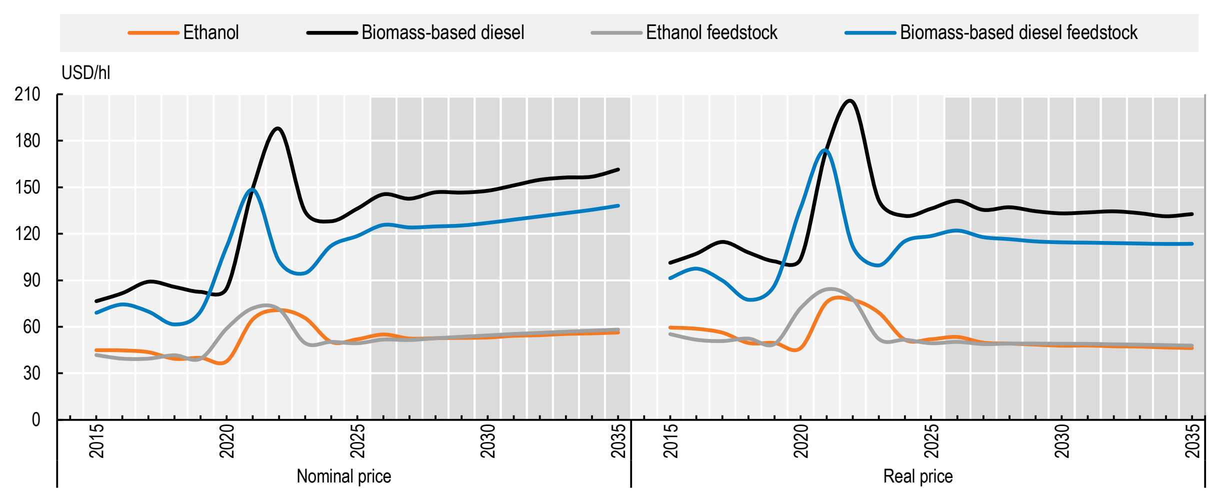
Globally, biomass-based diesel trade accounts for 10% of production, and this share is projected to decrease to about 8%. Indonesian biomass-based diesel exports fell dramatically in 2020 and have remained low since. Reflecting high domestic demand and reduced export opportunities to the European Union, Indonesia is not expected to return to international markets with significant biomass-based diesel exports. The top five exporters of biomass-based diesel – China, the United States, the European Union, Argentina and Malaysia – are projected to maintain a combined market share of 82% (Figure 8.4).

8.3.3. Prices

Prices in real terms are expected to decrease

Following their peak in 2022, nominal prices for biomass-based diesel and ethanol declined through 2023 and 2024, primarily attributed to lower feedstock and oil prices. In 2025, both prices recovered and, subsequently, projections indicate a gradual increase in nominal biofuel prices up to 2035 in line with energy and feedstock prices. However, in real terms, ethanol and biomass-based diesel prices are anticipated to decrease over the next decade (Figure 8.5).

Figure 8.5. The evolution of biofuel prices and biofuel feedstock prices



Note: Ethanol: wholesale price, US, Omaha; Biomass-based diesel: Biodiesel Producer price, Germany, net of Biomass-based diesel tariff and energy tax. Real prices are nominal world prices deflated by the US GDP deflator (2025=1). As proxy for the Biomass-based diesel feedstock price, the world vegetable oil price is used and for ethanol a weighted average between raw sugar and maize is applied.

8.4. Risks and uncertainties

Evolution of policies and relative prices are key

Uncertainties in the biofuel sector originate from the policy environment, feedstock availability and fossil fuel price movements. Policy-related uncertainty encompasses fluctuating mandate levels, varying enforcement mechanisms, shifts in investment toward non-traditional feedstocks, changes in tax exemptions and subsidies affecting biofuels and fossil fuels, and the influence of policies promoting EVs and sustainable aviation fuel (SAF) technologies. These factors collectively shape the stability and predictability of future biofuel demand.

Fluctuating fossil fuel prices play a direct role in determining the competitiveness of biofuels, often interacting with subsidy schemes that support the sector. Oil market volatility can disrupt established biofuel market structures by influencing related policy decisions, potentially creating enduring impacts. At the same time, emerging trade alliances and structural changes in the energy sector may generate new market premiums that affect biofuel pricing and competitiveness.

Feedstock supply uncertainty remains significant, as governments typically reserve surplus agricultural commodities for biofuel production to protect food security. Although blending mandates are expected to stimulate biofuel production in emerging economies, recent spikes in cereal and vegetable oil prices have renewed concerns about the ethical implications of diverting crops towards fuel. Consequently, feedstock eligibility towards reaching biofuel targets is uncertain. For example, a recent proposal of the European Union classifies soybeans as high-risk ILUC feedstocks. Advanced biofuels offer an alternative pathway, drawing on cellulosic feedstocks such as agricultural residues or energy crops that compete less with food production. Waste-based feedstocks, including municipal solid waste and used cooking oil and tallow, also provide viable options while contributing to improved waste management.

Global EV adoption has increased steadily since the mid-2000s, with more than 20 countries committing to phase out internal combustion engine vehicle sales and several, along with the European Union, aiming to achieve net zero emissions vehicles within the next 10-30 years. Governments continue to support this transition through deployment targets, purchase incentives and programmes that encourage research and innovation. However, in the United States EV sales grew rapidly through 2023 and 2024, surpassing one million units in 2023 and reaching a 10% share of all new light-duty vehicle sales in 2024. However, growth slowed in 2025 following the expiration of federal incentives, with EV market share dropping to 6% in towards the end of 2025. The EV-market outlook remains uncertain as the industry adjusts to the absence of federal tax credits and increasing competition between EV producers. In the European Union, however, EV sales increased by 30% in 2025, meaning that every fifth car that is sold today is fully electrical. At the same time, emerging discussions around protecting domestic EV industries from imported vehicles may add further uncertainty to global adoption trajectories.

While the Outlook does not explicitly model SAF production and consumption, substantial long-term increases in SAF use could significantly influence demand for feedstocks, depending on technological development and policy support. Biofuels are also expected to contribute to emissions reductions in the maritime shipping sector. Nonetheless, unexpected technological advances or regulatory changes across transport modes could alter future biofuel market projections. Countries are likely to introduce policies promoting innovative technologies to reduce GHG emissions, thereby influencing agricultural markets and shaping biofuel demand. The private sector’s response, particularly investments in EV and SAF technologies, will play a decisive role in determining biofuel usage patterns over the coming decade and beyond.

Notes

[1] Section 45Z of the United States Internal Revenue Code, created by the Inflation Reduction Act, is the Clean Fuel Production Credit. It provides a performance-based, technology-neutral tax credit to domestic producers of transportation fuels with low lifecycle greenhouse gas (GHG) emissions. It applies to fuel produced after 31 December 2024, and sold through 31 December 2029.

[2] The final decision was published on 27 March 2026, and suggest that projections for biomass-based diesel would be slightly higher compared to the numbers published in this Outlook.

[3] However, California has already reached a blending rate of 80% for BBD. This segment might be close to saturation.

[4] Recent discussions about extending the mandate to B50 have been paused.

9 Cotton

This chapter describes market developments and medium-term projections for world cotton markets for the period 2026-2035. Projections cover consumption, production, trade and prices for cotton. The chapter concludes with a discussion of the key risks and uncertainties which could have implications for world cotton markets over the next decade.

9.1. Projection highlights

Global use of raw cotton is projected to grow by 1.6% annually over the next decade, supported by the continued expansion of textile and spinning capacity in Asia, in particular in Bangladesh, India and Viet Nam, which benefit from competitive labour and production costs.

People's Republic of China (hereafter "China") will remain the world's largest cotton processor by 2035, followed by India.

Global cotton production is expected to grow by 1.6% annually, largely as a result of by yield improvements, reaching 30 million tonnes (Mt) by 2035. Faster production growth is expected to lead to an increase in cotton stocks over the Outlook period, reversing the decline observed over the past decade.

China is expected to remain the world's largest cotton producer, followed by India, where yields are projected to recover from the recent downturn and increase gradually over the Outlook period. Brazil should follow closely behind, thanks to major improvements in productivity.

Global cotton trade is projected to expand steadily at 2.4% per year over the medium term, fuelled by rising import demand in Asia, particularly in Bangladesh and Viet Nam. With limited domestic production capacity and continued growth in mill use, both countries are expected to surpass China as the world's largest cotton importers.

As Brazil's role in global cotton production continues to grow, it is expected to remain the largest exporter over the next decade, followed by the United States, with both countries meeting the growing demand from Asian countries.

International cotton prices are expected to decline slightly in real terms over the Outlook period, driven by productivity gains on the supply side and continued competition from synthetic and recycled fibres on the demand side.

A number of uncertainties could alter cotton market projections, changing macroeconomic conditions and unforeseen shifts of consumer preferences toward sustainability, organic cotton, recycling and second-hand clothing. On the supply side, projections are subject to yield uncertainty related to unexpected shocks and systematic changes in growing conditions due to weather shifts, water availability or pest infestations.

9.2. Current market trends

Global cotton production to remain above mill use in 2025/2026

Global cotton production in 2025/2026 (August/July) is expected to increase slightly compared with the previous year and exceed global mill use. The year-on-year increase is mainly driven by expectations of larger outputs in key producing countries, particularly China, India and Brazil. Together with the United States and Pakistan, these five countries account for about 79% of global cotton production and play a central role in shaping the global supply balance. In China, higher yields following generally favourable weather conditions during the growing season are projected to boost output, marking a steady recovery after the sharp decline in 2023/2024. Similarly, in India, a recovery in yields is expected to drive an increase in cotton production. In Brazil, production is forecast to rise from the previous year and reach a record level, driven by area expansion and higher yields supported by favourable growing conditions. These production gains are forecast to more than offset production declines in the United States and Australia. Pakistan and West African countries are also expected to record lower production, reflecting reductions in planted area and lower yields.

Global cotton consumption in 2025/2026 is projected to remain relatively subdued amid moderate global demand for textile and apparel products, with lower consumption in China, the largest cotton-spinning country, largely offset by higher mill use in India. Together, China, India, Pakistan, Bangladesh and Türkiye account for about 77% of global cotton mill use, underscoring the importance of developments in these markets for the global cotton outlook. In China, consumption is forecast to be marginally lower than in 2024/2025 amid weaker demand from the export-oriented textile and apparel sector and increasing substitution toward synthetic fibres. Consumption is also expected to decrease in Bangladesh. By contrast, cotton consumption is anticipated to increase in India, supported by sustained demand from the domestic textile industry, while mill use in Pakistan and Viet Nam is projected to remain broadly stable.

International cotton prices have generally trended downward since the beginning of the current season, mainly pressured by favourable global production prospects and ample exportable supplies. Subdued global demand for textile and apparel products, together with higher stock levels, has also contributed to the decline. With global production expected to exceed mill use, ample global supplies have continued to weigh on prices. In addition, cotton continues to compete with man-made fibres, particularly polyester, which remains relatively cheaper and continues to influence fibre selection decisions in the textile industry.

World trade of raw cotton in 2025/2026 is set to increase with Brazil and the United States remaining the leading exporters, while Viet Nam and Bangladesh continue to be the largest importers. On the export side, Brazil is expected to be the world's largest cotton exporter for the third consecutive season, accounting for over 30% of global trade, supported by strong production and ongoing improvements in logistics and transport infrastructure. Exports from the United States are also forecast to rise slightly, while shipments from Australia are anticipated to remain broadly stable. On the import side, cotton purchases by China are expected to recover from the sharp decline recorded in the previous season, while imports by Viet Nam are projected to increase further and reach a record level, supported by the expansion of its textile industry. Imports by Bangladesh and Türkiye are forecast to remain at levels similar to those observed in 2024/2025.

9.3. Market projections

9.3.1. Consumption

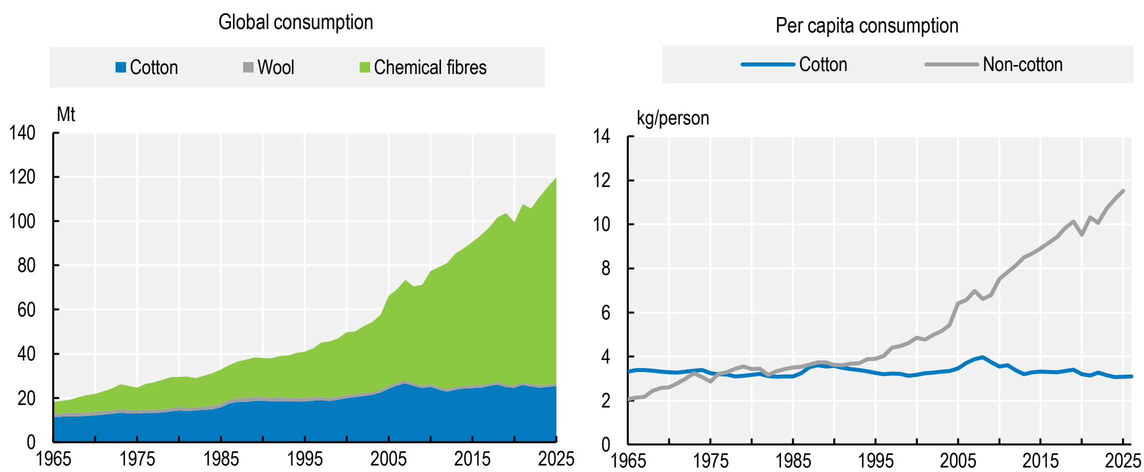
Continued expansions of Bangladesh's and Viet Nam's milling industry account for bulk of global growth

Cotton consumption refers to the transformation of cotton fibres by mills into yarn. Cotton mill use depends largely on two major drivers: global textile demand and competition from synthetic fibres. Over the past decades, global demand for textile fibres has increased sharply, driven mainly by population and income growth, particularly in low-income and middle-income countries. However, this expanding demand has been largely supplied by chemical fibres (Figure 9.1, left panel). The versatility of synthetic fibres and their competitive prices have encouraged the textile manufacturing industry to favour synthetic over cotton fibres. Since the early 1990s, non-cotton fibres have gained solid ground in the textile industry. In 2025, the end-use market share reached 78.9% for chemical fibres and only 21.1% for cotton. Likewise, per capita consumption of non-cotton fibres has strongly outpaced per capita consumption of cotton fibres and continues to increase strongly. In contrast, per capita consumption of cotton has remained stagnant over time and trended downwards in recent years (Figure 9.1, right panel).

The prospects for global cotton use rely mainly on its evolution in developing and emerging economies. Demand from these regions with lower absolute levels of consumption but higher income responsiveness is projected to exert upward pressure on global demand for cotton as these countries' incomes and populations are projected to increase. Global mill use is projected to grow by around 1.6% p.a. over the next decade, steady growth driven by increasing textile demand in middle-income and low-income countries where income and population growth are expected to be the strongest.

The geographical distribution of demand for cotton fibres depends on the location of spinning mills, where natural and synthetic fibres are transformed into yarn. Traditionally, the spun yarn industry has been established predominantly in Asian countries, where conditions such as lower labour costs are favourable for the industry. China has been the world's leading cotton consumer since 1960.

Figure 9.1. Historical trends in the consumption of textile fibres



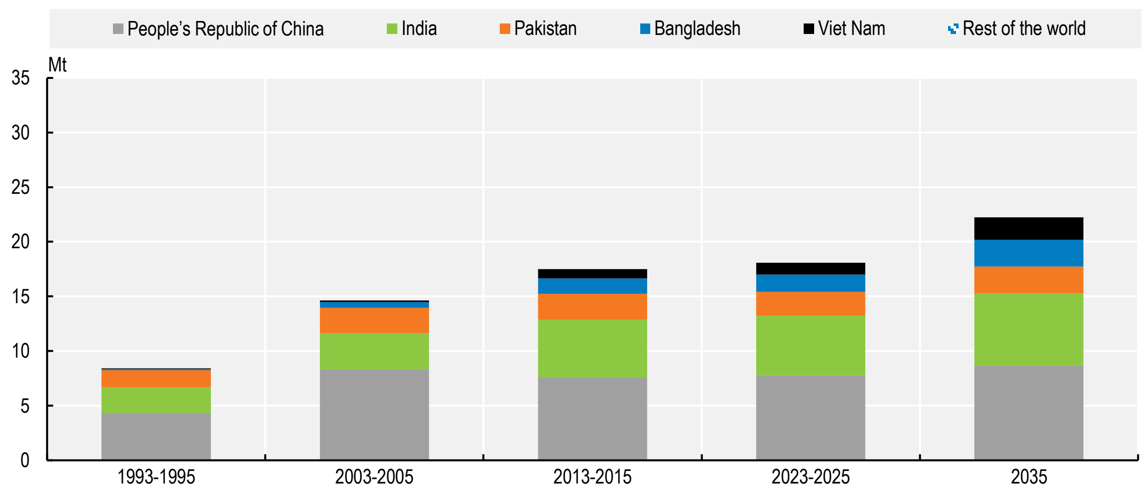
Source: ICAC World Textile Demand estimates, December 2025.

Higher labour costs and more stringent labour and environmental regulations have led to a gradual decrease in China's cotton mill consumption since 2010. This decline was further exacerbated by the abolishment of the support price system in 2014. This contributed to a move to other Asian countries, notably Bangladesh, Viet Nam and Pakistan. While this trend is expected to persist over the coming decade, China is projected to retain its position as the world's largest cotton-processing country.

In India, the world's second-largest cotton processing country, the growing textile industry is expected to result in continuous growth in cotton mill use, as the country's textile industry is predominantly cotton-based. This will be supported by various government initiatives, a number of free trade agreements (FTAs) like the India-EU FTA concluded in January 2026 and the India-UK FTA signed in July 2025, as well as foreign direct investment inflows.

Since the phase-out in 2005 of the Multi-Fibre Arrangement, which imposed fixed bilateral quotas on developing country imports into Europe and the United States, countries such as Bangladesh and Viet Nam have experienced strong growth of their textile industry based on an abundant labour force, low production costs and government support measures. In the case of Viet Nam, this was supported by its accession to the World Trade Organization in 2007 and by foreign direct investment, notably by Chinese entrepreneurs. In addition, FTAs, including the ASEAN-China Free Trade Agreement (2004), the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP, 2018), the EU-Viet Nam Free Trade Agreement (EVFTA, 2020), and the Regional Comprehensive Economic Partnership (RCEP, 2022), have facilitated greater market access to textile exports from Viet Nam. Similarly, in Bangladesh, foreign investments and FTAs, including Bangladesh's duty-free access to the European Union under the Generalized System of Preferences (GSP) and duty-free access to China since 2020, have boosted the country's textile industry, contributing to its emergence as a major global exporter of apparel, particularly knitted and woven garments. The trade agreement signed between the United States and Bangladesh in February 2026, which grants zero-tariff access for Bangladeshi apparel made with US cotton, should further support Bangladesh's expansion in the global textile industry. The expansion of textile industries in Asian economies is expected to continue to boost mill consumption growth over the coming decade. Viet Nam will take the lead in annual growth of mill use at 3.2% p.a., followed by Bangladesh at 2.6% p.a. Nevertheless, China is expected to remain the largest cotton processing country in 2035, followed by India, with consumption projected to grow by 1.3% and 1.6% p.a., respectively, over the next decade (Figure 9.2).

Figure 9.2. Cotton mill consumption by region



9.3.2. Production

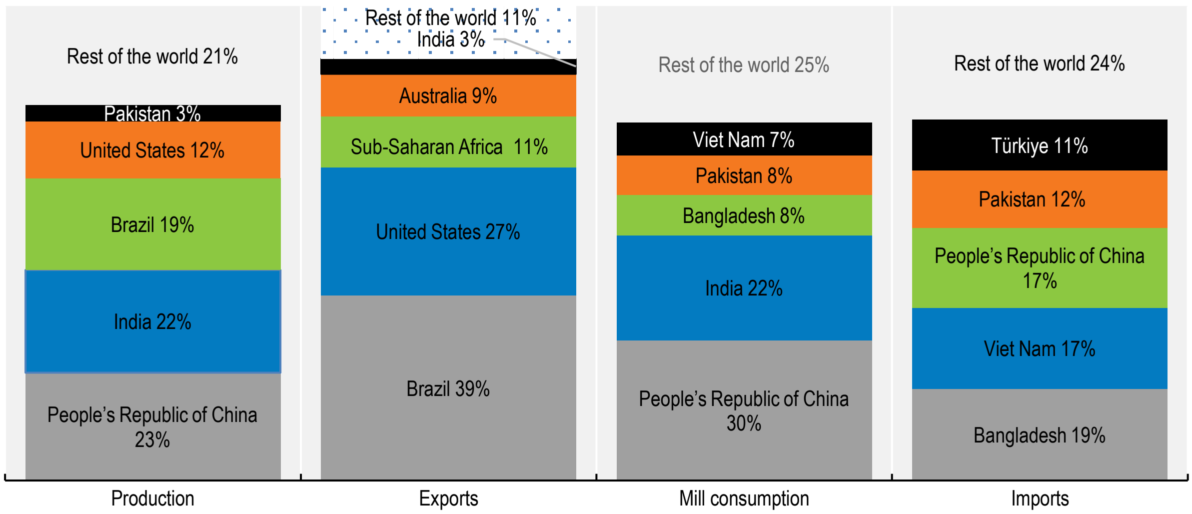
Global production to grow with improved yields, notably in Brazil

Cotton is grown in subtropical and seasonally dry tropical areas in the northern and southern hemispheres, although most of the world's production takes place north of the equator. The leading producing countries are China, India, Brazil and the United States. Jointly, these countries are expected to account for around 76% of global output in 2035 (Figure 9.3).

Global production of cotton is expected to grow steadily and reach 29.7 Mt by 2035, 18% higher than in the base period. The foreseen increase will mostly come from growth in the main cotton producers: Brazil will account for about 45% of the global increase, followed by India (25%) and the United States (14%). Overall, gains in cotton production are predominantly driven by higher yields and, marginally, on expansion in area harvested.

Average global yields are projected to increase by 15% compared to the base period. Factors such as improvements in genetics, better agricultural practices and digitalisation supporting precision agriculture will contribute significantly to enhancing productivity and sustainability. In particular, smart irrigation systems can reduce water usage and energy consumption (Wilson, 2023[1]). The use of sensors and GPS technology for fertiliser application ensures that crops receive the right amount of nutrients needed (IFA, 2019[2]). Additionally, drones and satellite imagery provide real-time monitoring of crop health, enabling more efficient application of water, fertilisers and pesticides (Prasad et al., 2024[3]). Transitioning from traditional diesel-powered harvesters to electric or hybrid models can further reduce emissions and enhance sustainability during the harvesting process. Finally, the development and adoption of drought-resistant cotton varieties can reduce the reliance on irrigation. Similarly, genetically modified cotton varieties, which offer greater resistance to pests like bollworms, can reduce the need for chemical pesticides, contributing to more sustainable agricultural practices.

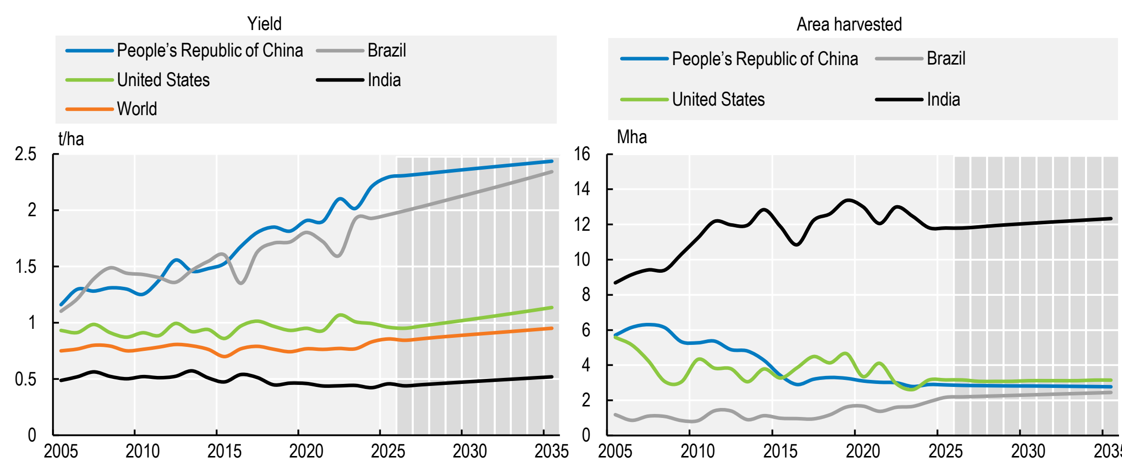
Figure 9.3. Global players in cotton markets in 2035



Note: Presented numbers refer to shares in world totals of the respective variable.

The yield gap between the main producers observed in 2025 is projected to remain constant over the Outlook period. By 2035, yields in Brazil and China are projected to reach well over 2 tonnes per hectare (t/ha), while in India, the second-largest cotton producer, yields are expected to reach only 0.5 t/ha (Figure 9.4, left panel). The cotton area is projected to expand by 1% compared to the base period, with the highest growth occurring in Brazil (+28% compared to the base period), where the prospect of increasing exports encourages producers to invest in increasing the planted area. In Brazil, cotton is very commonly grown in a double-cropping system with soybeans.

Figure 9.4. Cotton yields and area harvested in major producing countries



Chinese cotton is currently produced with the highest global yield (2.2 t/ha average in 2023-2025). Over the past two decades, the cotton area in China has been declining, although this trend seems to have slowed down since 2016. The cotton area is expected to decrease by 0.3% p.a. during the Outlook period, against a 1% decline in the past decade. While cotton production is expected to increase slightly thanks to consistently higher yields and government support,[1] China is expected to remain the largest global producer of cotton by 2035.

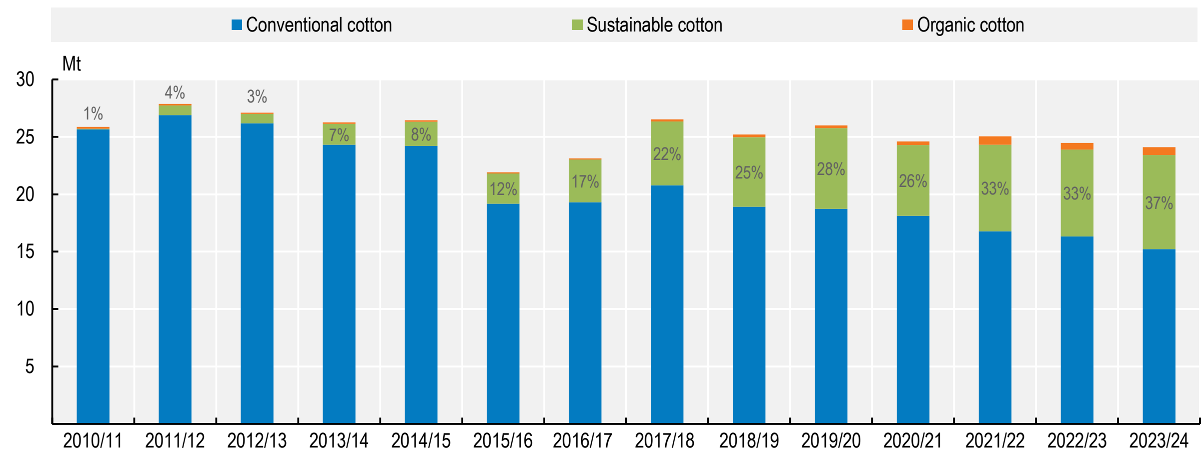
Production in India is projected to grow by around 2.4% p.a. over the next decade, mainly due to yield improvements rather than area expansion, since cotton already competes for land with other crops, such as soybeans and pulses. Raw cotton productivity has stagnated in recent years and is among the lowest globally. Cotton is traditionally grown on small farms, which limits the adoption of intensive farming technologies. Furthermore, farmers in India allocate more row space between plants to accommodate the passage of a bullock and cultivator for weed control purposes, reducing plant density and overall yield potential. To address this, researchers are promoting high-density planting systems, which involve closer plant spacing to maximise yields and enable mechanised harvesting. Following its introduction in the early 2000s, genetically modified (GM) pest-resistant cotton such as Bt initially reduced pest damage and pesticide use, boosting yields and lowering costs. Over time, however, the effectiveness of Bt technology has moderated, with the emergence of resistance in pests such as pink bollworm and increased incidence of secondary pests. In later years, this has been associated with some increase in pesticide use and rising production costs. Meanwhile, drought-tolerant cotton varieties, developed through conventional breeding, are also being promoted to sustain yields in water-stressed regions. Federal and state government agencies, along with research institutions, are actively engaged in cotton varietal development and integrated pest management to enhance productivity in the sector. Based on these considerations, the Outlook assumes a yield growth potential at 1.9% p.a. over the next decade, which will not enable India to catch up with China as the world's largest cotton producer by 2035.

In Brazil, cotton is grown in part as a second crop in rotation with soybeans or maize. Recently, output has strongly grown in the main cultivation areas such as Mato Grosso, where 72% of Brazilian cotton is currently harvested. Cotton output is foreseen to increase by 3% p.a. Production gains mostly come from higher yields due to the increased use of fertiliser and genetically engineered seeds. Recent investments in cotton-growing capacity and the acquisition of new equipment (planters, pickers and ginning capacity) are expected to boost production in the coming years. Due to strong competition with other crops, mainly maize for second crop, the planted area depends significantly on the profitability of cotton compared to other commodities. In this regard, good profitability and the possibility of advance sales of production have led producers to opt for the cotton crop or expand their areas. Moreover, the Brazilian Cotton Growers Association (Abrapa) enhances the competitiveness of Brazilian cotton by focusing on sustainability, traceability, quality and promotion.

Sustainability issues play an important role and will impact cotton markets in the medium term. In a context of growing concerns over the effects of extreme weather events and socio-environmental considerations, new initiatives have been introduced to promote sustainability along the supply chain. In the 2023/2024 season, the market share of virgin cotton covered by programmes recognised by the 2025 Sustainable Cotton Challenge (Textile Exchange, 2025[4]) reached 34% of global cotton production (Figure 9.5). Among the existing standards, Better Cotton, a non-profit organisation, dominates globally at around 23% of all cotton in the 2023/2024 season. Alternative strategies promote better agricultural practices to reduce GHG emissions and provide guidance to textile brands and retailers to source their cotton inputs from recognised and certified sustainable producers. Demand for more sustainable cotton is expected to continue to rise, driven by commitments from brands and awareness among young populations. Therefore, growing trends towards consumption of more sustainable cotton products will likely boost cotton production in countries such as Brazil, where the entire cotton output already complies with sustainability standards. In India and Pakistan, cotton programmes accounted for 31% and 36% of total cotton production in 2023/2024, respectively. The sub-Saharan region is also expected to benefit from higher compliance with sustainability standards, with programmes such as Cotton Made in Africa (CMIA) playing a key role. However, its equivalency agreement with Better Cotton ended in December 2022 and in November 2023 the Regenerative Cotton Standard (RCS) was launched to further promote sustainability. While RCS is still in its early stages, CMIA remains a major contributor to sustainable cotton in the region.

The share of organic cotton in world cotton production has only exceeded 1% since 2020/2021 and accounted for 2.9% of world cotton production in the 2023/2024 season, suggesting a growing demand in the next decade.

Figure 9.5. Evolution of global sustainable and organic cotton



Source: Calculations based on Textile Exchange (2025[4]).

9.3.3. Trade

Trade growth will originate in Bangladesh and Viet Nam over the next decade

World cotton trade is projected to expand steadily over the next decade by 2.4% p.a. to reach 12 Mt in 2035. This growth will be driven by the increasing demand for textiles in Asian countries, particularly Bangladesh, Viet Nam and Pakistan, where mill use is expanding rapidly. Bangladesh is projected to become the world's largest importer, supported by an expected annual growth rate of 3%. Viet Nam and China are expected to follow, with respective growth rates of 3.3% and 3.5% p.a.

As Brazil's role in global cotton production continues to grow, it is expected to remain the largest exporter of raw cotton in 2035, followed by the United States. Exports from the United States have decreased in recent years due to extreme weather conditions affecting production, and Brazil took over as the world's largest cotton lint exporter in the 2023/2024 season. By 2035, Brazil and the United States are projected to account for about two-thirds of global cotton exports.

Brazilian exports are expected to grow strongly over the next decade, benefiting from major investment in improving Brazilian port infrastructure and logistics capabilities. As a result, raw cotton exports are expected to increase by 4.6% p.a., reaching 4.6 Mt by 2035, compared to 3.2 Mt for the United States (+2.4% p.a.). Sub-Saharan Africa as a whole, where cotton is an essential export crop, follows behind (Figure 9.3) with 11% of global exports in 2035.

Sub-Saharan African exports are projected to remain broadly stable in the coming decade and represent nearly 80% of its production (Figure 9.6 left panel), with South and Southeast Asia being the major export destinations. The share of exports in production is projected to fall slightly, mainly reflecting stronger domestic mill use. The textile and apparel industry is expanding in countries such as Ethiopia and Benin, supported by foreign direct investment flows and government investments, leaving fewer opportunities for exports. Access to preferential trade agreements, including the European Union's Generalized Scheme of Preferences (GSP), further supports the industry's growth in these countries.

Figure 9.6. Trade as a percentage of cotton production and mill consumption

Note: * Includes mill consumption and imports from other countries such as Bhutan, Cambodia, Myanmar and Nepal.

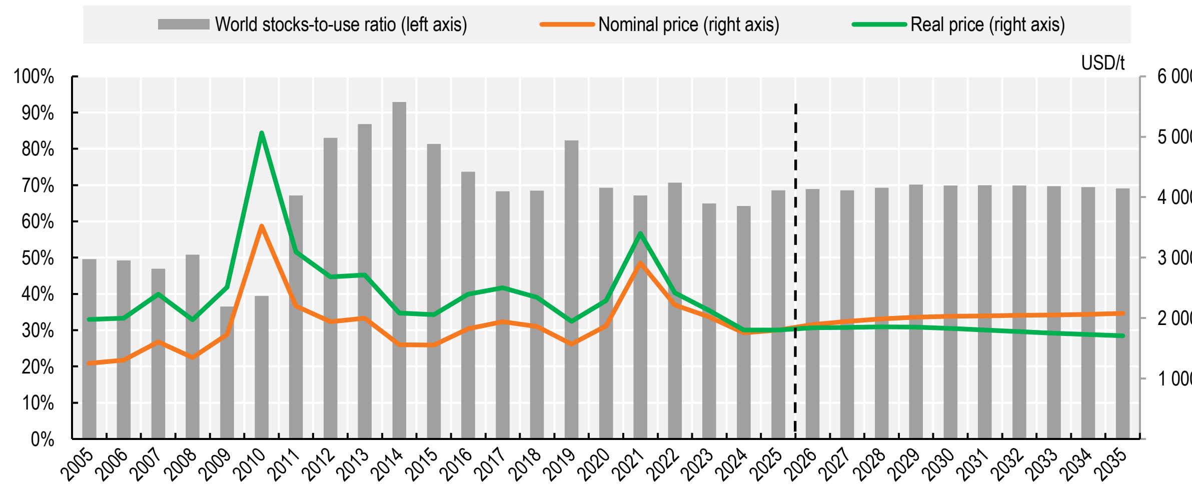
9.3.4. Prices

International cotton prices to decline in real terms over the medium term

International cotton prices in real terms are projected to trend slightly downward in the medium term (Figure 9.7). As the stock-to-use ratio is expected to be rather stable in the next decade, prices will continue to be influenced by competition from man-made and recycled fibres along with changes in consumers' preferences and productivity gains.

From the early 1970s, when polyester became price-competitive, cotton and polyester prices moved closely together. Between 1972 and 2009, cotton prices were, on average, only about 6% higher than polyester staple fibre prices. Since 2010, however, declining polyester production costs, mainly driven by efficiency gains and capacity expansion, have led to significantly lower polyester prices, while cotton prices have remained more volatile. As a result, the price gap has widened substantially, with cotton prices averaging around 77% more than polyester prices in nominal terms, with peaks exceeding 100% during 2020-2023. However, the price gap was observed to have narrowed in 2024/25.

Figure 9.7. World cotton price and stock-to-use ratio



Note: Real prices are nominal world prices deflated by the US GDP deflator (2025=1). The reference cotton price is the Cotlook price A index, Middling 1 1/8", CFR far Eastern ports. Data shown represent the marketing year average (August/July).

9.4. Risks and uncertainties

Evolving textile demand and supply-side shocks drive cotton price volatility, which directly impacts farmers' incomes

Key drivers of per capita textile demand in emerging economies, notably economic expansion and urbanisation, which contribute to rising incomes and evolving consumption patterns, will continue to exert substantial influence on cotton fibre demand, while deviations from expected macroeconomic conditions could alter demand outcomes. Additional demand trends affecting projections encompass the growing adoption of recycling in the textile sector, which now accounts for about 8% of the market, driven primarily by polyester produced from recycled plastic bottles. Within this broader recycling trend, recycled cotton remains marginal in scale and accounted for an estimated 0.3 Mt in 2024, compared to 25 Mt of newly produced cotton. Nevertheless, its expansion may gradually increase competition with cotton fibres and, therefore, slightly moderate the projected growth in cotton mill use over the outlook period (Textile Exchange, 2025[4]).[2] In particular, pre-consumer cotton waste from garment and fabric mills presents a significant opportunity for more efficient recycling, contributing to a lower carbon footprint for the textile sector. Moreover, increased competition from synthetic fibres and evolving consumer preferences towards athleisure apparel present significant hurdles to cotton demand. However, the adoption of sustainability norms and demand for organic and other certified cotton offer potential support to cotton demand amid mounting environmental concerns.

Harvest losses, due to pest infestations and weather variations or water availability constraints, along with supply chain disruptions, such as transportation bottlenecks or trade restrictions, can negatively affect cotton production and limit market availability; the resulting price volatility also affects farmers' income.

Regulatory frameworks promoting sustainability, traceability and labelling standards are reshaping the global cotton landscape, reflecting a growing consumer preference for eco-friendly products. Policies such as the Ecodesign for Sustainable Products Regulation and the Digital Product Passport, the Product Environmental Footprint and the Strategy for Sustainable Circular Textiles in the European Union exemplify initiatives driving this shift. Nonetheless, there are concerns that certain regulatory approaches could unintentionally disadvantage natural fibres. Furthermore, policy measures that affect consumption, such as initiatives by some East African countries to reduce second-hand clothing imports to boost local textile industries, have the potential to bolster cotton consumption and encourage value addition within Africa. However, it is important to ensure that the adoption of these standards benefits smallholder cotton growers by improving their livelihoods.

The transition towards a circular economy, characterised by recycling and the growing second-hand market, presents challenges and opportunities for the cotton industry. The Outlook assumes a slow transition. While recycling initiatives hold promise for resource efficiency, they may disrupt traditional supply chains and alter demand patterns for raw cotton. Furthermore, issues associated with social, economic and environmental sustainability, such as the Strategy for Sustainable Circular Textiles in the European Union, are gaining prominence among consumers, industry stakeholders and policymakers globally.

References

IFA (2019), *How Precision Agriculture is Improving Plant Nutrition*, International Fertilizer Association, https://www.fertilizer.org/wp-content/uploads/2023/01/IFA_2019_Infographic_Precision_Agriculture.pdf. [2]

Prasad, B. et al. (2024), *Fields of Tomorrow: Advancements in Modern Agriculture*, Astitva Prakashan. [3]

Textile Exchange (2025), *Materials Market Report*, Textile Exchange, https://textileexchange.org/knowledge-center/reports/materials-market-report-2024. [4]

Wilson, A. (2023), "Smart irrigation technology covers "more crop per drop"", news, MIT Office of Sustainability, https://sustainability.mit.edu/article/smart-irrigation-technology-covers-more-crop-drop. [1]

Notes

[1] In its Five-year Plan announced in February 2026, China has outlined plans to improve the target price policy for cotton to support farmer's income.

[2] The data cited here refer to mechanically recycled cotton only; chemically recycled cotton is excluded.

10 Other products

This chapter provides a market overview and description of the current market situation for roots and tubers (i.e. cassava, potato, yams, sweet potato, taro), pulses (field peas, broad beans, chickpeas and lentils), and banana and major tropical fruits (mango, mangosteen and guava, pineapple, avocado, and papaya) markets. It also provides medium-term (2026-2035) projections for production, consumption and trade for these products and describes the main drivers shaping these projections.

10.1. Roots and tubers

10.1.1. Market overview

Roots and tubers comprise a group of crops that accumulate starch in underground organs, either in roots (such as cassava, sweet potato and yams) or modified stems and corms (such as potatoes and taro). They are primarily produced for human consumption, either fresh or processed, but can also be used as animal feed or as inputs for industrial processing, notably in the production of starch, alcohol and fermented beverages. Due to their high moisture content and relatively low dry-matter levels, most roots and tubers are highly perishable once harvested unless processed or stored under controlled conditions. This limits long-distance trade and storage and makes the sector particularly susceptible to post-harvest losses.

Within this group of crops, potatoes account for the largest share of global production, followed by cassava. Potatoes rank among the world's most important crops in terms of food availability after maize, wheat and rice in terms of human consumption. They are valued for their relatively high caloric output per unit of land and water, short growing cycles and adaptability to a wide range of climatic conditions. Production is concentrated in Asia and Europe and represents the majority of roots and tubers output in high-income countries. However, global potato production has expanded only modestly over the past decade, reflecting slower growth in several traditional producing regions.

Cassava production has expanded more rapidly in recent decades, particularly in tropical regions of Africa and Asia where it plays an important role in food security and rural livelihoods. The crop is well-adapted to marginal soils and drought-prone environments, making it a resilient staple in many low-income countries. While historically cultivated largely for subsistence consumption, cassava is increasingly integrated into commercial value chains, including the production of starch, animal feed and bio-based products. Investments in processing capacity and growing demand from food, feed and industrial uses have supported the continued expansion and commercialisation of cassava production in several countries.

10.1.2. Current market situation

The largest producing regions of roots and tubers in the base period are Asia (126 million tonnes [Mt]) and Africa (103 Mt). In sub-Saharan Africa, roots play a significant role as a staple crop. Globally, about 154 Mt are used as food, 44 Mt as feed and 34 Mt for other uses, mostly biofuel and starch. As the perishable nature of these crops prohibits significant international trade in fresh produce, countries tend to be self-sufficient. About 8% of world production is traded internationally, mostly in processed or dried form. Thailand is the leading exporter, followed by Viet Nam. People's Republic of China (hereafter "China") is the main destination.

Global production of roots and tubers reached about 282 Mt (dry matter) in the base period (2023-2025). About 8 Mt was added annually over the previous decade and consumed mainly as food. The prices of roots and tubers (measured by the Cassava Thailand export unit value) have generally decreased since September 2024 due to subdued demand from key markets, especially China.

10.1.3. Main drivers for projections

Cassava remains a resilient and versatile crop, requiring relatively low input use and offering flexibility in harvest timing, as roots can be left in the ground beyond maturity. Its tolerance to drought and variable weather conditions supports its role in strategies to respond to extreme weather, particularly in sub-Saharan Africa. In addition to its competitive cost relative to other staples, cassava benefits from a wide range of uses. In Africa, policy initiatives continue to promote products such as high-quality cassava flour as a partial substitute for imported cereals, contributing to food security objectives.

In several countries, including Nigeria, policies encouraging the substitution of wheat flour with cassava-based products aim to reduce reliance on imports and ease pressure on foreign exchange reserves. In Asia, cassava is also used as a feedstock for ethanol production, supported in some countries by biofuel blending mandates, although its use remains sensitive to relative feedstock prices. In international markets, processed cassava products, such as starch and dried chips, compete with maize and other feed grains in industrial and feed applications.

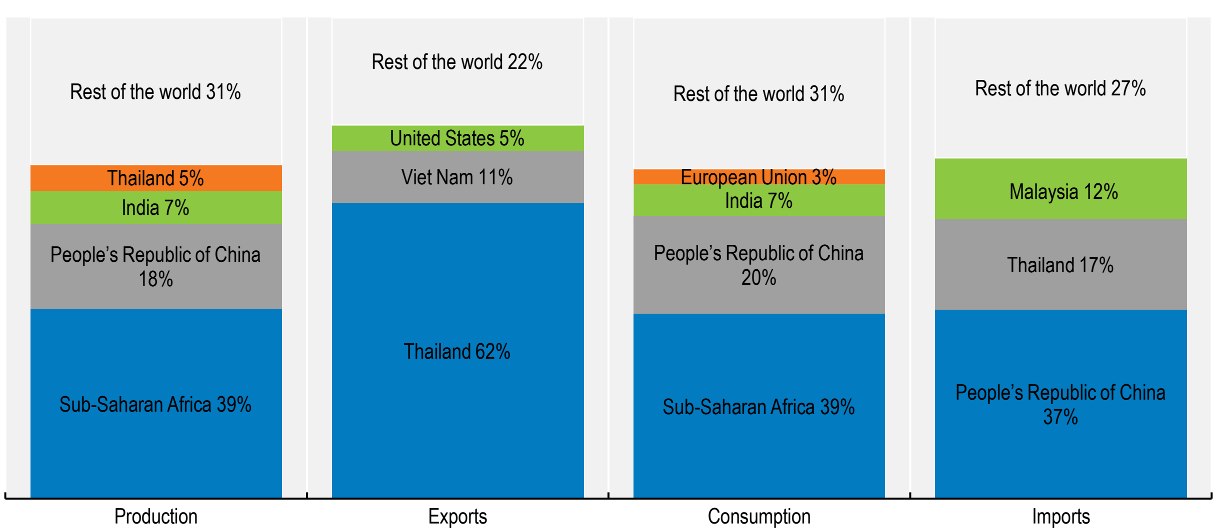
Potatoes continue to be predominantly consumed as food. However, per capita consumption in these regions has stabilised, limiting further growth in total demand. Future expansion in global potato production is, therefore, expected to be mainly driven by population growth and rising consumption in developing regions.

Global sweet potato production has shown a declining trend in recent years, largely reflecting reductions in harvested area in China, the world's leading producer. Demand for sweet potatoes and other roots and tubers remains primarily food-driven, with limited scope for industrial use compared to cassava. As a result, consumption patterns are closely linked to consumer preferences, income growth and relative prices, which continue to shape developments in these markets.

10.1.4. Projection highlights

Global production and use of roots and tubers are expected to expand significantly over the coming decade, by about 20% compared to current levels, depending on yield outcomes and demand developments. Expansion will be driven primarily by low- and lower middle-income countries, where population growth and dietary patterns continue to support rising consumption.

Figure 10.1. Global players in roots and tubers markets in 2035



Note: The presented numbers represent shares in world totals. Shares may not sum to 100% due to rounding.

Harvested area is projected to increase moderately, with most of the expansion occurring in sub-Saharan Africa, reflecting the crop's resilience and its role in food security systems. In contrast, area under cultivation of roots and tubers is expected to stagnate or decline in higher income regions, including parts of Europe and the Americas, where production faces competition from other crops and limited demand growth. Trends are more mixed in Asia, with relatively stable or slightly declining area, particularly due to structural changes in China's sweet potato sector.

Overall production growth is expected to rely increasingly on yield improvements and more intensive production systems, especially in Africa, where investments in improved varieties, better agronomic practices and market integration are gradually raising productivity (Figure 10.1).

Global per capita food consumption of roots and tubers is projected to increase moderately from 19 currently to around 21 kilogrammes (kg)/person/year in 2035, driven largely by population growth and rising consumption in sub-Saharan Africa, where consumption levels are already well above the global average. Growth in biofuel use, while starting from a small base (around 4% of total use), is expected to expand further, supported mainly by demand from China's starch and ethanol industries. Feed and other industrial uses are also projected to increase, reflecting the growing role of cassava and other roots as substitutes for cereals in feed and processing.

International trade in roots and tubers is expected to remain broadly stable at around 8% of global output over the medium term. Exports are concentrated in a small number of countries, notably Thailand and Viet Nam, whose combined shipments are projected to expand further to supply demand from China, particularly for starch production and, to a lesser extent, biofuels.

Prices of roots and tubers are projected to broadly follow developments in cereal markets over the medium term, reflecting their partial substitutability in food and feed uses. As a result, while nominal prices are expected to increase, real prices are projected to remain stable or decline slightly, assuming continued productivity growth and supply expansion.

10.2. Pulses

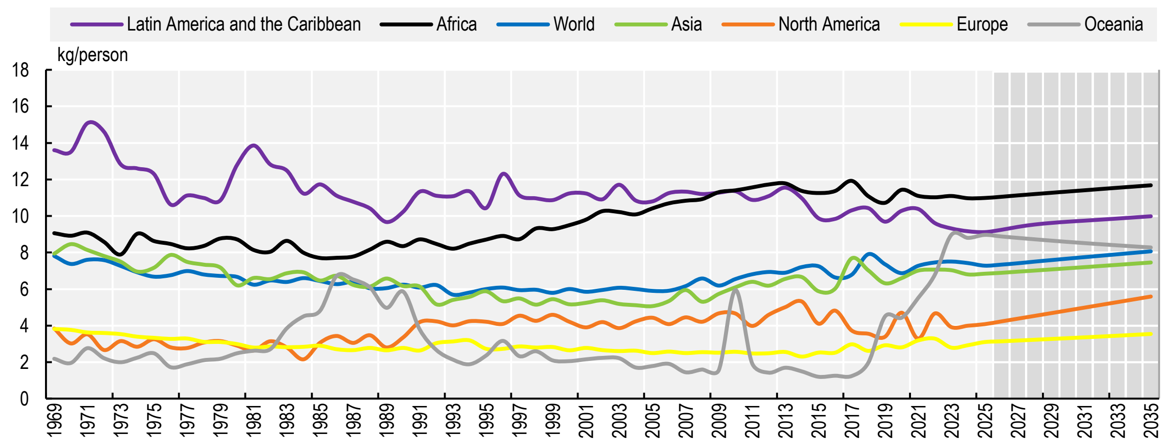
10.2.1. Market overview

Pulses are the dried edible seeds of plants in the legume family.[1] They are an important source of plant-based protein, dietary fibre, complex carbohydrates, vitamins and minerals. Pulses also contain bioactive compounds associated with various health benefits. Their consumption varies widely across regions depending on dietary traditions, relative prices and the availability of alternative protein sources. Compared with many other staple foods, pulses are relatively stable in storage because of their low moisture content and can be kept for extended periods of time without major losses in nutritional quality, which helps limit post-harvest losses.

Pulse cultivation has long been integrated into agricultural systems across many regions. Leguminous crops play an important role in improving soil fertility through biological nitrogen fixation and can contribute to higher soil organic matter when included in crop rotations or intercropping systems. These characteristics can reduce the need for synthetic fertilisers and help diversify cropping systems. Despite these agronomic advantages, global pulse production only expanded slowly until the early 2000s. Limited investment in breeding, relatively low yields compared with cereals and weaker policy support in some regions constrained production growth. Since the early 2000s, however, output has increased more rapidly, supported by expanding demand, improvements in varieties and agronomic practices, and policy initiatives promoting production in several countries, particularly in Asia and Africa.

Global per capita consumption declined from the 1960s to the early 2000s as dietary patterns shifted (Figure 10.2). In recent years, however, consumption has stabilised and gradually increased, reaching 7.5 kg/person/year. Growth has been the strongest in countries where pulses remain a key source of plant-based protein, including India and several African countries.

Figure 10.2. Per capita food consumption of pulses per continent



Pulses are consumed in a variety of forms, including whole seeds, split pulses and flours. More recently, advances in processing technologies have enabled the extraction of pulse proteins, starches and fibres, which are increasingly used in food manufacturing, including meat alternatives, snack products and bakery items.

10.2.2. Current market conditions

India remains the largest producer of pulses, accounting for roughly a quarter of global output. Other major producers include Canada, China, Russian Federation (hereafter "Russia") and the European Union. Asia represents the largest consumption region, where pulses remain an important source of dietary protein, but production does not fully meet demand, making the region a key destination for imports. Globally, roughly one-quarter of pulse production is traded internationally, with Canada leading exports (20% of global trade) and China leading imports (16% of global trade). Africa has continued to expand its production and consumption over the past decade, although the degree of self-sufficiency varies across countries.

In recent years, global pulse markets have been influenced by strong supply growth in major exporting countries, particularly Canada. Favourable growing conditions and attractive returns supported increases in both yields and harvested area, leading to higher exportable supplies. At the same time, policy decisions in key importing countries – most notably the temporary relaxation of import restrictions in India to contain domestic food price inflation – have supported trade flows. Following the price peaks observed in 2021, international pulse prices have eased, reflecting improved supply conditions and relatively moderate demand growth. International prices for pulses, approximated by the Canadian field pea price, have continued to fall since 2021 and are estimated at around 215 United States dollars per tonne (USD/t) in the current marketing year.

10.2.3. Main drivers for projections

Demand for pulses is supported by their role as a relatively affordable source of plant-based protein, particularly in low-income and middle-income countries. In higher income markets, growing interest in plant-based diets and alternatives to animal-sourced foods is contributing to increased use of pulses and pulse-derived ingredients in food processing.

On the supply side, policy support in several countries continues to play an important role. Initiatives aimed at improving domestic protein self-sufficiency, such as the European Union's protein strategy, as well as support programmes in major producing countries, are encouraging pulse cultivation. In addition, the agronomic benefits of pulses – particularly their contribution to soil fertility – make them an attractive component of sustainable cropping systems. At the same time, pulses remain less competitive than cereals in many production systems due to lower and more variable yields, which continues to limit more rapid supply expansion.

10.2.4. Projection highlights

Pulses are projected to regain importance in diets in many regions, with global per capita food consumption increasing by 11% from the base period to reach 8.2 kg/year by 2035. Growth is expected across most regions, with particularly strong increases in countries where pulses remain an important source of dietary plant-based protein and in higher income countries, where demand for plant-based food is expanding.

Global production is projected to increase by around 19 Mt over the coming decade, with India accounting for a significant share of this growth. Production gains in India are supported by improvements in seed varieties, mechanisation, and policy measures such as minimum support prices and procurement programmes.

Overall production growth is expected to result from a combination of yield improvements and more intensive land use, including increased intercropping with cereals, particularly in Asia and Africa. However, yield growth for pulses is projected to remain slower than for cereals and oilseeds, reflecting relatively lower investment in research, irrigation and input use.

World trade in pulses is projected to expand further, reaching around 25 Mt by 2035. Canada is expected to remain the leading exporter, followed by Australia and Russia. International prices in nominal terms are projected to increase over the projection period, while real prices are expected to decline, reflecting productivity gains and moderate demand growth.

10.3. Bananas and major tropical fruits

Bananas and the four major fresh tropical fruits – mango, pineapple, avocado and papaya – play a vital role in agricultural markets, food security and nutrition, and in securing the livelihoods of smallholders in tropical countries. In recent decades, rising incomes and changing consumer preferences in emerging and high-income markets, alongside improvements in transport and supply chain management, have facilitated fast growth in consumption and international trade in these commodities.

Global production of bananas and major tropical fruits generates some USD 125 billion in revenues to support producers. Although only approximately 14% of global banana production and 8% of global major tropical fruit production are traded in international markets, the two commodity groups respectively generate around USD 12.8 billion and USD 15.5 billion per year in export revenues (provisional 2025 figures). In exporting countries, which are mostly low-income or middle-income economies, production and trade revenues can weigh substantially in agricultural gross domestic product, particularly for tropical Latin American countries. For instance, bananas represented about 36% of agricultural export revenue in Ecuador in 2024, while combined exports of pineapples and bananas accounted for some 40% of agricultural export revenue in Costa Rica. As such, trade in bananas and major tropical fruits can generate significant export earnings.

10.3.1. Bananas

Market situation

Preliminary data for 2025 indicate that global trade in bananas experienced a noticeable recovery from the previous years' declines. Key developments centred around fast growth in exports from Colombia and the Philippines, which expanded at double-digit rates year-on-year, jointly adding an estimated 900 000 tonnes in 2025. Substantially higher supplies were also reported from Ecuador, India and Viet Nam, where growth was seen on the back of higher investments in production expansion and favourable climatic conditions. At the same time, the impact of adverse weather conditions and the spread of plant pests and diseases continued to be of concern to the industry and caused disruption to several key exporting countries.

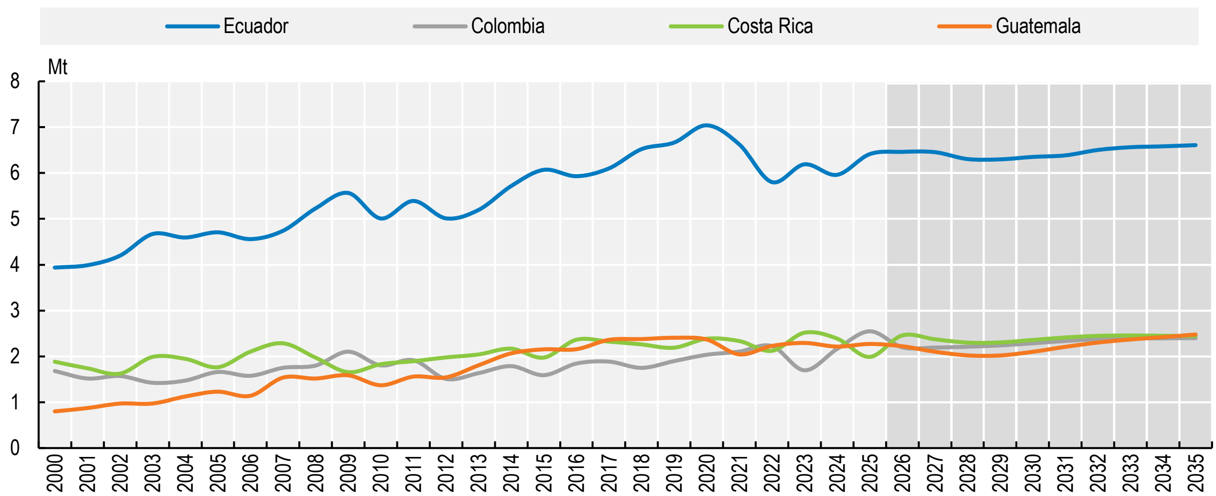
On the import side, a surge in procurements from China and Russia, which grew at double-digit rates over the first nine months of the year, was the main driver of expansion. In the European Union, the largest importer of bananas, demand remained solid against shortages in domestic production in the Canary Islands and the French West Indies. In the United States, rising unit prices for bananas resulted in a noticeable contraction in demand, in particular for higher priced organic bananas.

Projection highlights

Assuming normal weather conditions and no further spread of banana plant diseases, global banana production is expected to reach 168 Mt by 2035, from 140 Mt in the base period. As per capita demand for bananas is becoming increasingly saturated in most regions, growth in global production and consumption is expected to be primarily driven by population dynamics. In line with slowing world population growth, the current baseline projections expect world production and consumption of bananas to expand at a moderate 1.8% p.a. over the Outlook period. At the same time, in some emerging economies – principally China and India – income growth is anticipated to stimulate changing health and nutrition perceptions and support demand for bananas beyond population growth. Accordingly, Asia, the current top producing region, is anticipated to remain so at a quantity of some 87 Mt by 2035, equivalent to a share of just over 50%, with India projected to reach an output of 49 Mt and an annual per capita consumption of 30.4 kg by 2035, from 25.4 kg in the base period.

Production from the top exporting region of Latin America and the Caribbean is projected to reach 35 Mt by 2035, encouraged by rising demand from key markets, most importantly the European Union and the United States. With economic pressures expected to continue in 2026 and potentially beyond, demand for bananas is likely to be supported by the fruit's relative affordability. Total banana exports from Latin America and the Caribbean are expected to expand at 1% p.a., to around 16 Mt by 2035. The largest exporters from the region – Ecuador, Guatemala, Costa Rica and Colombia – are likely to benefit from this growth, provided that output can be shielded from the adverse effects of erratic weather events and disease outbreaks (Figure 10.3). Exports from India, meanwhile, are projected to reach some 1.3 Mt by 2035, from 0.8 Mt in the base period, on account of fast rising demand from the Near East and Central Asia, importantly from Iraq, the United Arab Emirates and Uzbekistan, as well as from neighbouring Nepal. Growing demand from the European Union and the United Kingdom is further expected to benefit exports from Africa, which are projected to expand at 1.3% p.a. over the outlook period – led by Côte d'Ivoire – to reach a total quantity of approximately 0.8 Mt in 2035. Rising import demand from China, where domestic production growth is likely to remain relatively slow, is assumed to be an additional factor driving production growth in Latin America and the Caribbean, and importantly also in emerging Asian suppliers Viet Nam and Cambodia, which may jointly export some 0.9 Mt by 2035. Against this background, world exports of bananas are projected to reach some 22.8 Mt by 2035.

Figure 10.3. World banana outlook: Exports of bananas by the four major Latin American and Caribbean exporters



Source: FAO trade data and projections

10.3.2. Mango, mangosteen and guava

Market situation

Global exports of mango, mangosteen and guava grew to approximately 2.7 Mt in 2025, an increase of 7% from the previous year. Higher exports of mangosteen from Thailand, as well as of mangoes from Brazil, Egypt and Peru were the main driving factors behind this growth. In terms of export quantities by type at the global level, mango accounted for around 85% of global shipments and mangosteen for around 15%. As previously, guava continued to display a low availability in import markets, in particular due to its lower suitability for transport.

Total global import quantities of fresh mangoes, mangosteens and guavas rose by 12% to 2.6 Mt in 2025. The United States and the European Union remained the leading global importers, with estimated import shares of 23% and 17%, respectively. In both markets, consumer demand for mangoes reportedly remained solid, driven by a mounting nutritional awareness of the assumed health benefits of these fruits.

Imports by China, the third leading global importer of mangoes, mangosteens and guavas in recent years, are estimated to have expanded by 19% in 2025, mainly on account of rising domestic demand for fresh or dried mangoes.

Projection highlights

Global production of mangoes, mangosteens and guavas is projected to increase at 2.5% p.a. over the next decade, to reach 89 Mt by 2035, from 63 Mt in the base period. Growth in mango production will mainly respond to income-driven growth in demand in producing countries, additionally supported by population dynamics. Asia, the native region of mangoes and mangosteens, will continue to account for just over 70% of global production in 2035. This will be primarily due to strong growth in domestic demand in India, the leading producer and consumer of mangoes globally, with rising incomes and associated shifts in dietary preferences being the main drivers. Mango production in India is projected to account for about 39 Mt in 2035, or 44% of global production, destined largely for local, informal markets. As such, India is projected to experience increases in per capita consumption of 1% p.a. over the outlook period, reaching 24.5 kg p.a. in 2035, compared to 18.9 kg in the base period, while average annual per capita consumption in Asia overall is expected to reach 14.4 kg in 2035, compared to 10.8 kg in the base period. By contrast, in Mexico and Thailand, the leading exporters, production growth will primarily be driven by expanding global import demand. Exports are anticipated to reach a 19% share of production in Mexico and 34% in Thailand by 2035. However, at projected production quantities of 3.1 Mt and 1.7 Mt in 2035, respectively, Mexico and Thailand will account for comparatively small shares in global production.

Global exports of mangoes, mangosteens and guavas are projected to reach 3.4 Mt in 2035, compared to 2.6 Mt in the base period, on account of higher procurements from the United States, China and the European Union. Mexico, the leading supplier of mangoes, is expected to benefit from further growth in import demand from its major market, the United States, provided the United States does not impose import tariffs on mangoes originating in Mexico. Under this assumption, Mexico would hold a 17% share of world exports in 2035. Meanwhile supplies from Brazil and Peru, two emerging exporters, will be mostly mangoes destined for the European Union. Brazil and Peru are expected to hold some 13% and 10% of world exports in 2035, respectively. Shipments from Thailand and Viet Nam of mangoes and mangosteens will cater mainly to rising import demand from China. Together, Thailand and Viet Nam are expected to account for over 30% of global exports, at roughly an even share each. China, whose annual per capita mango, mangosteen and guava consumption of 3 kg in the base period is relatively low compared to other Asian countries, is expected to experience a rise in imports of 2% p.a., to some 0.8 Mt in 2035. This will be mainly due to a strong, income-driven increase in Chinese import demand for mangosteen, as domestic production of this fruit is expected to remain low in China.

10.3.3. Pineapple

Market situation

Based on preliminary trade data, global exports of pineapples declined by approximately 5% in 2025, to 3.4 Mt, determined largely by significant supply shortages in Costa Rica, the world's leading exporter with a market share of around 60%. In terms of leading destinations, pineapple shipments from Costa Rica continued to be almost exclusively destined for the United States and the European Union. Exports from the Philippines, the second leading exporter of pineapples to global markets, meanwhile expanded by an estimated 14% in 2025, to some 780 000 tonnes, with supplies mainly delivered to China.

Preliminary trade data indicate a relatively stable global import level of approximately 3.2 Mt in 2025, only a moderate change from 2024. While demand in the United States and the European Union continued to be firm, growth was constrained by supply shortages from the main global supplier, Costa Rica, which could only marginally be offset by higher procurements from alternative suppliers. Imports by China, the third-leading global importer of pineapples, expanded by about 9% in 2025, to 260 000 Mt, as domestic production was affected by adverse weather conditions which resulted in lower yields and lower qualities throughout most of the year.

Projection highlights

Over the next decade, global production of pineapple is projected to grow at 1.5% p.a., to reach 37 Mt in 2035, from 30 Mt in the base period, on account of a 1% expansion in harvested area. Asia is expected to remain the largest producing region; accounting for 43% of global production, with sizeable pineapple production in China, India, Indonesia, the Philippines and Thailand. Cultivation in Asia will continue to largely cater to domestic demand and is projected to grow solidly in response to changing demographics and income growth, especially in China, India and Indonesia. Similarly, pineapple production in Latin America and the Caribbean, the second-largest producing region at a projected 34% of world production in 2035, will be primarily driven by the evolving consumption needs of the region's growing and increasingly affluent population. Only Costa Rica and the Philippines, two important global producers and exporters, are anticipated to see additional stimulation from rising import demand, with exports of fresh pineapples projected to account for approximately 77% of production in Costa Rica and 23% in the Philippines in 2035.

Global exports of fresh pineapple are set to grow at 1.4% p.a., to 3.8 Mt in 2035, predominantly driven by demand from the United States and the European Union. With projected imports of 1.2 Mt in 2035 – equivalent to a 34% global share – the United States is expected to remain the largest importer. The European Union is expected to account for some 26% of global imports. In both key markets, demand is assumed to benefit from continuously low unit prices and, to some degree, the introduction of more premium novelty varieties. Rising import demand from China, where consumption growth has been outpacing production expansion in recent years, is expected to additionally drive expansion in global exports. At a growth of 5.9% p.a., China is projected to reach import quantities of some 0.3 Mt per year by 2035, with supplies primarily sourced in the Philippines.

10.3.4. Avocado

Market situation

Global exports of avocado expanded by an estimated 13% in 2025, to around 3.3 Mt, in contrast to the moderate 2% expansion seen in 2024. While exports from Mexico were constrained by strong domestic demand, avocado shipments from Peru expanded substantially on the back of production expansion and rising import demand. Together these two exporters supply over 60% of total traded quantities to world markets, with shipments primarily destined for the United States and the European Union. Higher exports were also reported from several emerging suppliers to world markets, notably Chile, the Dominican Republic and Morocco. Meanwhile, exports from Kenya and South Africa contracted amid logistical bottlenecks related to the Red Sea crisis.

Preliminary data and information indicate that global imports of avocados rose by some 12% in 2025, to approximately 3.1 Mt. Strong supplies in global markets meant that rising demand in the key import destinations, the European Union and the United States, could be catered to. Both in the United States and across the European Union, consumption continued to gain in popularity among an increasingly health-conscious population, with avocados widely perceived as a highly nutritious fruit.

Projection highlights

Avocado has the lowest production level among the major tropical fruits but has experienced the fastest expansion in output in recent decades and is expected to remain the commodity whose production will grow most rapidly among the major tropical fruits over the Outlook period. Ample global demand, high returns per hectare and lucrative export unit prices continue to be the main drivers of this growth, stimulating investments in area expansion in both major and emerging production zones. By 2035, production is thereby projected to grow at 2.6% p.a. and reach 16 Mt – more than triple its level in 2015. While new growing areas have been emerging rapidly, avocado production is likely to remain concentrated in a small number of regions and countries. The top four producing countries – Mexico, Colombia, Peru and the Dominican Republic – are projected to expand production substantially over the coming decade, together accounting for some 53% of global production in 2035. Output in Colombia, Mexico and Peru is set to increase by some 25-50% from base period levels. As such, about 65% of avocado production is expected to remain in Latin America and the Caribbean.

Avocado is on track to become the most traded major tropical fruit in quantity, overtaking pineapples and reaching 4.3 Mt of exports by 2035. The total value of global avocado exports would thus reach an estimated USD 11 billion in constant 2023-2025 value terms, thereby placing avocado as one of the most valuable fruit commodities. Despite increasing competition from emerging exporters such as Colombia and Kenya, Mexico is expected to retain its leading position in global exports at a 38% quantity share in 2035. This will be supported by output growth of 1.9% p.a. over the coming decade and continued growth in demand in the United States, assuming that avocados can be shielded from potential import tariffs imposed by the United States. Exports from Peru, the second leading exporter, will account for some 25% of global shipments, with supplies mainly catering to rising demand from the European Union.

The United States and the European Union, where consumer interest in avocados is fuelled by the fruit's alleged health benefits, are expected to remain the main importers, with 41% and 28% of the circa 4 million tonnes of global imports in 2035, respectively. However, imports are also set to rise in the United Kingdom, Canada, China and some countries in the Middle East, on account of rising incomes and/or changing consumer preferences. Similarly, in many producing countries, per capita consumption of avocados is expected to rise with income growth, notably in Colombia, Indonesia and Mexico.

10.3.5. Papaya

Market situation

Preliminary trade data indicate an expansion in global exports of papayas by an estimated 14% in 2025, to some 420 000 tonnes. Exports from Mexico, the largest global exporter of papayas, are estimated to have grown by some 12% over the full year, to 230 000 tonnes. Virtually all Mexican papaya exports are destined for the United States, which globally ranks as the largest importer of papayas, accounting for over half of all global imports in 2025, as indicated by export data by destination. However, the bulk of Mexican papaya production continued to be for domestic consumption.

Preliminary data further suggest that global imports rose by 17% in 2024, to approximately 410 000 tonnes. The United States remained the largest importer globally, accounting for an estimated quantity share of 56% in 2025. Demand for papayas in the United States remained solid over 2025, with papayas benefiting from their reputation of being a rich source of beta carotene and vitamin C.

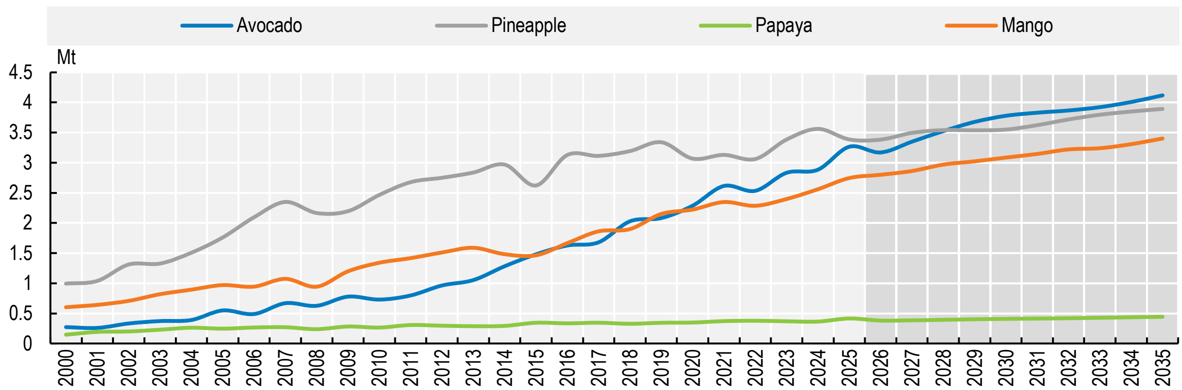
The second-leading importer globally continued to be the European Union, albeit with a much lower share in world imports of only an estimated 10% in 2025. Consumer awareness of papaya in the European Union generally remains low, mostly due to the fruit's fragility in transport, which renders a significant expansion in this market difficult to attain. Preliminary data accordingly suggest that imports by the European Union remained at a relatively low level of approximately 40 000 tonnes in 2025.

Projection highlights

Global papaya production is projected to rise by 2.1% p.a., to 18 Mt in 2035, from 15 Mt in the base period. As the share of exports in production is particularly low for papayas, at some 3% in the base period, production of this fruit is mostly driven by domestic demand due to population and income growth. Asia, the top global producer, is expected to have the strongest production expansion, with its share of world production set to rise to 57% by 2035, from 55% in the base period. India, the world's largest producer, is projected to increase production at a rate of 2.5% p.a., reaching a share of global output of 36% by 2035. Income and population growth will be the main factors behind this rise, with Indian per capita consumption of papayas expected to reach 4 kg in 2035, up slightly from 3.6 kg in the base period. Indonesia's production is projected to grow by 1.9% p.a. over the Outlook period, primarily on account of increasing domestic demand as per capita incomes are expected to expand at 3.3% p.a.

Global exports will predominantly be shaped by production expansion in Mexico and higher demand from the key importers. At an expected average annual rate of 1.9%, global exports of papayas are projected to reach just over 0.5 Mt by 2035. A major obstacle to significant expansion in international trade has so far been the fruit's high perishability and sensitivity in transport, which makes it problematic to supply to far afield destinations. Innovations in cold chain, packaging and transport technologies promise to facilitate a broader distribution of papaya, particularly in view of rising consumer demand for tropical fruits in import markets.

Figure 10.4. World major tropical fruit outlook: Global exports of the four major tropical fruits



Source: FAO trade data and projections

10.3.6. Uncertainties

The outlook for global production, trade and consumption of bananas and major fresh tropical fruits is subject to several potentially significant uncertainties. Elevated costs of living and exchange rate fluctuations threaten to hinder demand in domestic and import markets, especially for consumers in poorer economic strata. Given the typically high unit values and high income and demand-side price elasticities of tropical fruits, changes in consumer incomes – or prices – may quickly affect demand. Geopolitical uncertainties that may result in the disruption of established trade relationships and potentially cause grave effects on domestic and global markets are of further concern. In this regard, the risk of armed conflicts causing disruptions to global trade routes, energy markets and fertiliser supplies threatens to impede the production of bananas and tropical fruits in terms of quantity and quality. The adverse effects of such developments may result in additional pressure on production costs, jeopardise global supplies and cause price increases along the value chain. Tariffs implemented by major importing countries are another key uncertainty. Depending on the applied tariff rates as well as the role in world markets of the countries involved, the repercussions of such tariffs on trading partners and on global markets may be significant.

On the supply side, the effects of global warming are resulting in a higher occurrence of droughts, floods, hurricanes and other natural disasters, which render the production of bananas and major tropical fruits increasingly difficult and costly. Given the perishable nature of tropical fruits in production, trade and distribution, environmental challenges and insufficient infrastructure continue to jeopardise international production and supply. This is a particularly acute difficulty since the vast majority of tropical fruits are produced in remote, informal settings, where cultivation is highly dependent on rainfall, prone to the adverse effects of increasingly erratic weather events and disconnected from major transport routes.

In the face of rising temperatures, more rapid and severe spreads of plant pests and diseases are being observed, like the spread of Banana Fusarium Wilt. An assessment of the potential economic impact of the TR4 disease on global markets showed that a further spread of TR4 would, *inter alia*, entail considerable loss of income and employment in the banana sector in the affected countries, as well as significantly higher consumer costs in importing countries.[2]

Notes

[1] Pulses types: dry beans, dry broad beans, dry peas, chickpeas, cow peas, pigeon peas, lentils, Bambara beans, vetches, lupines and minor pulses (not elsewhere specified).

[2] An alternative simulation was run in 2019 to assess the potential economic impact of TR4 on global banana production and trade. The results of this scenario were published in the November 2019 issue of Food and Agriculture Organization's biannual publication *Food Outlook* (https://openknowledge.fao.org/server/api/core/bitstreams/5b53665b-3767-4681-9cad-ebf60d5d1dbe/content).

Annex A. Glossary

Aquaculture	The farming of aquatic organisms including fish, molluscs, crustaceans, aquatic plants, etc. Farming implies some form of intervention in the rearing process to enhance production, such as regular stocking, feeding and protection from predators. Farming also implies individual or corporate ownership of the stock being cultivated. For statistical purposes, aquatic organisms that are harvested by an individual or corporate body that has owned them throughout their rearing period contribute to aquaculture, while aquatic organisms that are exploitable by the public as a common property resource, with or without appropriate licenses, are the harvest of capture fisheries. In this *Outlook*, data relating to aquatic plants are not included.
African Swine Fever (ASF)	ASF is a highly contagious hemorrhagic disease of pigs, warthogs, European wild boar and American wild pigs. It is not a human health threat. The organism that causes ASF is a DNA virus of the Asfarviridae family. (For more information on this topic: https://www.woah.org/en/disease/african-swine-fever/).
Avian Influenza (AI)	AI is a highly contagious viral infection which can affect all species of birds and can manifest itself in different ways depending mainly on the ability of the virus to cause disease (pathogenicity) on the species affected (for more information on this topic, see https://www.woah.org/en/disease/avian-influenza/).
Base period	The 2023-2025 historical average, serving as a reference level for comparisons.
Baseline	The set of market projections used for the *Outlook* analysis, also used as benchmark to analyse the impact of different economic and policy scenarios. A detailed description on how this baseline was generated is provided in the methodology section.
Biofuels	In the wider sense, biofuels can be defined as all solid, fluid or gaseous fuels produced from biomass. More narrowly, the term comprises fuels that replace petroleum-based road-transport fuels. Ethanol is produced from sugar crops, cereals and other starchy crops, and can be used as an additive to, in a blend with, or as a replacement of gasoline. Biodiesel is produced mostly from vegetable oils, but also from waste oils and animal fats. There are two major forms of biodiesel: fatty acid methyl esters (FAME) and hydrogenated vegetable oil (HVO).
Biomass	Biomass is defined as any plant matter used directly as fuel or converted into other forms before combustion. Included are wood, vegetal waste (including wood waste and crops used for energy production), animal materials/wastes and industrial and urban wastes, used as feedstock for producing bio-based products. In the context of the *Outlook*, it does not include agricultural commodities used in the production of biofuels (e.g. vegetable oils, sugar or grains).
Blend wall	The term blend wall refers to short run technical constraints that act as an impediment to increased biofuel use in transportation fuels.
Bt cotton	A transgenic cotton variety that contains one or more foreign genes derived from the bacterium Bacillus thuringiensis. Bt cotton is resistant against some insect pests, but the fibre of BT cotton plants is shorter than that of traditional varieties.
Caloric sweeteners	Defined as sucrose and high fructose syrup.
Capture fisheries	Capture fisheries refer to the hunting, collecting and gathering activities directed at removing or collecting live wild aquatic organisms (predominantly fish, molluscs and crustaceans) including plants from the oceanic, coastal or inland waters for human consumption and other purposes by hand or more usually by various types of fishing gear such as nets, lines and stationary traps. The production of capture fisheries is measured by nominal catches (in live weight basis) of fish, crustaceans, molluscs and other aquatic animals and plants, killed, caught, trapped or collected for all commercial, industrial, recreational and subsistence purposes. It should be noted that in this *Outlook* data relating to aquatic plants are not included.
Carcass Weight Equivalent (cwe)	A commonly used measure of meat production, referring to the weight of livestock carcasses, including bones and other components, but excluding head, hide,blood,and some internal organs.

	Conversion may varies by region, species, and processing practices.
Cereals	Defined as wheat, maize, other coarse grains and rice (milled).
Common Agricultural Policy (CAP)	The European Union's agricultural policy, first defined in Article 39 of the Treaty of Rome signed in 1957.
Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP)	CPTPP is a trade agreement between Australia, Brunei, Canada, Chile, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore, and Viet Nam. It was signed in March 2018 and came into force for the first six countries in December 2018.
COVID-19	COVID-19 is the infectious disease caused by the most recently discovered coronavirus. This new virus and disease were unknown before the outbreak began in Wuhan, China, in December 2019. COVID-19 is now a pandemic affecting many countries globally.
Decoupled payments	Direct payments which are not linked to current production of specific commodities or livestock numbers or the use of specific factors of production.
Developed and developing countries	See summary table for country grouping in the *Agricultural Outlook*.
Direct payments	Payments made directly by governments to producers.
Domestic support	Refers to the annual level of support, expressed in monetary terms, provided to agricultural production. It is one of the three pillars of the Uruguay Round Agreement on Agriculture targeted for reduction.
El Niño- Southern Oscillation	*El Niño*-Southern Oscillation (ENSO) refers to periodic but irregular variations in wind and sea surface temperatures in the tropical eastern Pacific Ocean. ENSO consists of a warming phase known as *El Niño* and a cooling phase known as *La Niña*, and occurs typically at intervals of two to seven years. The abnormal warm ocean climate conditions of *El Niño* are accompanied by higher local rainfall and flooding, and massive deaths of fish and their predators (including birds).
Emission reduction technologies	In agriculture, emission reduction technologies (ERTs) encompass a broad range of innovations, tools, and practices designed to lower greenhouse gas emissions from farming systems without compromising productivity. These include both biological and technical interventions that address the main emission sources in crop and livestock systems.
Enteric fermentation	A natural part of the digestive process in ruminant by which carbohydrates are broken down by microorganisms into simple molecules for absorption into the bloodstream of an animal, producing methane as a by-product.
Ethanol	A biofuel that can be used as a fuel substitute (hydrous ethanol) or a fuel extender (anhydrous ethanol) in mixes with petroleum, and which is produced from agricultural feedstocks such as sugar cane and maize. Anhydrous alcohol is free of water and at least 99% pure. Hydrous alcohol contains water and usually has a purity of 96%. In Brazil, this ethanol is being used as a gasohol substitute in flex-fuel vehicles.
Export subsidies	Subsidies given to traders to cover the difference between internal market prices and world market prices, such as the EU export restitutions. The elimination of agricultural export subsidies is part of the Nairobi Package adopted at the WTO's Tenth Ministerial Conference in December 2015.
Farm Bill	In the United States, the Farm Bill is the primary agricultural and food policy tool of the federal government.
Feed Conversion Ratio (FCR)	A measure of an animal's efficiency in converting feed mass into increases in weight gained by the animal.
Fertiliser	Fertilisers provide essential nutrients for maintaining agricultural crop yields and quality, and for growth in production. The three most important nutrients are nitrogen (N), phosphorus (P), and potassium (K).
Flexible-fuel vehicles (FFVs)	Vehicles that can run on either gasohol or on hydrous ethanol.
Foot and Mouth Disease (FMD)	FMD is the most contagious disease of mammals and has a great potential for causing severe economic loss in susceptible cloven-hoofed animals (https://www.woah.org/en/disease/foot-and-mouth-disease/). International animal trade is linked to the FMD-status according to the World Organisation for Animal Health (WOAH).
Fresh dairy products	Fresh Dairy Products contain all dairy products and milk which are not included in the processed products (butter, cheese skim milk powder, whole milk powder and for some cases casein and whey). The quantities are in cow milk equivalent.

G20	The G20 is an international forum made up of 19 countries and the European Union, representing the world's major developed and emerging economies. Together, the G20 members represent 85% of global GDP, 75% of international trade, and two-thirds of the world's population. Originally bringing together finance ministers and central bank governors, the G20 has evolved into a forum to address broader global challenges.
Gasohol	Fuel that is a mixture of gasoline and anhydrous ethanol.
Highly Pathogenic Avian Influenza (HPAI)	A severe form of Avian Influenza (AI) that can cause high mortality in poultry and significant disruptions to production and trade. AI is a highly contagious viral infection which can affect all species of birds and can manifest itself in different ways depending mainly on the ability of the virus to cause disease (pathogenicity) on the species affected. AI viruses are classified into two categories: – LPAI (Low Pathogenic Avian Influenza): typically causes mild or no clinical signs. – HPAI (Highly Pathogenic Avian Influenza): causes severe disease and high mortality, particularly in poultry.
High Fructose Sweetener (HFS)	Starch-based sweetener extracted mainly from maize (high fructose corn syrup or HFCS).
Inflation Reduction Act (IRA)	The Inflation Reduction Act (IRA) was signed into United States law in 2022. The IRA targets include domestic energy security, climate change and rural areas, impacting farming, biofuels and fertiliser production.
Intergovernmental Panel on Climate Change (IPCC)	The IPCC is the United Nations body for assessing the science related to climate change. In its comprehensive assessment reports, the IPCC notably examines the Agriculture, Forestry and Other Land Use (AFOLU) sector due to its significant contribution to GHG emissions, mainly carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). GHG emission metrics are used to express emissions of different greenhouse gases in a common unit, and aggregated GHG emissions are stated in CO_2 equivalent (CO_2-eq) using the global warming potential with a time horizon of 100 years. AFOLU CO_2 emissions fluxes are mainly driven by land use, land-use change, and forestry (LULUCF) activities, and account for about half of total net AFOLU emissions. Enteric fermentation from ruminant animals is the main source of CH_4 emissions, while NO_2 emissions are dominated by organic and synthetic fertiliser use.
Intervention stocks	Stocks held by national intervention agencies in the European Union as a result of intervention buying of commodities subject to market price support. Intervention stocks may be released onto the internal market if internal prices exceed intervention prices.
Isoglucose	Isoglucose is a starch-based fructose sweetener, produced by the action of the glucose isomerase enzyme on dextrose. This isomerisation process can be used to produce glucose/fructose blends containing up to 42% fructose. Application of a further process can raise the fructose content to 55%. Where the fructose content is 42%, isoglucose is equivalent in sweetness to sugar.
Least squares growth rate	The least-squares growth rate, r, is estimated by fitting a linear regression trend line to the logarithmic annual values of the variable in the relevant period, as follows: $Ln(xt) = a + r \times t$ and is calculated as $[\exp(r) – 1]$. Therefore, projected annual growth rates in this report refer to least-squares average annual growth rates from 2026 to 2035.
Live weight	The weight of meat, finfish and shellfish at the time of their capture or harvest. In the case of fish products it is calculated on the basis of conversion factors from landed to nominal weight and on rates prevailing among national industries for each type of processing.
Manure management	Practices involved in the handling, storage, treatment, and disposal of animal feces and urine, which can impact nutrient management, methane emissions, and the environment.
Market access	Governed by provisions of the Uruguay Round Agreement on Agriculture which refer to concessions contained in the country schedules with respect to bindings and reductions of tariffs and to other minimum import commitments.
Marketing year	It is common to compare crop production across "marketing years," which are defined so that one season's harvest is not artificially split up across different calendar years. In this *Outlook*, international marketing years are mostly defined starting with their harvest in major supply regions, as follows: • Wheat: 1 June; 1 October in Australia • Cotton and pulses: 1 August • Maize: 1 September; 1 March in Australia • Other coarse grains: 1 September; 1 November in Australia

- Sugar, soybeans, other oilseeds, protein meal, vegetable oils: 1 October; 1 November in Australia.

Whenever the text refers to, for example, the marketing year 2025, this is short for 2025/26 for the above commodities. For all other commodities, the marketing year is equal to the calendar year except for meat and dairy products in New Zealand and beef and dairy products in Australia: year ending June 30.

New World screwworm disease	A wound or traumatic myiasis caused by the larvae of Cochliomyia hominivorax, a fly species whose larvae must feed on the living tissue of mammals, including humans, to develop. The larvae usually infest wounds or mucous membranes and can cause severe or fatal disease in livestock, wildlife, pets, and people. The disease can generate livestock losses and trade disruption. Control relies on surveillance, treatment of infested wounds, strict animal movement controls, and the sterile insect technique; no vaccine is available.
Other coarse grains	Defined as barley, oats, sorghum and other coarse grains in all countries except Australia where it includes triticale, and in the European Union where it includes rye and other mixed grains.
Other oilseeds	Defined as rapeseed (canola), sunflower seed, and groundnuts (peanuts).
Protein meals	Defined as soybean meal, groundnut meal, rapeseed meal, sunflower meal, coconut meal, cottonseed meal and palm kernel meal.
Purchasing Power Parity (PPP)	Purchasing power parities (PPPs) are the rates of currency conversion that eliminate the differences in price levels between countries. The PPPs are given in national currency units per US dollar.
Reed glasswing cicada	Insects infecting some plants like sugar beet with bacterial pathogens that cause the Stolbur disease and the Syndrome Basses Richesses (SBR) (Syndrome of Low Sugar Contents).
Renewable Energy Directive (RED)	EU directive legislating binding mandates of 20% for the share of renewable energy in all Member States' energy mix by the year 2020, with a specific target of 10% for the renewable energy share in transport fuels.
Renewable Fuel Standard (RFS and RFS2)	A standard in the United States for renewable fuel use in the transport sector in the Energy Act (EISA). RFS2 is a revision of the RFS programme for 2010 and beyond.
Retail weight equivalent (rwe)	Retail weight equivalent of a product, referring to the estimated edible portion available to consumers after processing, trimming, and packaging. It excludes bones, inedible parts, and significant processing losses. Conversion may varies by region, species, and processing practices.
Roots and Tubers	Plants that yield starch, either derived from their roots (e.g. cassava, sweet potato and yams) or stems (e.g. potatoes and taro). They are destined mainly for human food (as such or in processed form) but can also be used for animal feed or for manufacturing starch, ethanol and fermented beverages. Unless they are processed, they become highly perishable once harvested, which limits opportunities for trade and storage. Roots and tubers contain large amounts of water: all quantities in this publication refer to dry weight to increase comparability.
Rumen Manipulation	Techniques used to alter the microbial ecosystem in the rumen (a compartment of the stomach in ruminants) to improve feed efficiency and reduce methane emissions.
Scenario	A model-generated set of market projections based on alternative assumptions than those used in the baseline. Used to provide quantitative information on the impact of changes in assumptions on the outlook.
Stock-to-use ratio	The stock-to-use ratio for cereals is defined as the ratio of cereal stocks to its domestic utilisation.
Stock-to-disappearance ratio	The stock-to-disappearance ratio is defined as the ratio of stocks held by the main exporters to their disappearance (i.e. domestic utilisation plus exports). For wheat, the eight major exporters are considered, namely the United States, Argentina, the European Union, Canada, Australia, Russian Federation, Ukraine, and Kazakhstan. In the case of coarse grains, United States, Argentina, the European Union, Canada, Australia, Russian Federation, Ukraine, and Brazil are considered. For rice Viet Nam, Thailand, India, Pakistan and the United States enter this ratio calculation.
Sugar	Sucrose produced from sugar beet and sugarcane.
Support price	Prices fixed by government policymakers in order to determine, directly or indirectly, domestic market or producer prices. All administered price schemes set a minimum guaranteed support price or a target price for the commodity, which is maintained by associated policy measures, such as quantitative restrictions on production and imports; taxes, levies and tariffs on imports;

	export subsidies; and/or public stockholding.
Tariff-Rate Quota (TRQ)	A two-tier tariff regime where imports within the quota enter at a lower (“in-quota”) tariff rate while a higher (“out-of-quota”) tariff rate is used for imports above this level, As part of the Uruguay Round Agreement on Agriculture, certain countries agreed to provide minimum import opportunities for products they had previously protected by tariffs.
Tel quel basis	Weight of sugar, regardless of its sucrose content (measured by polarisation).
Vegetable oils	Defined as rapeseed oil (canola), soybean oil, sunflower seed oil, coconut oil, cottonseed oil, palm kernel oil, groundnut oil and palm oil.
World Trade Organization (WTO)	Intergovernmental organisation regulating international trade, providing a framework for negotiating trade agreements, and acting as dispute resolution process. The WTO was created by the Uruguay Round agreement and officially commenced in 1995.

Annex B. Methodology

This annex provides information on how the projections in the *Agricultural Outlook* are generated. First, it provides a general description of the different elements and timeline of the process leading to the agricultural baseline projections and the *OECD-FAO Agricultural Outlook* publication each year. Second, it discusses the consistent assumptions made on the projections of exogenous macroeconomic variables. Third, it provides reference to the underlying Aglink-Cosimo model. Finally, it explains how a partial stochastic analysis is performed with the Aglink-Cosimo model.

The generating process of the agricultural baseline projections

The projections presented in the *Agricultural Outlook* are the result of a process that brings together information from a large number of sources. The projections rely on input from country and commodity experts, and from the OECD-FAO Aglink-Cosimo model of global agricultural markets. This economic model is also used to ensure the consistency of baseline projections. Significant expert judgement, however, is applied at various stages of the *Outlook* process. The OECD and FAO Secretariats publish in the *Agricultural Outlook* a unified and plausible assessment of the future developments of the main agricultural commodity markets given the underlying assumptions and the information available at the time of writing.

The starting point: Creation of an initial baseline

The historical data series for the consumption, production, trade[1] and international prices of the various commodities covered in the *Outlook* are mainly drawn from OECD and FAO databases. These databases are largely based on national statistical sources. For each publication, the baseline generating process begins in November of the year preceding the projected decade and ends in February of the current year. It should reflect the situation at the end of the preceding year, i.e. the end of 2025 for the current edition. Starting values for the likely future development of agricultural markets are developed separately by OECD for its member states and some non-member countries and by FAO for all remaining countries.

- On the OECD side, an annual questionnaire addressed to national administrations is circulated in November to obtain countries' expectations of the medium term developments of their agricultural sector , as well as insights on the current status or recent changes of domestic agricultural policies.
- On the FAO side, the starting values for the country and regional modules are developed through model-based projections and consultations with FAO commodity specialists.

Macroeconomic factors obtained from external sources, such as the International Monetary Fund (IMF), the World Bank and the United Nations (UN), are also used to complete the view of the main economic forces determining market developments.

This part of the process is aimed at creating a first insight into possible market developments and at establishing the key assumptions which condition the *Outlook*. The main macroeconomic and policy assumptions are summarised in the first section of the Trends and Prospects chapter and in specific commodity tables. The sources for the assumptions are discussed in more detail further below.

As a next step, the OECD-FAO Aglink-Cosimo modelling framework is used to facilitate a consistent integration of the initial data and to derive an initial baseline of global market projections. The modelling framework ensures that at a global level, projected levels of consumption match with projected levels of production for the different commodities, subject to minimised trade imbalances. The model is discussed below.

In addition to quantities produced, consumed and traded, the baseline also includes projections for nominal prices (in local currency units) for the commodities concerned.

The initial baseline results are then reviewed:

- For the countries under the responsibility of the OECD Secretariat, the initial baseline results are compared with the questionnaire replies. Any issues are discussed in bilateral exchanges with country experts.
- For country and regional modules developed by the FAO Secretariat, initial baseline results are reviewed by a wider circle of in-house and international experts.

Final baseline

At this stage, the global projection picture starts to emerge, and refinements are made according to a consensus view of both Secretariats and external experts. On the basis of these discussions and updated information, a second baseline is produced. The information generated is used to prepare market assessments for cereals, oilseeds, sugar, meats, dairy products, fish, biofuels and cotton over the course of the *Outlook* period.

These results are then discussed at the annual meetings of the Group on Commodity Markets of the OECD Committee for Agriculture in March, which brings together experts from national administrations of OECD Member countries as well as experts from commodity organisations. Following comments by this group, and data revisions, the baseline projections are finalised.

The *Outlook* process implies that the baseline projections presented in this report are a combination of projections and experts knowledge. The use of a formal modelling framework reconciles inconsistencies between individual country projections and establishes global market equilibria, with prices determined through the balancing of global supply and demand. The review process ensures that judgement of country experts is brought to bear on the projections and related analyses. However, the final responsibility for the projections and their interpretation rests with the OECD and FAO Secretariats.

The *Agricultural Outlook* delves into the finale baseline projections to provide an overview as well as more detailed analyses of the world agricultural markets over the medium term. The report is discussed by the Senior Management Committee of FAO's Department of Economic and Social Development and the OECD's Working Party on Agricultural Policies and Markets of the Committee for Agriculture in May, prior to publication. In addition, the *Outlook* will be used as a basis for analyses presented to the FAO's Committee on Commodity Problems and its various Intergovernmental Commodity Groups.

Sources and assumptions for the macroeconomic projections

The *Outlook* uses the Medium Variant set of estimates from the United Nations Population Prospects database for the population data used for all countries and regional aggregates. For the projection period, the medium variant set of estimates was selected for use from the four alternative projection variants (low, medium, high and constant fertility). The UN Population Prospects database was chosen because it represents a comprehensive source of reliable estimates which includes data for non-OECD developing countries. For consistency reasons, the same source is used for both the historical population estimates and the projection data.

The other macroeconomic series used in the Aglink-Cosimo model are real GDP, the GDP deflator, the private consumption expenditure (PCE) deflator, the Brent crude oil price (in US dollars per barrel) and exchange rates expressed as the local currency value of USD 1. Historical data for these series in OECD Member countries as well as Brazil, Argentina, the People's Republic of China and the Russian Federation are consistent with those published in the *OECD Economic Outlook* No. 118 (December 2025). For other economies, historical macroeconomic data were obtained from the IMF, *World Economic Outlook* (October 2025). Assumptions for 2026 to 2035 are based on the projections of the IMF *World Economic Outlook*, October 2025, extended with growth rates from the Oxford Economic model for outer years.

The model uses indices for real GDP, consumer prices (PCE deflator) and producer prices (GDP deflator) which are constructed with the base year 2010 value being equal to 1. The assumption of constant real exchange rates implies that a country with higher (lower) inflation relative to the United States (as measured by the US GDP deflator) will have a depreciating (appreciating) currency and therefore an increasing (decreasing) exchange rate over the projection period, since the exchange rate is measured as the local currency value of USD 1. The calculation of the nominal exchange rate uses the percentage growth of the ratio "country-GDP deflator/US GDP deflator".

The oil price used to generate the *Outlook* until 2024 is taken from the short-term update of the *OECD Economic Outlook* No. 118 (December 2025). For 2025, the annual average daily spot price is used, while the January to mid-March 2026 average spot price is used for 2026. For the remainder of the projection period, the reference oil price used in the projections is assumed to remain constant in real terms.

The underlying Aglink-Cosimo model

Aglink-Cosimo is an economic model that analyses supply and demand of world agriculture. It is managed by the Secretariats of the OECD and the Food and Agriculture Organization of the United Nations (FAO), and used to generate consistent baseline projections presented in the *Agricultural Outlook* and policy scenario analysis.

Aglink-Cosimo is a recursive-dynamic, partial equilibrium model used to simulate developments of annual market balances and prices for the main agricultural commodities produced, consumed and traded worldwide. The Aglink-Cosimo country and regional modules cover the whole world. The OECD and FAO Secretariats in conjunction with country experts and national administrations are responsible for developing and maintaining the projections. Several key characteristics are as follows:

- Aglink-Cosimo is a "partial equilibrium" model for the main agricultural commodities, as well as biodiesel and bioethanol. Other non-agricultural markets are not modelled and are treated exogenously to the model. As non-agricultural markets are exogenous, hypotheses concerning the paths of key macroeconomic variables are predetermined with no accounting of feedback from developments in agricultural markets to the economy as a whole.
- World markets for agricultural commodities are assumed to be competitive, with buyers and sellers acting as price takers. Market prices are determined through a global or regional equilibrium in supply and demand.
- Domestically produced and traded commodities are viewed to be homogeneous and thus perfect substitutes by buyers and sellers. In particular, importers do not distinguish commodities by country of origin as Aglink-Cosimo is not a spatial model. Imports and exports are nevertheless determined separately. This assumption affects the results of analysis in which trade is a major driver.
- Aglink-Cosimo is recursive-dynamic, and outcomes for one year influence those for the next years (e.g. through herd sizes or dynamic yield expectations). Aglink-Cosimo models ten years into the future.

The modelling framework is regularly improved to develop the *Outlook's* capacity to reflect future market developments and to provide an enhanced analysis of beyond market outcomes (e.g. food security, land use and environmental outcomes).

As of the 2022-2023 *Outlook* cycle, the Secretariats have explicitly incorporated the use of the three main mineral fertilisers (Nitrogen, Phosphorus and Potassium) into the yield equations that determine the supply of crop commodities. This new feature separates the costs of fertilisers from those of other production inputs (energy, seeds, machinery, labour and other tradable and non-tradable inputs). Historical data series for fertiliser use per crop has been developed by combining existing information on total use from FAOSTAT with per crop estimates from the International Fertilizer Association.

Food loss and waste has been incorporated into the 2022-2023 cycle of the *OECD-FAO Agricultural Outlook*. In the 2023 edition, Box 1.1 of the "Trends and Prospects" chapter provides a detailed overview of the definitions, global estimates and drivers of food loss and waste. In terms of implementation in the data and Aglink-Cosimo model, three shares were added to account for food loss and waste at the retail and household levels. As a result, three different values for food use of agricultural commodities are now available: food availability, which accounts for the decrease in the quantity of food along the food supply chain occurring from post-harvest, slaughter or catch up to but not including the retail level; food consumption, derived by subtracting retail food waste from food availability and serving as the main market reference value used throughout the report and tables; and food available for in-house consumption, which represents the quantity after accounting for household waste.

In 2024, the Secretariat adopted a standardised template for animal production to enhance the Aglink-Cosimo model's functionality. The revised meat supply component now separates meat output into animal marketing numbers and average carcass weights, allowing for a better grasp of sectoral productivity trends. This update facilitates a more integrated approach by closely linking total animal inventory with marketing activities and aligning production systems, breeding improvements, and feed intensities with animal weight. Additionally, the revision standardised the calculations for projecting meat production, including returns per head, feed and pasture costs, and their connections to alternative land uses.

Furthermore, a comprehensive review of the model's elasticities has been conducted. These adjustments ensure a more uniform response in meat production across the various meat types and regions, effectively aligning output with animal inventories and weights. These changes are expected to enhance the reliability of short and medium-term responses in meat production.

A new indicator representing the farm labour productivity has been incorporated into the *OECD-FAO Agricultural Outlook 2026-2035* and is discussed in the thematic focus section 1.2.2. Agricultural labour productivity measures the economic value generated per agricultural worker over a given period. In the Outlook, it is defined as the ratio of agricultural GDP, expressed in constant 2015 USD to the number of agricultural workers, where both variables refer to primary agriculture, forestry, and fisheries. Agricultural GDP is sourced from the World Bank, while employment data come from ILOStat.

Both components need to be extended to project agricultural labour productivity into the future. In particular, the agricultural labour force is estimated using a two-way fixed effects model that captures structural and demographic dynamics. This approach incorporates rural population trajectories from the United Nations World Urbanization Prospects (2025 revision) as the main driver of labour supply, and per capita income projections from the IMF and Oxford Economics to reflect structural transformation and sectoral shifts. The GDP component is projected by linking Aglink-Cosimo outcomes to GTAP cost and revenue data from which a farm gate indicator is calculated that matches the labour productivity – but based on fewer commodities. The relative change of that indicator is used to extend the productivity indicator.

The latest detailed documentation of Aglink-Cosimo model is available on the official website of the Agricultural Outlook www.agri-outlook.org.

The model used to generate the fish projections is operated as a satellite model to Aglink-Cosimo. Exogenous assumptions are shared and interacting variables (e.g. prices for cross-price reactions) are exchanged. The fish model went through substantial revision in 2016. The aggregated aquaculture supply functions of 32 components of the model were replaced by 117 species-specific supply functions with specific elasticity, feed ration and time lag. The main species covered are salmon and trout, shrimp, tilapia, carp, catfish (including Pangasius), seabream and seabass, and molluscs. A few other minor productions such as milkfish were also included. The model was constructed to ensure consistency between the feed rations and the fishmeal and fish oil markets. Depending on the species, the feed rations can contain a maximum of five types of feed; fishmeal, fish oil, oilseed meals (or substitutes), vegetable oil and low protein feeds like cereals and brans.

Note

[1] Trade data for regions, e.g. the European Union or regional aggregates of developing countries, refer only to extra-regional trade. This approach results in a smaller overall trade figure than cumulated national statistics. For further details on particular series, enquiries should be directed to the OECD and FAO Secretariats.

OECD-FAO Agricultural Outlook 2026-2035

The *OECD-FAO Agricultural Outlook 2026-2035* assesses ten-year prospects for agricultural commodities and aquatic food markets at global, regional and national levels. Global production is projected to expand by 13% over the next ten years, driven mainly by productivity improvements and intensification, with growth concentrated in Asia, sub-Saharan Africa and Latin America. Direct agricultural greenhouse gas emissions are expected to increase by 6%, considerably slower than production growth. Projected productivity gains raise global gross agricultural income per worker by 9% by 2035, but inherent variability in natural and economic conditions still leaves a 25% chance of a 3% decline in workers' income. A supplementary analysis suggests that disruptions associated with the 2026 Middle East conflict will constrain fertiliser use and as a result cereal production, especially in low-income countries. In this context, international agricultural trade remains critical to balance supply and demand and mitigate adverse food security impacts.

More information is available at https://www.agri-outlook.org.

PRINT ISBN 978-92-64-98094-5
PDF ISBN 978-92-64-85071-2