OECD-FAO Agricultural Outlook 2024-2033

OECD

Food and Agriculture Organization of the United Nations

OECD-FAO Agricultural Outlook 2024-2033

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.

The names and representation of countries and territories used in this joint publication follow the practice of FAO.

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.

Specific territorial disclaimers applicable to the OECD
Kosovo*: This designation is without prejudice to positions on status and is in line with United Nations Security Council Resolution 1244/99 and the Advisory Opinion of the International Court of Justice on Kosovo's declaration of independence.

Specific territorial disclaimers applicable to FAO
The position of the United Nations on the question of Jerusalem is contained in General Assembly Resolution 181(II) of 29 November 1947, and subsequent resolutions of the General Assembly and the Security Council concerning this question.

Please cite this publication as:
OECD/FAO (2024), *OECD-FAO Agricultural Outlook 2024-2033*, Paris and Rome, https://doi.org/10.1787/4c5d2cfb-en.

ISBN 978-92-64-72259-0 (print)
ISBN 978-92-64-59211-7 (PDF)
ISBN 978-92-64-94407-7 (HTML)
ISBN 978-92-64-38550-4 (epub)

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

FAO
ISBN 978-92-5-138844-0 (print and pdf)

Revised version, October 2024
Details of revisions available at: https://www.oecd.org/en/publications/support/corrigenda.html

Photo credits: Cover © Designed by FAO and OECD.

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

© OECD/FAO 2024

Some rights reserved. This work is made available under the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 IGO licence (CC BY-NC-SA 3.0 IGO); https://creativecommons.org/licenses/by-nc-sa/3.0/igo/legalcode).
Under the terms of this licence, this work may be copied, redistributed and adapted for non-commercial purposes, provided that the work is appropriately cited and you indicate if any changes were made. In any use of this work, there should be no suggestion that FAO or OECD endorses any specific organization, products or services. The use of the OECD or FAO logo is not permitted. If the work is adapted, then it must be licensed under the same or equivalent Creative Commons license. If a translation of this work is created, it must include the following disclaimer along with the required citation: "This translation was not created by the Organisation of Economic Co-operation and Development (OECD) or Food and Agriculture Organization of the United Nations (FAO). OECD and FAO are not responsible for the content or accuracy of this translation. The original English edition shall be the authoritative edition."
Disputes arising under the licence that cannot be settled amicably will be resolved by mediation and arbitration as described in Article 8 of the licence. The applicable mediation rules will be the mediation rules of the World Intellectual Property Organization http://www.wipo.int/amc/en/mediation/rules and any arbitration will be in accordance with the Arbitration Rules of the United Nations Commission on International Trade Law (UNCITRAL).
Third-party materials. Users wishing to reuse material from this work that is attributed to a third party, such as tables, figures or images, are responsible for determining whether permission is needed for that reuse and for obtaining permission from the copyright holder. The risk of claims resulting from infringement of any third-party-owned component in the work rests solely with the user.

Foreword

The *OECD-FAO Agricultural Outlook 2024-2033* is a collaborative effort by the Organisation for Economic Co-operation and Development (OECD) and the Food and Agriculture Organization (FAO) of the United Nations. 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 20th joint edition of the *Agricultural Outlook* comprises four 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 evolution of global agricultural markets over the past 20 years (Section 1.1), recent market developments (Section 1.2), and underlying macroeconomic and policy assumptions (Section 1.3). It discusses the trends and prospects for consumption (Section 1.4), production (Section 1.5), trade (Section 1.7), and prices (Section 1.8). This year, the *Outlook* highlights the significance of food loss and waste for food security, resource use and the sustainability of food systems (Section 1.6).

Part 2: Regional briefs (Chapter 2) explores key trends and issues in the agricultural sector across the seven FAO regions. The regional aspects of production, consumption and trade projections are presented for Developed and East Asia (Section 2.1), South and Southeast Asia (Section 2.2), Sub-Saharan Africa (Section 2.3), Near East and North Africa (Section 2.4), Europe and Central Asia (Section 2.5), North America (Section 2.6), and Latin America and the Caribbean (Section 2.7).

Part 3: 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 3), Oilseeds and oilseed products (Chapter 4), Sugar (Chapter 5), Meat (Chapter 6), Dairy and dairy products (Chapter 7), Fish (Chapter 8), Biofuels (Chapter 9), Cotton (Chapter 10), and Other products (Chapter 11) — concludes with a discussion of the main issues and uncertainties affecting markets over the next ten years.

Part 4: 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 (2033) relative to a three-year base period (2021-23). The Statistical Annex is available online but not included in the printed version of the *Outlook*.

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, Nicolas Chiodi, Olivia Dubois, Armelle Elasri (publication co-ordinator), Hubertus Gay (Outlook co-ordinator), Céline Giner, Gaëlle Gouarin, Tomoo Higuchi, Lee Ann

Jackson (Head of Division), Edith Laget, Claude Nénert, Karolina Rimkute, Juan David Saenz Henao, and Grégoire Tallard of the Agro-Food Trade and Markets Division, and for fish and seafood by Claire Delpeuch and Will Symes of the Agricultural Resources Policy Division. The OECD Secretariat is grateful for the contributions provided by the visiting expert Wendkouni Jean-Baptiste Zongo (Ministry of Agriculture and Agri-Food Canada). The partial stochastic modelling builds on work by the Economics of the Food System Unit of the European Commission's Joint Research Centre. Communication and publication preparation were provided by Caitlin Boros, Piotr Dubiel, Liv Gudmundson, and Michèle Patterson. The publication benefited from the review of two external editors Fiona Hinchcliffe and David Hallam. Technical assistance in the preparation of the Outlook database 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, Giulia Caddeo, André Croppenstedt, Holger Matthey (Team Leader), Svetlana Mladenovic, Sabina Tuspayeva and Irmak Yaka. For fish, the team consisted of Pierre Charlebois, Adrienne Egger, and Stefania Vannuccini 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 and Fabio Palmeri, with data and technical advice by Peter de Klerk from the International Sugar Organization 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 Erin Collier, Shirley Mustafa, G.A. Upali Wickramasinghe, and Di Yang. Wouter van der Weijden of the Centre for Agriculture and the Environment in the Netherlands and Henk Breman of AgroBioAfrica contributed the material in Box 1.1 on sustainable intensification in Sub-Saharan Africa. Research assistance and database preparation were provided by David Bedford, Harout Dekermendjian, Carola Fabi, Annamaria Giusti, Grace Maria Karumathy, Yanyun Li, Lavinia Lucarelli, Emanuele Marocco, Marco Milo and Marc Rosenbohm. 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, Jonathan Hallo, Jessica Mathewson, Kimberly Sullivan, and Ettore Vecchione for their invaluable assistance with publication and communication issues.

Tracy Davids from BFAP led the drafting of the Regional Briefs. They were produced with generous support from the FAO Regional offices and national collaborators. Special thanks go to Gala Dahlet (RLC), Aziz Elbehri (RAP), Pedro Marcelo Arias (REU), Stephan Gagne (AAFC/AAC), Joseph Cooper (USDA OCE), Daniela Godoy (RLC), Suffyan Koroma (RAF), Marion Khamis (RLC), Abigail Alvarado (LRC), Maria Hadad (RLC), Ana Posas Guevara (RLC), Ameir Mbonde (RAF), Ahmad Mukhtar (RNE),Tianyi Liu (RAP),Maya Takagi (RLC) and Camilo Navara (RLC).

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.

The published *Agricultural Outlook 2024-2033* is available in the OECD's iLibrary and FAO Document Repository.

Table of contents

Foreword 3

Abbreviations and acronyms 11

Summary table for country groupings 15

Executive summary 17

1 Agricultural and food markets: Trends and prospects 20
- 1.1. OECD-FAO: 20 years of collaboration and 20 years of evolution in agri-food markets 21
- 1.2. Recent developments in agricultural markets 24
- 1.3. Expected macroeconomic and policy changes affecting agriculture markets 27
- 1.4. Consumption: Projected evolution for 2024-2033 29
- 1.5. Production: Projected evolution for 2024-2033 35
- 1.6. Food loss and waste: Impact of a 50% reduction 44
- 1.7. Trade: Projected evolution for 2024-2033 48
- 1.8. Prices: Projected evolution for 2024-2033 52
- References 55
- Note 57

2 Regional briefs 58
- 2.1. Regional outlook: Developed and East Asia 60
- 2.2. Regional outlook: South and Southeast Asia 69
- 2.3. Regional outlook: Sub Saharan Africa 78
- 2.4. Regional outlook: Near East and North Africa 88
- 2.5. Regional outlook: Europe and Central Asia 97
- 2.6. Regional outlook: North America 107
- 2.7. Regional outlook: Latin America and the Caribbean 117
- References 126
- Notes 127

3 Cereals 128
- 3.1. Projection highlights 129
- 3.2. Current market trends 131
- 3.3. Market projections 131
- 3.4. Risks and uncertainties 140

4 Oilseeds and oilseed products 142
4.1. Projection highlights 143
4.2. Current market trends 144
4.3. Market projections 145
4.4. Risks and uncertainties 152

5 Sugar 153
5.1. Projection highlights 154
5.2. Current market trends 155
5.3. Market projections 156
5.4. Risks and uncertainties 164
Notes 165

6 Meat 166
6.1. Projection highlights 167
6.2. Current market trends 168
6.3. Market projections 169
6.4. Risks and uncertainties 176
Notes 177

7 Dairy and dairy products 178
7.1. Projection highlights 179
7.2. Current market trends 181
7.3. Market projections 181
7.4. Risks and uncertainties 188
Note 189

8 Fish 190
8.1. Projection highlights 191
8.2. Market situation 192
8.3. Market projections 193
8.4. Risks and uncertainties 199
References 200
Notes 200

9 Biofuels 201
9.1. Projection highlights 202
9.2. Current market trends 203
9.3. Market projections 204
9.4. Risks and uncertainties 211
Note 211

10 Cotton 212
10.1. Projection highlights 213
10.2. Current market trends 214
10.3. Market projections 215
10.4. Risks and uncertainties 221
Notes 222

11 Other products 223
11.1. Roots and tubers 224
11.2. Pulses 226
11.3. Bananas and major tropical fruits 228
Note 235

Annex A. Glossary 236

Annex B. Methodology 240

Annex C. Statistical Annex 246

FIGURES

Figure 1.1. Shares of global food consumption 22
Figure 1.2. Shares of global production 22
Figure 1.3. Shares of global imports 23
Figure 1.4. Shares of global exports 24
Figure 1.5. Market conditions for key commodities 25
Figure 1.6. Annual GDP per capita and population growth rates 28
Figure 1.7. Use of agricultural commodities by type and region 30
Figure 1.8. Contribution of food groups to total daily per capita calorie intake 31
Figure 1.9. Contribution of protein sources to total daily per capita food intake 33
Figure 1.10. Food as a share of household expenditures 33
Figure 1.11. Change in demand for main feed categories 34
Figure 1.12. Share of biofuel and other industrial uses in total use of agricultural commodities 35
Figure 1.13. Trends in global agricultural production 36
Figure 1.14. Change in projected yields for selected crops and regions, 2021-23 to 2033 38
Figure 1.15. Change in agricultural land use 2021-23 to 2033 40
Figure 1.16. Global livestock and fish production on a protein basis 41
Figure 1.17. Direct GHG emissions from crop and livestock production by activity 42
Figure 1.18. GHG emissions and emissions intensity from agriculture, 2021-23 to 2033 43
Figure 1.19. Shares of food loss and waste by commodity, 2021-2023 46
Figure 1.20. Impact on calorie intake and agricultural direct GHG emissions of halving food loss and waste by 2030 48
Figure 1.21. Exports as a percentage of production 49
Figure 1.22. Net agricultural trade of main agricultural commodities by region, in constant value 50
Figure 1.23. Downside variability of national food availability 52
Figure 1.24. Long-term evolution of commodity prices, in real terms 53
Figure 1.25. Baseline and stochastic intervals for selected international reference prices 54
Figure 2.1. China a major driver of growth in agriculture and fish output in the Developed and East Asia region 65
Figure 2.2. Distribution of food waste and losses in Developed and East Asia in terms of calories and proteins, 2021-2023 65
Figure 2.3. Land use change and livestock production in Developed and East Asia 66
Figure 2.4. Demand for key commodities, food availability and agricultural trade balances in Developed and East Asia 67
Figure 2.5. Slowing growth of agriculture and fish output in South and Southeast Asia region 74
Figure 2.6. Distribution of food waste and losses in South and Southeast Asia in terms of calories and proteins, 2021-2023 74
Figure 2.7. Land use change and livestock production in South and Southeast Asia 75
Figure 2.8. Demand for key commodities, food availability and agricultural trade balances in South and Southeast Asia 76
Figure 2.9. Per capita net value of agriculture and fish production in Sub-Saharan Africa 83
Figure 2.10. Fertiliser application per hectare of land used for crop production is low in Sub-Saharan Africa 84
Figure 2.11. Distribution of food waste and losses in Sub-Saharan Africa in terms of calories and proteins, 2021-2023 84

Figure 2.12. Land use change and livestock production in Sub-Saharan Africa 85
Figure 2.13. Demand for key commodities, food availability and agricultural trade balance in Sub-Saharan Africa 86
Figure 2.14. Value of net food imports per capita in Near East and North Africa (including processed products) 92
Figure 2.15. Self-sufficiency ratios for selected commodities in Near East and North Africa 93
Figure 2.16. Distribution of food waste and losses in Near East and North Africa in terms of calories and proteins, 2021-2023 93
Figure 2.17. Land use change and livestock production in Near East and North Africa 94
Figure 2.18. Demand for key commodities, food availability and agricultural trade balance in Near East and North Africa 95
Figure 2.19. Net exports of agriculture and fish products from Europe and Central Asia (including processed products) 103
Figure 2.20. Distribution of food waste and losses in Europe and Central Asia in terms of calories and proteins, 2021-2023 103
Figure 2.21. Land use change and livestock production in Europe and Central Asia 104
Figure 2.22. Demand for key commodities, food availability and agricultural trade balance in Europe and Central Asia 105
Figure 2.23. Calories used in food, feed and other use in North America 113
Figure 2.24. Trends in export market shares of selected commodities of North America 113
Figure 2.25. Land use change and livestock production in North America 114
Figure 2.26. Demand for key commodities, food availability and agricultural trade balances in North America 115
Figure 2.27. Trends in export market shares of the Latin America and the Caribbean 122
Figure 2.28. Distribution of food waste and losses in Latin America and the Caribbean in terms of calories and proteins, 2021-2023 122
Figure 2.29. Change in area harvested and land use in Latin America and the Caribbean 123
Figure 2.30. Demand for key commodities and food availability in Latin America and the Caribbean 124
Figure 3.1. Regional contribution of growth in cereal production 2021-23 to 2033 130
Figure 3.2. Global use of cereals in 2033 132
Figure 3.3. Global cereal demand concentration in 2033 132
Figure 3.4. Regional cereal yields 135
Figure 3.5. Global cereal production concentration in 2033 136
Figure 3.6. Trade as a percentage of production and consumption 137
Figure 3.7. Global cereal trade concentration in 2033 138
Figure 3.8. World cereal prices 139
Figure 4.1. Oilseed and oilseed product use 143
Figure 4.2. Average annual growth in protein meal consumption and animal production, 2024-33 145
Figure 4.3. Per capita food consumption of vegetable oil in selected countries 146
Figure 4.4. Oilseed crush by country or region 147
Figure 4.5. Average annual yield growth for palm oil and oilseeds 149
Figure 4.6. Exports of oilseeds and oilseed products by region 150
Figure 4.7. Evolution of world oilseed prices 151
Figure 5.1. Evolution of sugar consumption and imports, by region 155
Figure 5.2. Daily per capita food consumption of calories from the different group carbohydrate sources, in the different regions 156
Figure 5.3. Per capita consumption of caloric sweeteners 158
Figure 5.4. Main sugar producing countries/regions classified by sugar crops 159
Figure 5.5. Raw and white sugar imports, by regions 161
Figure 5.6. Evolution of world sugar prices 163
Figure 6.1. Sources of growth in the meat sector, 2033 vs base period 2021-23 167
Figure 6.2. Share of proteins in total meat consumption 170
Figure 6.3. Growth of meat production by meat type, 2033 vs. 2021-23 172
Figure 6.4. Strongest growth in GHG emissions from meat in Africa 173
Figure 6.5. Meat trade will decrease at the start of the *Outlook* 175
Figure 6.6. World reference prices for meat -rising in nominal, but falling in real terms 176
Figure 7.1. Milk production and yield in selected countries and regions 179
Figure 7.2. Per capita consumption of processed and fresh dairy products in milk solids 182
Figure 7.3. Per capita consumption of butter in selected regions 182
Figure 7.4. Annual changes in inventories of dairy herd and yields between 2024 and 2033 184
Figure 7.5. Exports of dairy products by region 185
Figure 7.6. Imports of dairy products by region 186

Figure 7.7. Dairy product prices, 2003-2033 187
Figure 8.1. Per capita consumption of fish 191
Figure 8.2. Quantities of fishmeal and oilseed meal used in aquaculture 194
Figure 8.3. Aquaculture and capture fisheries production 195
Figure 8.4. Growth rates in world exports of fish for human consumption 196
Figure 8.5. World fish prices 198
Figure 9.1. Regional contribution of growth in biofuel consumption 202
Figure 9.2. Biofuel demand trends in major regions 204
Figure 9.3. World biofuel production from conventional and advanced feedstocks 205
Figure 9.4. Biofuel trade dominated by a few global players 209
Figure 9.5. The evolution of biofuel prices and biofuel feedstock prices 210
Figure 10.1. Evolution of global sustainable and organic cotton 214
Figure 10.2. Historical trends in consumption of textile fibres 215
Figure 10.3. Cotton mill consumption by region 216
Figure 10.4. Global players in cotton markets in 2033 217
Figure 10.5. World cotton production, consumption, and stocks 218
Figure 10.6. Cotton yields and area harvested in major producing countries 219
Figure 10.7. Trade as a percentage of cotton production and mill consumption 220
Figure 10.8. World cotton prices 221
Figure 11.1. Global players in roots and tubers markets in 2033 225
Figure 11.2. Per capita food consumption of pulses per continent 228
Figure 11.3. Exports of bananas by the four major LAC exporters 230
Figure 11.4. Global exports of the four major tropical fruits 234

TABLES

Table 2.1 Regional Indicators: Developed and East Asia 68
Table 2.2. Regional Indicators: South and Southeast Asia 77
Table 2.3. Regional indicators: Sub-Saharan Africa 87
Table 2.4. Regional indicators: Near East and North Africa 96
Table 2.5. Regional indicators: Europe and Central Asia 106
Table 2.6. Regional indicators: North America 116
Table 2.7. Regional Indicators: Latin America and the Caribbean Region 125
Table 3.1. Rice per capita food consumption 133
Table 6.1. Trends in non-ruminant Feed Conversion Ratios in selected countries 172
Table 9.1. Biofuel production ranking and major feedstock 206

BOXES

Box 1.1. Sustainable intensification of agriculture in Sub-Saharan Africa 38
Box 1.2. Agricultural production is shaped by climate change impact and adaptation 44
Box 1.3. Role of trade in mitigating the impact of extreme weather events 51
Box 5.1. Handling practices in raw and white sugar trade 162
Box 6.1. Pathways towards lower emissions: A global assessment of the greenhouse gas emissions and mitigation options from livestock agrifood systems 174

Follow OECD Publications on:

https://twitter.com/OECD

https://www.facebook.com/theOECD

https://www.linkedin.com/company/organisation-eco-cooperation-development-organisation-cooperation-developpement-eco/

https://www.youtube.com/user/OECDiLibrary

https://www.oecd.org/newsletters/

Follow FAO on:

Food and Agriculture Organization of the United Nations

https://twitter.com/FAOSocioEcon
https://twitter.com/faostatistics
https://twitter.com/FAOKnowledge

https://www.facebook.com/UNFAO

https://www.linkedin.com/company/fao

https://www.youtube.com/user/FAOoftheUN

https://instagram.com/fao

Abbreviations and acronyms

AEDP	Alternative Energy Development Plan
AfCFTA	African Continental Free Trade Area
AFOLU	Agriculture, Forestry and Other Land Use
ASF	African Swine Fever
B30	Alternative diesel fuel consisting of regular petroleum diesel (70%) blended with biodiesel (30%)
BFAP	Bureau for Food and Agricultural Policy
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
CSA	Climate-smart agriculture
CV	Coefficient of variation
Cwe	Carcass weight equivalent
DDGs	Dried Distiller's Grains
dw	Dry weight
E10	Fuel mixture composed of 10% ethanol and 90% gasoline
E15	Fuel mixture composed of 15% ethanol and 85% gasoline
E20	Fuel mixture composed of 20% ethanol and 80% gasoline
EBP	Ethanol Blended Petrol
EJ	Exajoule
El Niño	Climatic condition associated with the temperature of major sea currents
EPA	US Environmental Protection Agency
ERS	Economic Research Service of the US Department for Agriculture
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
FDI	Foreign Direct Investment
FLW	Food loss and waste
FOB	Free on board (export price)
FTA	Free Trade Agreement
g	Grams
GDP	Gross Domestic Product
GE	Genetically Engineered
GHG	Greenhouse gas
GLEAM	Global Livestock Environmental Assessment Model

GMO	Genetically modified organism
GTAP	Global Trade Analysis Project
GtCO2-eq	Giga tons of CO_2 equivalents
ha	Hectares
HFCS	High Fructose Corn Syrup
HIS	High Intensive Sweeteners
HPAI	Highly Pathogenic Avian Influenza
HQCF	High Quality Cassava Flour
HVO	Hydrotreated Vegetable Oil
ICAC	International Cotton Advisory Committee
IEA	International Energy Agency
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
ILUC	Indirect Land Use Change
IMF	International Monetary Fund
IPCC	Intergovernmental Panel on Climate Change
IRA	Inflation Reduction Act
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)
LDCs	Least Developed Countries
LULUCF	Land Use, Land Use Change and Forestry
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 metric tonnes of carbon dioxide equivalent
NENA	Near East and North Africa
NGO	Non-governmental organization
OECD	Organisation for Economic Co-operation and Development
PAHO	Pan American Health Organization
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
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
SMP	Skim Milk Powder

SPS	Sanitary and Phyto sanitary measures (WTO agreement)
SSA	Sub-Saharan Africa
t	Metric tonnes
t/ha	Metric tonnes/hectare
TFP	Total Factor Productivity
tq	Tel quel basis (sugar)
TRQ	Tariff Rate Quota
TR4	Banana Fusarium Wilt Tropical Race 4
UCO	Used Cooking Oil
UFLPA	Uyghur Forced Labor Prevention Act
UK	United Kingdom
UN	The United Nations
UNCTAD	United Nations Conference on Trade and Development
UN DESA	United Nations Department of Economic and Social Affairs
UNEP	United Nations Environment Programme
UNICEF	United Nations Children's Fund
UN WWDR	UN World Water Development Report
US	United States
USDA	United States Department of Agriculture
USMCA	United States—Canada—Mexico Agreement
WFP	World Food Programme
WHO	World Health Organization
WMP	Whole Milk Powder
WOAH	World Organization 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)
GDP	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

Summary table for country groupings

Countries	Continent	FAO region[3]	Income group[1]	Developed	Developing	LDC[2]	OECD
Canada	North America	North America	HIC	x			x
United States		North America	HIC	x			x
Argentina	Latin America	Latin America and Caribbean	UMC		x		
Brazil		Latin America and Caribbean	UMC		x		
Chile		Latin America and Caribbean	HIC		x		x
Colombia		Latin America and Caribbean	UMC		x		x
Mexico		Latin America and Caribbean	UMC		x		x
Paraguay		Latin America and Caribbean	UMC		x		
Peru		Latin America and Caribbean	UMC		x		x
South and Central America and the Caribbean (Antigua and Barbuda, Bahamas, Barbados, Belize, Bolivia (Plurinational State of), Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Nicaragua, Panama, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, Trinidad and Tobago, Uruguay, Venezuela (Bolivarian Republic of))		Latin America and Caribbean	UMC		x		
Great Britain	Europe	Europe and Central Asia	HIC	x			x
Norway		Europe and Central Asia	HIC	x			x
Russian Federation		Europe and Central Asia	UMC	x			
Switzerland		Europe and Central Asia	HIC	x			x
Ukraine		Europe and Central Asia	LMC	x			
European Union (Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden)		Europe and Central Asia	HIC	x			x
Other Europe (Albania, Andorra, Belarus, Faroe Islands, Bosnia and Herzegovina, Iceland, Monaco, Republic of Moldova, The former Yugoslav Republic of Macedonia, Serbia and Montenegro, San Marino, Serbia, Montenegro)		Europe and Central Asia	UMC	x			
Egypt	Africa	Near East and North Africa	LMC		x		
Ethiopia		Sub-Saharan Africa	LIC		x	x	
Nigeria		Sub-Saharan Africa	LMC		x		
South Africa		Sub-Saharan Africa	UMC	x			
North Africa, Least Developed (Mauritania, Sudan (former), Sudan)		Near East and North Africa	LIC		x	x	
Other North Africa (Algeria, Libya, Morocco, Tunisia)		Near East and North Africa	LMC		x		

Countries	Continent	FAO region[3]	Income group[1]	Developed	Developing	LDC[2]	OECD
Other Sub-Saharan Africa (Botswana, Cameroon, Cabo Verde, Congo, Equatorial Guinea, Gabon, Ghana, Côte d'Ivoire, Kenya, Mauritius, Namibia, Zimbabwe, Seychelles, Western Sahara, Eswatini)		Sub-Saharan Africa	LMC		x	x	
Africa, Least Developed (Angola, Burundi, Central African Republic, Chad, Comoros, Benin, Djibouti, Gambia, Guinea, Lesotho, Liberia, Madagascar, Malawi, Mali, Mozambique, Niger, Guinea-Bissau, Eritrea, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, Somalia, United Republic of Tanzania, Togo, Uganda, Burkina Faso, Democratic Republic of the Congo, Zambia, South Sudan)	Africa	Sub-Saharan Africa	LIC		x	x	
China	Asia	Developed and East Asia	UMC		x		
India		South and Southeast Asia	LMC		x		
Indonesia		South and Southeast Asia	LMC		x		
Iran, Islamic Republic of		South and Southeast Asia	UMC		x		
Israel		Europe and Central Asia	HIC	x			x
Japan		Developed and East Asia	HIC	x			x
Kazakhstan		Europe and Central Asia	UMC	x			
Malaysia		South and Southeast Asia	UMC		x		
Pakistan		South and Southeast Asia	LMC		x		
Philippines		South and Southeast Asia	LMC		x		
Republic of Korea		Developed and East Asia	HIC		x		x
Saudi Arabia		Near East and North Africa	HIC		x		
Thailand		South and Southeast Asia	UMC		x		
Türkiye		Europe and Central Asia	UMC		x		x
Viet Nam		South and Southeast Asia	LMC		x		
Central Asia (Armenia, Azerbaijan, Georgia, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan)		Europe and Central Asia	LMC	x			
Asia, Least Developed (Afghanistan, Bangladesh, Bhutan, Myanmar, Cambodia, Lao People's Democratic Republic, Nepal, Timor-Leste)		South and Southeast Asia	LIC		x	x	
Other Near East (Bahrain, Iraq, Jordan, Kuwait, Lebanon, Qatar, Syrian Arab Republic, Oman, United Arab Emirates, Yemen, Palestine)		Near East and North Africa	UMC		x		
Other Asia (Brunei Darussalam, Sri Lanka, Hong Kong, Democratic People's Republic of Korea, Macao, Maldives, Mongolia, Singapore, Taiwan)		South and Southeast Asia	HIC		x		
Australia	Oceania	Developed and East Asia	HIC	x			x
New Zealand		Developed and East Asia	HIC	x			x
Other Oceania (American Samoa, Cook Islands, Fiji, French Polynesia, Guam, Kiribati, Marshall Islands, Micronesia, Nauru, New Caledonia, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu, Wallis and Futuna Islands)		South and Southeast Asia	LMC		x	x	

1. The 38 individual countries and 11 regional aggregates in the baseline are classified into the four income groups according to their respective per-capita income in 2018. The applied thresholds are: low (LIC): < USD 1 550, lower-middle (LMC): < USD 3 895, upper-middle (UMC): < USD 13 000, high (HIC): > USD 13 000.
2. Least Developed Countries (LDC) are a subgroup of developing countries.
3. Source FAO, https://www.fao.org/faostat/en/#definitions.

Executive summary

Summary of key messages

- Emerging economies have increasingly driven global agricultural and fisheries market developments over the last 20 years and are expected to continue to do so over the next decade.
- The role of the People's Republic of China in driving global food and agricultural consumption is waning, whilst India and Southeast Asia are expected to gain influence, driven by their growing urban populations and increasing affluence.
- Calorie intake is expected to increase by 7% in middle-income countries, largely due to greater consumption of staples, livestock products and fats. Calorie intake in low-income countries will grow at 4%, too slowly to achieve the Sustainable Development Goal target of zero hunger by 2030 (SDG2).
- Agriculture's global greenhouse gas (GHG) emissions intensity is expected to decline, as growth will be based on productivity improvements rather than cultivated land and livestock herd expansions, although direct emissions from agriculture will still increase by 5%.
- Halving food loss and waste has the potential to reduce global agricultural GHG emissions by 4% and the number of undernourished people by 153 million by the year 2030.
- Well-functioning international agricultural commodity markets will remain important for global food security, as 20% of calories are traded and rural livelihoods can benefit from participation in markets and global agrifood value chains.
- A slight fall in real international reference prices for main agricultural commodities is projected over the next ten years but this may not be reflected in local retail food prices

The *OECD-FAO Agricultural Outlook* 2024-2033 provides a comprehensive analysis of the ten-year prospects for agricultural commodity and fish markets at national, regional, and global levels. The *Outlook* has been produced jointly by the OECD and FAO for 20 years, in collaboration with their Members and international commodity organisations. It serves as a structured reference for policy planning, especially in the context of the recent global COVID-19 pandemic, rising geopolitical tensions and the increasing impact of climate change. This 20th joint *Agricultural Outlook* reflects on the evolution of global agriculture over the past two decades and provides projections through to 2033.

Emerging economies have increasingly driven global agricultural and fisheries market developments over the last 20 years and are expected to continue to do so over the next decade.

The last 20 years have seen the consumption of agricultural commodities expand, driven mainly by population and income growth in low- and middle-income economies. These countries have also rapidly increased their production through technology and innovation advances, and by increasing the use of their natural resources. The resulting shifts in agricultural production and consumption locations have led to changes in international agricultural trade patterns.

The role of the People's Republic of China in driving global food and agricultural consumption is waning, whilst India and Southeast Asian countries are expected to expand their global consumption share, driven by their growing urban population and increasing affluence.

The *Outlook* baseline projections suggest that the influence of the People's Republic of China (hereafter "China"), India and Southeast Asian countries on global agrifood systems will continue to grow over the coming ten years. However, while China contributed 28% of global consumption growth in the previous decade, its share of additional demand over the coming decade is expected to fall to 11%, attributed to a stabilisation of nutrition patterns, slower income growth and declining population. Conversely, India and Southeast Asian countries are expected to account for 31% of global consumption growth by 2033, driven by their growing urban population and increasing affluence.

Total use of agricultural and fisheries products is projected to grow by 1.0% annually over the next decade, located largely in low- and middle-income countries. Global food consumption is projected to increase by 1.2% annually due to population and income growth. In most regions, the growth of feed use of crops is expected to outpace growth in direct food use, driven by the projected shift to higher shares of animal-derived foods in diets and the resulting expansion and intensification of livestock production.

Calorie intake is expected to increase by 7% in middle-income countries, largely due to greater consumption of staples, livestock products and fats. Calorie intake in low-income countries will grow at 4%, too slowly to achieve the Sustainable Development Goal target of zero hunger by 2030.

In middle-income countries, average daily per capita calorie intake will increase by 7% by 2033, driven by greater consumption of staples, livestock products and fats. In low-income countries average calorie intake is expected to grow by only 4%, indicating that the global community will fail to achieve the Sustainable Development Goal (SDG) 2 target of eliminating hunger by 2030. Income constraints in these countries are also hampering the transition to more nutrient- and protein-rich diets based on animal products, fish and seafood, vegetables and fruits, leading to a continuing heavy reliance on staples. Dietary preferences in high-income countries reflect growing concerns over the links between diets, health and sustainability, as evidenced by a slightly declining intake of fats and sweeteners, as well as shifting and stabilising protein intake over the coming decade.

Agriculture's global greenhouse gas (GHG) emissions intensity is expected to decline as production growth will be based on productivity improvements rather than cultivated land expansion although direct emissions from agriculture will still increase by 5%.

Over the coming decade, the carbon intensity of agricultural production is projected to continue to fall across the seven regions studied in this *Outlook* as direct agricultural GHG emissions (according to the

Intergovernmental Panel on Climate Change (IPCC) definition) grow more slowly than agricultural production. However, despite this relative decoupling, growing agricultural production will lead to a 5% absolute increase in direct GHG emissions.

Growth in crop production is projected to be driven primarily by productivity increases on existing land, rather than an expansion of the cultivated area. Similarly, a significant proportion of the growth in livestock and fish production is also expected to result from productivity improvements, although herd expansions will also contribute to production growth. Despite these expected productivity improvements, particularly in low- and middle-income countries, significant productivity gaps are projected to persist, challenging farm incomes and food security and increasing countries' dependence on food imports.

Halving food loss and waste by 2030 has the potential to reduce global agricultural GHG emissions by 4% and the number of undernourished people by 153 million.

This year's *Outlook* features a stylised scenario that simulates the impact of halving food losses along supply chains and food waste at the retail and consumer levels by 2030 (SDG 12.3.). The scenario projects a potential 4% reduction in global agricultural GHG emissions by 2030, distributed relatively evenly across countries regardless of income levels. It also projects food prices to fall, resulting in increased food intake in low- (+10%) and lower-middle-income (+6%) countries. reducing the number of undernourished people by 153 million (-26%) by 2030. While the scenario illustrates potential benefits for consumers and the environment, it also points to challenges for producers, as lower producer prices and decreased production would notably impact their livelihoods.

Well-functioning international agricultural commodity markets will remain important for global food security as 20% of calories are traded and rural livelihoods benefit from participation in markets and global agrifood value chains.

Agricultural trade continues to grow in line with production and consumption, with approximately 20% of all calories crossing borders before being consumed. At the same time, the COVID-19 pandemic and geopolitical tensions have highlighted the vulnerability of international agricultural trade. While the traded share of production is projected to stabilise, the volumes of commodities traded globally are expected to grow further, seeing shipments increase between net exporting and net importing regions in the coming decade. Latin America and the Caribbean, North America, Europe and Central Asia are all projected to reinforce their positions as major net exporters of agricultural commodities, thereby creating additional opportunities for farmers to benefit from the participation in global food supply chains. Net imports by Asia and Africa will continue to expand, as the growth of demand is projected to outpace growth in production. This highlights the importance of well-functioning markets and the need for resilient trading systems to ensure global access to safe and nutritious food, while supporting income generation across agricultural industries and mitigating the impact of localised shocks, such as crop failures or extreme weather events.

A slight fall in real international reference prices for main agricultural commodities is projected over the next ten years but this may not be reflected in local retail food prices.

Supply and demand factors are expected to maintain or marginally reduce real international reference prices for main agricultural commodities over the next ten years (assuming no deviation from stable weather conditions, macroeconomic and policy assumptions, and continued technological improvements). However, these lower real international commodity prices may not be reflected in local retail food prices, due to domestic inflation and currency devaluation as well as high domestic logistics and processing costs sustaining or widening the wedge between international commodity and retail food prices. Such exacerbating local conditions may pose challenges to livelihoods and threaten the food security of vulnerable consumers.

1 Agricultural and food markets: Trends and prospects

This chapter presents the key findings for the consumption, production, trade, and prices of major agricultural and fish commodities covered in the *OECD-FAO Agricultural Outlook* for the period 2024 to 2033. It summarises a plausible baseline scenario of the next ten years, based on assumptions regarding macroeconomic conditions, productivity trends, weather conditions, consumer preferences, and agriculture and trade policy settings. Global agricultural demand is projected to grow more slowly over the coming decade due to the foreseen slowdown in population and per capita income growth. This 20th joint edition features a review the evolution of agricultural markets over the last twenty years, highlighting the increasing importance of emerging economies. While the influence of The People's Republic of China in global food and agricultural consumption is projected to diminish over the next decade, India and Southeast Asia are expected to gain significance. Agriculture's global greenhouse gas emissions intensity is projected to decline, as the projected production growth will be based on productivity improvements rather than cultivated land and livestock herd expansions. However, direct emissions are still projected to rise. The chapter also presents a scenario focussing on the impact of food loss and waste reduction on GHG emissions, food security and nutrition.The *Outlook* emphasises the continued importance of well-functioning international agricultural commodity markets for global food security and rural livelihoods. The expected developments in global demand and supply are projected to keep real international reference prices on a slightly declining trend over the next ten years, yet potential deviations from the underlying environmental, social, geopolitical and economic assumptions would alter the baseline projections.

The *OECD-FAO Agricultural Outlook* is 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 2024 to 2033.

The baseline projections are based on structured expert inputs. These projections are influenced by current market conditions (Section 1.2), as well as assumptions about macroeconomic, demographic, and policy developments Section 1.3). The OECD-FAO Aglink-Cosimo model, which links sectors and countries covered in the *Outlook,* ensures consistency and global equilibrium across all markets.

In Section 1.6, this *Outlook* highlights the importance of food loss and waste for food security, resource use and the sustainability of food systems. It also presents a scenario analysis that explores the potential implications for global supply and demand of reducing food waste by 50% at the retail and consumer levels between now and 2030, in line with the SDG 12.3. target, along with halving food losses at the production level and through the supply chains over the same period.

1.1. OECD-FAO: 20 years of collaboration and 20 years of evolution in agri-food markets

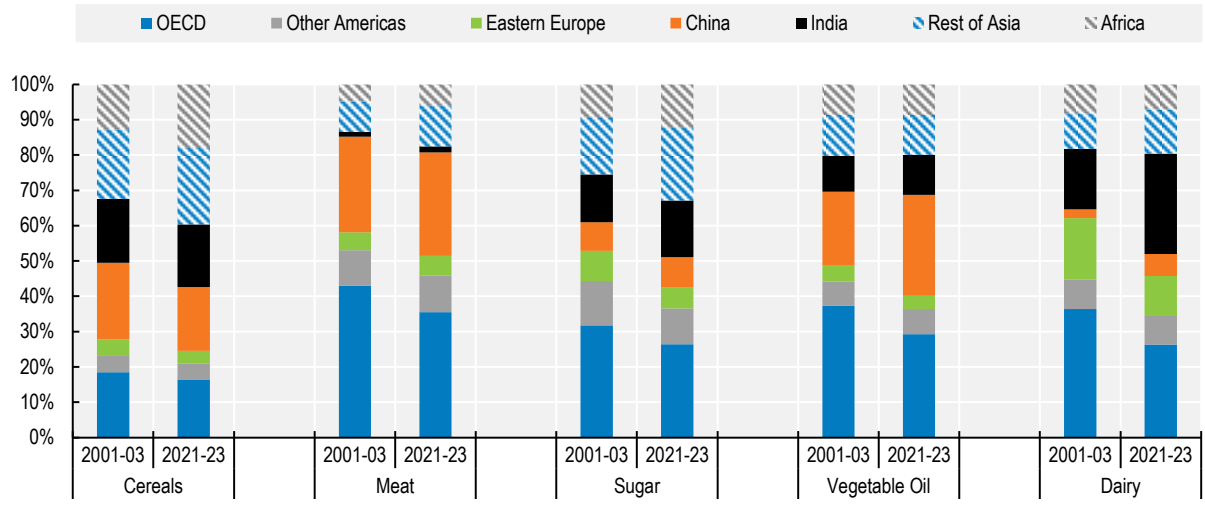
This 20th joint edition presents an opportunity to reflect on the evolution of global agricultural markets over the past two decades. While consumption and production of agricultural commodities have in general grown steadily there have been noteworthy structural, behavioural and policy shifts within the overall global picture. Imports and exports have surged by 105% globally, from the reference period of 2001-2003 to the base period of 2021-2023. Consumption and production have increased by 58% over the same timeframe. One has been the rising prominence of emerging economies as both consumers and producers, fueled by rapid population growth, increasing disposable incomes and technological progress, and leading to a revised order in international markets. This new order and the evolution towards it, is the background for the *Outlook*'s projections to 2033. Many of the same shifts will continue to shape agricultural markets in the medium term.

1.1.1. Consumption trends have seen China and India grow in stature

OECD countries have witnessed the most drastic decreases in world market consumption shares for dairy, vegetable oil and meat, with People's Republic of China (hereafter "China"), India, and the rest of Asia contributing most to these shifts (Figure 1.1). OECD countries' share of world dairy consumption dropped from 36% to 26%. India largely accounted for this shift, increasing its market share by 11 percentage points. For vegetable oil, the market shares largely shifted towards China, which increased its share by 8 percentage points. In meat, all regions aside from the OECD group showed moderate increases in market shares, with the rest of Asia region showing the largest increase (approximately 3 percentage points).

In non-food consumption, OECD countries' share in terms of feed use of cereals and protein meals dropped dramatically over the past 20-year period – by 17 and 20 percentage points respectively. In both cases, China contributed most significantly to this shift, increasing its shares in cereal and protein meal consumption by 9 and 11 percentage points respectively.

Figure 1.1. Shares of global food consumption



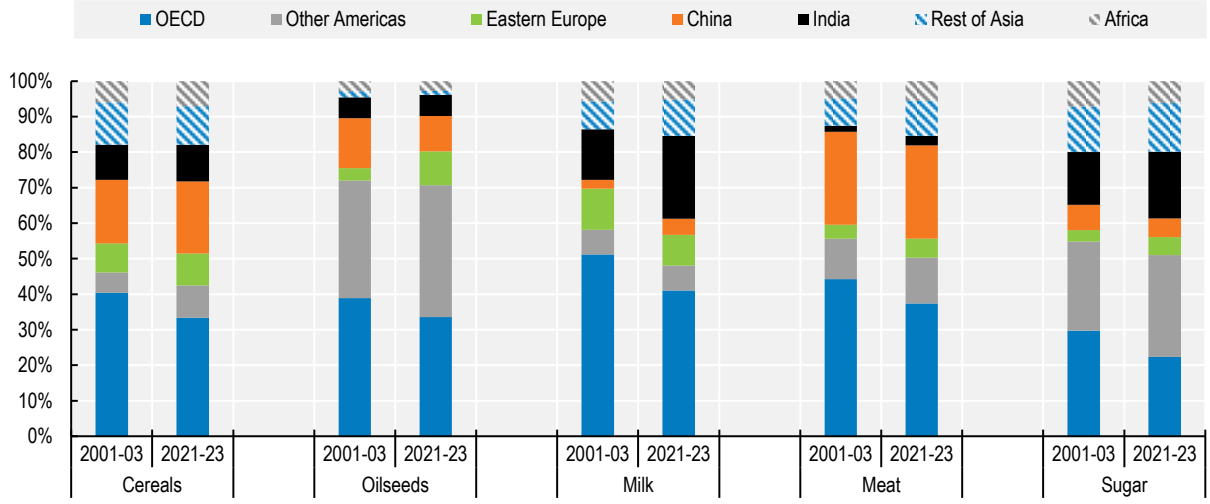
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/9zgjoy

1.1.2. OECD production shares are declining relative to other regions, especially India

OECD countries' global share of production of cereals, oilseeds, milk, meat and sugar decreased on average by about 7 percentage points in the last 20 years. The most notable change occurred in global milk markets, with the OECD share dropping from 51% to 41% (Figure 1.2). India accounted for nearly all of this shift, increasing its share from 14% to 23%. Interestingly, in oilseeds production markets, China's share decreased nearly the same amount as OECD countries' shares, a drop of 4 and 5 percentage points, respectively, with Eastern Europe and the Other Americas regions filling the gap.

Figure 1.2. Shares of global production



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

StatLink https://stat.link/w2k19j

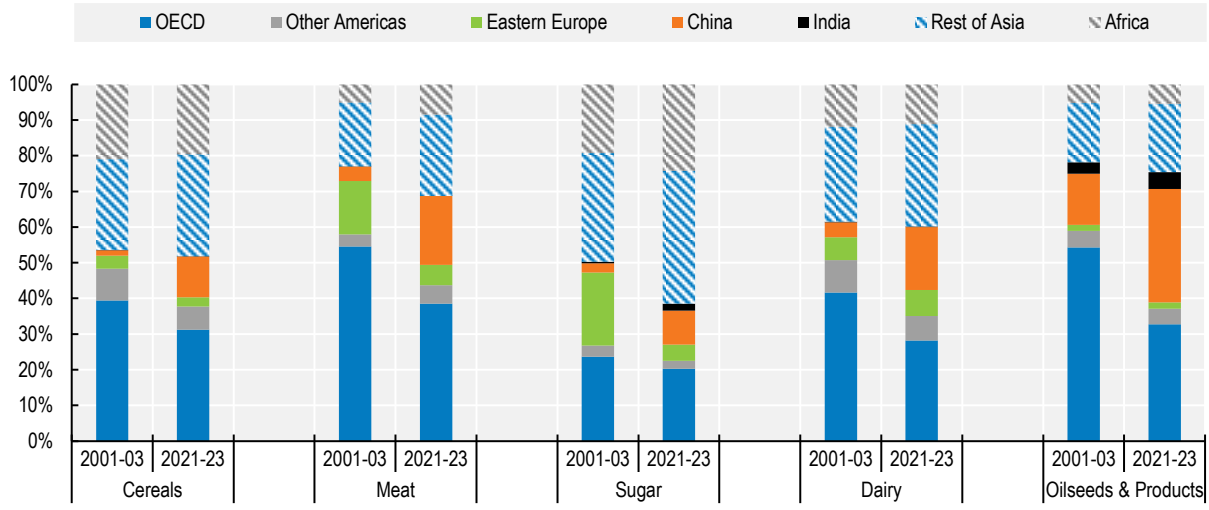
1.1.3. The trade landscape has shifted significantly

The OECD countries' global share of imports of the five commodities shown in Figure 1.3 decreased across the board, most notably in oilseeds and products (a 21 percentage point decrease), meat (16 percentage point decrease), and dairy (13 percentage point decrease). China filled the gap with markedly increased shares in all three markets. For all five commodities shown in Figure 1.3, China showed the largest increases in import shares out of all the regions, followed by the rest of Asia.

While OECD shares decreased modestly in sugar import markets, the most significant drop occurred in Eastern Europe, plummeting from 20% to just 5%. China, the rest of Asia, and Africa collectively filled this gap, with the most notable increases in sugar import shares. Eastern Europe experienced a notable decline in meat import shares, dropping from 15% to 6%.

OECD countries' global share of exports of the five commodities shown in Figure 1.4 all decreased drastically, except for oilseeds and products, which decreased modestly from 30% to 27%. China's export shares decreased or remained the same for all five commodities. In cereals, the Eastern Europe and Other Americas regions accounted for the largest share increases at 13 and 12 percentage points respectively. India – which exhibited modest changes for all other commodities in both import and export markets – and the Other Americas shared responsibility for sugar import market shifts, with 9 and 7 percentage point increases respectively.

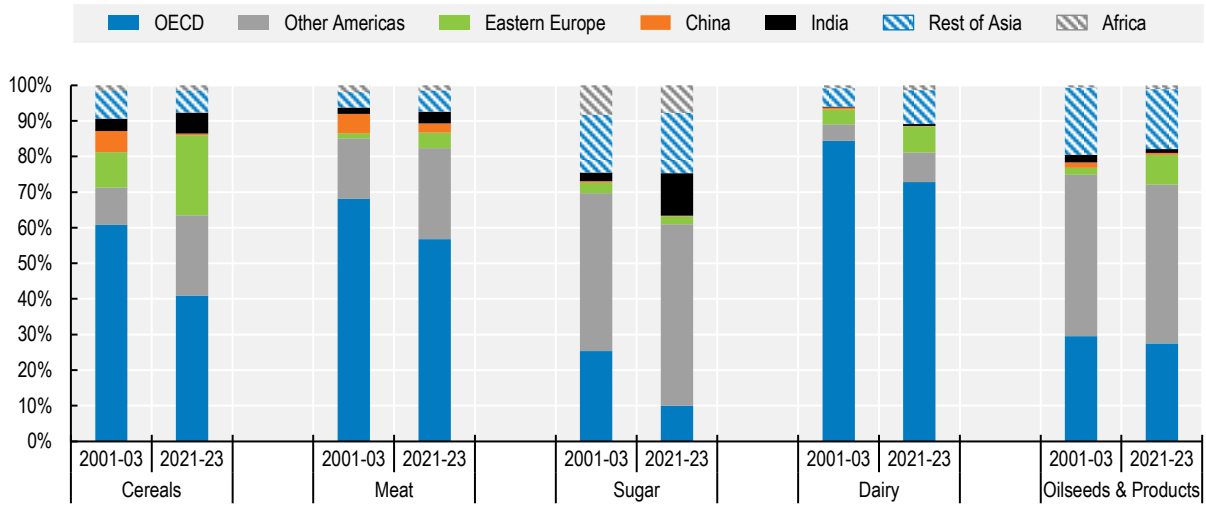
Figure 1.3. Shares of global imports



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

StatLink https://stat.link/vifu5a

Figure 1.4. Shares of global exports



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

StatLink https://stat.link/lq0o2d

1.2. Recent developments in agricultural markets

International agricultural commodity supplies continued to increase in 2023 and matched demand. This resulted in a decline of international reference prices. Those prices are now close or slightly below the last ten-year average. A notable exception are sugar prices which are considerably higher, as increasing global demand outpaced stable production in 2023. Figure 1.5 provides more information on the current commodity situation which is the starting point of the projections.

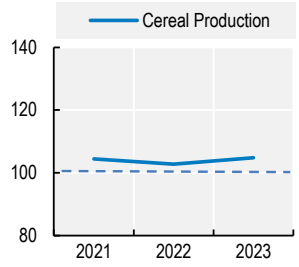
Figure 1.5. Market conditions for key commodities

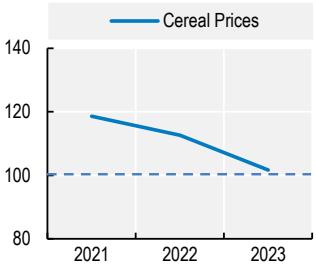
Current market conditions

Production index
Average 2014-2023 = 100

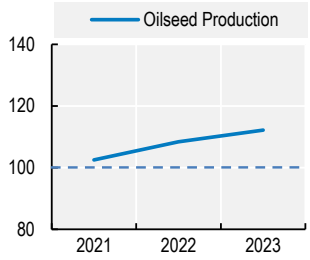
Real Price Index
Average 2014-2023 = 100

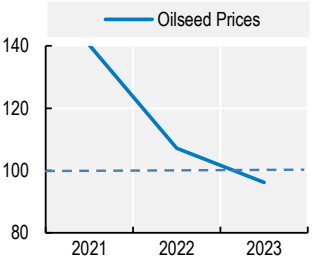
Cereal: Ample grain supplies from the United States and Argentina, along with competition among exporters, lowered global wheat and maize prices. Alternative Ukrainian shipment routes and lower input costs also eased market sentiment. In contrast, the rice market faced turbulence due to El Niño concerns and subsequent supply shortfalls, but stabilised by late 2023, as actual production impacts were milder than expected.



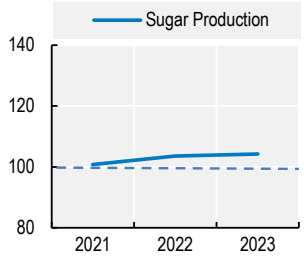


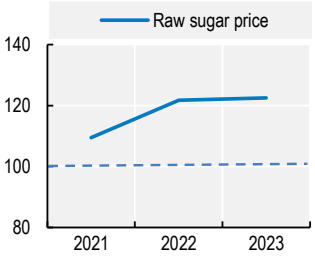
Oilseed: International prices for oilseeds and products dropped from record highs during 2022 and 2023. Oilseed prices have stabilised since late 2023, mainly reflecting prospects of sufficient global supplies of soybean, rapeseed, and sunflower seed. Similar development has also occurred for vegetable oil prices, as below-potential palm oil production coincided with subdued global demand.



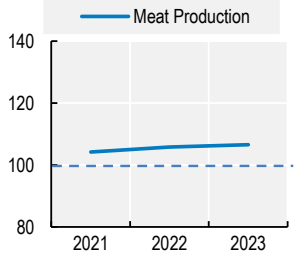


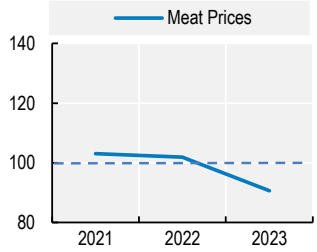
Sugar: Sugar production in 2023 season is expected to increase with a large output in Brazil, the main global supplier, more than offsetting a decline in India and Thailand. International raw sugar price to stay high amid strong demand.



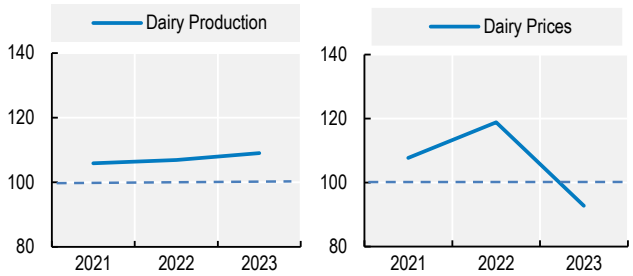


Meat: In 2023, global meat prices fell due to sustained production from key regions and reduced demand from major importers. Despite challenges such as animal diseases, rising costs, regulatory constraints, and adverse weather conditions, meat production saw slight growth, led by Asia, South America, and Oceania, though Europe's output declined.

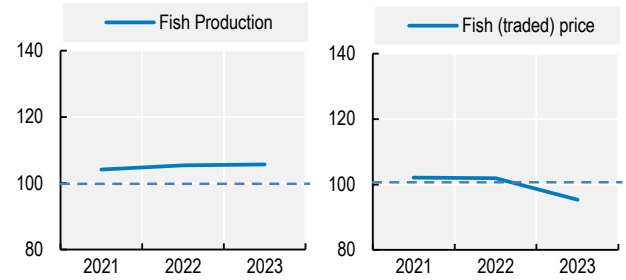




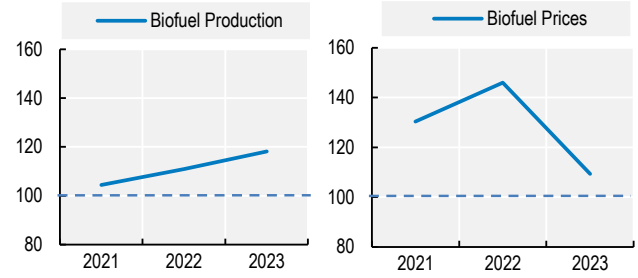
Dairy: The 2023 prices dropped significantly from high 2022 levels for all dairy products, mainly driven by a decrease in input costs and lower global consumption. Domestic prices often show a slightly different development as only a small share of milk is traded internationally. Global milk production increased more slowly in 2023 than in previous years. World trade in dairy products declined, mainly due to lower imports demand from China.



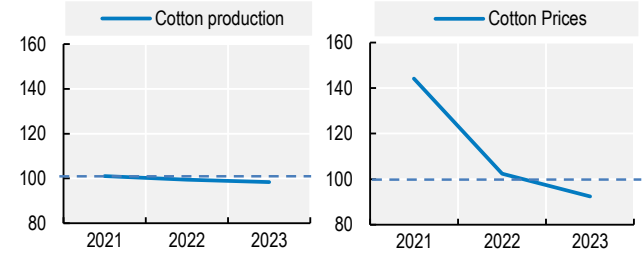
Fish: In 2023, global fish production remained broadly stable, with a rise in aquaculture output offset by lower capture fisheries production, particularly in Peru. International fish prices experienced a decline in 2023 compared to the high levels observed in 2021 and 2022, primarily due to reduced prices of aquaculture products.



Biofuels: In 2023, global biofuel production experienced steady growth for the third consecutive year in response to sustained demand, rebounding from the lows of 2020. This growth was driven by supportive policies, lower oil prices which boosted demand for transport fuel, and decrease in feedstock prices.



Cotton: In 2023, global consumption increased only slightly as a consequence of slowing economic growth. International prices declined since the start of the season in August 2023, pressured downwards by concerns over weak global demand. World cotton production slightly decreased mainly reflecting reduced outputs in key producing countries, China and India.



Note: All graphs expressed as an index where the average of the past decade (2014-2023) is set to 100. Production refers to global production volumes. 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.

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

StatLink https://stat.link/ekr1mc

1.3. Expected macroeconomic and policy changes affecting agriculture markets

This baseline scenario generating 2024-2033 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 following changes are expected to influence the evolution of agricultural markets in the coming ten years.

1.3.1. A slowing pace of global population growth

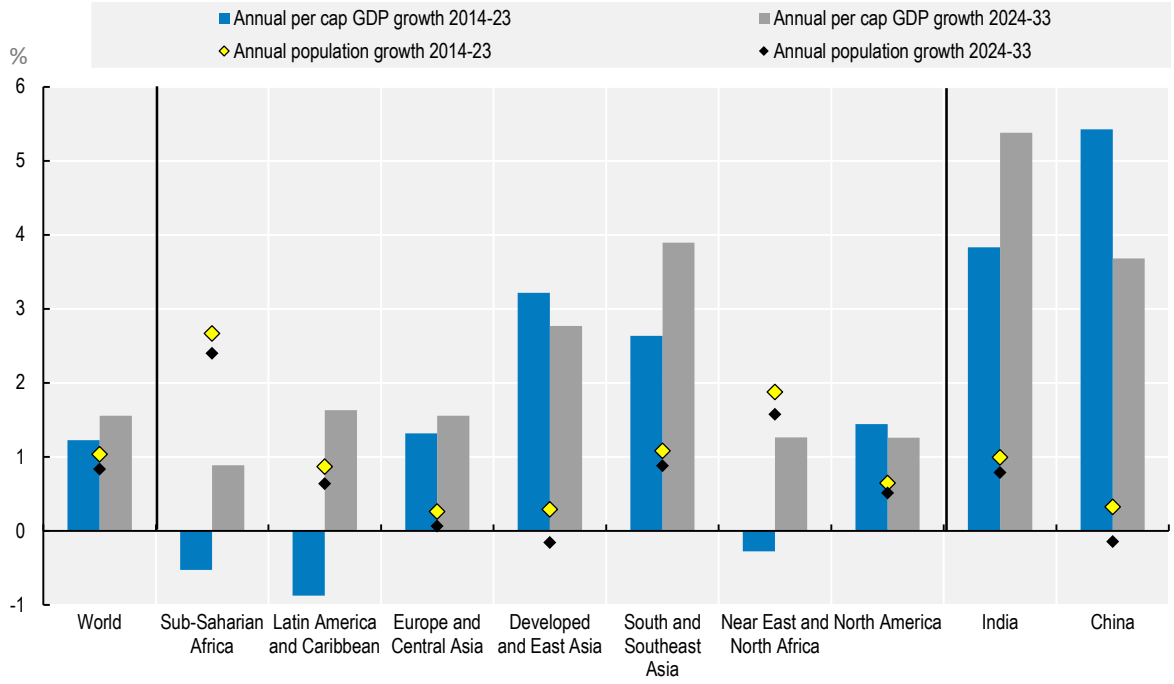
World population[1] is projected to increase by over 700 million, reaching 8.7 billion by 2033. This reflects an average growth rate of 0.8% p.a., signaling a deceleration compared to the 1.0% p.a. growth observed in the past decade (Figure 1.6). Sub-Saharan Africa is anticipated to witness the most rapid population growth at 2.4% p.a. whereas the population of China is expected to decline gradually. India is projected to cement its position as the most populous country, surpassing China in 2023, with an average growth rate of 0.8% p.a. over the next decade. The overall slowdown in global population growth is anticipated to lead to a slower growth in global food demand compared to the previous ten years.

1.3.2. A sluggish global economic recovery

Global economic recovery from the disruptions of the COVID-19 pandemic and the Russian Federation's (hereafter "Russia") war against Ukraine is anticipated to be slow, more so in the advanced economies than in developing markets. Globally, GDP growth is projected to stabilise at an average rate of 3.0% p.a. over the next decade, after declining from an estimated 3.5% in 2022 to 3.0% in 2023. Emerging and developing Asian economies are expected to continue experiencing the fastest growth at 4.5% p.a., followed by Sub-Saharan Africa at 4.3%. In contrast, GDP growth in advanced economies is expected to remain below 2.0% p.a. This divergent recovery will reinforce the role of low- and middle-income countries as primary drivers of global agricultural demand growth.

Global per capita income, expressed in constant 2010 United States Dollars, is expected to grow at 1.4% p.a. in 2024, further weakening from the 2.2% and 1.6% observed in 2022 and 2023 respectively. This indicator is used to represent household disposable income, one of the main determinants of demand for agricultural commodities. Over the next decade, an average annual growth rate of 1.6% p.a. is foreseen globally (Figure 1.6). Strong per capita income growth is expected in Asia, especially in India (5.4% p.a.), Viet Nam (5.1% p.a.), the Philippines (4.2% p.a.) and Indonesia (4.0% p.a.). Per capita income growth in China is expected to weaken to 3.7% p.a. compared to the 5.4% observed in the previous decade. In Sub-Saharan Africa and Latin America and the Caribbean, average per capita incomes are projected to grow at 0.9% and 1.6% p.a. respectively, which are still substantial improvements from the falls seen in the last decade. However, in Sub-Saharan Africa, despite relatively strong overall GDP growth, rising populations will continue to limit gains in real per capita incomes.

Figure 1.6. Annual GDP per capita and population growth rates



Source: OECD and FAO secretariats calculations based on UN Population Prospects 2022, *IMF World Economic Outlook* 2023 and *OECD Economic Outlook* 2023 numbers.

1.3.3. Improved affordability of energy and fertiliser inputs as fossil fuel demand weakens

The *Outlook* uses a composite cost index for agricultural production which covers seeds and energy, as well as various other tradable and non-tradable inputs. In addition, fertiliser costs are explicitly accounted for in the yield and land allocation equations of the Aglink-Cosimo model. Energy costs are represented by the international crude oil price expressed in domestic currency while fertiliser prices are linked to crop and crude oil prices.

According to the International Energy Agency, global demand for oil, coal and gas is set to have peaked in 2023 given the rise of clean energy technologies, potentially putting pressure on international energy prices. Global fertiliser prices have also eased from their 2022 peaks, thanks to lower energy prices and improved market access. Projections in this report are therefore based on the assumption that oil prices will remain flat in real terms.

1.3.4. Existing policies remain unchanged

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 2023 are considered in the *Outlook*. This specification provides a useful benchmark and allows for the evaluation and analysis of future policy changes.

1.3.5. Many uncertainties are likely to affect the projections

The projections of agricultural commodity markets in this report are subject to environmental, social, geopolitical and economic uncertainties that might lead macroeconomic variables to diverge from the assumptions outlined above. A key source of uncertainty is the possible occurrence of abnormal weather events during the ten years ahead, pushing yields outside of the assumed trends influenced by both the effects of climate change and concurrent adaptation measures. In 2023, the Earth recorded its hottest land and sea surface temperatures. Climate change continues to exacerbate the intensity of global temperatures along with the likelihood of other extreme events such as droughts, hurricanes, and floods, impacting global agricultural production and trade patterns. Box 1.3 in Section 1.7 summarises a recently published scenario analysis exploring the role of trade in mitigating the impacts of such extreme weather events. The introduction of more stringent environmental policies by countries to address the sector's environmental footprint and foster greater sustainability may also limit the production prospects expected over the next decade.

On the demand side, unexpected changes in consumer preferences and behaviour may alter the projections as the *Outlook* assumes a continuation of current consumer preference developments over the coming decade. Mounting environmental, health and animal welfare concerns may influence consumer behaviour beyond the trends assumed in the *Outlook*, further increasing the popularity of foods viewed favourably from a health or environmental perspective such as poultry, fish, fruits and vegetables, nuts and seeds, as well as dairy and meat alternatives. In contrast, consumer preferences may increasingly diverge away from commodities with large environmental footprints or potentially adverse health effects such as sugar, palm oil and beef, especially among consumers in upper middle- and high-income economies.

On the trade side, current and potential disruptions to key maritime passages especially the Suez Canal, Panama Canal and the Black Sea may present complex challenges for the seamless movement of agricultural commodities across borders. Disruptions at these critical chokepoints, be it due to geopolitical tensions, changing climate, natural weather phenomenon or other logistical hurdles, can have severe consequences for global supply chains, leading to delays and increased freight costs and thereby affecting the cost and availability of agricultural commodities. For instance, while it may still be too early to make a complete assessment of the impacts of the current Middle East crisis on agricultural markets, prolonged rerouting of oil tankers away from the Suez Canal could lead to spikes in energy prices and transportation costs, reminiscent of the challenges faced during the recovery phase of the COVID-19 pandemic.

Finally, animal and plant disease outbreaks remain a significant source of uncertainty for the global agricultural sector going forward. The economic and social consequences of disease outbreaks for producers and consumers are substantial and often require several years to resolve. This underscores the importance of collaborative biosecurity efforts to ensure disease outbreaks are managed, particularly in the face of risks to exports and imports.

1.4. Consumption: Projected evolution for 2024-2033

1.4.1. Low- and middle-income economies underpin consumption growth for agricultural commodities

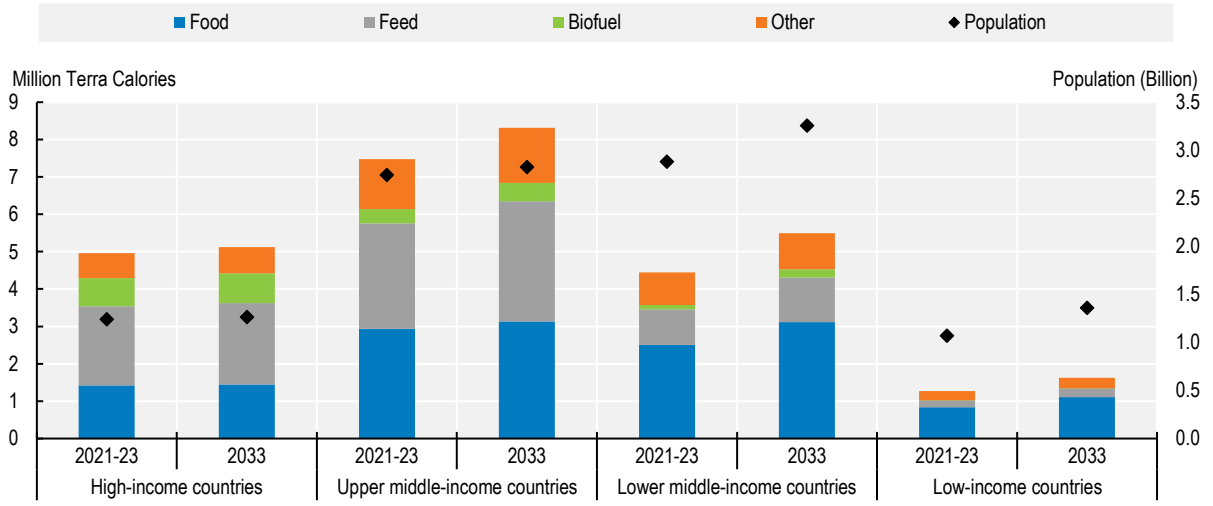
Demand for agricultural commodities is underpinned by a set of factors including real disposable incomes, population, expected prices, consumer preferences and policies, which determine the amount of agricultural output that is consumed as food, feed and fuel, as well as raw materials for other industrial applications. Over the coming decade, total consumption is projected to grow by 1.1% annually, reaching 20.6 million terra calories in 2033. Nearly 94% of the additional consumption is projected to occur in middle- and low-income countries, due to their specific economic, demographic and preference patterns (Figure 1.7). South and Southeast Asia are projected to account for about 40% of additional global

consumption, with half this share attributed to India. Growing and increasingly affluent populations are shaping demand for agricultural commodities in these regions, where nutrition patterns are evolving.

A notable shift in the current *Outlook* is the declining role played by China and the increasing role of India and Southeast Asian countries. While it contributed 28% of global consumption growth in the previous decade, its share of additional demand over the coming decade is expected to fall to 12%, attributed not only to a declining population and slower income growth but also to a stabilisation of nutrition patterns. This contrasts with the rapid nutrition transition observed in the previous decade as the country experienced significant economic growth. India and Southeast Asian countries are expected to account for 31% of global consumption growth by 2033, driven by their growing urban population and increasing affluence. Among predominantly low-income regions, Sub-Saharan Africa is projected to contribute a sizeable share of additional global consumption (18%), primarily due to population-driven demand for food. The Latin America and Caribbean region, an important producer of meat and biofuels, is also expected to contribute a significant share of additional demand, mostly as raw materials for non-food uses.

Globally, food use remains the primary outlet, currently accounting for 42% of total consumption. Feed use, which has expanded strongly over the past decades due to income-driven diversification of diets towards animal sources and subsequent expansion and intensification of livestock production, takes up a third. The largely policy-driven biofuel use is responsible for another 7% of total consumption. The remaining 17% is either lost along the supply chain or used as feedstock for other industrial applications.

Figure 1.7. Use of agricultural commodities by type and region



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

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

StatLink https://stat.link/g8dqhz

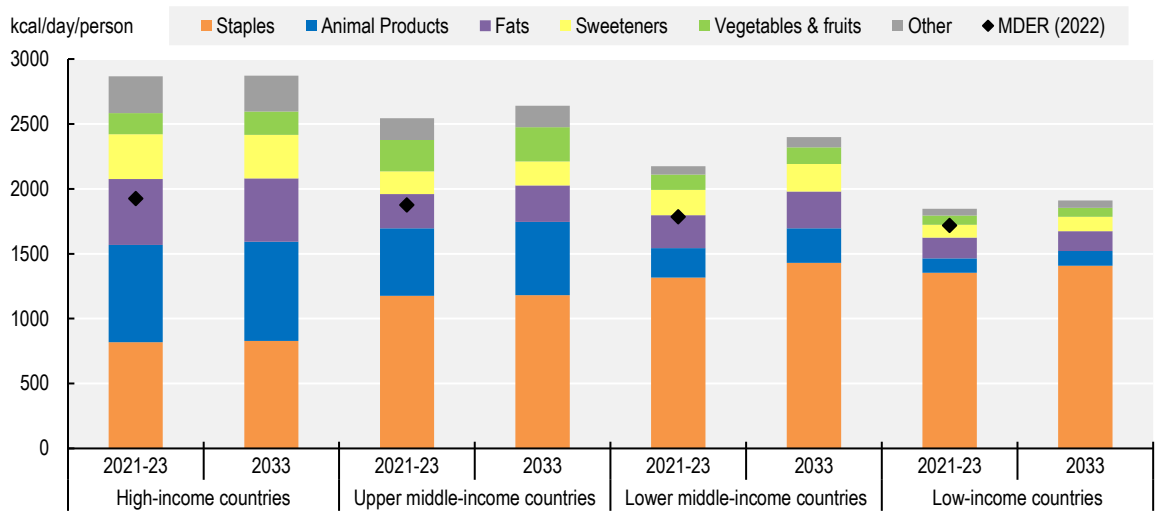
Over the *Outlook* period, food use is projected to account for 46% of additional global demand for agricultural commodities, largely due to growing populations in Sub-Saharan Africa, Southeast Asia and India, where urbanisation is also increasing rapidly. Feed use will represent roughly one-third of additional consumption, thanks to the anticipated development of the livestock sector. While food use of crops is anticipated to grow faster than feed use at the global level, this aggregation masks marked differences across countries. In middle- and upper-income economies, feed use of crop commodities is projected to grow faster than food use as higher demand for animal protein is expected to fuel greater demand for feed

to sustain production. This trend is especially pronounced in upper middle-income countries where more than half of additional feed demand will originate. On the other hand, low-income countries are projected to see growth in food use exceed growth in feed use as rising populations drive higher demand for staples. Globally, biofuel use is also set to grow, increasing its share of total use by 0.5% by 2033.

1.4.2. Calorie intake is rising but dietary diversification remains slow

Daily per capita calorie intake (consumption net of household waste) is projected to increase in developing and emerging economies, with lower middle-income countries adding the most calories followed by upper middle-income countries (Figure 1.8). In particular, gains in per capita incomes in India and other parts of emerging Asia are expected to contribute to growth in intake of all food commodities. In low-income countries, despite relatively high rates of GDP growth, increasing populations will mean only modest gains in per capita terms and therefore only moderate increases in food intake compared to middle-income countries. Consumers in high-income economies will increase their calorie intake only marginally as diets have stabilised.

Figure 1.8. Contribution of food groups to total daily per capita calorie intake



Note: Estimates are based on historical time series from the FAOSTAT Food Balance Sheets database which are extended with the *Outlook* database. Products not covered in the *Outlook* are extended by trends. The 38 individual countries and 11 regional aggregates in the baseline are classified into the four income groups according to their respective per-capita income in 2018. The applied thresholds are: low: < USD 1 550, lower-middle: < USD 3 895, upper-middle: < USD 13 000, high: > USD 13 000. Staples include cereals, roots and tubers and pulses. Animal products include meat, dairy products (excluding butter), eggs and fish. Fats include butter and vegetable oil. Sweeteners include sugar and HFCS. The category other includes other crop and animal products. MDER stands for minimum dietary energy requirement.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/fpbuxr

Per capita intake of staple commodities, the main source of calories, is projected to increase by 5.3% globally, with growth concentrated in low- and middle-income countries as intake in high-income countries has levelled off. While a shift in dietary structure from staples to more high-value items is expected, this transition remains slow as food baskets around the world evolve only gradually, constrained by incomes and cultural preferences. By 2033, the share of dietary energy from nutrient-rich animal products, fruits and vegetables in middle-income countries is projected to increase by just over 1%. Dietary patterns are even more rigid in low-income countries where the share of dietary energy from animal sources remains unchanged and the bulk of calories (71%) continues to come from staples. This slow transition towards

animal-source and other nutritious foods in low- and middle-income economies illustrates the challenges in achieving the SDG objective of improved nutrition for global populations by 2030. Nevertheless, despite the limited change in diets, the *Outlook* projects additional consumption of high-value food items for both low- and middle-income countries, in line with economic growth.

At a global level, per capita intake of fats and sweeteners is projected to increase by 7.2 kcal/day and 6.6 kcal/day, respectively. A strong growth in intake is projected for fats in India, Southeast Asia and Latin America and for sugar in Southeast Asia, driven by rising per capita incomes. In high-income economies, per capita intake of fats and sweeteners is expected to decline further over the coming decade due to growing health concerns and policy measures that discourage their excessive consumption. Reductions in consumption of these foods are offset by increases in poultry, fish, fruits and vegetables, which are viewed as more desirable from a health point of view.

FAO's *State of Food Security and Nutrition in the World (SOFI)* report compiles statistics on the prevalence of undernourishment around the world. The report defines hunger as the proportion of the population whose daily food intake falls below the minimum dietary energy requirement (MDER). According to (FAO, 2023[1]), an estimated 735 million people – or 9.2% of the global population – faced hunger in 2022. However, as Figure 1.8 shows, average daily per capita calorie intake in the base period (2021-23) exceeds the 2022 MDER for all country groupings. This implies that although there is enough food to meet the required energy needs, unequal distribution of calories within and between countries is the main reason for the prevalence of hunger. This highlights the importance of socio-economic policies such as effective social safety nets and food distribution programmes in addressing undernourishment.

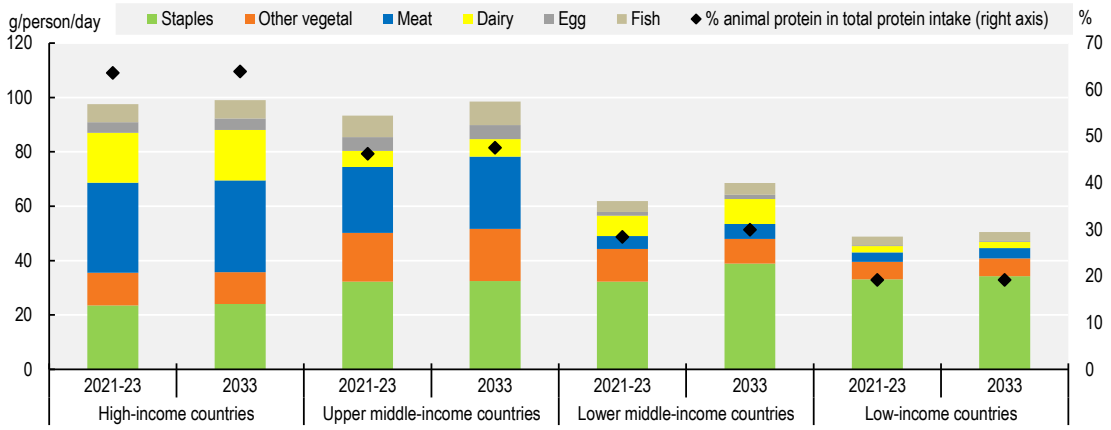
1.4.3. Protein consumption is projected to increase globally from a variety of sources

In response to increasing affluence among consumers in emerging economies, global per capita intake of protein is projected to rise to 79.8g per day by 2033, from 76.6g in the base period. While upper middle-income countries are projected to close the consumption gap with high-income countries by the end of the decade, the gap for poorer countries will remain between 50%-70% of the intake in high-income countries, a slight improvement from the base period.

Differences in the composition of protein sources will also persist, with countries in Sub-Saharan Africa and Near East and North Africa regions expected to consume mostly proteins from vegetal sources, given their substantially lower average household incomes (Figure 1.9). In South Asia, fresh dairy products remain a critical source of protein. India and Pakistan are each projected to add more than 2g of dairy protein to their average daily per capita intake, bringing the share of dairy in total protein intake to 17.6% and 28.3% respectively.

In the high-income countries of North America, Europe and Central Asia, nutrition patterns have stabilised, and animal sources supply the bulk of their protein needs. However, despite the broad stability of dietary patterns in these regions, mounting environmental and health concerns are expected to shift consumer preferences away from red and processed meat, notably beef, towards leaner and allegedly more environmentally friendly alternatives such as poultry, fish and plant-based protein. This trend towards substitution between meat types is already visible in many industrialised countries, where a noticeable increase in per capita consumption of poultry has occurred at the expense of beef. Growing health awareness in industrialised economies is also expected to raise demand for some other high-value items such as fruits, vegetables, nuts and seeds.

Figure 1.9. Contribution of protein sources to total daily per capita food intake



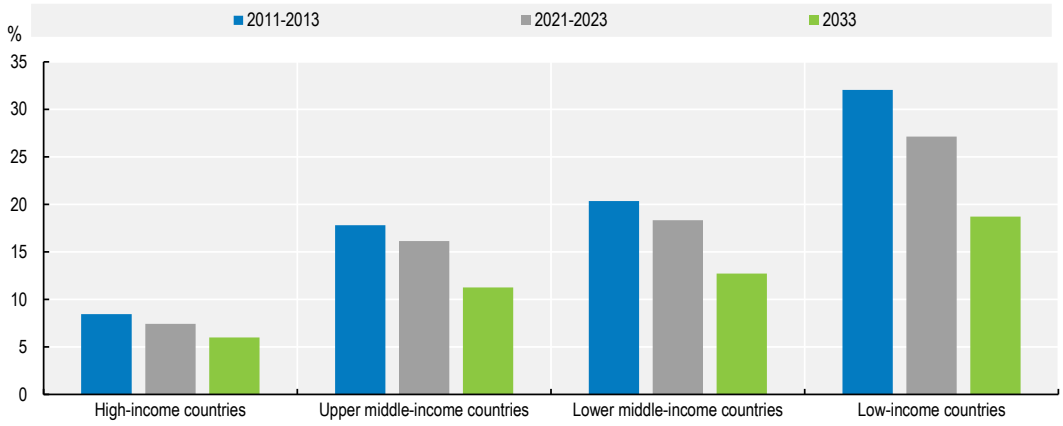
Note: Staples include cereals, pulses, and roots and tubers. The 38 individual countries and 11 regional aggregates in the baseline are classified into the four income groups according to their respective per-capita income in 2018. The applied thresholds are: low: < USD 1 550, lower-middle: < USD 3 895, upper-middle: < USD 13 000, high: > USD 13 000.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/swjl6d

1.4.4. The share of food in total household expenditure continues to decline but remains high in the poorest countries

The share of disposable household income spent on food is expected to continue to fall in all regions (Figure 1.10). Although the largest decline is foreseen in low-income countries, their food expenditure share will remain high, indicating a greater vulnerability to food commodity price shocks in the most food insecure countries. A high share of food in total expenditure also has adverse effects on the macroeconomic performance of low-income countries. For those countries that are net importers of agricultural commodities, such as those in Sub-Saharan Africa, high and fluctuating international prices impact food import bills, exacerbating balance of payments problems and adding to inflationary pressures.

Figure 1.10. Food as a share of household expenditures

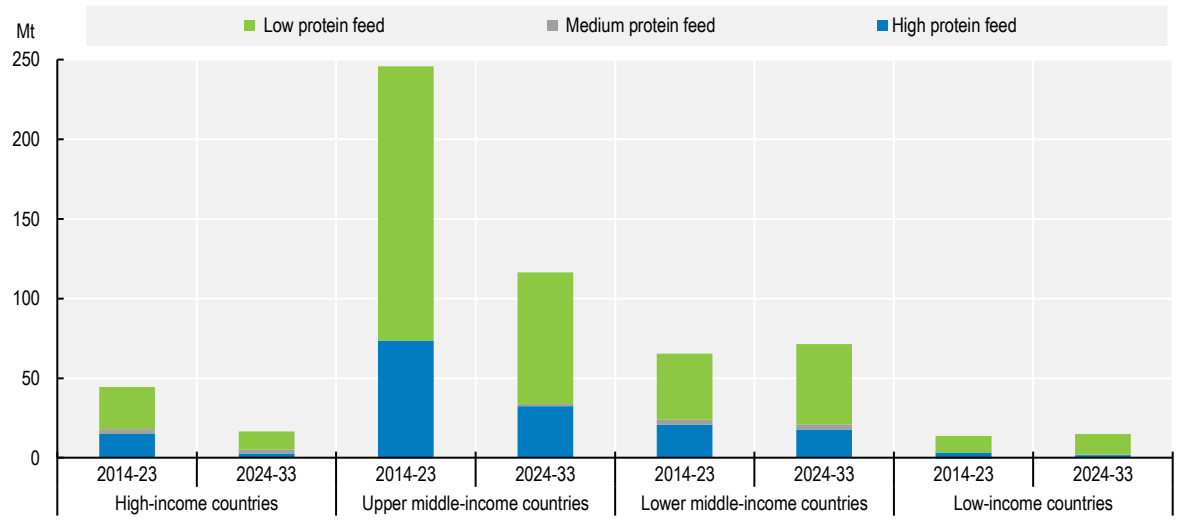


Note: The 38 individual countries and 11 regional aggregates in the baseline are classified into the four income groups according to their respective per-capita income in 2018. The applied thresholds are: low: < USD 1 550, lower-middle: < USD 3 895, upper-middle: < USD 13 000, high: > USD 13 000.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

1.4.5. Growing feed use is driven by expansion of herds and increasing intensification of livestock and aquaculture production systems

Over the projection period, global animal inventories are projected to expand by 10%, whereas output on a protein basis increases by 14%, indicating further intensification of livestock and aquaculture production systems. Expanding animal herds and the continuing intensification of production systems, fuelled by income-driven demand for animal protein and rising populations, are projected to lead to a 13% increase in protein-equivalent feed demand globally, indicating overall improvements in animal genetics, feed technology and herd management. The bulk of the expected increase in feed consumption will come from middle-income countries where the share of production from commercialised and feed-intensive farms is increasing and animal numbers are growing (Figure 1.11). In these countries, growth in feed consumption is similar to or exceeds growth in animal production, even without accounting for the share of production from non-concentrate feeds such as pasture, hay, straw and scraps that are not included in the projected feed demand. Feed intensification is expected especially in Southeast Asia, where expanding pig and poultry production will raise demand for mostly imported protein meal and cereals.

Figure 1.11. Change in demand for main feed categories



Note: Low protein feed includes maize, wheat, other coarse grains, rice, cereal brans, beet pulp, molasses, roots and tubers. Medium protein feed includes dried distilled grains, pulses, whey powder. High protein feed includes protein meal, fish meal, and skim milk powder. The 38 individual countries and 11 regional aggregates in the baseline are classified into the four income groups according to their respective per-capita income in 2018. The applied thresholds are: low: < USD 1 550, lower-middle: < USD 3 895, upper-middle: < USD 13 000, high: > USD 13 000.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/r2u5cl

However, despite the projected increase in feed consumption to 2033, the pace of growth is set to slow down substantially compared to the previous decade. Among the upper middle-income economies, feed demand growth in China in particular is expected to slow considerably due to improved feed efficiency and efforts to achieve lower protein meal shares in livestock feed rations, a sluggish economic recovery, and a declining population consuming a relatively stable diet. In high-income economies, greater production efficiency will result in herd reductions, and thus only a slow growth in the use of protein meals and feed cereals is expected.

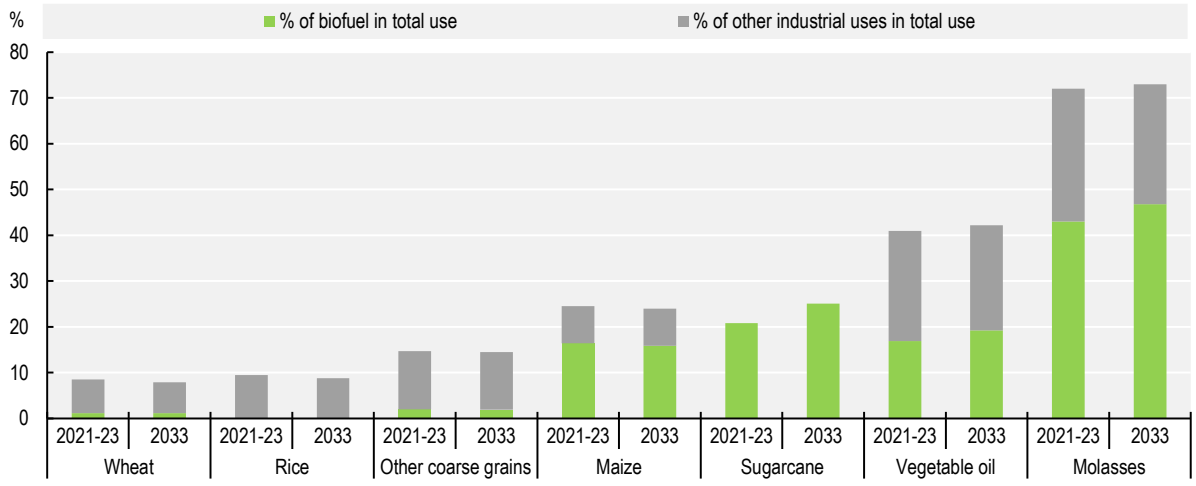
1.4.6. Emerging economies lead the expansion in the use of primary agricultural commodities as feedstocks in biofuels production

Biofuels are liquid transport fuels derived from biomass and are used mostly in blends with fossil fuels to reduce GHG emissions and increase energy security. The production of biofuels creates additional demand for agricultural commodities. Maize and sugar products make up the majority of the feedstock for ethanol, while biodiesel production relies mainly on vegetable oils and used cooking oils. Globally, 6.9% of annual total energy consumed is from biofuels, a share that is projected to increase to 7.3% by the end of the decade.

Global biofuel use is projected to grow, driven by transport fuel demand and public policies. Over the coming decade a significant share of new biofuel production will be accounted for by emerging economies, especially Brazil, Indonesia, and India, where transport fuel demand is rising and supportive policies for biofuel consumption and production are being implemented. Sugarcane-based ethanol is projected to contribute significantly to the increase in these countries (Figure 1.12).

In the United States and European Union, where biofuel consumption is high, new biofuel use by land transport will be constrained by factors such as increasing adoption of electric vehicles, vehicle efficiency improvements, and policies promoting sustainable feedstocks that do not compete directly with food and feed crops.

Figure 1.12. Share of biofuel and other industrial uses in total use of agricultural commodities



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

StatLink https://stat.link/xjiwem

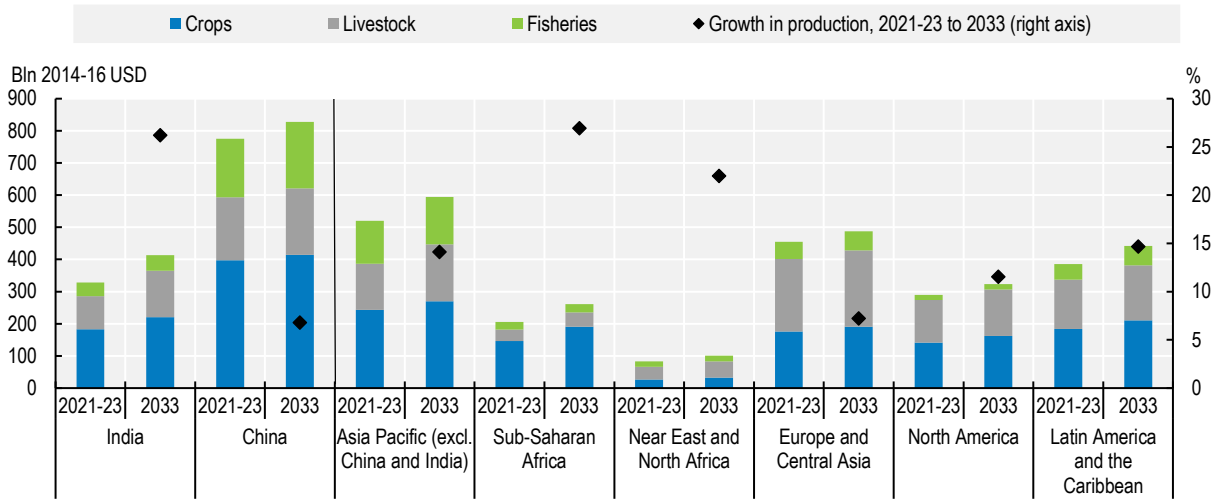
1.5. Production: Projected evolution for 2024-2033

1.5.1. Growth in production continues to be supported mainly by yield gains in low- and middle-income countries

Over the next ten years, the value of global agricultural production is projected to increase by 1.1% annually (measured at constant prices). Livestock production is anticipated to lead this growth, at 1.3% p.a., driven by expected increase in the proceeds of production sales. Fish production is expected to increase by 1.1% annually, while crop production is projected to grow at an annual rate of 1.0%.

Middle- and low-income countries are expected to remain the main locations of global agricultural expansion (Figure 1.13), contributing nearly 80% of global agricultural output by the end of the projection period. China is projected to have a lower share in both crop and livestock production, but to increase its production share in fisheries. Conversely, India is expected to have a greater share in both livestock and crop production.

Figure 1.13. Trends in global agricultural production



Note: Estimates are based on historical time series from the FAOSTAT Value of Agricultural Production domain which are extended with the *Outlook* database. Remaining products are trend-extended. The net value of production uses own estimates for internal seed and feed use. Values are measured at constant USD of the period 2014-2016.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/vpf063

Sub-Saharan Africa and the Near East and North Africa regions are anticipated to achieve significant production growth, albeit from a low base. Although crops currently dominate agricultural output in these regions, faster growth is projected in higher-value livestock production sectors. Specifically, dairy will account for much of the livestock production expansion in Sub-Saharan Africa, while poultry is expected to be the primary growth leader in the Near East and North Africa.

In other regions, production growth is expected to be more moderate. Europe and Central Asia will grow the slowest. Limited growth is also anticipated in North America and Latin America and the Caribbean, with growth in crop production surpassing that of livestock. Growth will mainly be derived from productivity gains as the long-term decline in agricultural land-use is expected to persist, but tighter regulations related to environmental sustainability and animal welfare will place downward pressure on yield improvements.

Assuming the continued transition to more intensive production systems, particularly in middle- and low-income countries, projections suggest that 80% of the global crop production growth will come from improvements in yields. Similarly, a significant proportion of the growth in livestock and fish production is also expected to result from yield improvements, although herd expansion will also contribute to livestock production growth. However, it is anticipated that the rate of output growth will not match the levels seen in the previous decade. This slowdown can be attributed to reduced growth incentives with weaker demand growth and more limited progress in improving production efficiency.

In the resource-constrained Asia Pacific region, the *Outlook* projects that production growth will be predominantly driven by improved land productivity gains. Sub-Saharan Africa's crop production expansion will be supported by both expanded acreage and land productivity increases, mostly coming from the availability of improved crop varieties and better farm management. In Latin America and the Caribbean, robust crop production growth, stemming from both expansion and intensification, will be augmented by yield gains resulting from anticipated rapid increases in fertiliser application. Developed economies are expected to derive growth primarily from productivity gains, given the long-term decline in agricultural land use. However, stricter regulations related to environmental sustainability and animal welfare may temper yield improvements if they are tightened later.

1.5.2. Yield improvements support production growth but there is scope for sustainable intensification

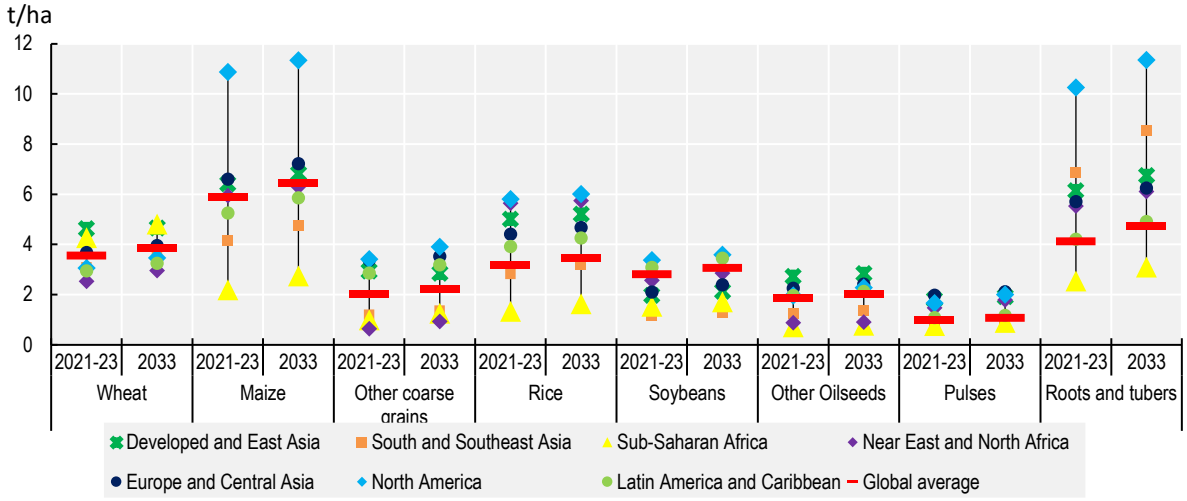
Despite growth in global average yields and notable increases in low and middle-income regions, significant disparities in yield levels between high and low-yielding regions are anticipated to persist across various commodities. Figure 1.14 shows the substantial variations in yields across regions for selected crop commodities. Commodities like maize, roots and tubers exhibit the widest spread in yields, due to greater yield potential for these commodities. The *Outlook* does not project any significant changes in the distribution of yields over the next decade as reflected in the figure.

Under the caveat that changing composition of commodities may influence yield progress, the largest absolute and relative increases in global average yields are projected for roots and tubers, primarily driven by the South and Southeast Asia region. Soybean yield distribution, on the other hand, is already relatively high across regions indicating that the bulk of the output is produced by advanced producers. Other oilseeds, however, show a shorter spread and the slowest increase in average yield, largely attributed to the challenges associated with ageing palm oil plantations in Indonesia. In Sub-Saharan Africa, significant percentage increases are expected for cereals and roots and tubers, albeit from a very low base. While global yield gaps are expected to narrow for certain cereals such as wheat (-7%), maize (-1%), and rice (-2%), the spread is expected to increase for other coarse grains (7%), soybeans (2%), other oilseeds (7%), pulses (6%), and roots and tubers (7%).

Analysing the application of fertilisers per hectare of planted crop in relation to output per hectare can help to explain the observed variation in yields across regions. However, it is important to note that factors beyond fertilisers – including farm management practices, climatic conditions, and natural endowments – also influence yield development. In the European Union and the United States where yields are already high, future developments in production practices may be limited compared to other countries, although changes in yields are still expected to outpace changes in fertiliser application. Sub-Saharan Africa, despite starting from a low base, is anticipated to see significant increases in both nitrogen fertiliser application and yields.

Meeting future food demand without increasing the land area used for agriculture, and thereby avoiding GHG emissions from land clearance, will require yields to increase on currently cultivated agricultural land through the sustainable intensification of agricultural systems. Box 1.1 highlights current factors limiting farm yields and what actions are required to improve yields in Sub-Saharan Africa.

Figure 1.14. Change in projected yields for selected crops and regions, 2021-23 to 2033



Note: Yields are defined as tonnes produced per area harvested. Each symbol represents the average yield for a given commodity within a region. The red lines correspond to the global average per commodity.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/rsg4et

Box 1.1. Sustainable intensification of agriculture in Sub-Saharan Africa

Sub-Saharan Africa has become the world's most food insecure region and is increasingly dependent on imported food to feed its growing population. The risk this brings has become obvious since the start of Russia's war against Ukraine when fertiliser and food prices spiked. The 2023 Africa Food Summit in Senegal agreed that the continent can and should feed itself. Sub-Saharan Africa is food insecure because of limited agricultural development along with a generally low natural production potential for crops that is increasingly compounded by climate change. The average crop yield is only 1 250 kg/ha of cereal equivalencies compared to the global average of 4 100 kg/ha. However, the potential yields in the region are two to six times higher, depending on the region and crops concerned.

Sustainable intensification: The way forward?

Agricultural policies are required that create an enabling environment for farmers to invest in their existing land instead of clearing forest and rangeland. The potential yield increases from sustainable intensification can have multiple benefits, including increased food security and sovereignty, economic development, reversal of soil depletion, and reduced pressure on land, nature, and the climate. Supporting African countries in an agricultural intensification that triggers socio-economic development can also be a cost-effective way of reducing illegal immigration into Europe by addressing two root causes: poverty and conflict. To intensify agriculture in a sustainable way, several key conditions must be met.

Raise the volume and quality of both food and feed production

African crop production being much more severely limited by poor soils than by low rainfall, increasing fertiliser use is a much more effective and cheaper first step in agricultural intensification than irrigation (Plant Production Systems, 2019[2]). Fertilisers must be used as part of integrated soil fertility management, combined with soil amendments (e.g. organic matter, lime) for improving and maintaining

soil health, improved seeds, and crop protection products. Although the region has a higher application rate for manure compared to synthetic fertilisers, the quality of manure is generally low due to poor animal diets and inefficient collection, handling and storage. With respect to synthetic fertilisers, an average 20 kg/ha is currently used in the region, way below the global use of 140 kg/ha. In countries below the 20 kg/ha, the annual production per capita is 250 kg of cereal equivalencies, just enough to cover the energy requirement; in countries above the 20 kg/ha 400 kg/capita is produced. The reasons for the underapplication of fertiliser are not simply high prices and limited farmers experience, but also lack of improved seeds and of crop protection products as well as low farmgate crop prices. Besides quality extension services, well-functioning transparent input and output markets are required to increase availability, affordability and application of fertilisers. In one-fifth of the countries such developments are well underway and can serve as examples.

Promote livestock production

Large areas of the region – mainly desert borders and highlands where rainfall and temperatures limit crop yields – are ideal for ruminant production. In the Sahel, the traditional nomadic system even used to produce up to eight times more protein per square km than ranching under similar conditions in the United States and Australia (Breman and de Wit, 1983[3]). However, nomadic ruminant husbandry is losing more and more of its grazing land to arable farmers as the cropping area expands, driven by population growth. In addition, arable farmers increasingly keep livestock as capital and for manure production and animal traction, instead of maximising the production of animal proteins. Improving food production as described above, goes hand in hand with increasing availability and quality of feed. As the required external inputs usually have better cost/benefit ratios in arable farming than in animal husbandry, one opportunity for increasing livestock productivity can be found in mixed farming systems, where fertiliser use increases the quality of animal feeds produced on-farm. In addition, there is an opportunity for ranching in typical livestock regions such as the Sahel, where deteriorating animal diets due to loss of pastoral mobility can be improved with feed concentrates produced in neighbouring arable regions. In this way, the current competition for land – a root cause of clashes between livestock and arable farmers – can be turned into collaboration.

Invest in infrastructure for growth

The road and rail network as well as storage infrastructure have long remained underdeveloped in Sub-Saharan Africa due to low population densities and lack of public and private sector investment. This has limited agricultural as well wider socio-economic development. A key policy option is therefore to improve transport and infrastructure, invest in storage facilities such as refrigeration to reduce the often-high food losses, and develop input and output markets including value chains. For farmers, this provides strong incentive to raise their production. After all, the best incentive for higher productivity is the market.

Level the playing field

The competitiveness of agriculture in Sub-Saharan Africa being low, countries should be allowed to impose temporary boarder measures (tariffs or quotas) on staples while being supported in their intensification process. Such policies are necessary until the largely infant agri-food industry in the region becomes mature and can compete on the world market. This also levels the playing field in world agriculture, given the subsidies farmers are still receiving in North America, Europe, and many Asian countries.

Note: This box is a summary of a series of articles published by Wouter Van der Weijden and Henk Breman on https://agrifoodnetworks.org.
Source: (Plant Production Systems, 2019[2]; Van der Weijden and Breman, 2024[4]; Breman and de Wit, 1983[3]).

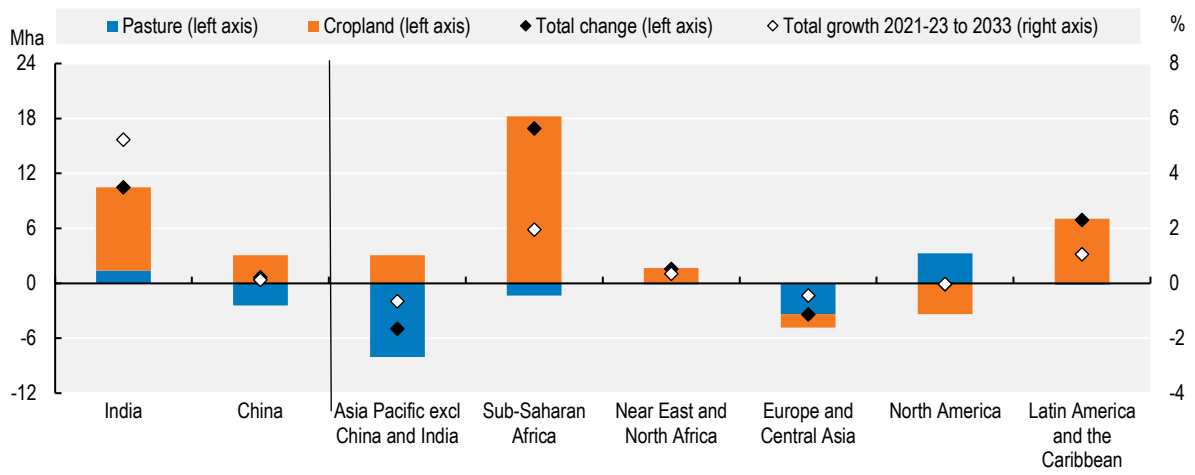
1.5.3. Only minor changes are projected in land used for agriculture

Agriculture uses 38% of the global land area, with one-third of this land under crop cultivation and the remaining used as livestock pasture. Historically, land conversion from natural ecosystems to agriculture has been the primary source of indirect GHG emissions from the agricultural sector. While the measurement of the effects of land conversion to indirect GHG emissions are not included in the *Outlook*, projecting changes in land use from both yield and resource perspectives is important to understand future developments in agricultural markets. Over the next decade, the overall area of land used for agriculture is not anticipated to increase, as any increases in cropland will be offset by decreases in pasture (Figure 1.15). The expansion of cropland is expected to contribute 15% of the projected growth in crop production.

Cropland expansion is projected to occur predominantly in Asia and the Pacific (by 15 Mha), Latin America (7 Mha), and Sub-Saharan Africa (18 Mha). In Asia and the Pacific, pasture will likely be converted into cropland, while in Latin America and Sub-Saharan Africa, primarily non-agricultural land will be utilised. However, in the Near East and North Africa, cropland expansion will be restricted by natural conditions, with low rainfall inhibiting rainfed agriculture and the cost of irrigation being prohibitive in most areas. Conversely, in North America and Western Europe, cropland is anticipated to decrease due to strict regulations on environmental sustainability governing any increase in crop production or loss of natural habitats.

Pastureland is projected to diminish by 8 Mha overall in Asia and the Pacific (excluding China and India), with the expected transition from pasture-based livestock production to more intensive systems for pigs and poultry. Ruminant production is also expected to shift towards more feed-intensive systems which require less pastureland. Conversely, pasture is projected to slightly increase in North America due to the anticipated expansion of the cattle herd.

Figure 1.15. Change in agricultural land use 2021-23 to 2033



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

1.5.4. Livestock production, especially dairy, will expand most while growth in fish production will slow

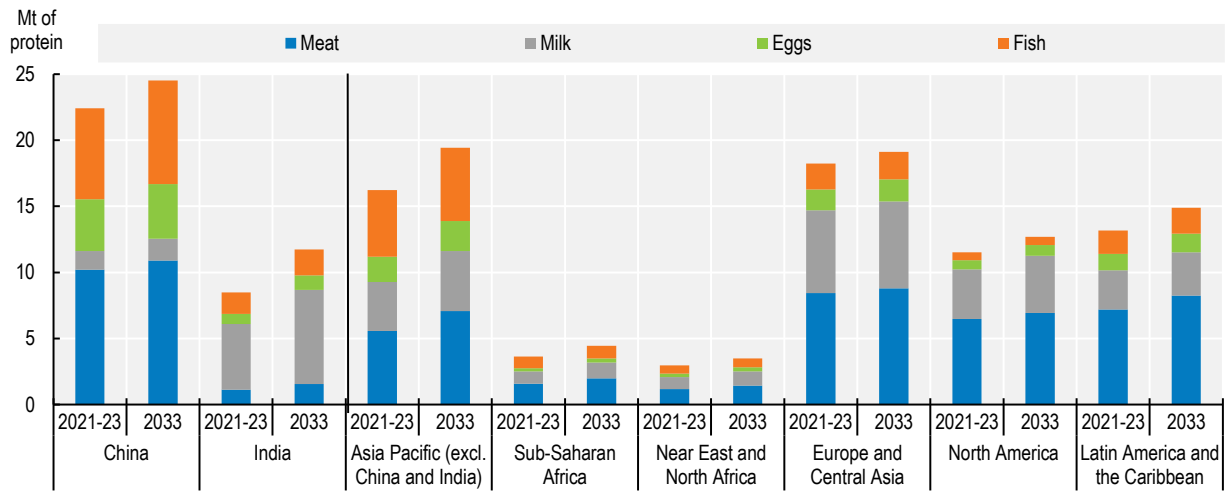
The share of livestock production in agricultural output is projected to decline in high-income countries but to increase in low and middle-income countries (Figure 1.16). The anticipated rise in global meat

production will mainly originate in middle and low-income countries across all livestock sectors. Poultry production is projected to account for over half of the total increase in animal protein produced. Shorter production cycles and greater efficiency in feed conversion will contribute to lower prices for poultry meat relative to beef. The greatest volume increase in production will occur in the Asia Pacific region, primarily supported by intensified feed practices and advances in breeding techniques.

Dairy is expected to remain the fastest-growing livestock sector, with India and Pakistan leading in absolute milk production growth. Growth factors will vary by region: high-income countries will focus on intensifying production through yield improvements, while middle and low-income countries, particularly India and Pakistan, will also increase the number of milking animals.

In recent years, global fish production has been evenly split between capture fisheries and aquaculture. Future growth is expected to be based on a continued, though slower expansion in aquaculture, while capture fisheries production will remain relatively constant. This slowdown in aquaculture production growth is attributed to tightened environmental regulations in China. While the negative effects of *El Niño* on capture fisheries are expected to be temporary, increasing fuel costs will continue to constrain growth in the sector. At the same time, policies promoting sustainable fisheries are driving a transformation of the sector which may entail slower growth as it takes place.

Figure 1.16. Global livestock and fish production on a protein basis



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

StatLink https://stat.link/yg6fzj

1.5.5. Agriculture's global GHG emissions intensity will decline despite rising emissions in lower and lower-middle income countries

Overall, agriculture, forestry and other land use (AFOLU) represents around one-fifth (22%) of global anthropogenic GHG emissions. Half of this stems from direct on-farm emissions of methane and nitrous oxide, and the other half from indirect CO_2 emissions resulting from land use, land use change and forestry (LULUCF) due to agricultural expansion. The *Outlook* reports only the direct component linked to on-farm production.

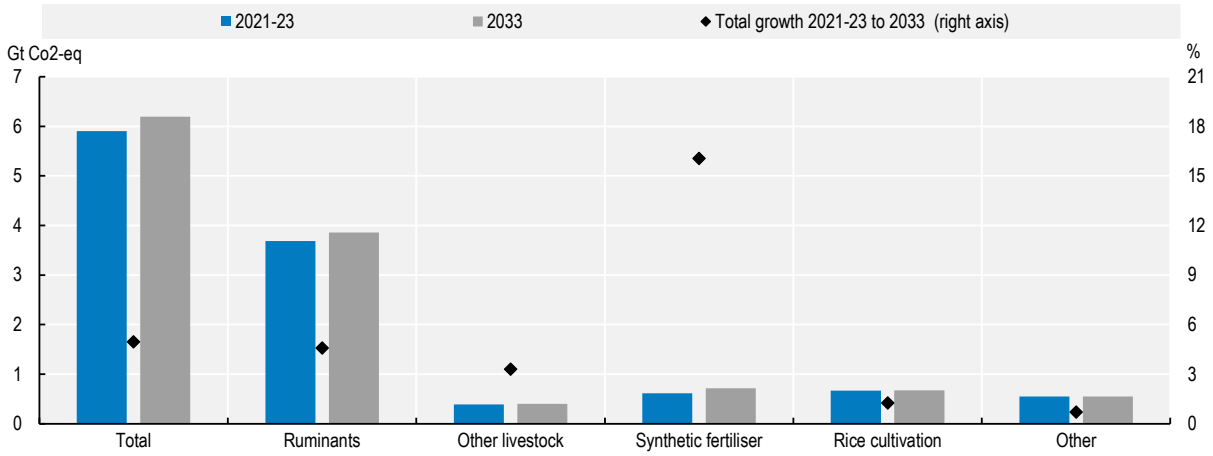
The *Outlook* estimates IPCC-Agriculture GHG emissions using the historical time series from the FAOSTAT Climate Change: Agrifood systems emissions database and following the IPCC's Tier 1 approach (i.e. basic method relying on direct emission factors such as herd size, synthetic fertiliser

application per hectare, or per hectare emission related to rice cultivation). The projections assume no change in current policies and a continuation of current trends in technological progress. Higher-tier methods (that account for management practices for instance) would provide greater certainty of the estimates but are beyond the scope of the *Outlook*.

Subject to the above caveat, the projected growth in agricultural production is expected to cause a 5% increase in direct GHG emissions over the coming decade. Ruminants and other livestock production will account for 62% of this increase (Figure 1.17). Furthermore, the use of synthetic fertilisers represents a source of direct GHG emissions, primarily through the release of nitrous oxide during the fertilisation process. Synthetic fertilisers are expected to contribute 34% to the additional direct GHG emissions over the next ten years. The *Outlook* does not account for GHG emissions associated with fertiliser production. However, if it were to do so, this would effectively increase their reported environmental footprint in the baseline by approximately 70%.

Rice cultivation is another source of direct GHG emissions in agriculture because irrigated paddy fields emit significant quantities of methane. However, the projected increase in rice production will be largely the result of yield improvements with unchanged paddy areas, thereby curbing the increase in GHG emissions.

Figure 1.17. Direct GHG emissions from crop and livestock production by activity

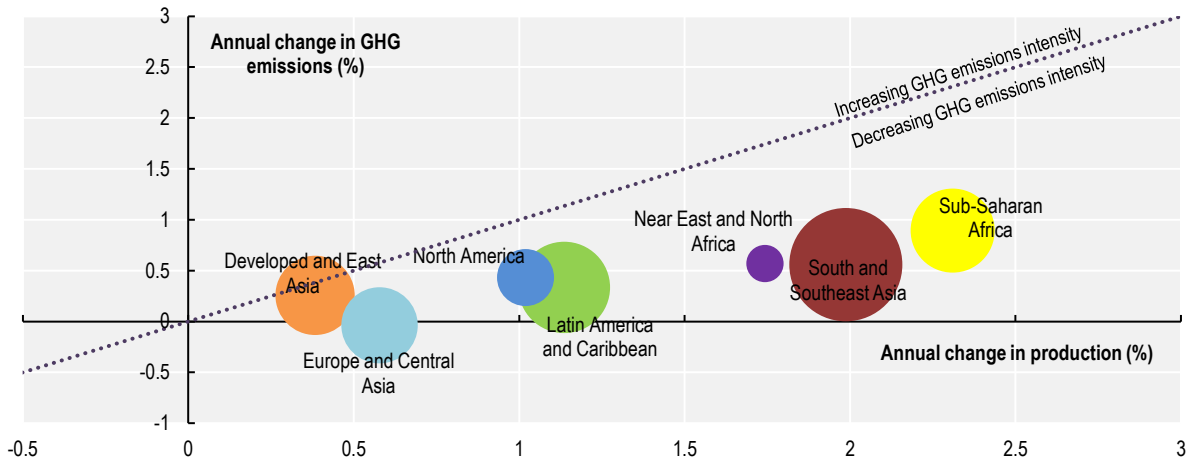


Note: Estimates are based on historical time series from the FAOSTAT Climate Change: Agrifood systems emissions databases which are extended with the *Outlook* database.CO2 equivalents are calculated using the global warming potential of each gas as reported in the IPCC Sixth Assessment Report (AR6). 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 January 2024; OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en

Most of the increase in GHG emissions is projected to occur in middle and low-income regions, primarily due to the higher growth in ruminant production. Despite significant efforts in these regions to enhance the sustainability of production systems, they tend to be more emission-intensive on average compared to high-income countries. By 2033, Sub-Saharan Africa will have the highest annual growth in direct GHG emissions (0.9%), albeit starting from a low base as this region only accounts for 16% of global direct GHG emissions from agriculture. Conversely, Europe and Central Asia is the only region where GHG emissions are anticipated to decrease due to the declining share of ruminant production. Nevertheless, in per capita terms, GHG emissions in low-income countries will remain below those of high-income countries.

Globally, the carbon intensity of agricultural production is expected to decline over the coming decade as direct GHG emissions are projected to grow more slowly than agricultural production (Figure 1.18). However, this masks important geographical variations. Sub-Saharan Africa is expected to experience the most substantial decrease in GHG emissions intensity. This is because it is generally easier to reduce emissions in production systems that are initially more emissions-intensive than in regions where significant efforts have already been invested in emissions reduction.

Figure 1.18. GHG emissions and emissions intensity from agriculture, 2021-23 to 2033



Note: This figure shows projected annual growth in direct GHG emissions from agriculture together with annual growth in the estimated net value of production of crop and livestock commodities covered in the *Outlook* (measured in constant USD 2014-16 prices). The size of the bubbles corresponds to the level of agricultural GHG emissions in the baseline period 2021-2023. Estimates are based on historical time series from the FAOSTAT Climate Change: Agrifood systems emissions databases which are extended with the *Outlook* database.CO2 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. The net value of production uses own estimates for internal seed and feed use.
Source: FAOSTAT Emissions-Agriculture and Value of Agricultural Production databases, http://www.fao.org/faostat/en/#data, accessed January 2024; OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/e85ljy

1.5.6. The impacts of climate change will pose additional challenges and opportunities to agricultural production

Agricultural production is concurrently shaped by the effects of climate change and by measures taken to adapt to them. While both aspects are factored into the *Outlook's* production projections, the strong interlinkages between them makes it impracticable to separate out their individual effects in the medium term. Box 1.2 describes the extent to which the Aglink-Cosimo model incorporates these effects.

Box 1.2. Agricultural production is shaped by climate change impact and adaptation

In the *OECD-FAO Agricultural Outlook* the impact of climate change is implicitly incorporated in production projections. Yields are influenced by many interacting and inter-dependent factors, including weather, crop variety, production technique, pests and diseases which lead to wide variations in observed yields. The effects of climate change on yields are being felt increasingly through time, through increased variability of temperatures and rainfall, disruptions to ecosystem services, and increasing frequency and severity of extreme weather events, including droughts, floods, heat waves and storms. While some regions may benefit from longer growing periods, climate change can also render many current growing regions unsuitable for production.

Private actors are taking actions to prepare for, cope with and adapt to the effects of climate change – referred to as "autonomous adaptation". Typical responses by farmers include on-farm innovation in operations management, such as shifting planting dates, altering crop mix, diversifying farming activities, implementing integrated pest control and other climate-smart agriculture (CSA) practices and technologies. In practice, there are many constraints on farmers' capacity to adopt these types of practices, including lack of resources and incentives, and these limitations are especially severe where farmers are poor and vulnerable. Governments can promote autonomous adaptation and CSA practices by leveraging on social protection policies, such as social transfers and public work programmes.[1] Social protection transfers can ease budget constraints and alter the risk preferences of beneficiaries to increase the likelihood of them implementing CSA practices. Similarly, public work programmes can potentially improve the adaptative capacities of both direct beneficiaries and their communities.

Since the Aglink-Cosimo model is linked to historical developments, its starting point is the world as it is now, where the effects of climate change on potential yields are already visible. However, autonomous adaptation has reduced an important part of its negative effects. All these factors influence the production, especially the yield projections, and are accounted for in the *Outlook* projections for the next ten years, based on modelling and expert judgement.

Because slow-onset[2] events are moderated by autonomous adaptation and extreme events will likely have larger effects over the longer-term, the ten-year projection horizon of the *Outlook* results in only small yield variations resulting from climate change. Furthermore, due to the close interrelation between the effects of climate change and autonomous adaptation, it is not possible in the current *Outlook* to separate the individual influences of these drivers.

[1] These impacts, however, depend on multiple and very context-specific factors.
[2] Slow-onset events evolve gradually from incremental changes occurring over a long period of time or from an increased frequency or intensity of recurring event (UNFCCC, 2011[1]). Classic examples are desertification, sea-level rise and epidemic diseases.
Source: Cobourn (2023[5]), FAO (2022[6]), OECD (2023[7]), Scognamillo, Mastrorillo and Ignaciuk (2024[8]).

1.6. Food loss and waste: Impact of a 50% reduction

1.6.1. Reducing food loss and waste would help foster sustainable food systems

The significant loss and waste of food across global food value chains is widely acknowledged. According to the FAO seminal report on food losses and waste, based on 2007 data (FAO, 2011[9]), "Roughly one-third of the edible parts of food produced for human consumption, gets lost or wasted globally". This not only strains the natural environment, but also reduces food availability. Tackling food loss and waste is therefore crucial for enhancing the environmental sustainability of global food systems and improving food security and nutrition. Despite the absence of a harmonised framework, food loss is generally defined as

all losses within the food value chain from post-harvest, slaughter or catch, right through to the retail stage. Food waste refers to waste in retail and final consumption.

As part of the United Nations 2030 Agenda for Sustainable Development, Sustainable Development Goal (SDG) 12 creates a global commitment to ensure sustainable consumption and production patterns. SDG target 12.3 calls for halving per capita global food waste at the retail and consumer levels by 2030, as well as reducing food losses along production and supply chains, including post-harvest losses, over the same period. Nevertheless, government efforts to tackle this challenge are impeded by the absence of dependable data on the scale and distribution of food loss and waste within value chains, its cross-country variations, and the commodities most affected.

For the purpose of monitoring SDG 12.3, estimates have been made of food loss and food waste. The FAO estimates that globally, around 13% of food produced is lost after harvesting and before reaching retail markets (FAO, 2019[10]), while UNEP finds that 19% of total global food production is wasted in households, the food service and retail (UNEP, 2024[11]). As part of the continued efforts to develop its capacity to track impacts beyond market outcomes and gauge the effects of market developments on food systems, the *Outlook* has developed enhanced estimates for food intake. It estimates food intake by integrating analytical methods that first remove food loss from the food available after harvest, and then removes food waste from food consumption.

The *Outlook* projections find that the SDG 12.3 target will be missed without transformation of global agrifood systems. By 2033 under the assumption of constant food loss and waste shares, the *Outlook* projects that close to 700 Mt of food will be lost between harvest/slaughter/catch and retail, while a further 1 140 Mt will be wasted at retail and household levels. This represents an additional food loss and waste of about 230 Mt compared to the base period (2021-2023).

In the base period, fruit and vegetables account for more than half of the lost and wasted food, given their extremely perishable nature and relatively short shelf life (Figure 1.19, Panel a). As the most produced and consumed commodity, cereals contribute a substantial 23% share of the total. Meat and dairy products represent a low share by weight, which can be explained by the fact that households tend to waste fewer high-value products. However, they predominate, accounting for a third of food loss and waste when measured by monetary value.

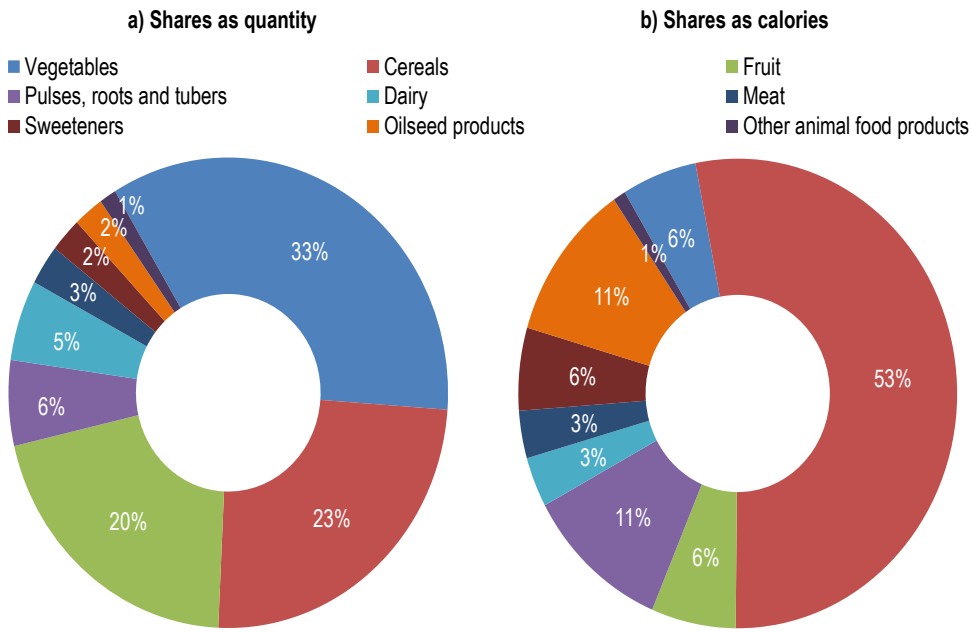
In terms of food security and nutrition, food loss and waste shares can be converted to calories or protein to reflect the amount of energy or nutrients of different commodities. Some food commodities have high protein content (animal products), some are rich in calories (staples, fat, and sugar), while others provide essential vitamins and minerals (fruit and vegetables). Panel b of Figure 1.19. Shares of food loss and waste by commodity, 2021-2023illustrates how major food commodities contribute to total food loss and waste on a calorie basis over the base period. It shows that by 2033, an estimated 2.8 million terra calories will be lost and wasted between leaving the farm and reaching retail and households. To put this into perspective, this represents more than double the total number of calories currently consumed in low-income countries in one year. Cereals, pulses, roots and tubers, the primary source of calories in most of the world's poorest populations, account for almost two-thirds of the lost and wasted calories, with cereals alone contributing 53%.

Reducing food loss and waste therefore represents a potential opportunity to address the existing unequal distribution of calories within and between countries. By minimising losses throughout the food supply chain, more food can be preserved and distributed equitably, ensuring that a greater proportion of available calories reach those in need. This aligns with the SDG objectives of improved food security and nutrition for global population by 2030.

Several factors underpin the occurrence of food loss and waste across income groups. At the lower end of income spectrum, limited access to technology and infrastructure such as cold storage and efficient transport lead to supply chain inefficiencies and household waste. As consumers become more affluent,

such technological impediments are overcome gradually and food loss and waste are mostly determined by natural environmental factors, marketing standards, food safety measures (e.g. handling of expiration dates) and consumer behaviour; the latter reflecting an interplay between overconsumption and food waste in high-income economies.

Figure 1.19. Shares of food loss and waste by commodity, 2021-2023



Note: Other animal food products include egg and fish.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/25ber4

1.6.2. Scenario analysis shows the implications for food systems of halving food loss and waste

In line with the commitments for sustainable development set in 2015, several intergovernmental initiatives call for the development and implementation of national strategies to meet the SDG 12.3 target. A growing number of countries are setting national targets for reducing food loss and waste, and implementing policies aimed at achieving these targets. A forthcoming OECD report providing a stocktake of food loss and waste policies (OECD, forthcoming[12]) indicates that almost all OECD countries have set national strategies, and all have implemented policies to support these strategies.

In a scenario analysis, this *Outlook* explores the potential implications for global supply and demand if these strategies successfully halve food loss and waste by 2030. While the SDG 12.3 establishes a clear objective of achieving a 50% reduction in food waste by 2030, it only provides recommendations for reducing food loss without specifying quantitative targets. This stylised scenario uniformly applies a 50% reduction target to both food loss and food waste between the base period and 2030. This target is a highly ambitious upper bound and would require substantial changes by both consumers and producer side. Two assumptions are made:

Assumption 1: Transmission of food waste reduction to food demand

When considering how consumers might respond to a reduction in food waste, it is important to recognise that some households may opt to increase their calorie intake rather than decrease their overall food demand. Therefore the distribution of consumer preferences plays an important role. In this scenario, the first assumption accounts for a lower proportion of food demand reduction in poorer countries, based on the prevalence of undernourishment (PoU). PoU estimates the percentage of the population whose regular food intake fails to meet the energy requirements for maintaining a healthy, active life. In countries where PoU falls below the critical threshold of 2.5%, representing the level required to achieve zero hunger, the scenario assumes that most of the reduction in wasted food will translate directly into a decrease in food demand. However, in countries with higher PoU levels, this transmission will only be partial.

Assumption 2: Transmission of costs to producer and consumer prices

When considering the economic costs associated with reducing food loss and waste, it is crucial to acknowledge that despite their adverse impacts on the overall food systems, food loss and waste originate from individual optimisation decisions that fail to account for their negative externality. In the current production and consumption framework, there is little to no perceived value attached to the food that ends up being lost or wasted. Few policies exist that could achieve a reduction in food loss and waste without incurring costs along the value chain and, among those, hardly any could accomplish a 50% reduction. Therefore a second assumption must be made to account for the cost of implementing measures to push halving food loss and waste below the observed patterns of production and consumption. These costs of reduction inevitably affect both consumers and producers. In the absence of comprehensive information about the cost structure, it is necessary to adopt simplifications and make tractable assumptions to facilitate the analysis. In this stylised scenario, consumer prices are assumed to increase by the same percentage as the reduction in food demand established under assumption 1, while producer prices are adjusted by half of the reduction in losses.

Based on these two assumptions, the scenario projects that global direct GHG emissions from agriculture would fall by 4%, a reduction distributed relatively evenly across countries regardless of income levels. It would also result in increasing the average per capita calorie intake in low-income and lower-middle-income countries (Figure 1.20).

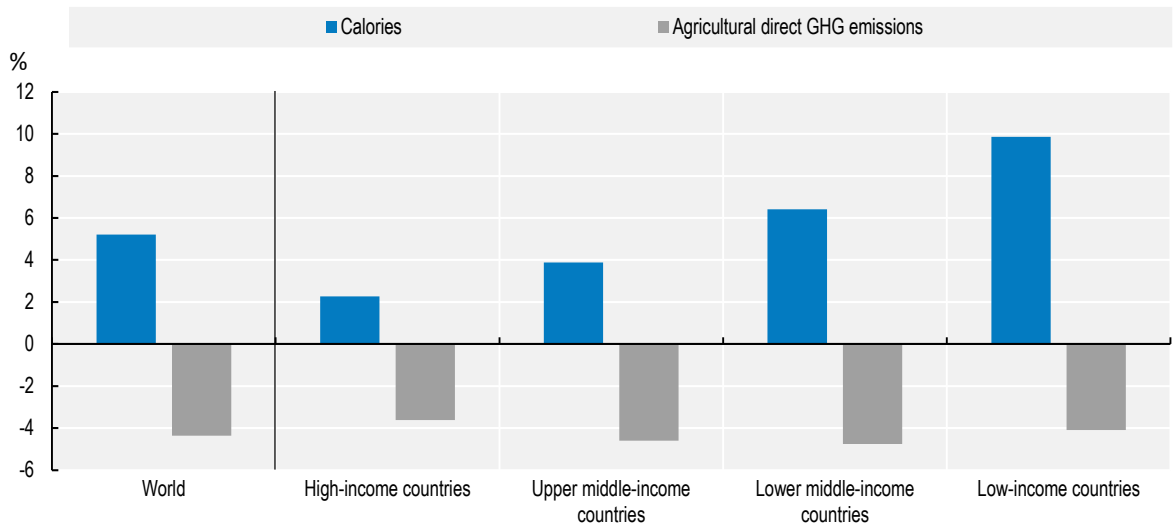
Decreasing food loss and waste is also an important lever for reducing global undernourishment. According to FAO (2023[1]), approximately 600 million people will be facing hunger in 2030. Measures to reduce food loss and waste could significantly increase food intake worldwide as more food becomes available and prices fall, ensuring greater access to food for low-income populations. The scenario analysis shows that cutting food loss and waste in half could result in increased food intake for low- (+10%), lower middle-income (+6%) and upper middle-income (+4%) countries, potentially reducing the number of people facing hunger worldwide in 2030 by 153 million (-26%). This potential decline in global undernourishment parallels the notable improvements seen over the 2004-2014 decade when economic growth, political stability and targeted social protection policies in Asia and Latin America led to a 30% reduction in the number of undernourished globally.

While the scenario illustrates potential benefits for consumers and the environment, it also presents challenges for producers, as decreased production and lower producer prices would significantly impact their livelihoods. It is also important to note that the impact on consumers and producers are sensitive to the underlying assumptions.

Implementing measures to curb food loss and waste would involve significant costs and would need to overcome a number of obstacles. Consumer behavior plays a significant role, with factors such as lack of awareness about food waste impacts, over-purchasing, or discarding food that is still safe to eat because of best-before dates contributing to wastage. Supply chain inefficiencies, including fragmented supply chains, inadequate infrastructure, logistical challenges or lack of circularity in business practices, further

hinder food loss and waste reduction efforts. Regulatory and policy constraints, such as regulatory barriers, inconsistent or fragmented policies, and lack of standardised measurement and reporting, pose additional obstacles to effective initiatives. Moreover, technology and innovation gaps, limited adoption of solutions, especially among smaller producers and businesses, and insufficient education and collaboration among stakeholders will also impede progress in addressing food loss and waste. Overcoming these obstacles requires comprehensive strategies encompassing regulatory reform, infrastructure development, technology adoption, education, and collaboration to achieve significant reductions in food loss and waste.

Figure 1.20. Impact on calorie intake and agricultural direct GHG emissions of halving food loss and waste by 2030



Note: Emission estimates are based on historical time series from the FAOSTAT Climate Change: Agrifood systems emissions databases which are extended with the *Outlook* and Scenario databases. The 38 individual countries and 11 regional aggregates in the baseline are classified into the four income groups according to their respective per-capita income in 2018. The applied thresholds are: low: < USD 1 550, lower-middle: < USD 3 895, upper-middle: < USD 13 000, high: > USD 13 000.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

1.7. Trade: Projected evolution for 2024-2033

1.7.1. Growth of agricultural trade will slow down and export growth will stabilise

Over the next decade, trade in the agricultural commodities covered in the *Outlook* is projected to expand by 1% annually. Despite the disruptions caused by the COVID-19 pandemic to global trade, agricultural commodity trade demonstrated greater resilience compared to other sectors of the economy. This resilience is expected to persist, with continued growth anticipated for most of the agricultural commodities covered in the *Outlook*. Conversely, the share of exported agricultural products has stabilised in recent years, following a significant surge in the 2000s attributed to the implementation of the WTO Agreement on Agriculture and China's accession to the rules-based trading system in December 2001. The *Outlook* projects that this stabilised share of exported agricultural products will be maintained.

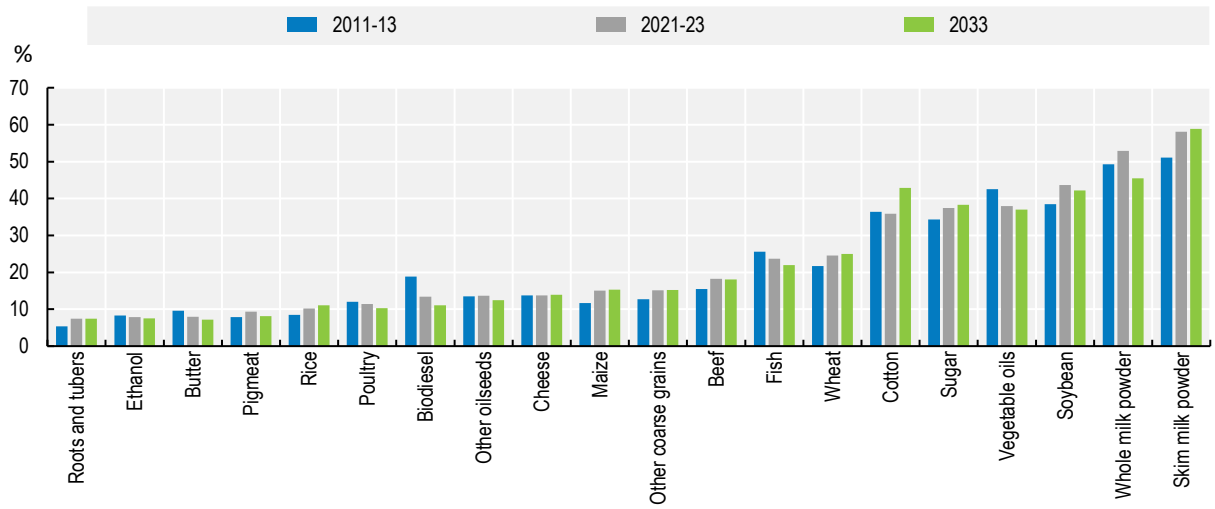
The *Outlook* also suggests a diminishing impact of past trade liberalisation efforts as progress in reducing multilateral tariffs and addressing trade-distorting producer support has slowed in recent years. The global food and agricultural market have become more resilient, but many countries remain vulnerable to the impact of trade shocks such as supply chain bottlenecks.

Despite this stabilisation, trade remains crucial to provide consumers worldwide with adequate, safe and nutritious food, while also generating income for stakeholders across the agricultural and food industries by efficiently distributing agricultural products globally from surplus to deficit regions. The proportion of production traded for commodities covered in the *Outlook* has steadily increased over time, rising from an average of 15% in 2000 to 23% in the baseline period of 2021-23, reflecting a trade sector growing at a faster rate than agricultural production.

However, there are significant variations in the importance of trade across commodities. For many agricultural commodities, most of the production is used domestically. For a few commodities trade can represent from one-third to more than half of global production. This is the case for sugar, cotton, vegetable oils, soybean, and milk powders, which are either demanded for further processing or produced in highly concentrated markets.

Over the coming decade, the share of production that is exported will not change significantly for most commodities covered in the *Outlook* but a few will experience some shifts in trading patterns. The export ratio of vegetable oils, fish and biodiesel are projected to decline, reflecting increasing domestic use.

Figure 1.21. Exports as a percentage of production



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

1.7.2. Shipments between exporting and importing regions will expand

The increasing differentiation between agricultural commodity net exporting and net importing regions is expected to continue in the coming decade (Figure 1.22). Net exporters of agricultural commodities, such as Latin America and North America, are expected to increase their surplus volumes along with their production while regions with significant population growth, such as the Near East and North Africa and Sub-Saharan Africa, are projected to see their net imports grow proportionately to their growing consumption.

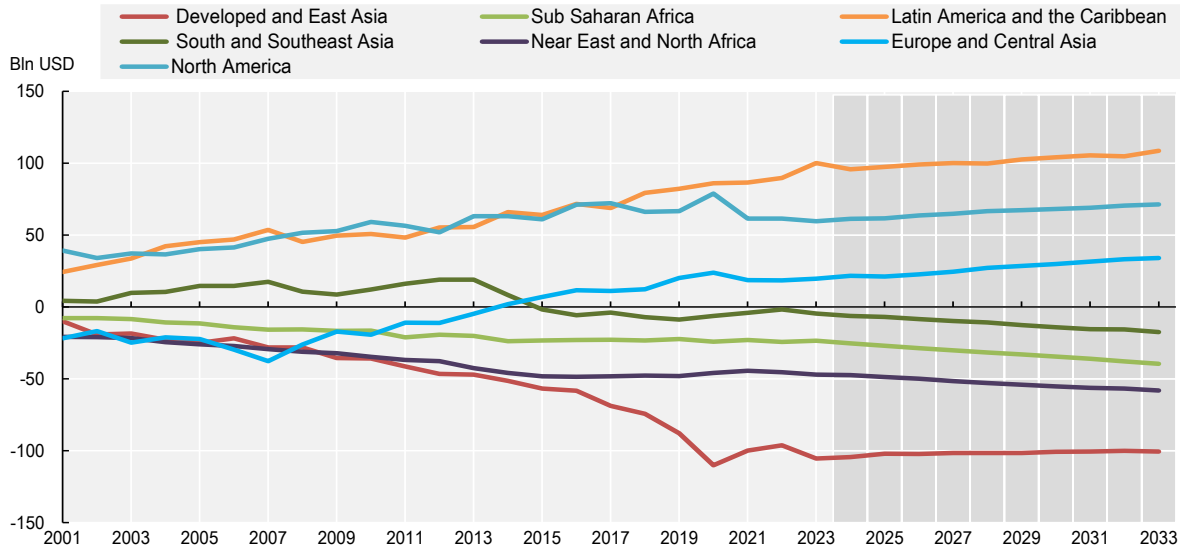
The Latin America and Caribbean region, particularly Brazil, has seen significant growth in exports, with projections indicating its reinforcement as the world's leading exporting region. North America is projected to maintain its position as the second-largest exporter, although domestic consumption growth may slightly dampen its net exporting growth. Eastern Europe and Central Asia transitioned into net exporters in 2014, benefiting from productivity gains due to foreign and domestic investments and restructuring of the

agricultural sector in the region. However, Russia's war against Ukraine is expected to temporarily slow down the region's trade surpluses due to disruptions in agricultural production and exports, particularly impacting Ukraine's agricultural sector. Despite this, the *Outlook* assumes a return to pre-war trends in the medium term.

Global import patterns have undergone significant shifts due to burgeoning demand for agricultural products, particularly in regions experiencing population booms. Asia, home to approximately 60% of the global population, has witnessed a more than quadruple increase in import demand over the past three decades, largely fuelled by China's rapid development. However, with projected decreases in Chinese population growth, its net importer position is expected to stabilise over the next decade.

In the Near East and North Africa region, imports are expected to expand while exports will remain flat, driven by population growth and limited domestic production growth due to resource constraints, contributing to a 32% increase in the net imports by 2033. Net imports of basic food commodities, mainly cereals, into Sub-Saharan Africa are projected to increase by 77% by 2033. Global food and agricultural markets have become more resilient to support the food security needs of its fast-growing population.

Figure 1.22. 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 2014-16 USD. Net trade figures include intra-regional trade but exclude intra-EU trade. The regions Developed and East Asia, and South and Southeast Asia are defined as in Chapter 2.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

1.7.3. Trade plays a crucial role in resilience

International agricultural trade plays a crucial role in enhancing the resilience of global, regional and national food systems. By enabling the efficient exchange of products from regions with optimal production capabilities to areas of need for processing or consumption, trade serves as a vital mechanism for diversifying food sources and mitigating the impact of localised shocks, such as crop failures or extreme weather events (Box 1.3).

Extreme weather events such as heatwaves, droughts, floods, and storms have devastating effects on agriculture. Climate change is making these events more frequent and severe. With agriculture heavily

reliant on weather conditions, the changing climate is already causing negative impacts such as higher temperatures, unpredictable rainfall, and increased pest infestations. These extreme events not only damage crops directly but also disrupt farming practices, exerting pressures of productivity improvement. Trade plays a crucial role in mitigating these risks by allowing farmers to access resources from other regions unaffected by extreme weather, ensuring a more stable food supply despite the challenges posed by climate change. Similarly, consumers benefit from the maintenance of stable food supplies and prices where trade is allowed to compensate for local food supply shortfalls.

Box 1.3. Role of trade in mitigating the impact of extreme weather events

Extreme weather events can disrupt agricultural markets by reducing supply, disrupting supply chains, increasing input costs, and reducing product quality. However, agricultural trade can help address subsequent food security concerns. Using the Aglink-Cosimo partial equilibrium model, a recent OECD report sheds light on the complex relationships between trade and food security in an environment where extreme weather events create uncertainty (Adenäuer, Frezal and Chatzopoulos, 2023[13]).

To assess the potential for trade to mitigate the impact of extreme weather events on agriculture the authors apply the stochastic framework of the Aglink-Cosimo model, applied to two trade specifications:

- The “Restricted Trade” scenario in which border protection is increased. In this scenario, tariffs are doubled, and TRQs and import parameters are cut in half.
- The “Integrated Trade” scenario in which border protection is reduced. In this scenario, tariffs are cut in half and TRQs and import parameters are doubled.

Both scenario specifications are compared to the baseline of the *OECD-FAO Agricultural Outlook 2022-2031*, where policy measures are usually kept at their current level unless legislation foresees any change in the next decade.

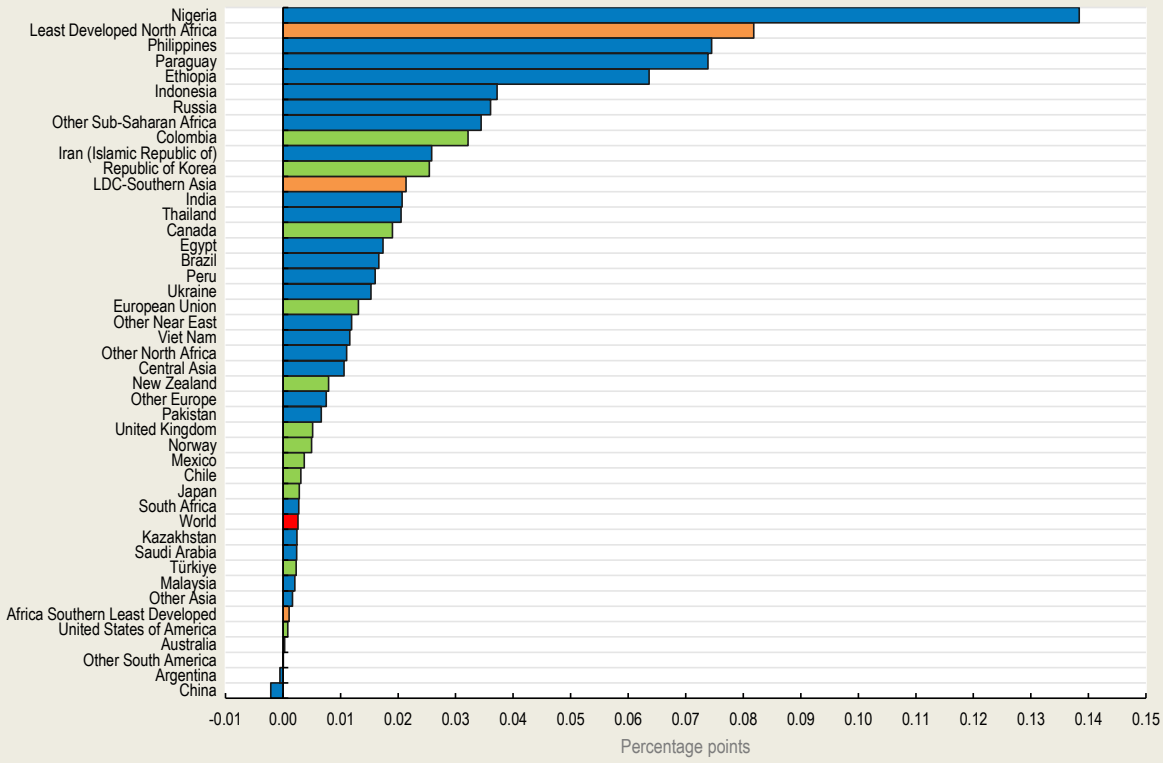
The analysis suggests that trade integration makes countries less vulnerable to negative yield shocks by stabilising food availability and mitigating the risk of extreme food price rises. Figure 1.23 shows that in most countries the decline in food availability is less severe in the Integrated Trade scenario than in the Restricted Trade scenario. Whereas the risk of lower food availability might increase for some commodities in some countries in the Integrated Trade scenario, the overall effect of trade integration on food availability is found to be positive.

The analysis also shows that the risk of high domestic food prices decreases with greater trade integration, suggesting that open trade can help stabilise food expenditures. Greater trade openness could help to cushion the impacts of yield shocks on consumers by increasing the flexibility with which purchases can be made on the international market to offset domestic supply shortfalls. In most cases, price vulnerability to domestic yield extremes is reduced with a higher level of trade integration. However, in some cases, particularly when domestic production accounts for a small share of total consumption, trade liberalisation can increase the price transmission from the international market, and this can lead to higher domestic price variability.

Despite trade’s crucial role in enhancing food systems resilience, global agricultural markets remain distorted by trade regulations. The results of Figure 1.23 indicate that food security would be enhanced by reductions in these border protections.

Figure 1.23. Downside variability of national food availability

Difference between the Restricted Trade and Integrated Trade scenarios



Note: OECD countries are shaded in green, the three least developed countries (LDC) aggregates in orange, the world average in red, and the remaining in blue. Figure uses lower semi-variation coefficient of average food availability across the time horizon 2022-2040. Positive values indicate higher vulnerability under the Restricted Trade scenario. For example, Nigeria's downside coefficient of variation of food availability is 0.63% in the Integrated Trade scenario and 0.76% in the restricted one. Here the difference of both (0.13 percentage points) is plotted. For the calculation of semivariance please refer to equation 2 in the original article.
Source: Adenäuer, Frezal and Chatzopoulos (2023[13]).

StatLink https://stat.link/18zn6q

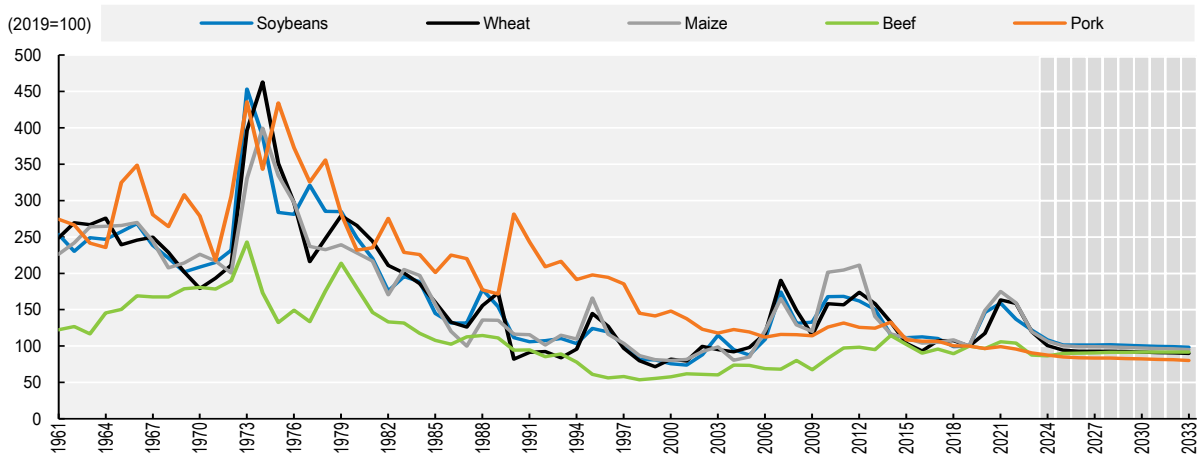
1.8. Prices: Projected evolution for 2024-2033

1.8.1. Prices will resume their long-run trend following the peak in 2022

The *Outlook* uses prices at key international ports as reference prices to clear global agricultural commodity markets. In the first few years of the coming decade, projected prices reflect the lingering effects of events in the base period such as the COVID-19 pandemic, Russia's war against Ukraine and weather conditions in key producing regions. Supply chain disruptions linked to these events have led to steep increases in energy and fertiliser costs, causing real prices of many agricultural commodities to rise substantially and remain high over the 2020-2022 period. Prices have since fallen from their peaks and are expected to fall more rapidly in the near term as the effects of the events underpinning their increases subside (Figure 1.24). Over the medium term, real prices are projected to resume their long-term declining path, consistent with the assumptions of in trend productivity and weather lowering marginal cost of production for most agricultural commodities.

While lower international real prices are expected to put pressure on farmers' incomes, they will benefit consumers. However, since the reference prices used in the *Outlook* reflect global markets, their actual impacts on the decisions of producers and consumers vary based on their specific transport costs, local currency movements, trade policies and the degree of integration of domestic markets into the global trading system can influence whether and to what extent international price signals are transmitted to domestic markets.

Figure 1.24. 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).
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

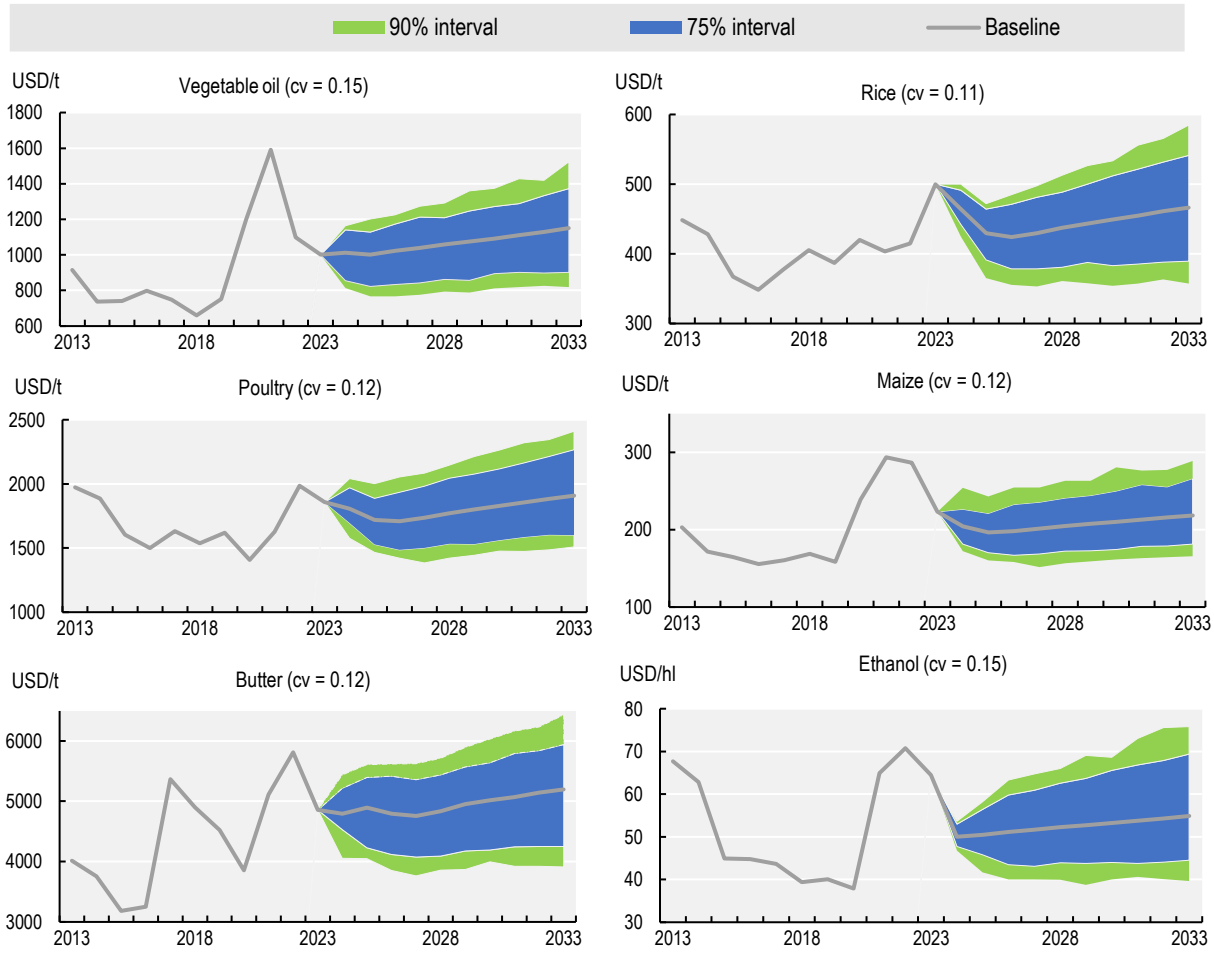
1.8.2. Stochastic simulations show the possible variation in price projections

Price projections presented in this *Outlook* result from the interplay of fundamental supply and demand factors under expected weather and yield trends, as well as specific macroeconomic and policy assumptions. The *Outlook* is based on the best information available but there is an unavoidable degree of uncertainty attached to the projections and to the underlying assumptions. Examples of such uncertainties include climate change, environmental policies and geopolitical tensions, which may affect production and trade prospects and cause market volatility.

The assumption of stable trends in this *Outlook* results in a smooth trajectory for most projected variables. However, deviations from the assumed trends will cause price volatility. To assess the impact of such deviations, a partial stochastic analysis (PSA) was performed on the baseline projections. The PSA simulates the potential future variability of the main determinants of prices using observed past variability. The analysis includes the variability in global macroeconomic drivers and specific agricultural crop yields. Variability related to animal disease or policy changes is not considered. The aggregated results of multiple PSA simulations indicate the sensitivity of the baseline price paths (Figure 1.25). With 75% probability, prices will remain within the blue range in any given year, and they are expected to remain with a 90% probability within the green range. An extreme event that would cause a price to fall entirely outside these ranges occurs with a probability of 40% at least once during the projection period. An illustration of such an event occurred during the calendar years 2021 and 2022, marked by a price hike in vegetable oil. This price hike was attributed to a 5% production decrease in Malaysia compared to previous years, stemming from adverse weather conditions and labour shortages. The PSA analysis provides policy makers and

other stakeholders with an understanding of the potential fiscal exposure to high import costs, or high farm subsidy payments in case of low prices.

Figure 1.25. Baseline and stochastic intervals for selected international reference prices



Note: Expected evolution of nominal prices under the baseline scenario of the *Outlook* (solid line) in relation to the stochastic outcomes shown in the blue 75% and green 90% confidence intervals.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/6b1eyf

References

Adenäuer, M., C. Frezal and T. Chatzopoulos (2023), "Mitigating the impact of extreme weather events on agricultural markets through trade", *OECD Food, Agriculture and Fisheries Papers*, No. 198, OECD Publishing, Paris, https://doi.org/10.1787/aa584482-en. [13]

Barange, M. et al. (2018), *Impacts of Climate Change on Fisheries and Aquaculture. Synthesis of Current Knowledge, and Mitigation Options*. [27]

Breman, H. and C. de Wit (1983), "Rangeland Productivity and Exploitation in the Sahel", *Science*, Vol. 221/4618, pp. 1341-1347, https://doi.org/10.1126/science.221.4618.1341. [3]

Chamberlin, J., T. Jayne and D. Headey (2014), "Scarcity amidst abundance? Reassessing the potential for cropland expansion in Africa", *Food Policy*, Vol. 48, pp. 51-65, https://doi.org/10.1016/j.foodpol.2014.05.002. [15]

Cobourn, K. (2023), "Climate change adaptation policies to foster resilience in agriculture: Analysis and stocktake based on UNFCCC reporting documents", *OECD Food, Agriculture and Fisheries Papers*, No. 202, OECD Publishing, Paris, https://doi.org/10.1787/5fa2c770-en. [5]

Copernicus (2023), *October 2023 - Exceptional temperature anomalies; 2023 virtually certain to be warmest year on record*, Copernicus Climate Bulletins Newsflash, European Commission, https://climate.copernicus.eu/copernicus-october-2023-exceptional-temperature-anomalies-2023-virtually-certain-be-warmest-year. [14]

FAO (2023), *The State of Food Security and Nutrition in the World 2023*, FAO; IFAD; UNICEF; WFP; WHO;, https://doi.org/10.4060/cc3017en. [1]

FAO (2022), *Leveraging social protection to enhance farmers' climate adaptive capacities*, https://www.fao.org/3/cc2006en/cc2006en.pdf. [6]

FAO (2019), *The state of Food and Agriculture, moving forward on food loss and waste reduction*, https://doi.org/10.4060/CA6030EN. [10]

FAO (2011), *Global Food Losses and Food Waste- Extent, Causes and Prevention*, FAO. [9]

FAO, IFAD, PAHO, UNICEF and WFP (2023), *Latin America and the Caribbean - Regional Overview of Food Security and Nutrition 2023*, FAO; IFAD; UNICEF; WFP; PAHO;, https://doi.org/10.4060/cc8514en. [21]

Fuglie, K. (2018), "Is agricultural productivity slowing?", *Global Food Security*, Vol. 17, pp. 73-83, https://doi.org/10.1016/j.gfs.2018.05.001. [20]

Jayne, T. et al. (2016), "Africa's changing farm size distribution patterns: the rise of medium-scale farms", *Agricultural Economics*, Vol. 47/S1, pp. 197-214, https://doi.org/10.1111/agec.12308. [16]

Kelly, M. (2016), "The Nutrition Transition in Developing Asia: Dietary Change, Drivers and Health Impacts", in *Eating, Drinking: Surviving, SpringerBriefs in Global Understanding*, Springer International Publishing, Cham, https://doi.org/10.1007/978-3-319-42468-2_9. [25]

Law, C., I. Fraser and M. Piracha (2020), "Nutrition Transition and Changing Food Preferences in India", *Journal of Agricultural Economics*, Vol. 71/1, pp. 118-143, https://doi.org/10.1111/1477-9552.12322. [26]

OECD (2023), *Agricultural Policy Monitoring and Evaluation 2023: Adapting Agriculture to Climate Change*, OECD Publishing, Paris, https://doi.org/10.1787/b14de474-en. [7]

OECD (forthcoming), "A stocktaking of food loss and waste policies". [12]

OECD/FAO (2019), *OECD-FAO Agricultural Outlook 2019-2028*, OECD Publishing, Paris/Food and Agriculture Organization of the United Nations, Rome, https://doi.org/10.1787/agr_outlook-2019-en. [22]

Plant Production Systems (2019), *From fed by the world to food security : Accelerating agricultural development in Africa*, Plant Production Systems Wageningen University, Wageningen, https://doi.org/10.18174/498300. [2]

Reardon, T. et al. (2014), *Urbanization, Diet Change, and Transformation of food supply chains in Asia*, Michigan State University, Global Center for Food Systems Innovation, https://www.fao.org/fileadmin/templates/ags/docs/MUFN/DOCUMENTS/MUS_Reardon_2014.pdf. [24]

Scognamillo, A., M. Mastrorillo and A. Ignaciuk (2024), "One for all and all for one: Increasing the adaptive capacity of households and communities through a public work programme", *World Development*, Vol. 175, p. 106467, https://doi.org/10.1016/j.worlddev.2023.106467. [8]

Tarasuk, V. and A. Mitchell (2020), *Household food insecurity in Canada, 2017-18*, Toronto: Research to identify policy options to reduce food insecurity (PROOF), https://proof.utoronto.ca/wp-content/uploads/2020/03/Household-Food-Insecurity-in-Canada-2017-2018-Full-Reportpdf.pdf. [19]

UN DESA (2024), *World Population Ageing 2023*, United Nations, https://www.un-ilibrary.org/content/books/9789213586747. [23]

UN WWDR (2022), *UN World Water Development Report 2022: Groundwater: Making the invisible visible*, United Nations, https://unesdoc.unesco.org/ark:/48223/pf0000380721. [17]

UNEP (2024), *Food Waste Index Report 2024*. [11]

Van der Weijden, W. and H. Breman (2024), *Sustainable intensification of agriculture in Sub-Saharan Africa, a summary of a series of articles*. [4]

Weersink, A. et al. (2021), "COVID-19 and the agri-food system in the United States and Canada", *Agricultural Systems*, Vol. 188, p. 103039, https://doi.org/10.1016/j.agsy.2020.103039. [18]

Note

[1] For population growth, the *Outlook* uses the UN Medium Variant set of estimates from the 2022 Revision of the United Nations Population Prospects database. National GDP and per capita income assumptions are based on the IMF *World Economic Outlook* (October 2023).

2 Regional briefs

This chapter describes key trends and emerging issues facing the agricultural sector in the six FAO regions: Asia Pacific (which is split into Developed and East Asia and South and Southeast Asia); Sub-Saharan Africa; Near East and North Africa; Europe and Central Asia; North America; and Latin America and the Caribbean. It highlights the regional aspects of production, consumption, and trade projections for the period 2024-33 and provides background information on key regional issues that relate to the projections.

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

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

This chapter contains seven sections, with text, tabular and graphic information for each region following a similar template. A background section provides the key regional characteristics and provides the setting from which the projection is described in the subsequent sections for production, consumption, and trade. Each regional brief contains an annex providing common charts and tables outlining the key aspects for the region concerned.

2.1. Regional outlook: Developed and East Asia

2.1.1. Background

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

The Developed and East Asia region[1] comprises a diverse range of countries that includes the second and third largest economies in the world, in the People's Republic of China (hereafter "China") and Japan. In per capita terms, income levels range from USD 9 298 in China to USD 64 182 in Australia. The region is the second most populous of those covered in this chapter. It comprises 21% of the global population and most of its 1.6 billion people reside in China. It is the only region where the population is expected to decline over the coming decade, mainly on account of the decline in China and to a lesser extent Japan. Urbanisation has been rapid and estimates suggest that by 2033, 73% of people will reside in urban settings, up from just 55% in 2010. Such urbanisation occurs mainly in China, as an estimated 89% of the population in the rest of the region already resided in urban areas in 2023. China's nutrition patterns are stabilising, but continued urbanisation may still drive demand for more, processed and conveniently packaged food.

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

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

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

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

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

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

2.1.2. Production

Sustainable productivity gains critical

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

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

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

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

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

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

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

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

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

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

2.1.3. Consumption

Greater nutritional stability in China driving regional demand preferences

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

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

As the only region with a projected decline in population by 2033, Developed and East Asia also exhibits some distinctive age distribution trends that may influence demand prospects. In Japan and Korea, age dependency ratios are already high and set to increase further (UN DESA, 2024[1]). It is generally assumed that aging populations will dampen overall food consumption growth rates. In China, rising age dependency is combined with rapid urbanisation, which is expected to drive growing consumption of convenience foods as well as sugars and fats, albeit much slower than in the past. Sugar consumption is expected to grow fastest among the various food groups. Vegetable oil consumption growth is slower, absolute levels are already high. By 2033, it is expected to exceed 26 kg per capita, exceeding the global average by 65%.

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

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

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

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

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

2.1.4. Trade

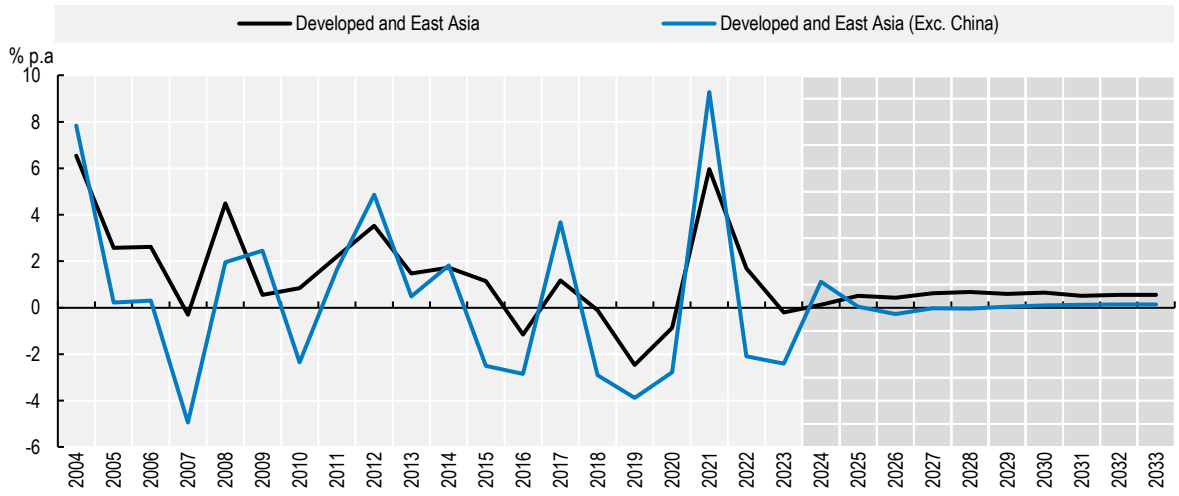
Diverse group of net importers and exporters

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

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

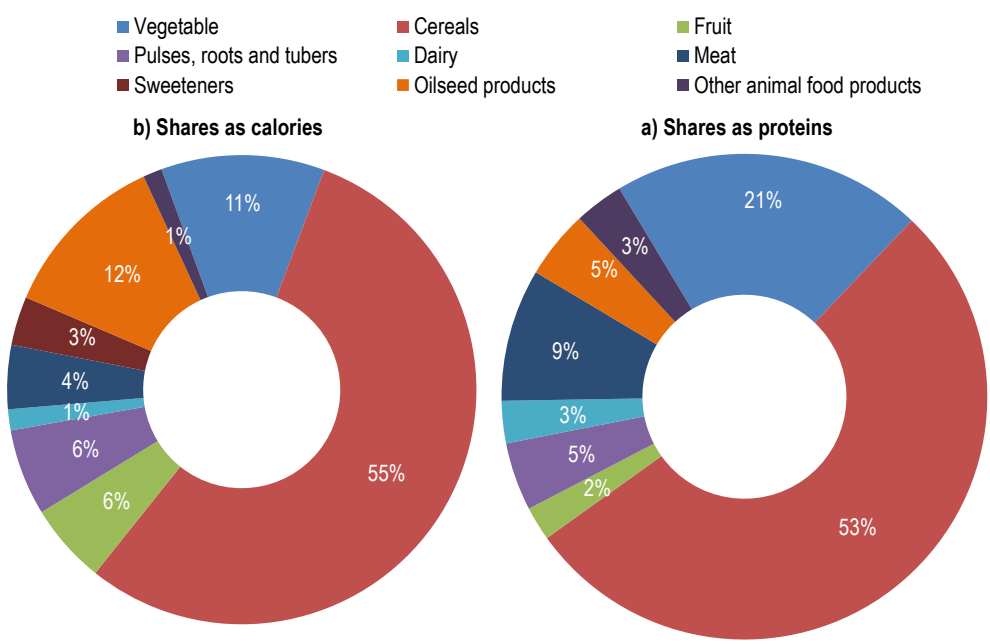
Net exports from the region are expected to rise by 13% over the *Outlook* period, with two thirds attributed to China and almost a third to the combination of Australia and New Zealand. China's export growth is mainly driven by fish, whereas growth from Australia and New Zealand is derived from meat,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

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



Note: Estimates are based on historical time series from the FAOSTAT Value of Agricultural Production domain which are extended with the *Outlook* database. Remaining products are trend-extended. The Net Value of Production uses own estimates for internal seed and feed use. Values are measured in constant 2014-2016 USD.
Source: FAO (2024). FAOSTAT Value of Agricultural Production Database, http://www.fao.org/faostat/en/#data/QV; OECD/FAO (2024) "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

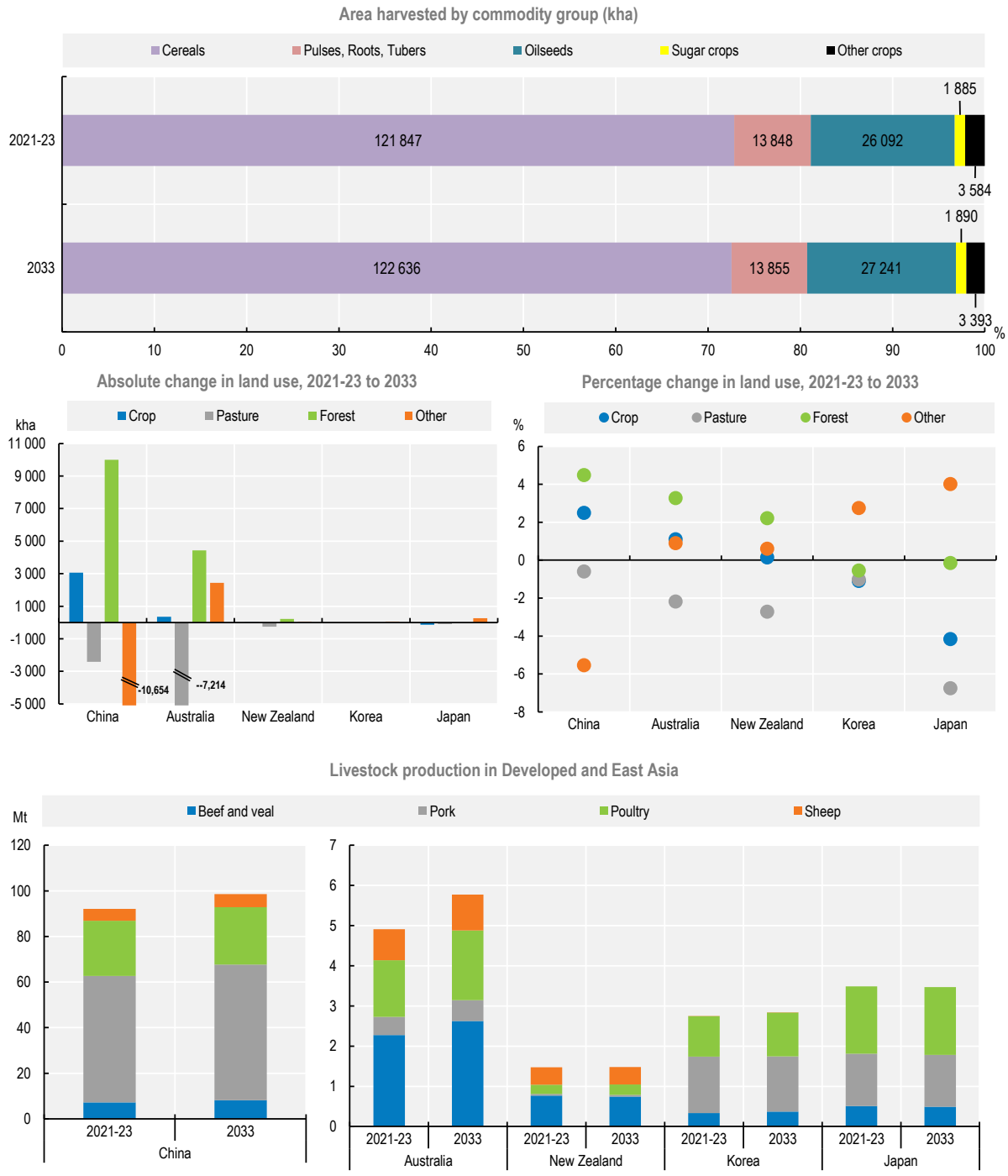
Figure 2.2. Distribution of food waste and losses in Developed and East Asia in terms of calories and proteins, 2021-2023



Note: Other animal food products include egg and fish.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/e9z4nm

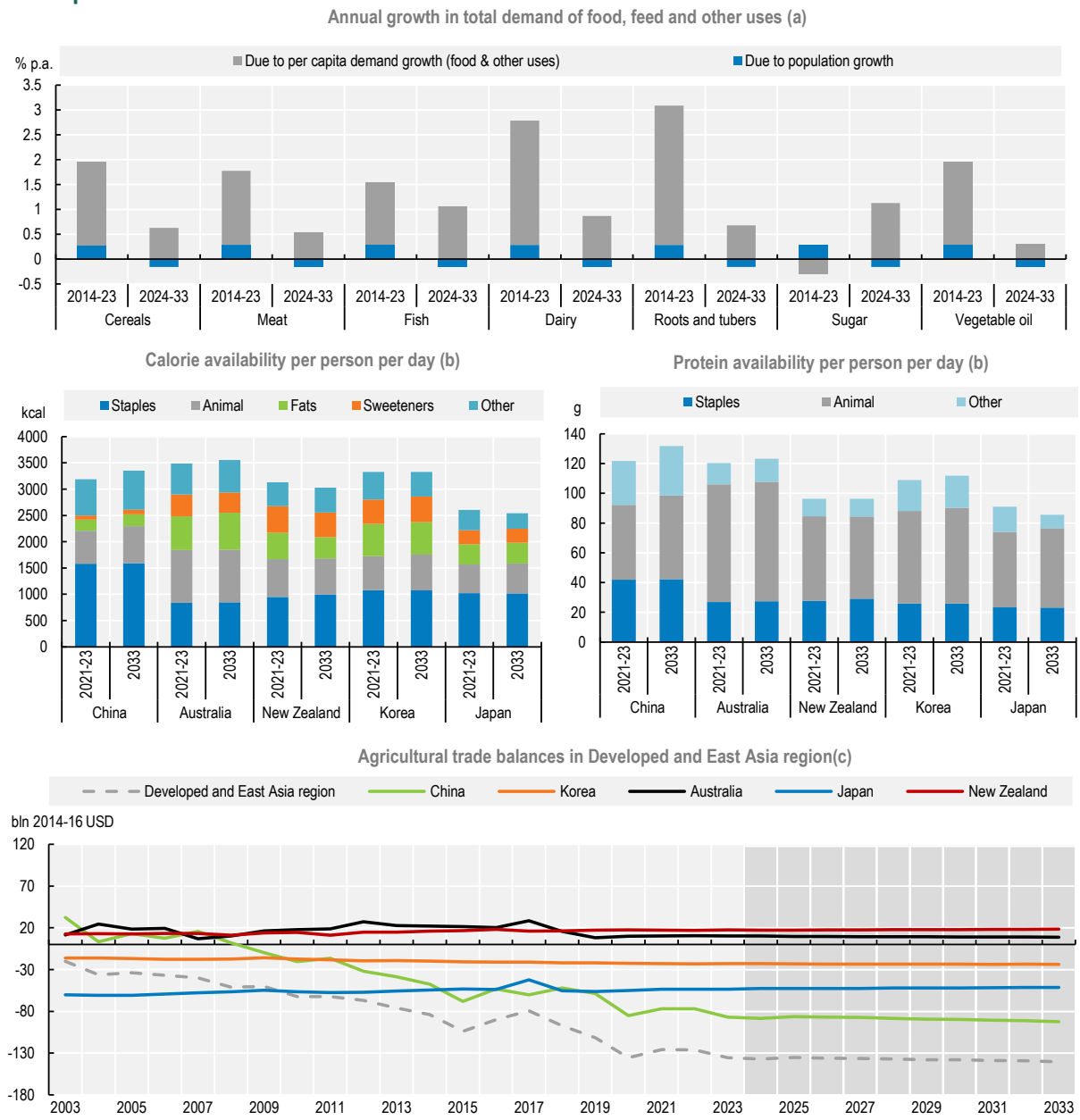
Figure 2.3. Land use change and livestock production in Developed and East Asia



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

StatLink https://stat.link/bup1n0

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



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

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

StatLink https://stat.link/hl0ro3

Table 2.1 Regional Indicators: Developed and East Asia

	Average			%	Growth[2]	
	2011-13	2021-23 (base)	2033	Base to 2033	2014-23	2024-33
Macro assumptions						
Population ('000)	1 571 213	1 632 941	1 608 552	-1.49	0.29	-0.16
Per capita GDP[1] (kUSD)	10.03	14.02	19.20	36.98	3.22	2.77
Production (USD bln 2014-16)						
Net value of agricultural and fisheries[3]	818.3	889.6	941.1	5.79	0.47	0.58
Net value of crop production[3]	415.1	446.9	461.9	3.37	0.59	0.42
Net value of livestock production[3]	232.3	242.9	254.3	4.69	-0.05	0.31
Net value of fish production[3]	170.8	199.8	224.8	12.53	0.82	1.23
Quantity produced (kt)						
Cereals	554 321	637 787	668 797	4.86	0.91	0.56
Pulses	7 384	9 156	10 194	11.34	3.08	0.75
Roots and tubers	40 843	54 000	57 548	6.57	3.24	0.26
Oilseeds[4]	44 402	63 507	69 553	9.52	4.77	0.64
Meat	92 111	104 731	112 102	7.04	0.85	0.44
Dairy[5]	9 195	10 551	11 482	8.83	1.36	0.62
Fish	60 758	71 734	80 778	12.61	0.97	1.23
Sugar	17 622	14 318	15 597	8.93	-0.99	0.97
Vegetable oil	22 832	31 570	35 903	13.73	2.18	0.79
Biofuel production (mln L)						
Biodiesel	1 462	3 268	3 452	5.63	9.90	-1.03
Ethanol	9 198	10 756	11 937	10.99	0.68	0.98
Land use (kha)						
Total agricultural land use	931 796	906 817	900 103	-0.74	0.01	-0.07
Total land use for crop production[6]	159 845	160 118	163 380	2.04	0.03	0.18
Total pasture land use[7]	771 952	746 698	736 723	-1.34	0.00	-0.12
GHG emissions (Mt CO2-eq)						
Total	961	834	853	2.31	-1.55	0.26
Crop	458	355	374	5.28	-2.77	0.50
Animal	487	464	464	-0.05	-0.53	0.06
Demand and food security						
Daily per capita caloric food consumption[8] (kcal)	2 909	3 151	3 296	4.59	0.79	0.28
Daily per capita protein food consumption[8] (g)	105.0	118.8	127.5	7.35	1.38	0.46
Per capita food consumption (kg/year)						
Staples[9]	156.2	162.0	162.9	0.52	0.58	0.01
Meat	40.6	45.8	49.0	7.04	1.73	0.54
Dairy[5]	4.4	5.2	5.6	8.99	2.85	0.83
Fish	37.0	43.2	48.2	11.48	1.37	1.20
Sugar	11.5	11.5	12.9	12.32	-0.06	1.14
Vegetable oil	20.5	24.3	26.1	7.24	1.35	0.32
Trade (bln USD 2014-16)						
Net trade[3]	- 68	- 129	- 140	8.61	..	..
Value of exports[3]	112	122	138	12.84	0.16	1.33
Value of imports[3]	180	251	278	10.66	2.71	0.82
Self-sufficiency ratio (calorie basis)[10]	86	82	81	-0.77	-0.36	0.03

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

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

2.2. Regional outlook: South and Southeast Asia

2.2.1. Background

Strong demand on account of robust income growth and expanding population

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

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

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

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

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

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

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

2.2.2. Production

Sustainable productivity gains are paramount to offset resource constraints

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

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

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

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

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

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

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

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

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

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

2.2.3. Consumption

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

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

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

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

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

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

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

2.2.4. Trade

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

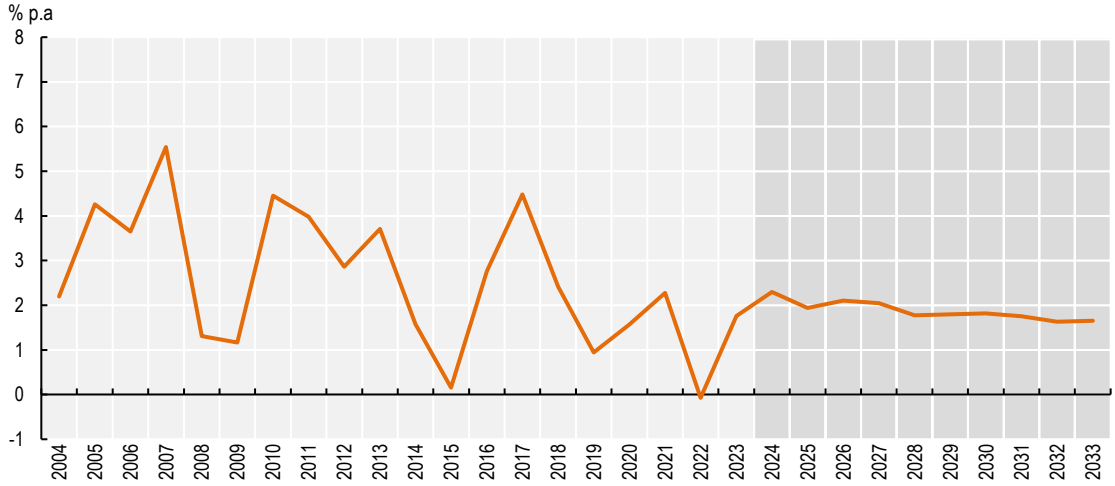
Trade dynamics in the South and Southeast Asia region are shifting with a small trade surplus in the base period expected to transition to a deficit by 2029. India stands out as a major driver of this shift. Historically the biggest net exporter in the region, its trade surplus by 2033 is expected to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

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

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

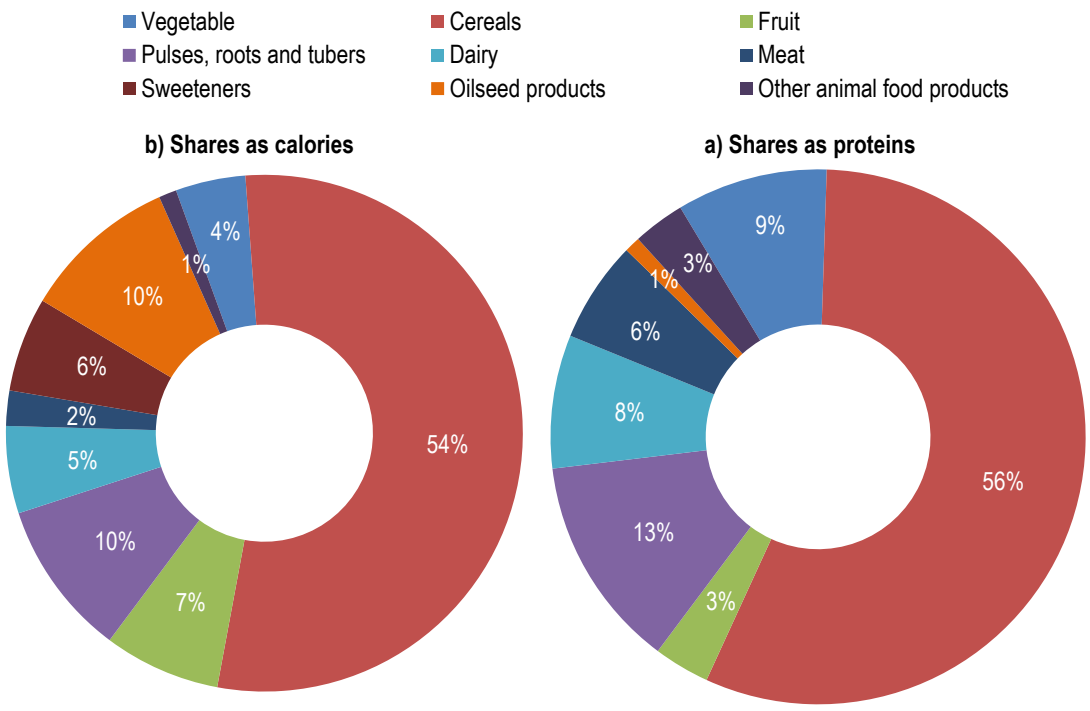
In line with strong demand growth, the regions dependence on imports is growing and its total import bill for food and agricultural products is expected to be 26% higher by 2033 compared to the 2021-23 base period. Import dependence is expected to rise for most commodities, along with the region's share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

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



Note: Estimates are based on historical time series from the FAOSTAT Value of Agricultural Production domain which are extended with the *Outlook* database. Remaining products are trend-extended. The Net Value of Production uses own estimates for internal seed and feed use. Values are measured in constant 2014-2016 USD.
Source: FAO (2024). FAOSTAT Value of Agricultural Production Database, http://www.fao.org/faostat/en/#data/QV; OECD/FAO (2024) "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

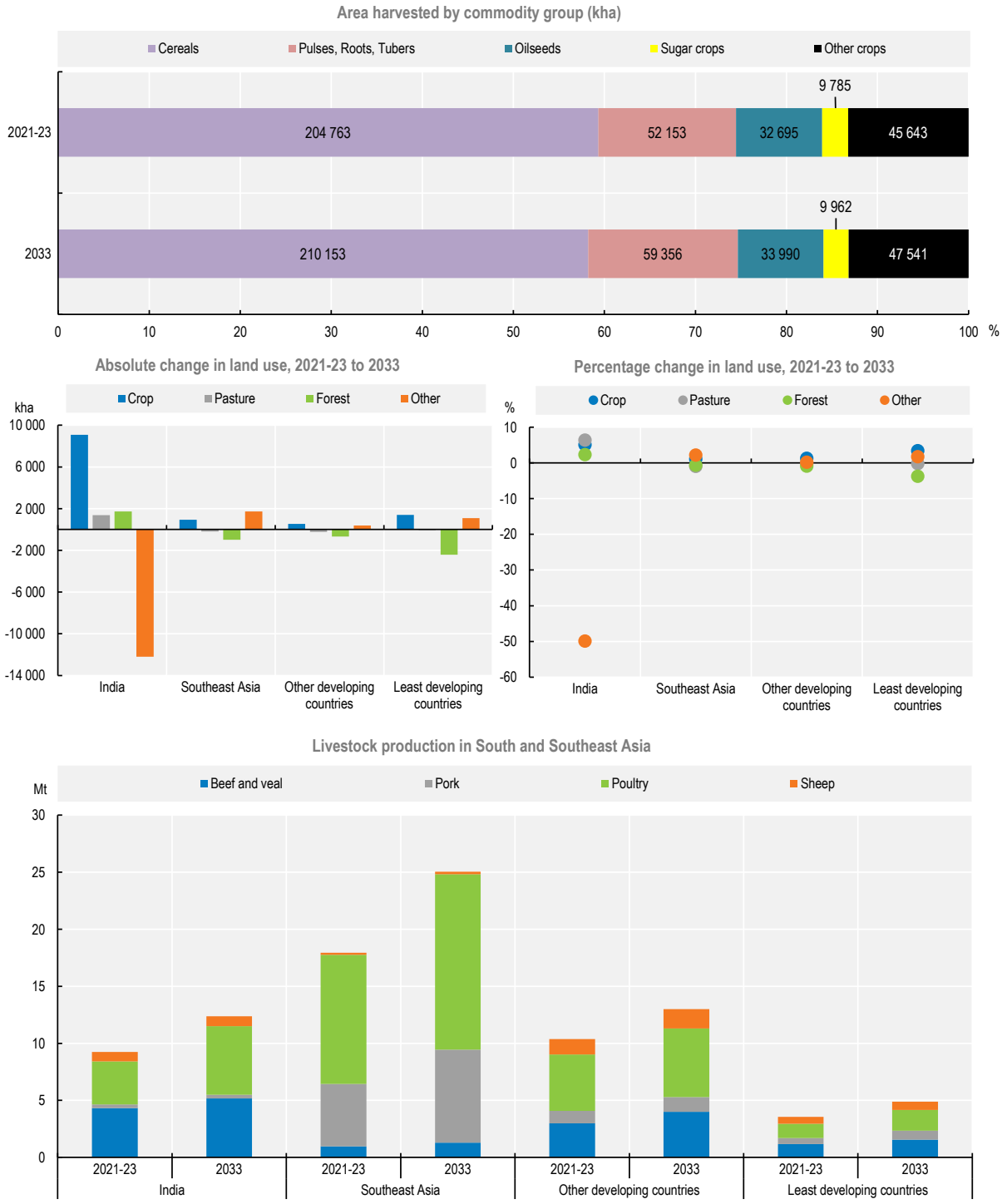
Figure 2.6. Distribution of food waste and losses in South and Southeast Asia in terms of calories and proteins, 2021-2023



Note: Other animal food products include egg and fish.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/ovnr4p

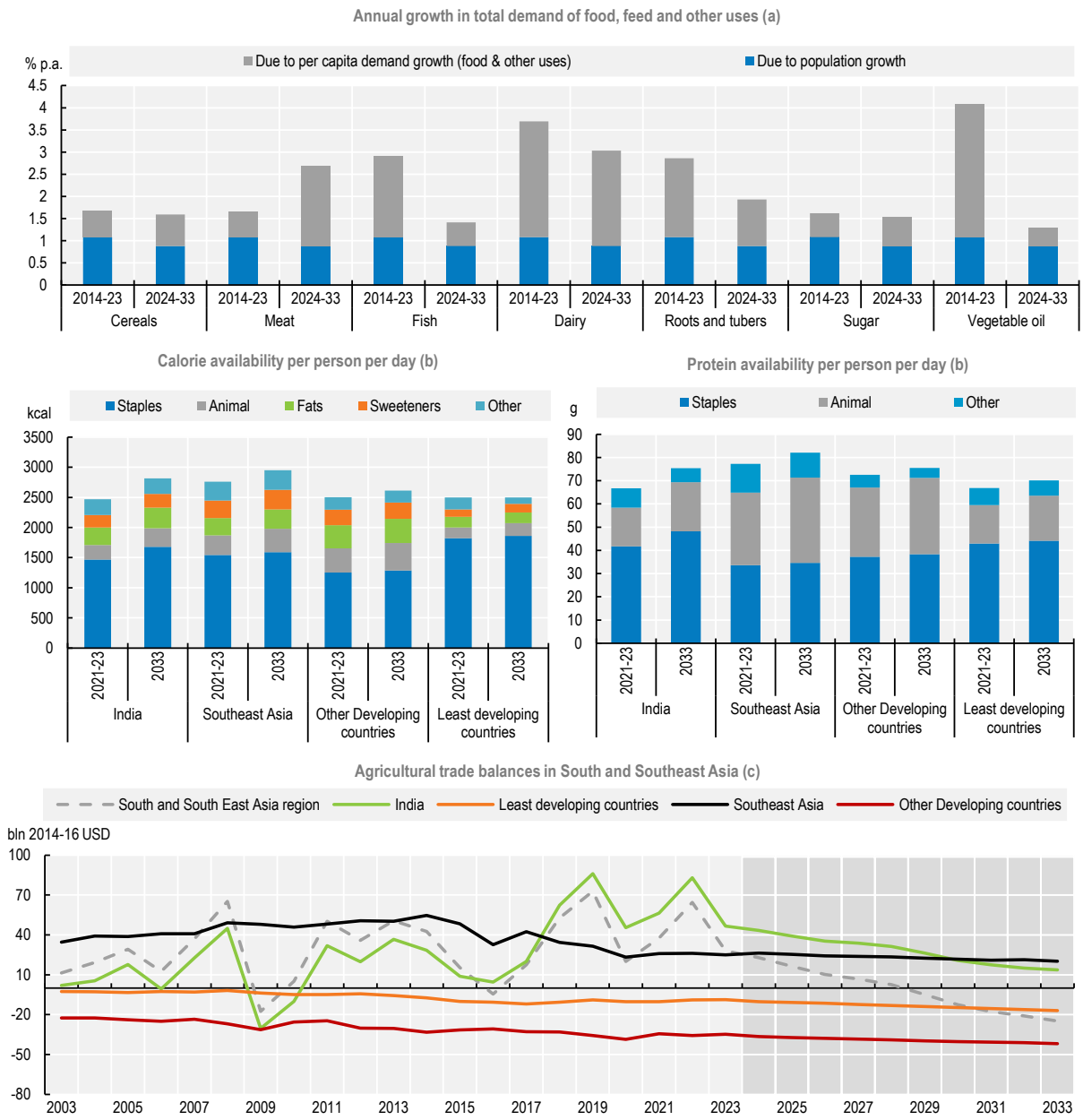
Figure 2.7. Land use change and livestock production in South and Southeast Asia



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

StatLink https://stat.link/azcrnw

Figure 2.8. Demand for key commodities, food availability and agricultural trade balances in South and Southeast Asia



Notes: Estimates are based on historical time series from the FAOSTAT Food Balance Sheets and trade indices databases and include products not covered by the *Outlook*. a) Population growth is calculated by assuming per capita demand constant at the level of the year preceding the decade. b) Fats: butter and oils; Animal: egg, fish, meat and dairy except for butter; Staples: cereals, oilseeds, pulses and roots and tubers. c) Include processed products, fisheries (not covered in the FAOSTAT trade index) based on outlook data.
Source: FAO (2024). FAOSTAT Value of Agricultural Production Database, http://www.fao.org/faostat/en/#data/QV; OECD/FAO (2024) "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/6pzl29

Table 2.2. Regional Indicators: South and Southeast Asia

	Average			%	Growth[2]	
	2011-13	2021-23 (base)	2033	Base to 2033	2014-23	2024-33
Macro assumptions						
Population ('000)	2 444 747	2 737 645	3 020 406	10.33	1.08	0.88
Per capita GDP[1] (kUSD)	2.43	3.27	4.96	51.57	2.63	3.89
Production (USD bln 2014-16)						
Net value of agricultural and fisheries[3]	602.3	734.3	894.7	21.85	1.94	1.84
Net value of crop production[3]	338.8	377.1	442.3	17.29	1.31	1.40
Net value of livestock production[3]	143.9	199.1	274.7	37.99	2.84	3.01
Net value of fish production[3]	119.6	158.1	177.8	12.42	2.39	1.25
Quantity produced (kt)						
Cereals	516 668	592 977	697 216	17.58	1.72	1.51
Pulses	27 024	33 283	41 617	25.04	2.64	2.10
Roots and tubers	40 956	54 609	70 018	28.22	2.83	2.04
Oilseeds[4]	31 384	39 194	45 026	14.88	4.58	1.35
Meat	32 329	41 110	55 318	34.56	1.70	2.65
Dairy[5]	30 718	46 555	64 592	38.74	3.79	3.06
Fish	42 475	57 208	65 316	14.17	2.67	1.26
Sugar	49 303	57 790	67 769	17.27	1.27	1.68
Vegetable oil	73 401	99 186	110 363	11.27	2.97	0.80
Biofuel production (mln L)						
Biodiesel	4341.54	15485.34	23118.87	49.30	15.45	2.05
Ethanol	4 585	9 852	19 012	92.98	8.49	4.68
Land use (kha)						
Total agricultural land use	549 474	573 337	586 198	2.24	0.53	0.18
Total land use for crop production[6]	319 057	346 154	358 119	3.46	0.94	0.28
Total pasture land use[7]	230 417	227 183	228 079	0.39	-0.08	0.04
GHG emissions (Mt CO2-eq)						
Total	1 571	1 693	1 815	7.20	0.88	0.56
Crop	657	679	728	7.27	0.59	0.53
Animal	895	993	1 063	7.00	1.05	0.57
Demand and food security						
Daily per capita caloric food consumption[8] (kcal)	2 369	2 541	2 810	10.55	0.65	0.90
Daily per capita protein food consumption[8] (g)	62.1	69.9	78.6	12.45	1.1	1.2
Per capita food consumption (kg/year)						
Staples[9]	169.0	171.3	186.4	8.86	0.23	0.66
Meat	8.6	9.3	11.3	21.54	0.18	1.72
Dairy[5]	13.1	16.9	21.2	25.41	2.33	2.11
Fish	14.7	17.4	18.7	7.46	1.23	0.58
Sugar	19.2	20.4	22.0	7.55	0.72	0.65
Vegetable oil	8.2	9.7	10.6	9.45	0.87	0.75
Trade (bln USD 2014-16)						
Net trade[3]	46	43	-25	-157.24	..	..
Value of exports[3]	188	247	231	-6.54	3.07	-0.23
Value of imports[3]	142	204	256	25.55	2.16	2.12
Self-sufficiency ratio (calorie basis)[10]	102.5	97.6	95.1	-2.56	-0.14	-0.16

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

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

2.3. Regional outlook: Sub Saharan Africa

2.3.1. Background

Food security for a growing population still a major challenge

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

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

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

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

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

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

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

2.3.2. Production

Productivity gains critical as land expansion slows

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

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

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

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

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

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

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

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

2.3.3. Consumption

Food demand driven by population growth, with limited dietary diversification

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

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

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

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

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

2.3.4. Trade

Import dependence grows with slow progress in regional trade agreements

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

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

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

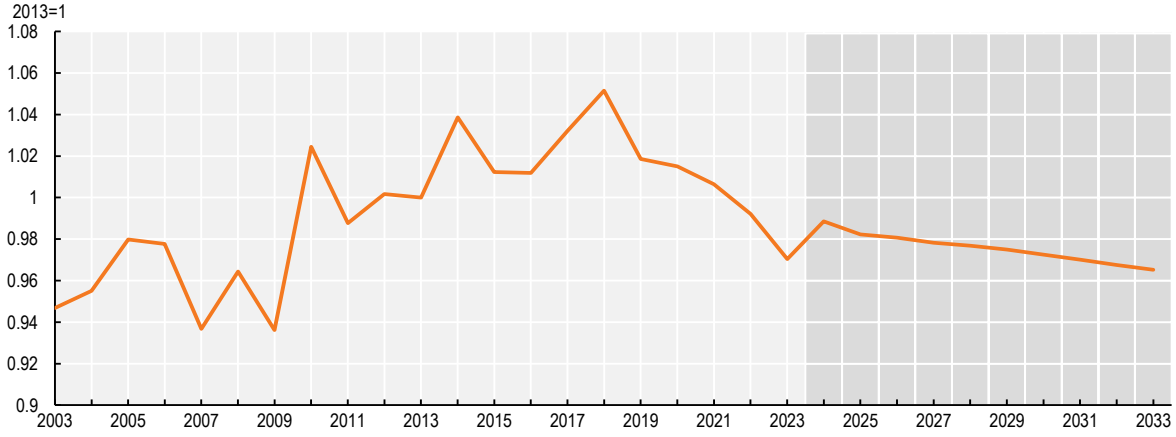
Fresh fruit and vegetables, along with high value products such as cotton, cocoa, tea and coffee are major contributors to export revenue. More than 85% of cotton production is destined for the export market and cotton exports are expected to rise by 7% over the coming decade. The real value of fruit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

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

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

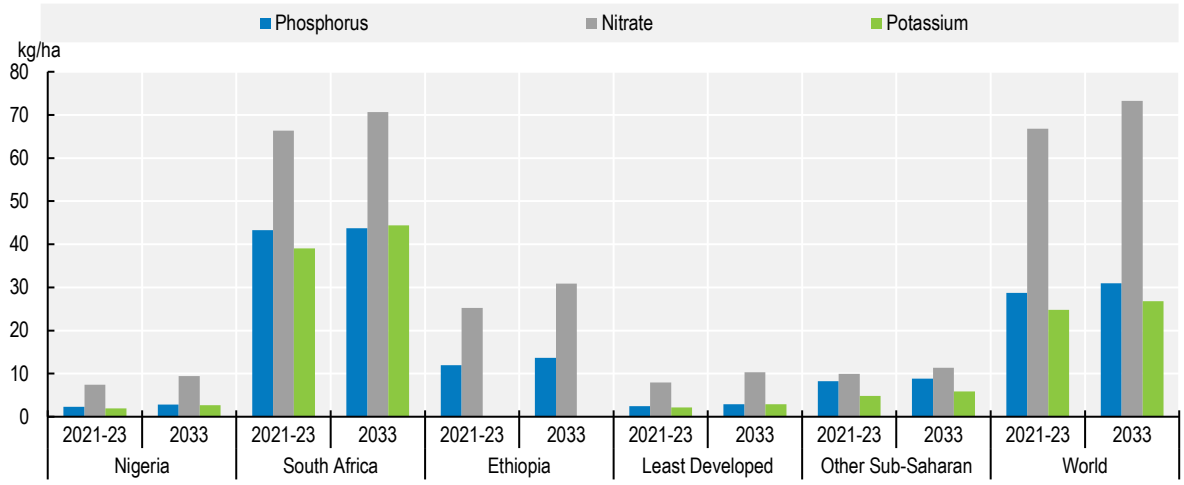
The agreement has the ambition of achieving a zero tariff rate on 90% of tariff lines, through a phased approach over a period of ten years for LDC's and five years for others. Despite progress made, some customs union members are yet to ratify the agreement, which prevents several regional trade unions from fully trading under preferential terms, unless concessions can be made to allow the agreement to be implemented on an individual basis. Furthermore, the success of the agreement will ultimately hinge on the extent to which it deals successfully with non-tariff measures, which are highly prohibitive to trade in the region, and high costs of trade and logistics. While it includes a mutual recognition of standards and licences, harmonisation of sanitary and phytosanitary (SPS) measures, rules of origin and a Pan African payment and settlement system that will undoubtedly aid particularly SME's, many non-tariff barriers are more difficult to remove.

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



Note: Estimates are based on historical time series from the FAOSTAT Value of Agricultural Production domain which are extended with the *Outlook* database. Remaining products are trend-extended. The Net Value of Production uses own estimates for internal seed and feed use. Values are measured in constant 2014-2016 USD.
Source: FAO (2024). FAOSTAT Value of Agricultural Production Database, http://www.fao.org/faostat/en/#data/QV; OECD/FAO (2024) "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

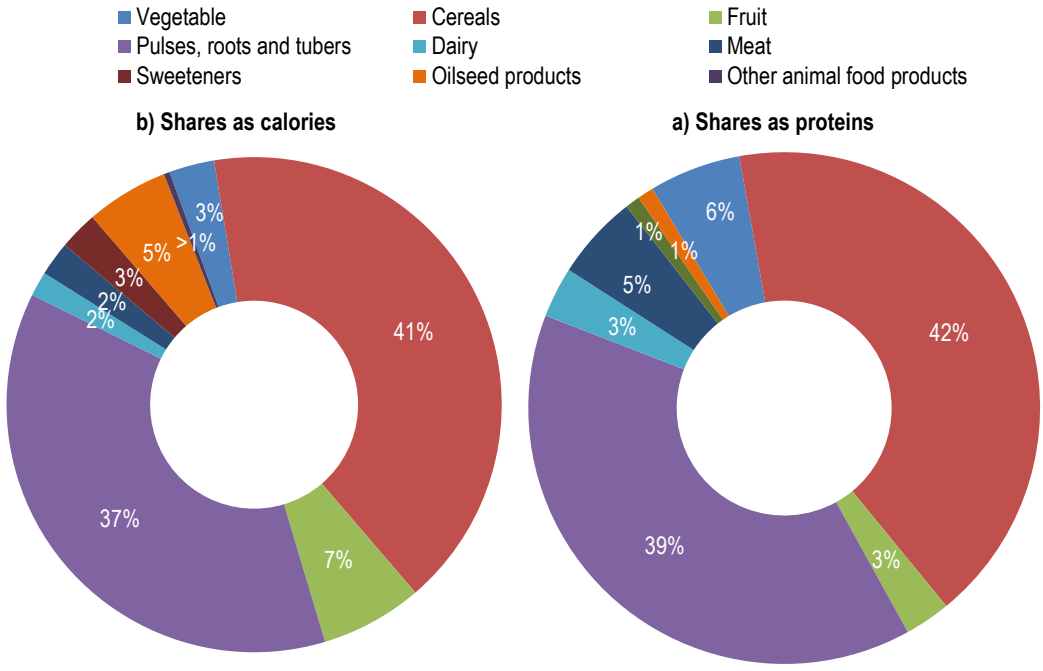
Figure 2.10. Fertiliser application per hectare of land used for crop production is low in Sub-Saharan Africa



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

StatLink https://stat.link/6ycte7

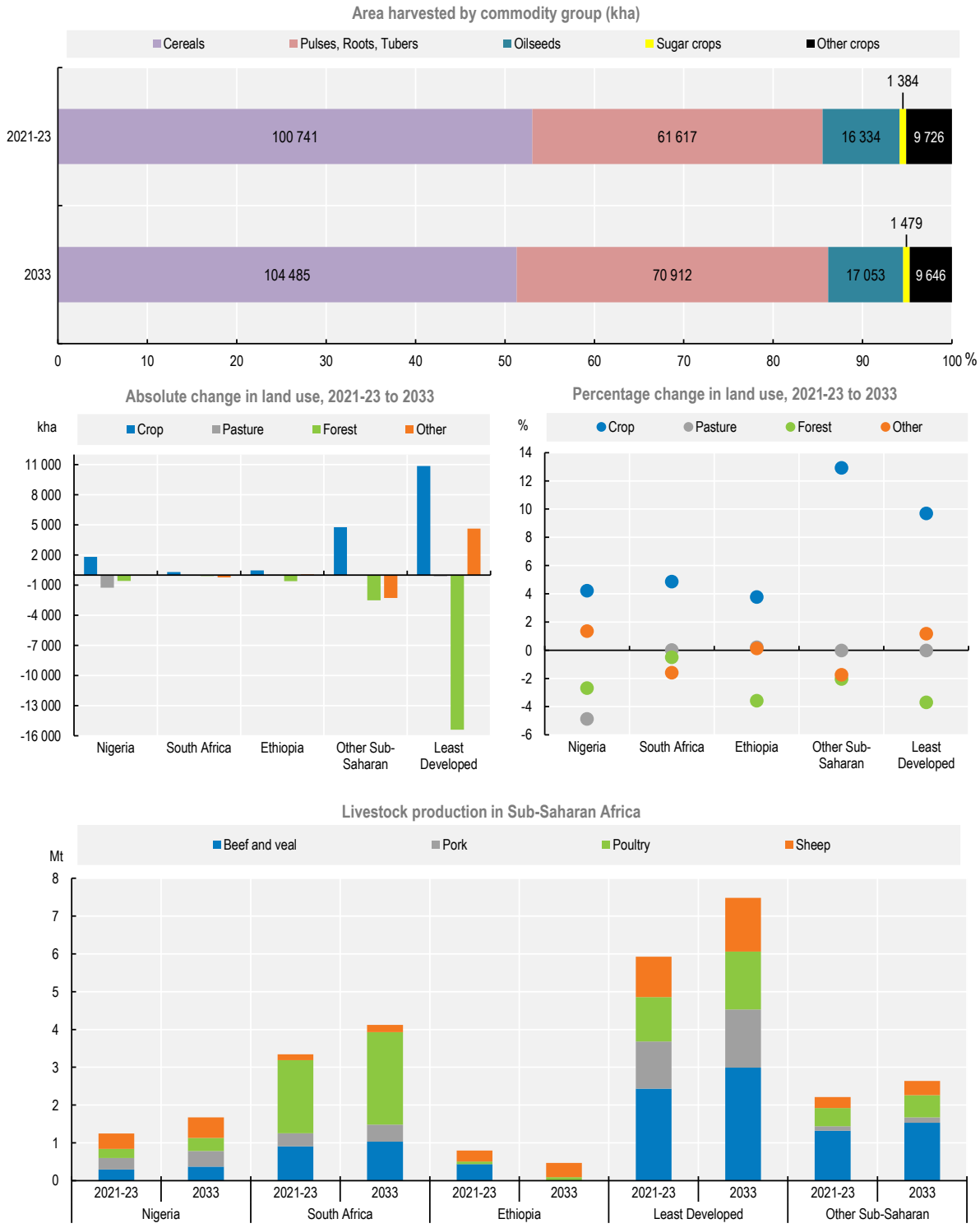
Figure 2.11. Distribution of food waste and losses in Sub-Saharan Africa in terms of calories and proteins, 2021-2023



Note: Other animal food products include egg and fish.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/5q2oup

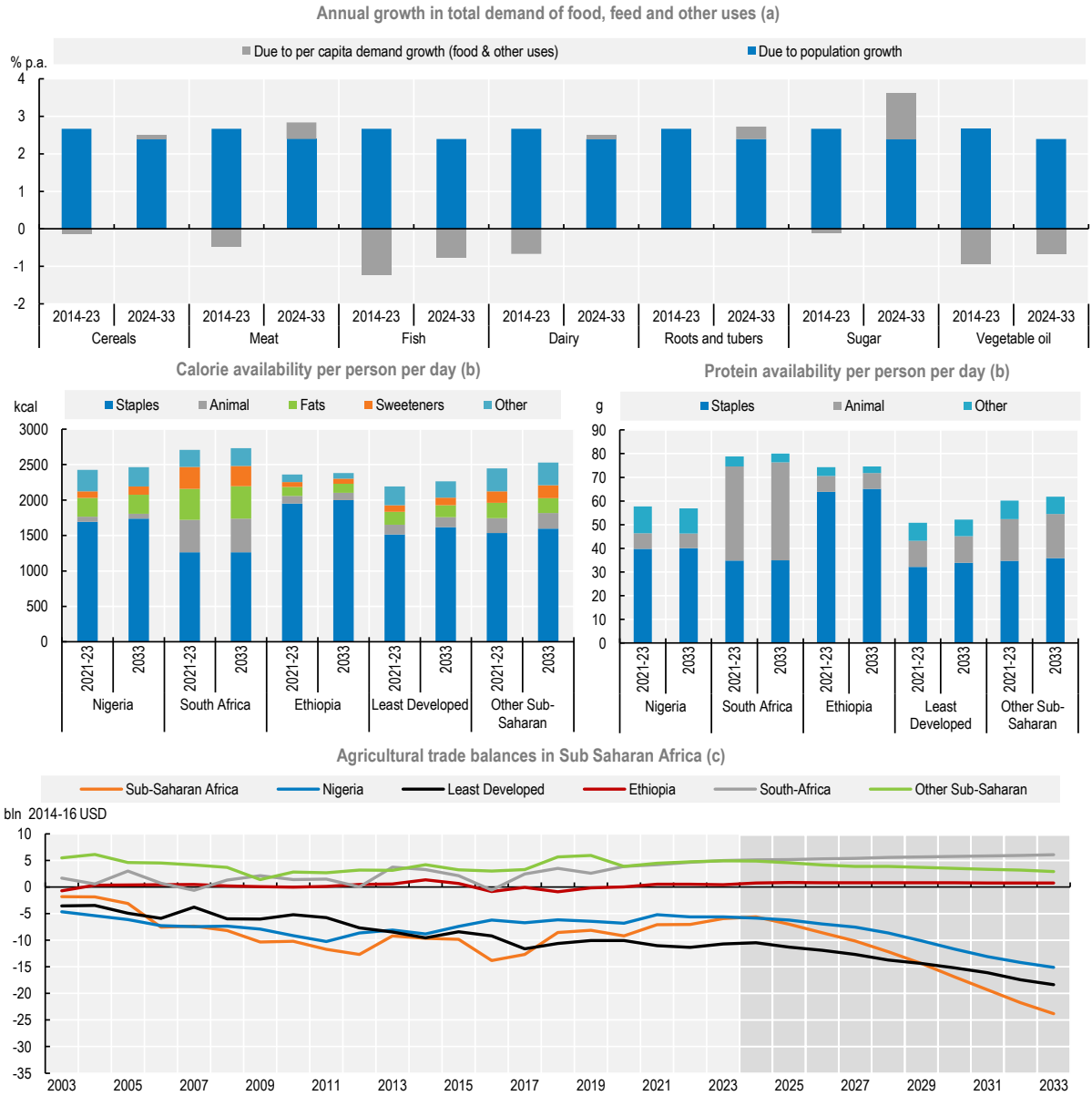
Figure 2.12. Land use change and livestock production in Sub-Saharan Africa



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

StatLink https://stat.link/uhdse7

Figure 2.13. Demand for key commodities, food availability and agricultural trade balance in Sub-Saharan Africa



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

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

StatLink https://stat.link/cimfwr

Table 2.3. Regional indicators: Sub-Saharan Africa

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

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

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

2.4. Regional outlook: Near East and North Africa

2.4.1. Background

Rising import dependence amid resource constraints

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

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

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

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

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

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

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

2.4.2. Production

Productivity led growth essential amid structural resource constraints

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

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

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

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

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

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

2.4.3. Consumption

Food security concerns increasing amid persistent affordability challenges

Despite historic progress in reducing food insecurity and the prevalence of undernourishment, which was supported by subsidies, the economic challenges over the past decade led to a deterioration in the situation. This deterioration accelerated from 2020 as disruptions such as the COVID-19 pandemic, Russia's war against Ukraine and the cost-of-living crisis exacerbated existing challenges. Amid persistently high food price inflation and conflict in several countries, the prevalence of undernourishment increased again in 2022 despite accelerated income growth. Despite policy actions by a number of countries including additional subsidies, value added tax reductions and export controls on selected commodities[6], calorie availability declined further in 2023 as income and affordability pressure intensified. Given ongoing conflict in several countries and weak economic growth expectations in the short-term, broad-based support will be critical to stabilise the situation and ultimately build resilience to improve both calorie intake and dietary diversity.

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

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

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

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

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

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

2.4.4. Trade

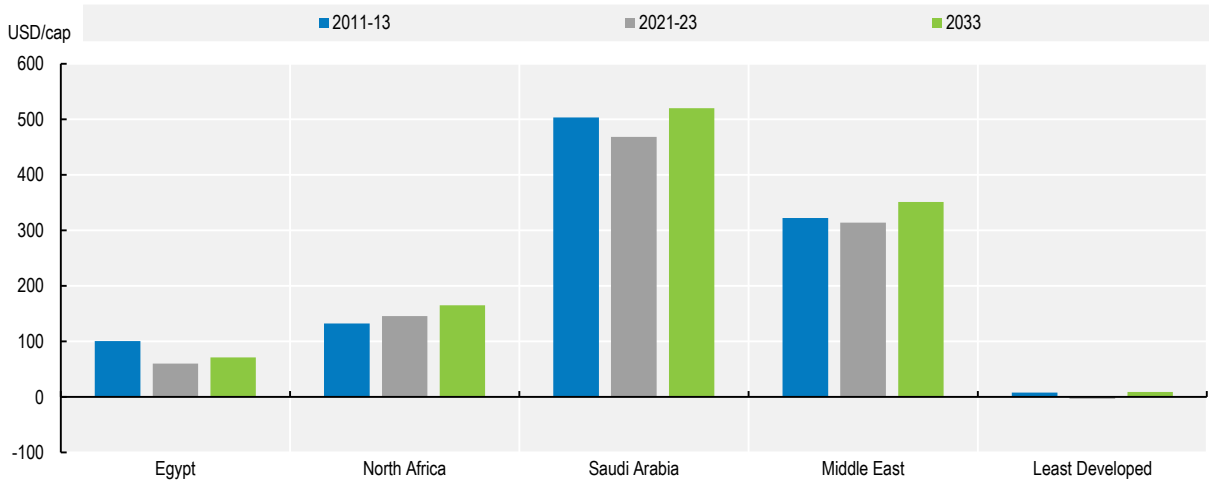
Import bill continues to rise

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

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

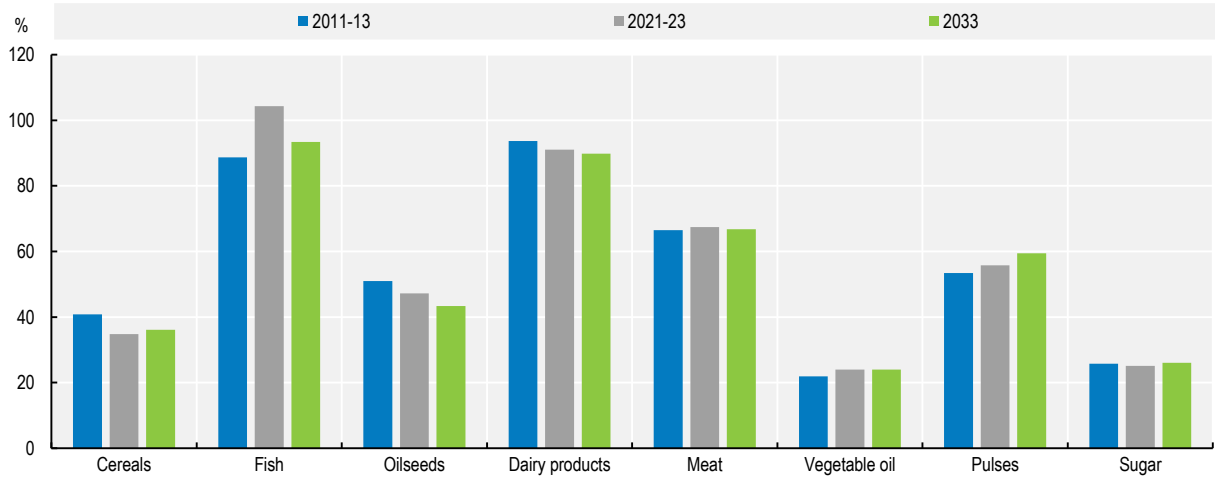
The region's vulnerability to disruptions is underscored by the high share of imports in domestic consumption as well as its high share in global markets for a number of commodities. These characteristics are expected to become more pronounced over the *Outlook* period. Imports are expected to rise for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

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



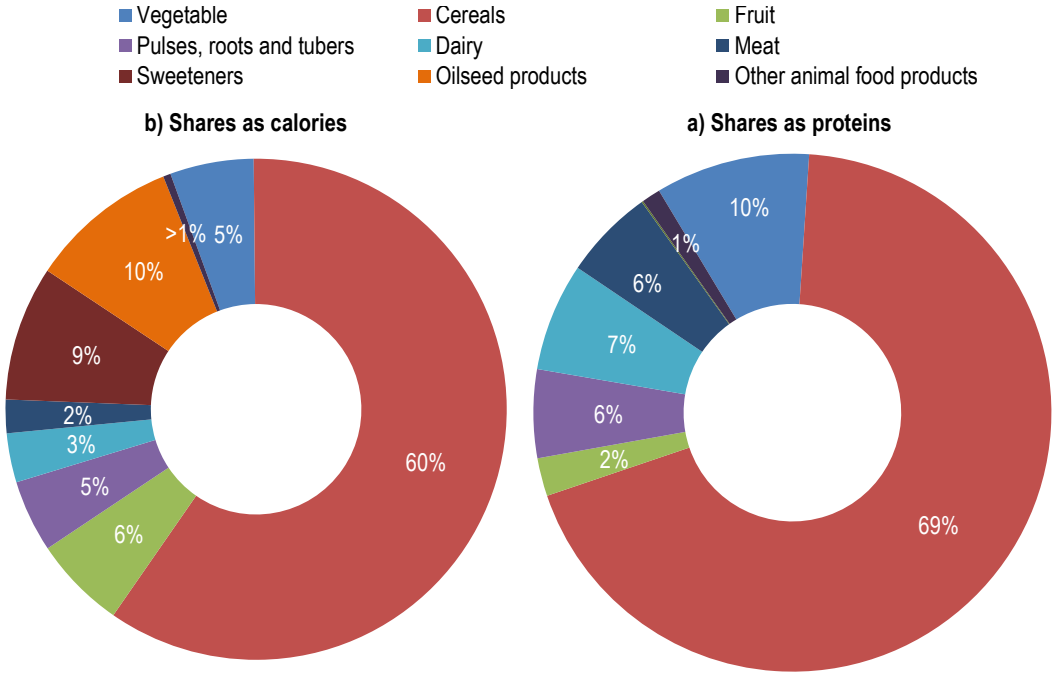
Note: Estimates are based on historical time series from the FAOSTAT Trade indices domain which are extended with the *Outlook* database. Products not covered by the *Outlook* are extended by trends. Total trade values include also processed products, usually not covered by the *Outlook* variables. Trade values are measured in constant 2014-2016 USD and trade values for fisheries (not available in the FAOSTAT trade index) have been added based on *Outlook* data.
Source: FAO (2024). FAOSTAT Value of Agricultural Production Database, http://www.fao.org/faostat/en/#data/QV; OECD/FAO (2024) "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

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



Note: Self-sufficiency ratio calculated as (Production / (Production + Imports - Exports))*100
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

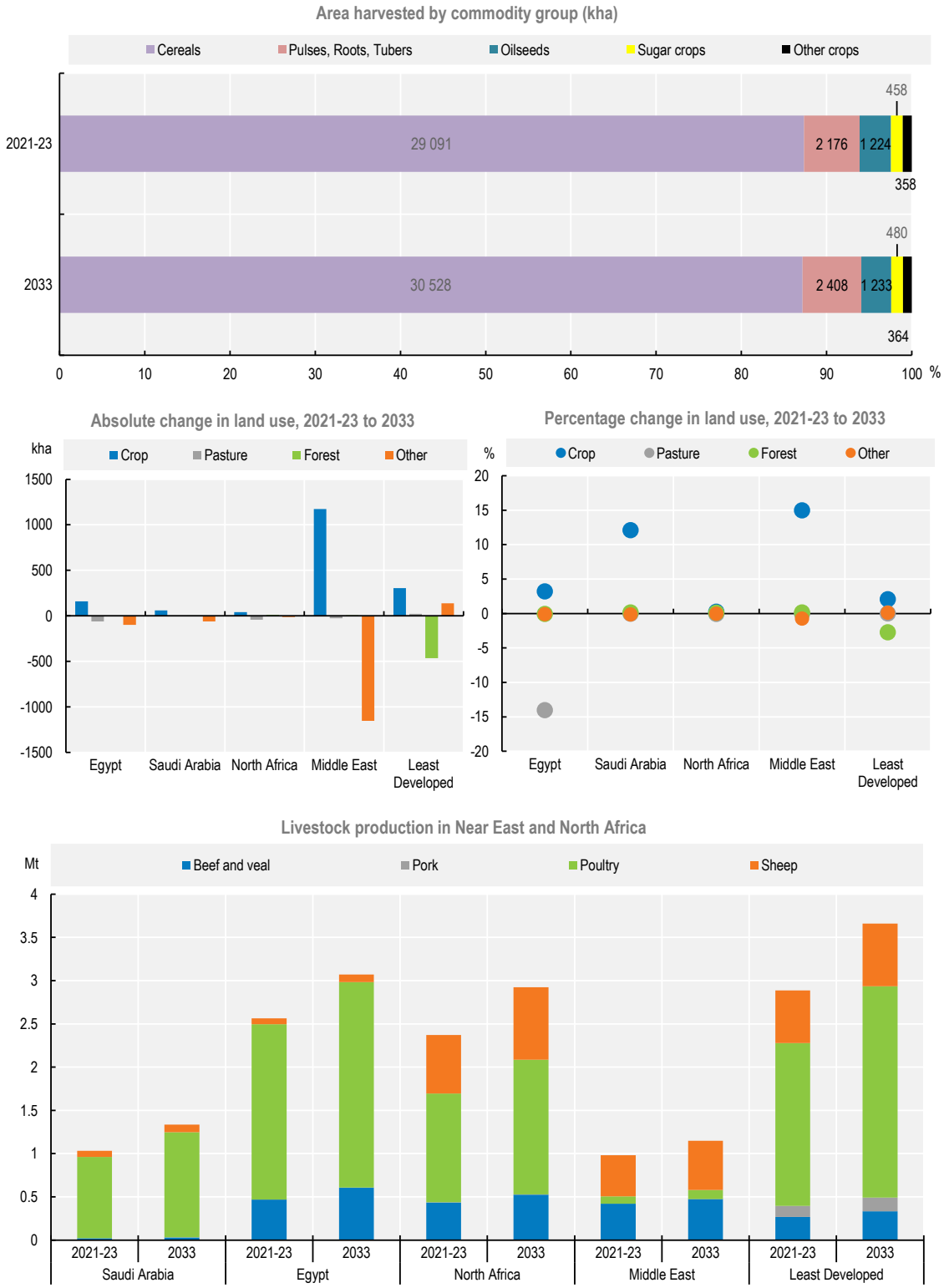
Figure 2.16. Distribution of food waste and losses in Near East and North Africa in terms of calories and proteins, 2021-2023



Note: Other animal food products include egg and fish.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/lsxk6q

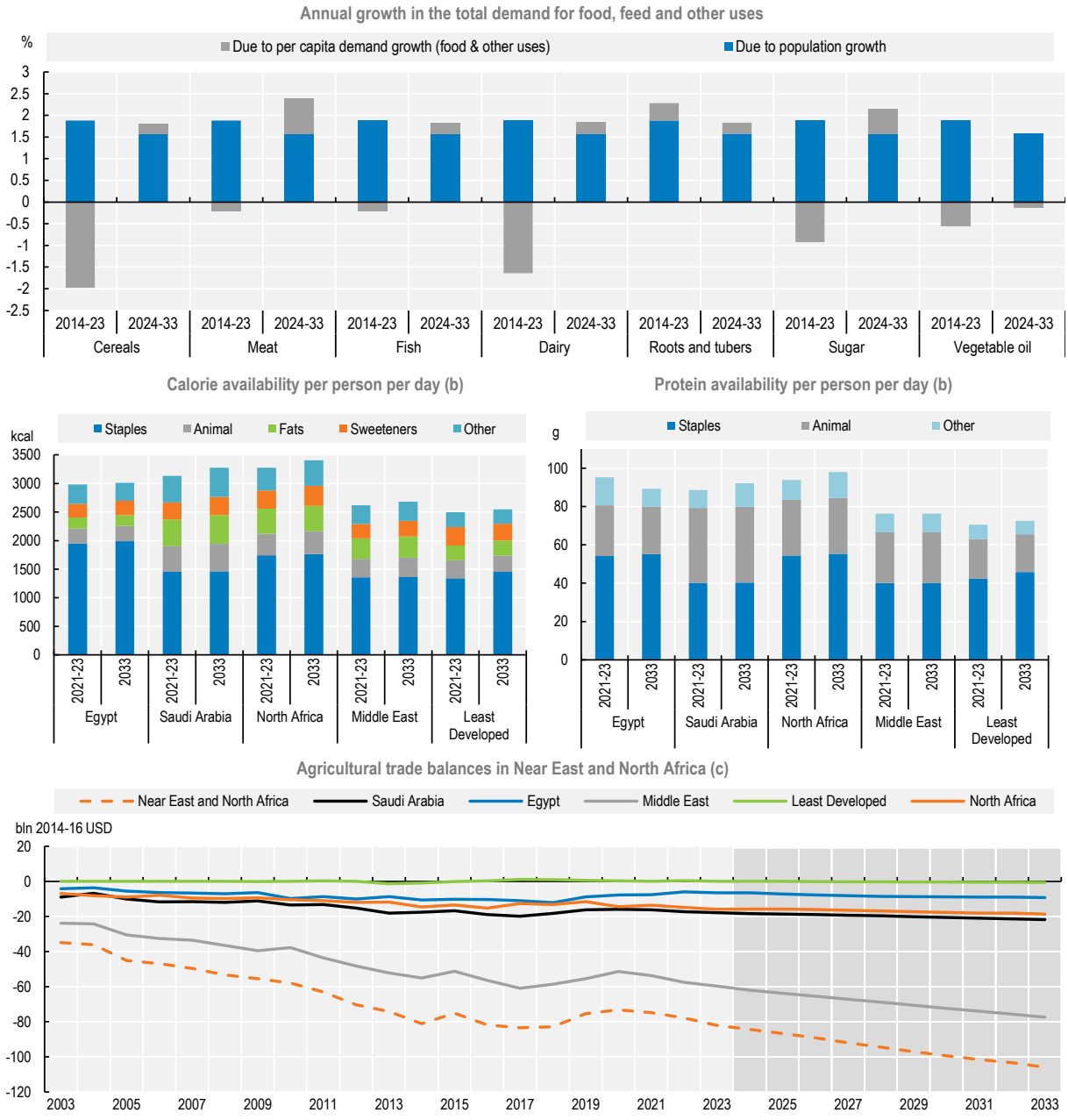
Figure 2.17. Land use change and livestock production in Near East and North Africa



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

StatLink https://stat.link/vjgwpb

Figure 2.18. Demand for key commodities, food availability and agricultural trade balance in Near East and North Africa



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

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

StatLink https://stat.link/471e8o

Table 2.4. Regional indicators: Near East and North Africa

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

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

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

2.5. Regional outlook: Europe and Central Asia

2.5.1. Background

Increasing focus on sustainability in environment with elevated risks

The Europe and Central Asia[7] region includes a diverse range of countries that span two continents and exhibit various stages of development. Considerable differences exist across countries in terms of agricultural resources, demographics and public policies. The challenges facing the region are diverse. Russia's war against Ukraine has caused extensive destruction and continues to raise uncertainty. While supply chains are adapting, the prolonged nature of the war raises uncertainty, at a time when the European Union continues its transition to greener, more sustainable growth, which may be slower than in the past.

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

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

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

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

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

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

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

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

2.5.2. Production

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

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

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

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

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

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

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

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

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

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

2.5.3. Consumption

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

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

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

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

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

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

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

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

2.5.4. Trade

Recovery in Ukraine exports depends on resolution of the war

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

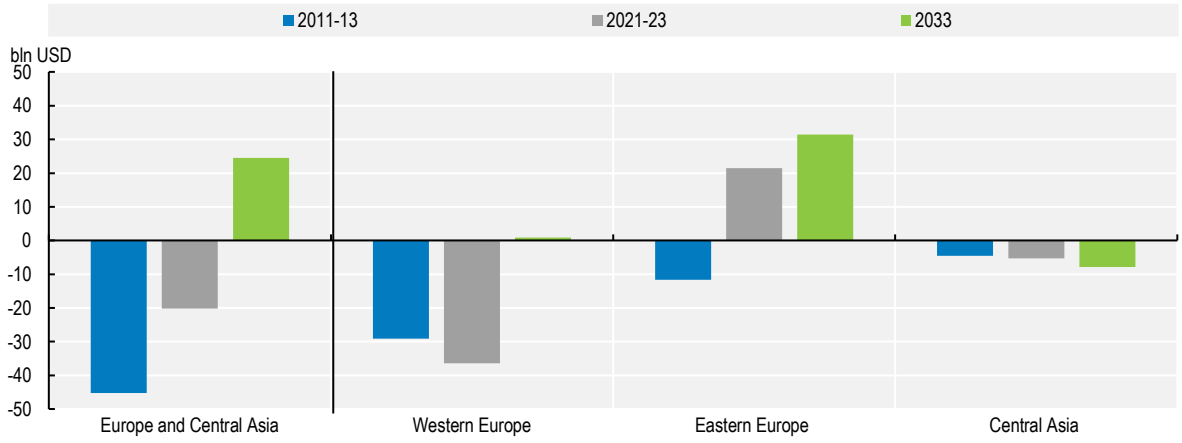
Underpinned by a growing surplus in the European Union, Western Europe is expected to transition from a substantial trade deficit in the 2021-23 base period, to a small surplus by 2033. The biggest contributors to the additional surpluses generated by the European Union are expected to be fresh fruit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

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

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

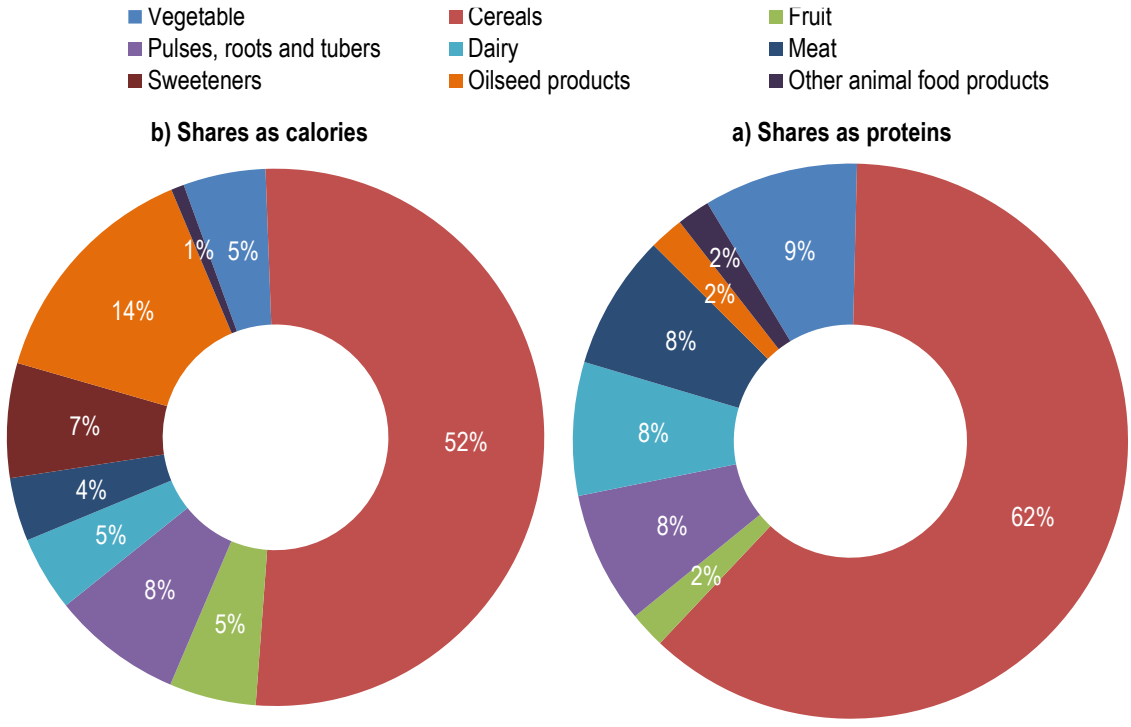
Despite the increasing export orientation which raises its exposure to trade related disruptions, such as the conflict in the Red Sea that is affecting passage through the Suez Canal, the region also remains a significant importer of many agricultural products. In the European Union, such imports will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

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



Note: Estimates are based on historical time series from the FAOSTAT Trade indices domain which are extended with the *Outlook* database. Products not covered by the *Outlook* are extended by trends. Total trade values include also processed products, usually not covered by the *Outlook* variables. Trade values are measured in constant 2014-2016 USD.
Source: FAO (2024). FAOSTAT Trade Indices Database, http://www.fao.org/faostat/en/#data/TI; OECD/FAO (2024) "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

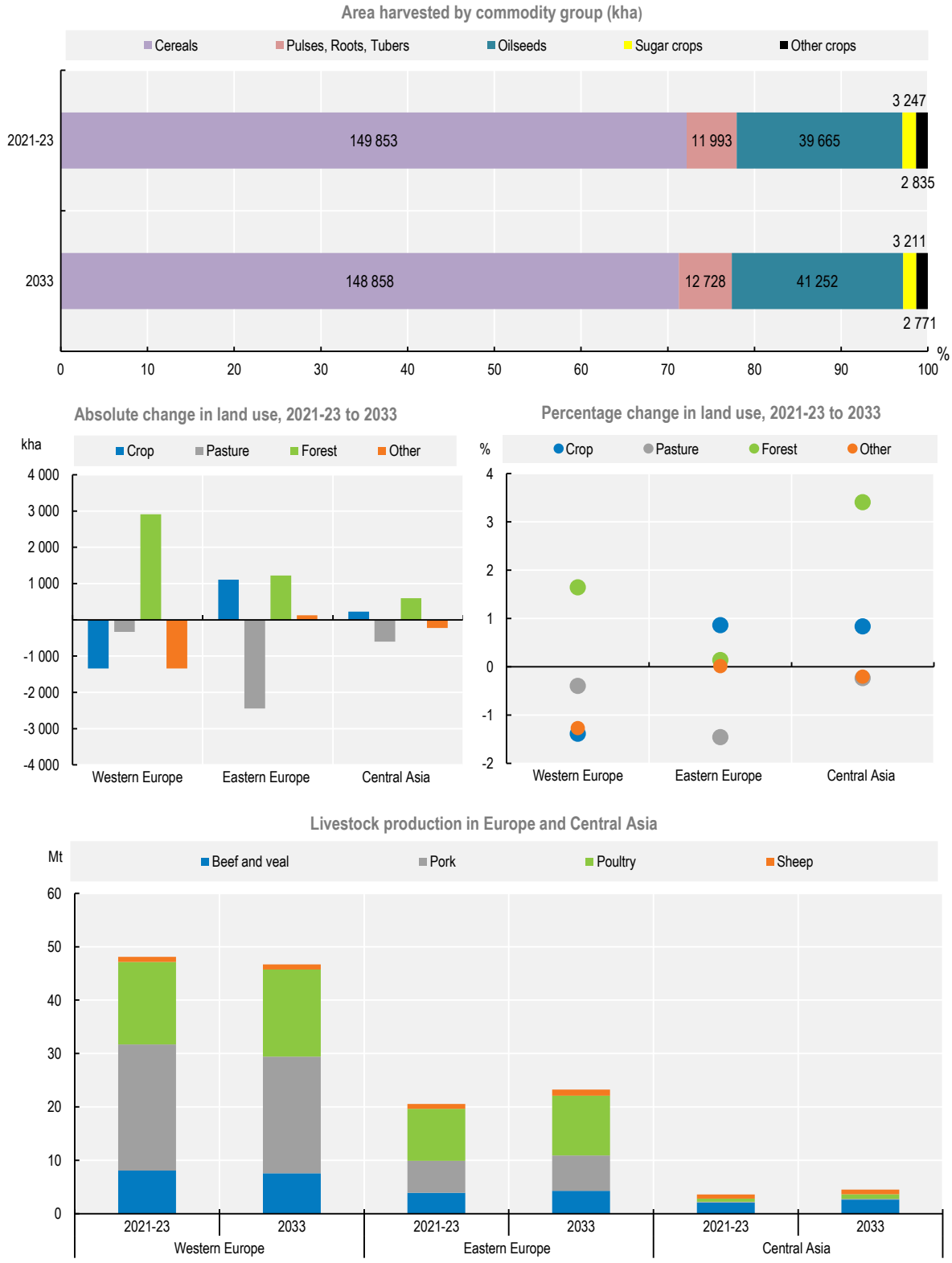
Figure 2.20. Distribution of food waste and losses in Europe and Central Asia in terms of calories and proteins, 2021-2023



Note: Other animal food products include egg and fish.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/a6optx

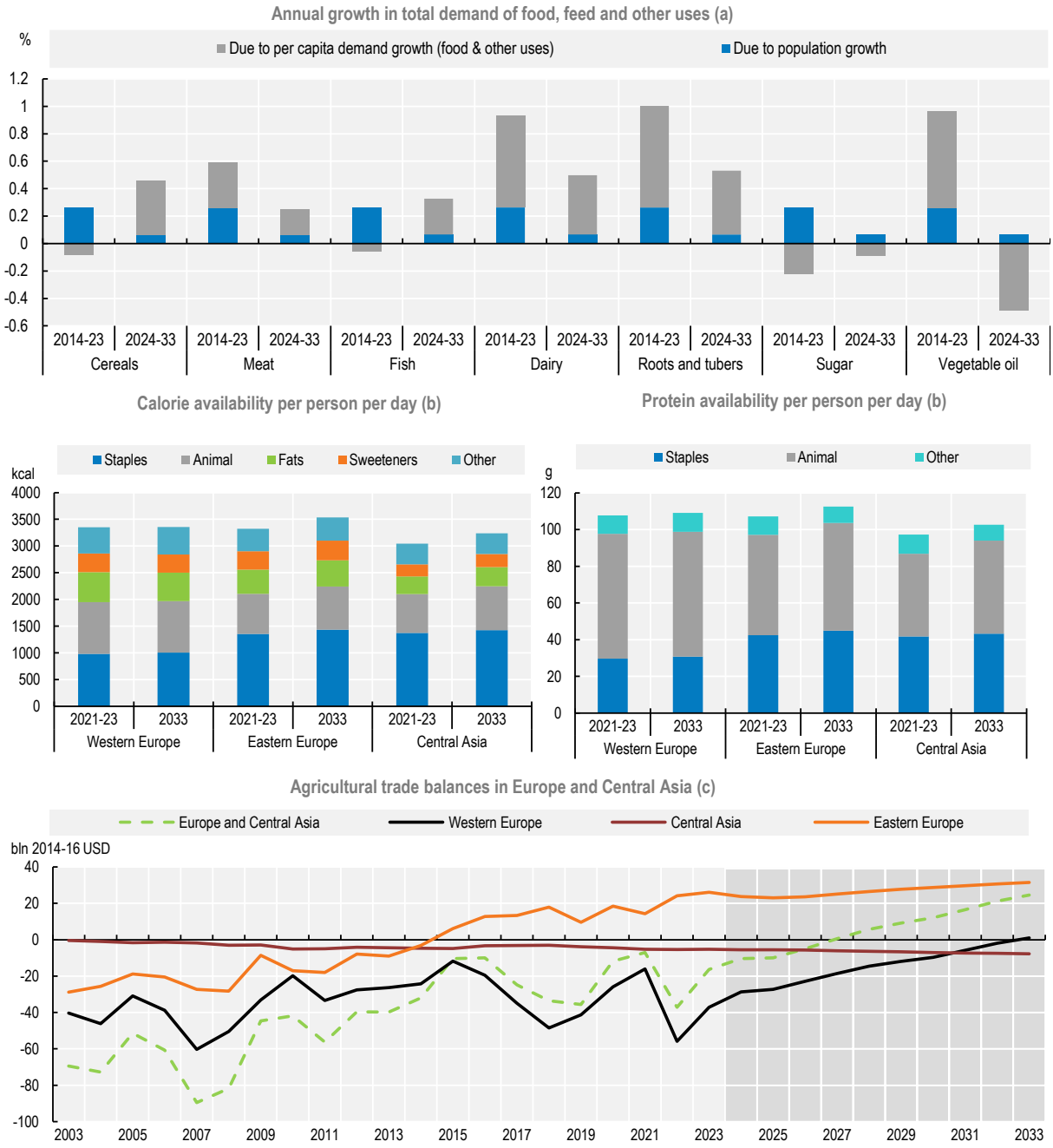
Figure 2.21. Land use change and livestock production in Europe and Central Asia



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

StatLink https://stat.link/aluzqv

Figure 2.22. Demand for key commodities, food availability and agricultural trade balance in Europe and Central Asia



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

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

StatLink https://stat.link/oj8dwv

Table 2.5. Regional indicators: Europe and Central Asia

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

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

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

2.6. Regional outlook: North America

2.6.1. Background

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

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

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

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

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

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

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

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

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

2.6.2. Production

Productivity based crop production driving growth

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

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

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

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

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

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

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

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

2.6.3. Consumption

Changing consumer preferences to dictate demand prospects

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

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

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

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

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

2.6.4. Trade

Trade surplus to diminish

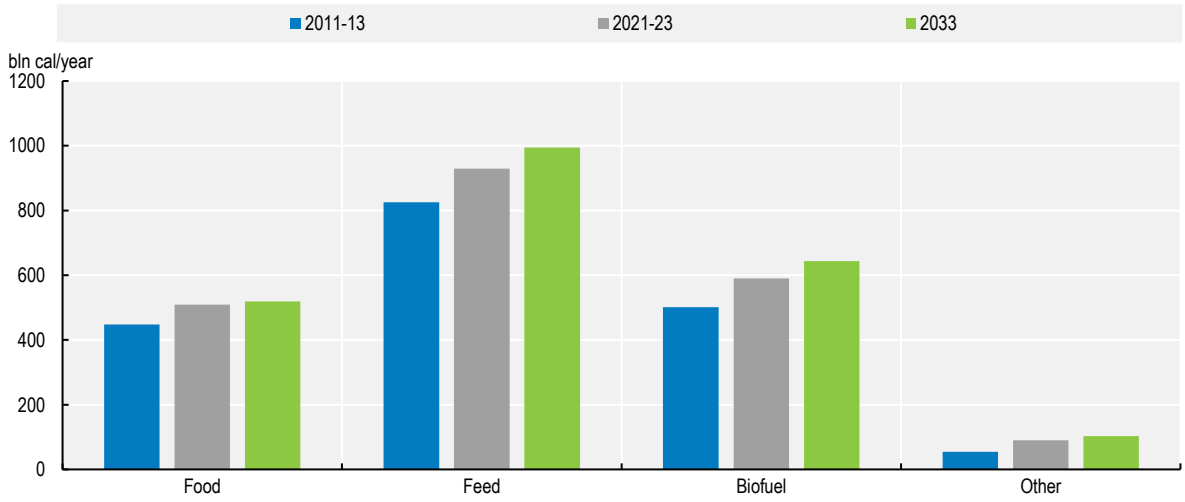
Over the past decade, North America's trade surplus in major agricultural and food commodities has halved and by 2033 is expected to diminish to almost zero. This transition emanates from growth of 19% in the value of imports compared to just 13% growth in the value of exports by 2033 relative to the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

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

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

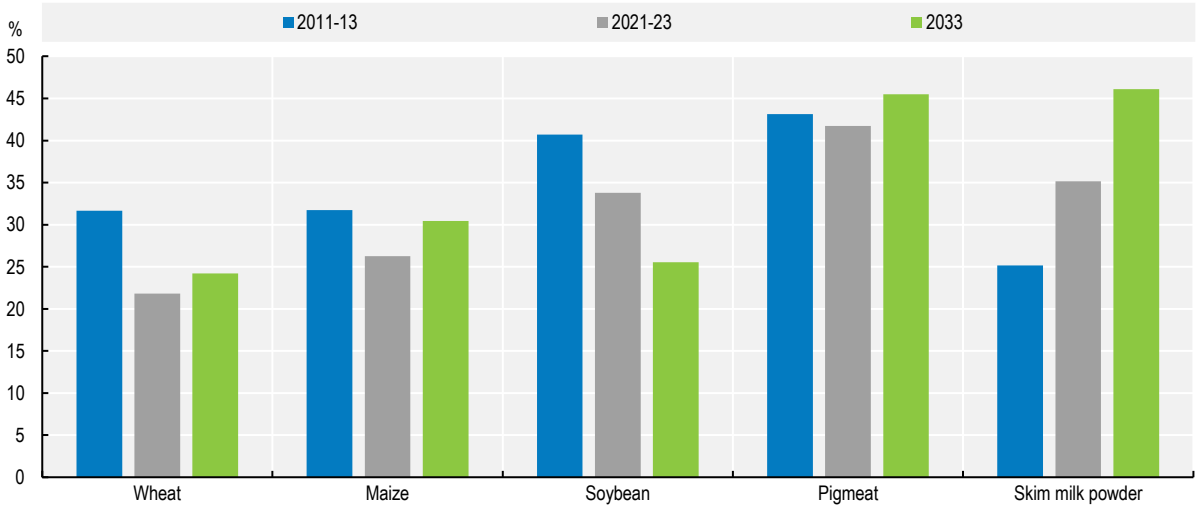
Despite its trade surplus and prolific role in global exports, the North American region is also a significant and growing importer of several products. These include fresh produce, fish and vegetable oil, where imports are expected to rise by 27%, 9% and 11% respectively. While meat import volumes are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

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



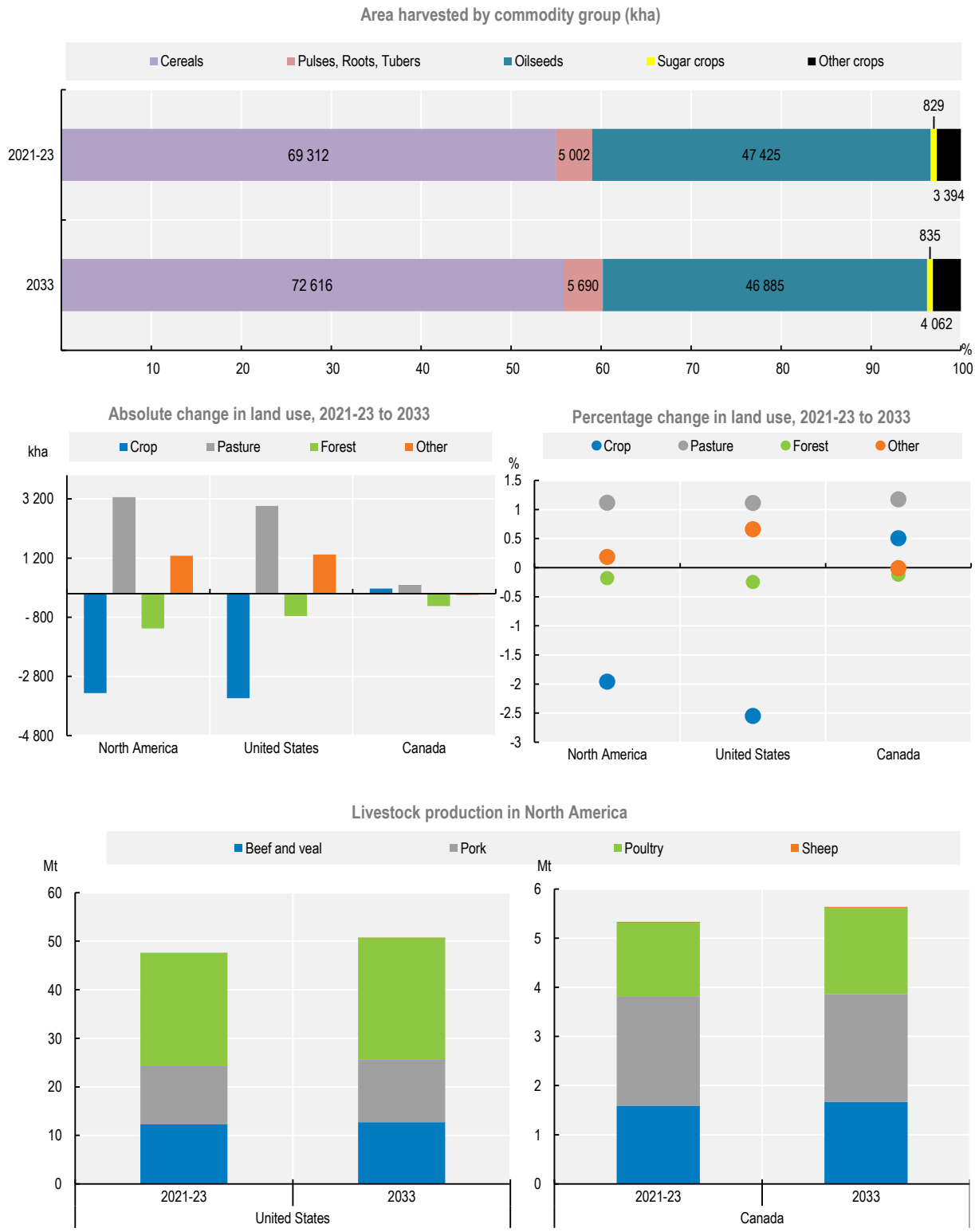
Note: Estimates are based on historical time series from the FAOSTAT Food Balance Sheets database which are extended with the *Outlook* database. Products not covered in the *Outlook* are extended by trends.
Source: FAO (2024). FAOSTAT Food Balances Database, http://www.fao.org/faostat/en/#data/FBS; OECD/FAO (2024) "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

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



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

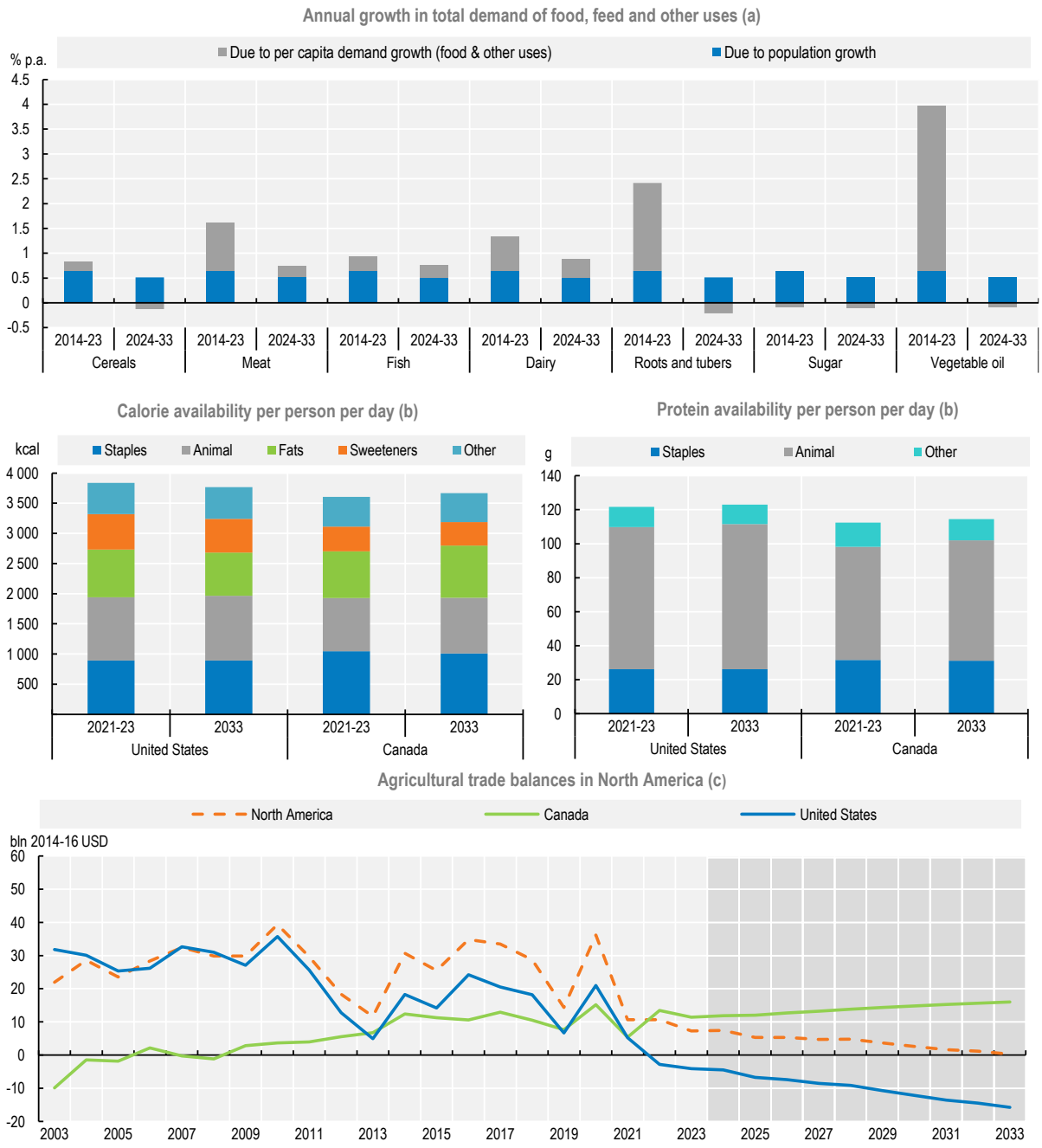
Figure 2.25. Land use change and livestock production in North America



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

StatLink https://stat.link/m17ra8

Figure 2.26. Demand for key commodities, food availability and agricultural trade balances in North America



Notes: Estimates are based on historical time series from the FAOSTAT Food Balance Sheets and trade indices databases and include products not covered by the *Outlook*. a) Population growth is calculated by assuming per capita demand constant at the level of the year preceding the decade. b) Fats: butter and oils; Animal: egg, fish, meat and dairy except for butter; Staples: cereals, oilseeds, pulses and roots and tubers. c) Include processed products, fisheries (not covered in the FAOSTAT trade index) based on outlook data.
Source: FAO (2024). FAOSTAT Value of Agricultural Production Database, http://www.fao.org/faostat/en/#data/QV; OECD/FAO (2024) "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/8jbgp9

Table 2.6. Regional indicators: North America

	Average			%	Growth[2]	
	2011-13	2021-23 (base)	2033	Base to 2033	2014-23	2024-33
Macro assumptions						
Population ('000)	351 327	376 892	398 917	5.84	0.65	0.51
Per capita GDP[1] (kUSD)	49.32	57.30	65.73	14.72	1.44	1.26
Production (USD bln 2014-16)						
Net value of agricultural and fisheries[3]	252.0	289.7	323.1	11.54	0.85	0.98
Net value of crop production[3]	121.0	140.8	162.2	15.20	-0.01	0.80
Net value of livestock production[3]	112.6	132.9	143.8	8.23	2.22	1.27
Net value of fish production[3]	18.4	16.0	17.1	6.89	-1.71	0.24
Quantity produced (kt)						
Cereals	444 544	496 382	559 410	12.70	0.01	0.62
Pulses	7 790	7 311	10 247	40.17	-2.63	2.99
Roots and tubers	5 272	6 051	6 308	4.25	1.44	0.27
Oilseeds[4]	110 446	144 850	153 361	5.88	0.40	0.70
Meat	45 812	52 949	56 424	6.56	1.80	0.82
Dairy[5]	12 350	14 547	16 405	12.77	1.59	1.16
Fish	6 543	5 650	5 955	5.39	-1.82	0.24
Sugar	7 202	7 871	8 595	9.21	0.65	0.70
Vegetable oil	14 257	18 754	21 097	12.49	2.22	0.84
Biofuel production (mln L)						
Biodiesel	4 615	11 947	20 846	74.49	10.21	2.38
Ethanol	54 476	61 636	64 941	5.36	0.35	0.33
Land use (kha)						
Total agricultural land use	461 686	463 475	463 370	-0.02	0.02	0.00
Total land use for crop production[6]	170 827	171 800	168 435	-1.96	-0.04	-0.18
Total pasture land use[7]	290 859	291 676	294 935	1.12	0.06	0.10
GHG emissions (Mt CO2-eq)						
Total	427	431	449	4.33	0.14	0.43
Crop	127	124	136	9.63	-0.21	0.33
Animal	285	289	294	1.98	0.25	0.48
Demand and food security						
Daily per capita caloric food consumption[8] (kcal)	3 698	3 815	3 753	-1.63	0.60	-0.18
Daily per capita protein food consumption[8] (g)	114.8	120.7	122.6	1.5	0.8	0.2
Per capita food consumption (kg/year)						
Staples[9]	125.5	124.8	124.8	0.01	0.19	-0.02
Meat	72.3	78.6	79.2	0.76	0.57	0.22
Dairy[5]	31.2	33.7	34.9	3.52	0.68	0.39
Fish	21.4	22.8	23.9	4.93	0.60	0.15
Sugar	30.3	30.2	29.7	-1.52	-0.11	-0.10
Vegetable oil	33.9	40.2	36.4	-9.49	0.72	-0.72
Trade (bln USD 2014-16)						
Net trade[3]	20	10	0	-97.39	..	..
Value of exports[3]	144	172	194	12.60	0.19	1.12
Value of imports[3]	124	163	194	19.05	2.21	1.51
Self-sufficiency ratio (calorie basis)[10]	128.6	127.6	130.1	1.99	-0.59	0.26

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

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

2.7. Regional outlook: Latin America and the Caribbean

2.7.1. Background

Export led growth facing an increasingly fragmented global environment

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

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

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

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

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

Given its favourable resource endowment, the Latin America and Caribbean region is a major contributor to global agriculture. Between 2021 and 2023, it accounted for 13% of the net value of agriculture and fish production globally and its share in total exports was even higher at 18%. This stems primarily from South America, with the Caribbean being a net importer. The importance of agricultural exports in the region is further underscored by its growing share in total production value, which has risen to almost 70%. Historic export growth has been aided by greater competitiveness, with total factor productivity increasing by 40% from 2000 to 2019.[9] Growth has been underpinned by greater input use, notably fertiliser which rose by 27% in the past decade alone. The sharp increase in fertiliser costs in 2022, combined with supply chain challenges arising from Russia's war against Ukraine induced a significant contraction in fertiliser application per hectare and heightened focus on efficient use. The benefits of investment in increased efficiency are reflected in a deceleration of growth in fertiliser application per hectare to 8% over the coming decade. With expected growth in the coming decade predominantly export-led, openness to trade, input use efficiency, successful climate change mitigation and adaptation strategies and an increased focus on environmental sustainability will be critical to maintain and grow competitiveness.

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

2.7.2. Production

Growth reflects a combination of expansion and productivity gains

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

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

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

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

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

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

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

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

2.7.3. Consumption

Dietary patterns are diverse but slowly evolving

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

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

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

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

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

2.7.4. Trade

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

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

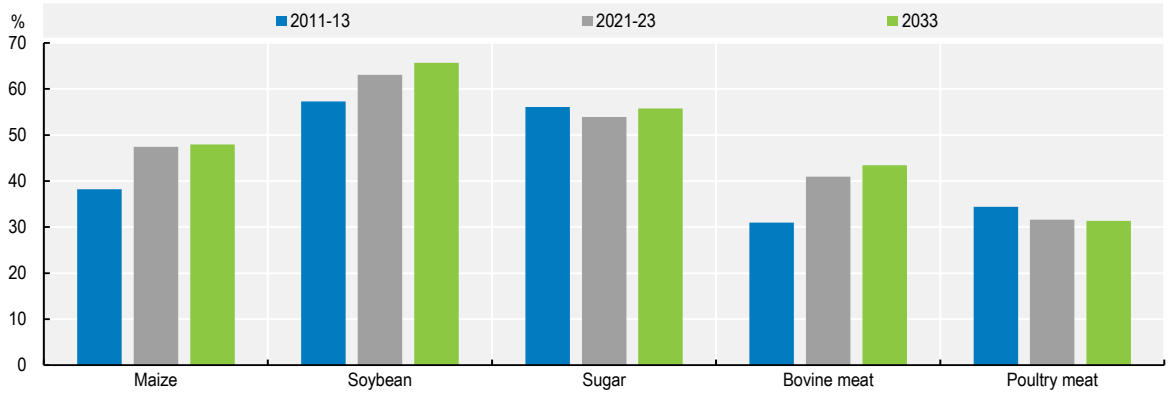
Exports have played a pivotal role in driving agricultural growth within the region, mitigating its vulnerability to inherent macroeconomic instability and enhancing its resilience to exogenous shocks. Its relative importance is underscored by consistent increases in the share of exports in total production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

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

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

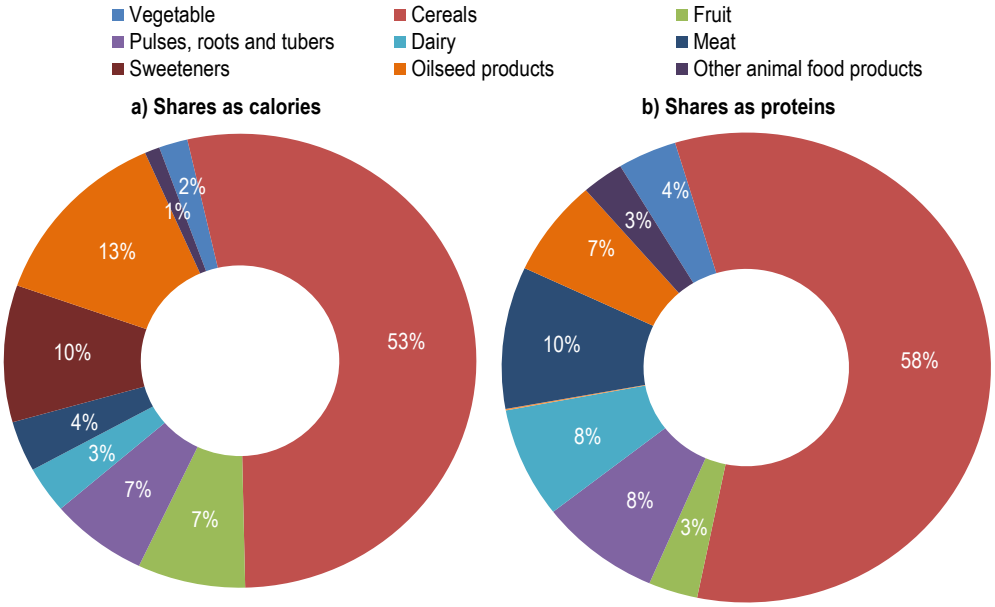
Amid the various crises, several exporting countries imposed trade policies that prioritise domestic supply. The absence of such constraints in Latin American and Caribbean provided opportunities to gain market share. However, the development of domestic supply chains has been prioritised in many parts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

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



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

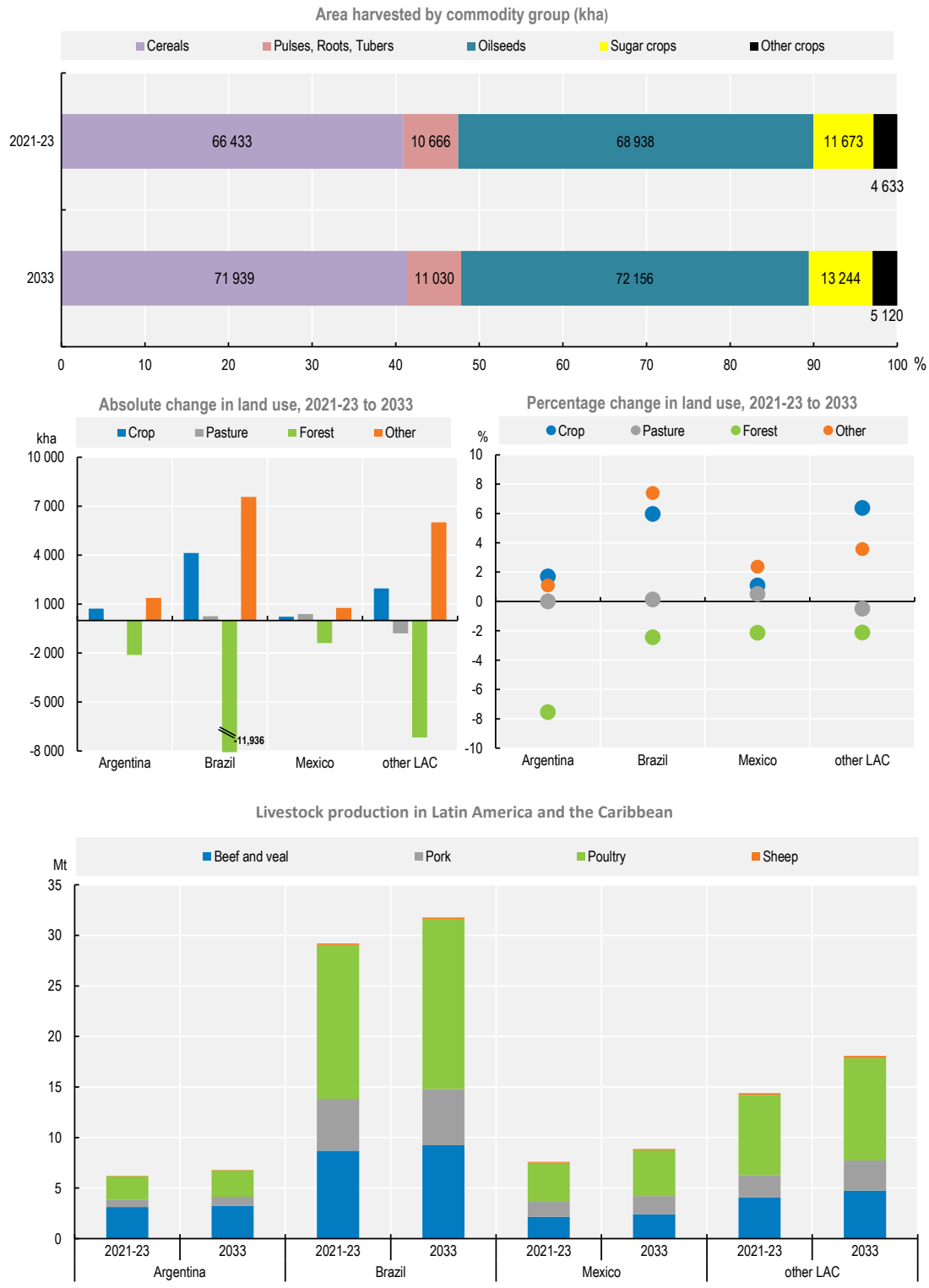
Figure 2.28. Distribution of food waste and losses in Latin America and the Caribbean in terms of calories and proteins, 2021-2023



Note: Other animal food products include egg and fish.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/34oe87

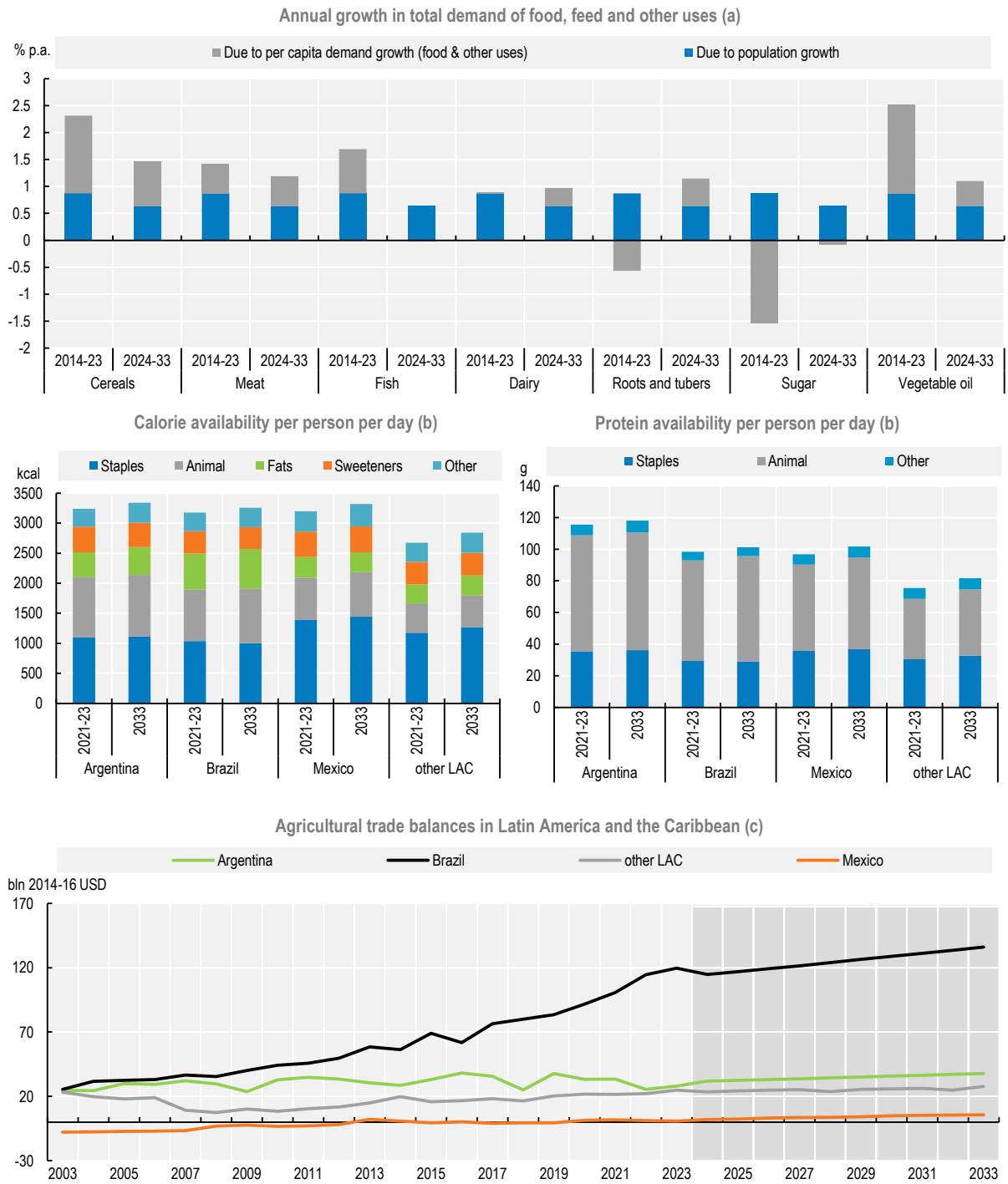
Figure 2.29. Change in area harvested and land use in Latin America and the Caribbean



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

StatLink https://stat.link/dm59is

Figure 2.30. Demand for key commodities and food availability in Latin America and the Caribbean



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

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

StatLink https://stat.link/8h5jqr

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

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

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

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

References

Chamberlin, J., T. Jayne and D. Headey (2014), "Scarcity amidst abundance? Reassessing the potential for cropland expansion in Africa", *Food Policy*, Vol. 48, pp. 51-65, https://doi.org/10.1016/j.foodpol.2014.05.002. [7]

FAO (2023), *The State of Food Security and Nutrition in the World 2023*, FAO; IFAD; UNICEF; WFP; WHO;, https://doi.org/10.4060/cc3017en. [5]

FAO, IFAD, PAHO, UNICEF and WFP (2023), *Latin America and the Caribbean - Regional Overview of Food Security and Nutrition 2023*, FAO; IFAD; UNICEF; WFP; PAHO;, https://doi.org/10.4060/cc8514en. [12]

Fuglie, K. (2018), "Is agricultural productivity slowing?", *Global Food Security*, Vol. 17, pp. 73-83, https://doi.org/10.1016/j.gfs.2018.05.001. [11]

Jayne, T. et al. (2016), "Africa's changing farm size distribution patterns: the rise of medium-scale farms", *Agricultural Economics*, Vol. 47/S1, pp. 197-214, https://doi.org/10.1111/agec.12308. [6]

Kelly, M. (2016), "The Nutrition Transition in Developing Asia: Dietary Change, Drivers and Health Impacts", in *Eating, Drinking: Surviving, SpringerBriefs in Global Understanding*, Springer International Publishing, Cham, https://doi.org/10.1007/978-3-319-42468-2_9. [3]

Law, C., I. Fraser and M. Piracha (2020), "Nutrition Transition and Changing Food Preferences in India", *Journal of Agricultural Economics*, Vol. 71/1, pp. 118-143, https://doi.org/10.1111/1477-9552.12322. [4]

OECD/FAO (2019), *OECD-FAO Agricultural Outlook 2019-2028*, OECD Publishing, Paris/Food and Agriculture Organization of the United Nations, Rome, https://doi.org/10.1787/agr_outlook-2019-en. [13]

Reardon, T. et al. (2014), *Urbanization, Diet Change, and Transformation of food supply chains in Asia*, Michigan State University, Global Center for Food Systems Innovation, https://www.fao.org/fileadmin/templates/ags/docs/MUFN/DOCUMENTS/MUS_Reardon_2014.pdf. [2]

Tarasuk, V. and A. Mitchell (2020), *Household food insecurity in Canada, 2017-18*, Toronto: Research to identify policy options to reduce food insecurity (PROOF), https://proof.utoronto.ca/wp-content/uploads/2020/03/Household-Food-Insecurity-in-Canada-2017-2018-Full-Reportpdf.pdf. [10]

UN DESA (2024), *World Population Ageing 2023*, United Nations, https://www.un-ilibrary.org/content/books/9789213586747. [1]

UN WWDR (2022), *UN World Water Development Report 2022: Groundwater: Making the invisible visible*, United Nations, https://unesdoc.unesco.org/ark:/48223/pf0000380721. [8]

Weersink, A. et al. (2021), "COVID-19 and the agri-food system in the United States and Canada", *Agricultural Systems*, Vol. 188, p. 103039, https://doi.org/10.1016/j.agsy.2020.103039. [9]

Notes

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

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

[3] See "Southeast Asia, Prospects and Challenges" in the OECD-FAO Agricultural *Outlook* 2017-2026.

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

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

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

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

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

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

3 Cereals

This chapter describes market developments and medium-term projections for world cereal markets for the period 2024-33. Projections cover consumption, production, trade and prices for wheat, rice, maize and other coarse grains. The chapter concludes with a discussion of key risks and uncertainties which could have implications for world cereal markets over the next decade.

3.1. Projection highlights

Demand growth decelerates as production is sustained by growing yields

Over the forthcoming decade, the growth of cereal demand is anticipated to slow compared to the previous ten years, primarily due to weaker expansions in feed demand, biofuels, and other industrial applications. Additionally, in many high and middle-income countries, the direct per capita food consumption of most cereals is nearing saturation levels, posing a constraint on overall demand growth. Much of the rise in food demand is attributed to population growth, particularly in low- and lower-middle-income countries. Population-induced growth in wheat and rice consumption is foreseen in Asia, whereas in Africa, an increase in the consumption of millet, sorghum, and white maize is expected. Furthermore, the increasing significance of rice in African diets is projected to result in ongoing rises in its per capita food utilization in the region.

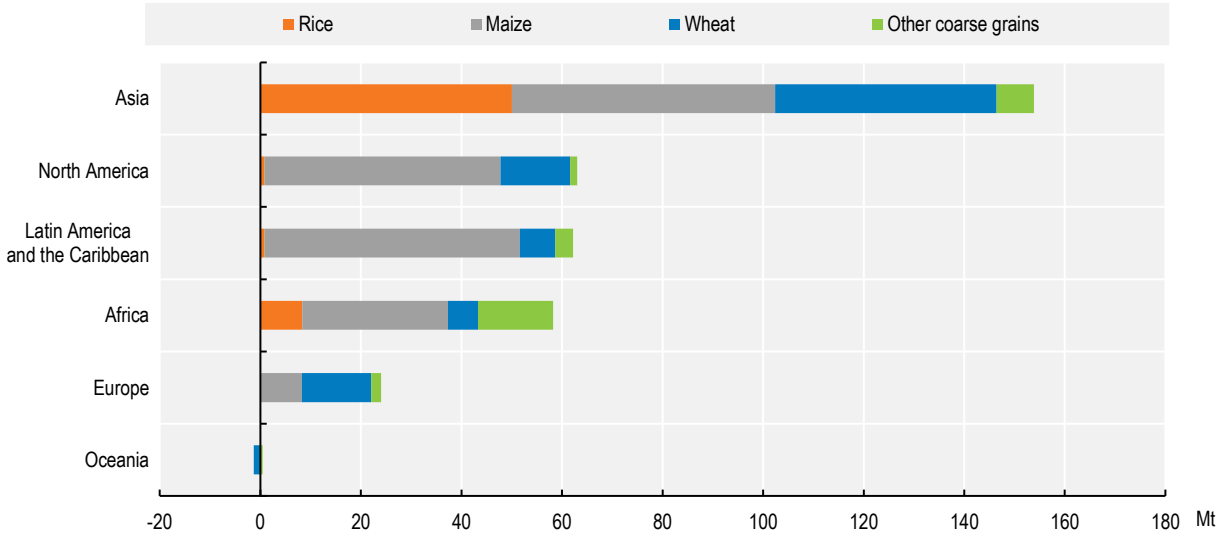
While cereals generally are less perishable compared to other food items, certain cereal-based food products such as bread or pastries can still be highly perishable. Consequently, and because cereals represent a significant portion of global consumption (about 45% of calories), their contribution to overall calorie loss and wastage exceeds 50%. If current trends persist, projections suggest that food loss and waste volumes within the cereal sector will increase by approximately 11% by 2033 relative to present levels, reflecting the anticipated increase in food utilization.

Over the next decade, the growth in global cereal production will stem from increasing productivity, in particular enhanced yields and the more intensive utilisation (multi-cropping) and to a lesser extent expansion of cultivated land. This anticipated increase is credited to broader accessibility and adoption of new and improved seed varieties, as well as the implementation of more rigorous and efficient input usage alongside improved agricultural techniques.

Global cereal production is projected to rise from its current level by approximately 350 Mt to 3.2 bln t by 2033, mainly due to increases in maize and wheat production. Asian countries are expected to contribute around 40% of this growth, similar to trends observed over the last decade with the People's Republic of China (hereafter "China") and India remaining as the leading producer of rice. Africa, with maize and other coarse grains as primary commodities, is anticipated to contribute larger shares to global cereal production growth compared to the previous decade. Latin America and the Caribbean will also play a significant role, particularly in maize production. However, Oceania is unlikely to sustain the record production levels seen in the base period, assuming average growing conditions (Figure 3.1).

In 2023, 17% of total global cereal production were traded internationally, with variations across different cereals, ranging from 10% for rice to 24% for wheat. This distribution as well as the share of production traded is expected to remain steady over the next decade. Asia is expected to retain its status as the world's largest rice-exporting region, while nations in Latin America and the Caribbean are anticipated to primarily import wheat and export maize. Moreover, many countries in Africa and Asia are projected to increasingly depend on cereal imports in the coming decade.

Figure 3.1. Regional contribution of growth in cereal production 2021-23 to 2033



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

World cereal trade is anticipated to grow by 16% by 2033, reaching a total of 551 Mt. Wheat is expected to contribute 35% to this growth, with maize accounting for 52% and rice for 7%. The Russian Federation (hereafter "Russia") is projected to maintain its position as the largest wheat exporter, providing 26% of global exports in 2033 as compared to 20% in the base period. The United States will surpass Brazil and become the primary maize exporter, while the European Union will continue as the main exporter of other coarse grains. Leading rice exporters will include India, Thailand, and Viet Nam, with Cambodia, Pakistan and Myanmar playing increasingly significant rice export roles. The expected export growth by the latter suppliers reflects a reaction to India's implementation of rice export restrictions in July/August 2023. These restrictions are assumed to remain in place throughout the projection period, but their effects are assumed to be partly mitigated by exceptions approved by the Indian Government since instituting them on food security grounds. Chinese feed demand is expected to continue influencing cereal markets, with projections assuming imports of maize increasing by 16% to reach nearly 27 Mt by 2033.

As anticipated in previous *Outlook* editions, wheat and coarse grain prices have decreased from their recent highs, whereas international rice prices hit a 15-year peak in 2023. Under the assumptions of average yields and geopolitical stability, the long-term trajectory of declining prices in real terms may recommence and persist until 2033.

As evidenced in the recent past, trade disruptions due to political instability and attempts to control domestic inflation and food availability can have a significant effect on future cereal markets. Some countries have expressed their intention to develop strategies to manage domestic prices, such as stock building, export restrictions, import barriers and increasing subsidies for producers and consumers, but the implementation of these measures is often unclear and financially difficult to sustain. Moreover, disruptions in transport and the importance of choke points as apparent from recent events become increasingly important. Conversely, production growth could face limitations due to the adverse effects of climate change on yields, limited access to new technologies in certain regions, and inadequate investments. Heightened environmental concerns and the implementation of new environmental policies could also temper yield growth.

3.2. Current market trends

Cereal prices below recent peaks

During the 2023/2024 season, food commodity markets were under general downward pressure and exhibited less volatility, despite facing external challenges such as shipping disruptions. This trend mostly reflected significant year-on-year declines in grain prices, while rice prices increased.

Wheat and maize prices continued their downward trend from their near-record and record levels reached in 2022 following the outbreak of Russia's war against Ukraine. By 2023, wheat and maize prices reached their lowest values since 2021. Ample supplies, especially in Russia (wheat) and Brazil (maize), and strong competition among exporters underpinned the downward trend in world wheat and maize prices. Reduced uncertainty as a result of continued shipments from Ukraine by alternative routes, along with lower energy and input prices also contributed to the overall softer market sentiment.

In contrast, 2023 proved more tumultuous for the global rice market. International rice prices soared to a 15-year peak, spurred initially by apprehensions regarding the adverse production effects of *El Niño* and by a step-up of export restrictions by India in July and August 2023. Since then, further prices increases have been averted by signs that the actual impact of *El Niño* on global rice production would be less severe than expected, combined with sizeable exceptions to export restrictions approved by India and a step-up of shipments by other exporters. Nevertheless, reflective of the lingering uncertainties surrounding trade policies and weather conditions, in March 2024, international rice prices remained high and about 14% above their year-earlier levels.

3.3. Market projections

3.3.1. Consumption

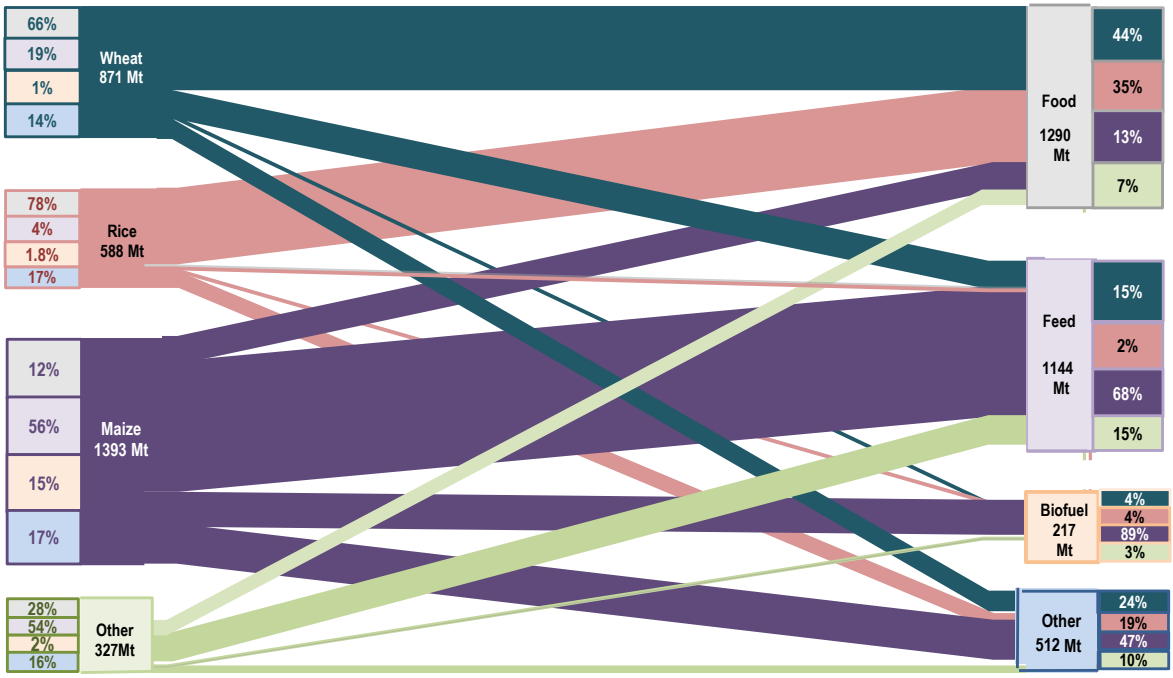
Asian countries will lead demand growth of cereals for food and feed

Cereal demand will continue to be dominated by food use closely followed by feed use. In 2033, 41% of all cereals will be directly consumed by humans, while 36% will be used for animal feeds. Biofuels and other uses are projected to account for the remaining 23%. However, these shares differ across the different cereal types. While wheat and rice are mainly used for food, feed use dominates maize and other coarse grains (Figure 3.2).

Between 48% and 66% of global cereal consumption occurs in the top five consuming countries for each commodity, which is rather less concentrated than production (Figure 3.3). Global use of cereals is projected to increase slightly from 2.8 bln t in the base period to 3.2 bln t by 2033, driven mainly by higher food use (+162 Mt), followed by feed use (+127 Mt). Asian countries will account for slightly more than half of the projected demand increase.

Increased global consumption of cereals for feed is expected to be dominated by maize followed by other coarse grains, wheat and rice over the next decade. Consumption of cereals for food is expected to increase at a higher rate than in the previous decade as per capita consumption is projected to increase in several lower- and middle-income countries.

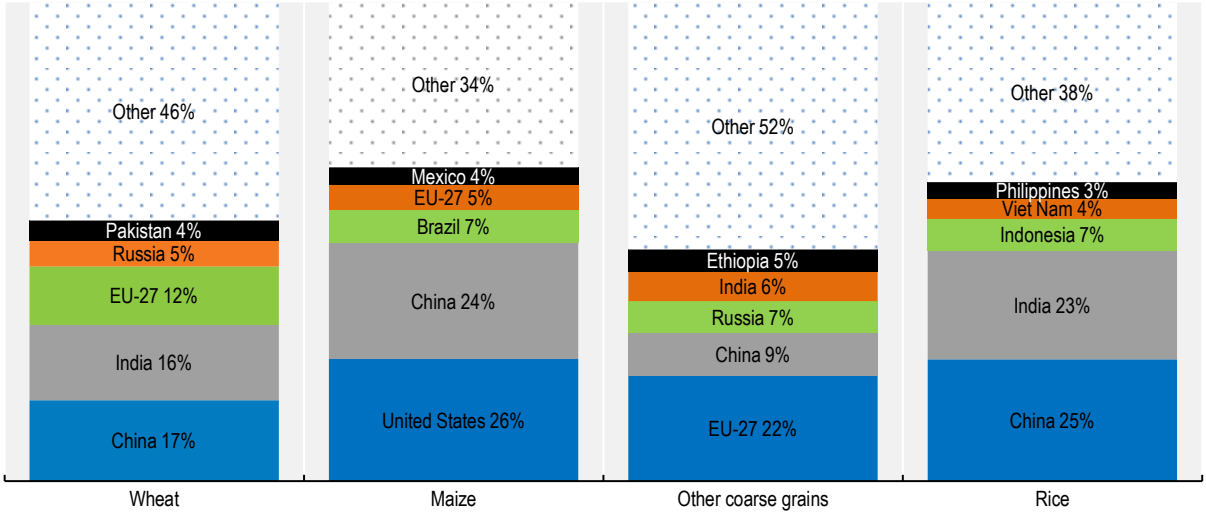
Figure 3.2. Global use of cereals in 2033



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

StatLink https://stat.link/irw5g3

Figure 3.3. Global cereal demand concentration in 2033



Note: Presented numbers refer to shares in world totals of the respective variable
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/0ompve

Wheat consumption is expected to be 11% higher in 2033 than in the base period. Four countries, India, Pakistan, the Arab Republic of Egypt (hereafter "Egypt"), and China account for more than half of this increase. Global use of wheat for food is projected to increase by 64 Mt but to remain stable at about 66% of total consumption; growth will be similar to the previous decade, in spite of the slowing rate of increase in world population.

Globally, the projected increase in consumption of wheat for food is more than three times larger than that for feed, especially in Asia, primarily in Western Asia and Central Asia where wheat is the mainstay in diets for a large share of the population. Moreover, there is increasing demand for processed products that call for higher quality, protein rich wheat, produced in the United States, Canada, Australia and, to a lesser extent, in the European Union and Russia. Countries in North Africa and Western Asia, notably Egypt and the Republic of Türkiye (hereafter "Türkiye"), and the Islamic Republic of Iran, will remain major consumers of wheat with high levels of per capita consumption. Global production of wheat-based ethanol is expected to recover mainly in India offsetting the reduction in other countries.

Rice is primarily consumed as food and is a major food staple in Asia, Latin America and the Caribbean, and increasingly in Africa. Total world rice consumption is expected to increase by 0.9% p.a., at a same pace as during the last decade, with Asian countries accounting for 66% of the projected increase, largely due to population rather than per capita consumption growth (Table 3.1). Across the various regions, Oceania and Africa are projected to see increases in per capita food intake of rice. At the global level, the average per capita food use of rice is projected to increase by 1.7 kg to around 52 kg per year.

Table 3.1. Rice per capita food consumption

kg/person/year

	2021-23	2033	Growth rate (% p.a.)
Africa	25.1	28.5	0.79
North America	12.2	13.5	0.48
Europe	7.1	7.2	0.27
Oceania	19.0	21.5	1.11
Latin America and Caribbean	24.9	24.9	0.17
Asia	72.2	75.0	0.14

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

Global *maize* consumption is projected to increase by 1.2% p.a., a much slower pace compared to 2.1% p.a. in the previous decade. This increase is principally driven by higher incomes that translate into higher feed demand, which accounts for the largest share of total utilisation, maintaining 56% from the base period to 2033. Asian countries will account for 56% of the increase in feed consumption (nearly half of this in China) due to their rapidly expanding livestock sectors. Feed demand globally is expected to rise by 99 Mt to 777 Mt, mainly in China, the United States, Brazil, Argentina, Mexico, India, Viet Nam, Indonesia, and Egypt. Consumption in Southeast Asia will increase due to its fast-growing poultry industry.

The use of maize as food is expected to increase primarily in Sub-Saharan Africa where population growth is strong. White maize will remain an important staple, accounting for about a quarter of total caloric intake. Growth in maize consumption as food in African countries is expected at about 2.5% p.a. on average.

Globally, maize use for biofuel production is expected to increase at a much slower rate than in the past two decades as national ethanol markets of key producers are constrained by biofuel policies. Brazil and the United States together account for more than 80% of the increase.

World utilisation of other coarse grains is projected to increase by nearly 29 Mt, or 0.8% p.a., over the next ten years, compared to 0.1% p.a. in the previous decade. This will be driven by greater use in African and Asian countries, while consumption is expected to remain stable in high-income countries. The food share of total consumption is projected to increase from about 26% in the base period to 28% by 2033. Sub-Saharan African countries, especially Ethiopia, rely heavily on millet as a food source owing to its resistance to droughts and the diverse climate conditions in the region.

Cereals account for more than 50% of calories lost and wasted globally. Most post-harvest losses of cereals occur during transport and processing, and are, currently estimated to be around 5% of global production. Additional waste occurs during distribution at the retail stage, reducing global food availability by another 5%, while household waste accounts for approximately 14%. If these proportions remain unchanged over the next decade, it is projected that food loss and waste volumes in the cereal sector will increase with global consumption by 11% by 2033 compared to current levels. This calls for further efforts to address food loss and waste in the cereal sector that may involve a combination of technological innovations, infrastructure development, policy interventions, consumer education, and behavioural changes throughout the supply chain. Initiatives such as improved storage facilities, better transportation networks, standardised labelling and donation programs have been implemented in some regions to mitigate these issues. Additionally, raising awareness about the environmental and social impacts of food waste is crucial in fostering a more sustainable food system.

3.3.2. Production

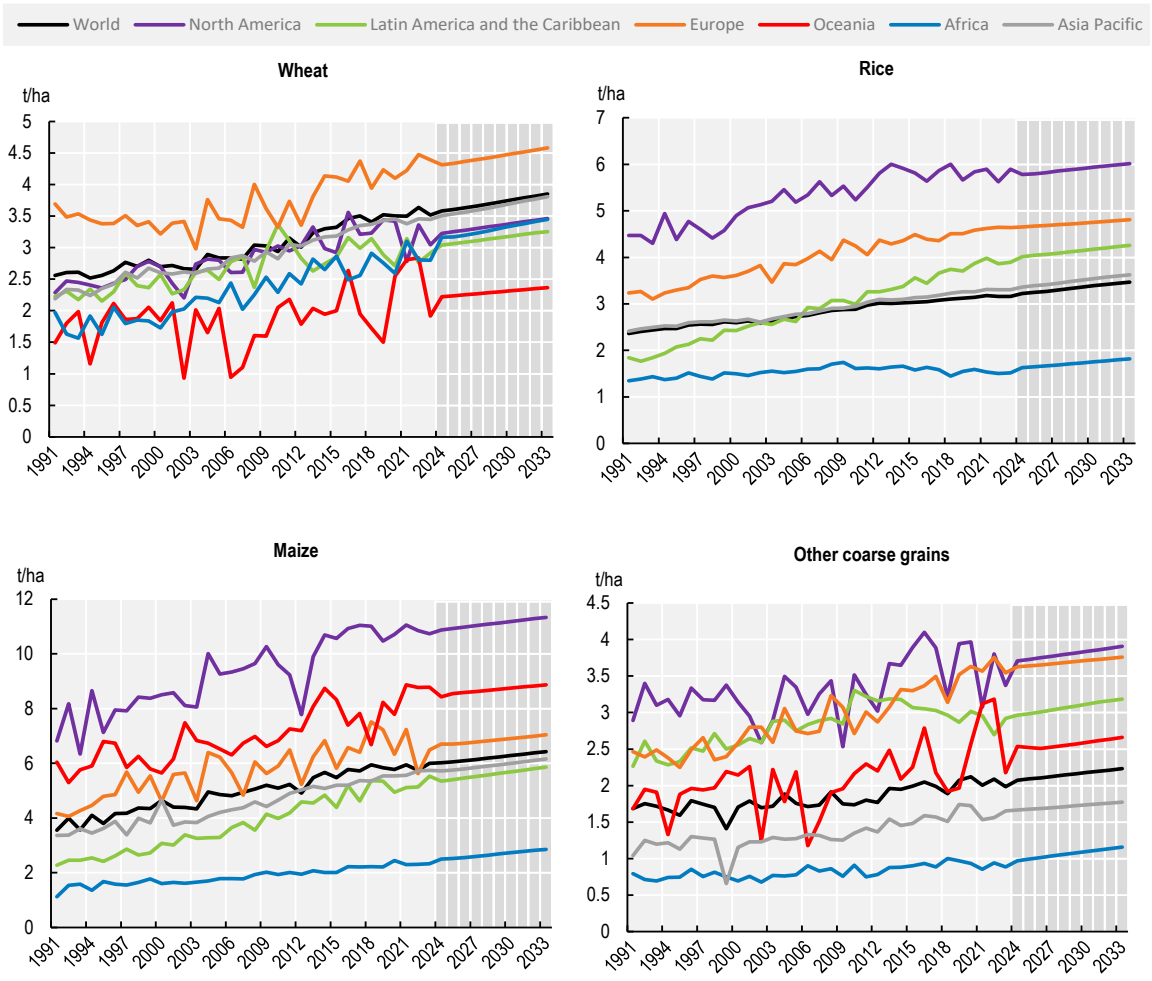
Improved technology and cultivation practices sustain yield and production growth

The global harvested area of cereals is expected to grow by 19.2 Mha (3%) by 2033. It will expand mainly in Latin American and the Caribbean by about 5.5 Mha, notably in Argentina and Brazil and more than half of this increase reflects increases in double-cropping production practices. Globally, wheat, maize and rice areas are projected to increase respectively by 2%, 6% and 2%, while the other coarse grains areas are expected to remain unchanged. Decreasing harvested areas of rice in China, Japan and Brazil will be offset by gains in some Asian and African countries. Compared to the previous decade, future land availability will be limited as many governments place constraints on converting forest or pasture into arable land, and land is taken by ongoing urbanisation. Increased global production is therefore expected to be largely driven by intensification. This growth in yields from improving technology and cultivation practices, in middle-income countries in particular, is expected to sustain future cereals production. Globally, yields are projected to grow by around 8% for wheat, 9% for maize, and 10% for rice and other coarse grains.

Nevertheless, regional disparities in cereal yields are expected to persist, with no convergence anticipated between higher and lower yield regions (Figure 3.4). Several factors contribute to these variations: natural conditions vary significantly, leading to heterogeneous regional yield potentials, diverse crop varieties exhibit differing yield performances, and optimal yields may not necessarily align with maximal yields, particularly when other factors like available land are not constraining. Despite these differences, countries in Africa, Latin America and Asia holds substantial untapped potential for further yield increases.

Global *wheat* production is expected to increase by 83 Mt to 872 Mt by 2033, of which 44 Mt will be in Asia (Figure 3.1), a higher growth rate than in the last decade. India, the world's third largest wheat producer, is expected to provide the largest share of the additional wheat, accounting for more than 30% of the global production increase, driven by yield improvements and area expansion in response to national policies to improve self-sufficiency. There will also be significant production increases in Russia, Canada, Argentina, the United States, Türkiye, and Pakistan. The European Union is projected to become the largest producer of wheat by 2033 (Figure 3.5), overtaking China, where wheat production is adjusting to lower demand from negative population growth.

Figure 3.4. Regional cereal yields



Note: Oceania has been dropped from the rice chart as the crop is not so relevant for that region.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/7vt620

Global rice production is expected to grow by 60 Mt to reach 587 Mt by 2033. Yield improvements are expected to drive this growth. Production expansions in Asian countries, which account for the bulk of global rice output, are expected to be robust. The highest growth is expected in India, which will become the world's largest rice producer by 2033 (Figure 3.5), followed by the LDC Asian region, Viet Nam, the Philippines and Thailand. India will remain a major producer of indica and basmati rice.

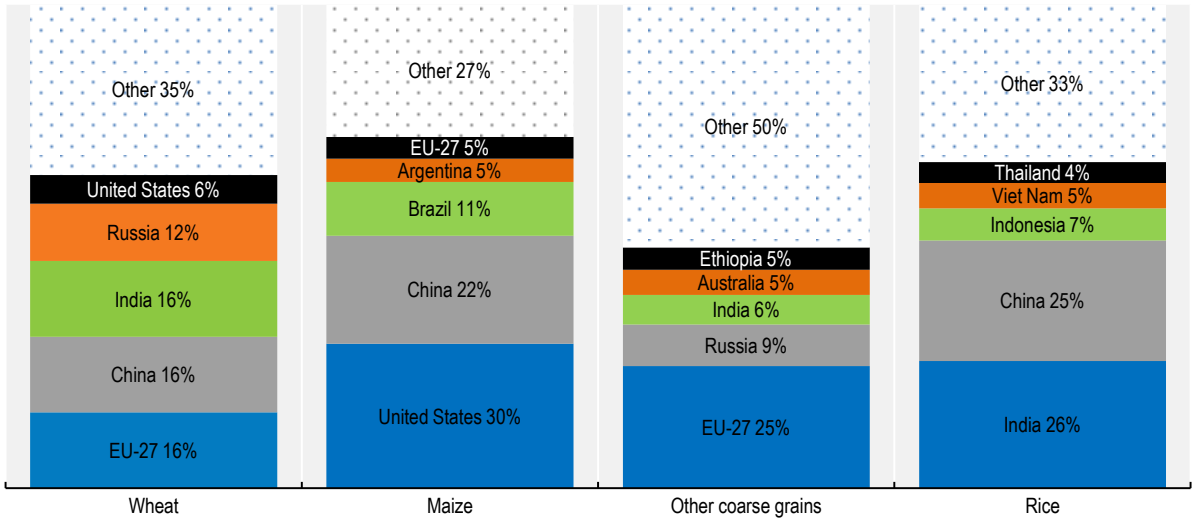
As with most other major rice producers, projected output gains are expected to rely on yield improvements, amid expectations in China that efforts to move least productive land out of cultivation will continue. Production in high-income countries, such as Korea and Japan is expected to continue a downward trend. Output in the European Union will remain close to base period levels, in the United States and Australia it will expand by about 0.5% and 2.2% p.a. respectively.

Global *maize* production is expected to grow by 187 Mt to 1.40 bln t by 2033, with the largest increases in the United States and China, followed by Brazil, Argentina and India. Increased production in Brazil will be largely driven by higher second-cropped maize following the soybean harvest. Production growth in the

United States is expected to be below the global average of 1.2% p.a., at 0.6% p.a. over the next ten years. In Sub-Saharan Africa, total maize output is projected to increase by 28 Mt, of which white maize will account for the largest share.

Global production of other coarse grains – sorghum, barley, millets, rye, and oats – is projected to reach 329 Mt by 2033, up 30 Mt from the base period. African countries will contribute more than 50% of this increase. Ethiopia, India, Russia, Brazil, and Türkiye will be contributing most to global production growth. Output in the European Union will continue its decreasing trend due to decreasing biofuel feedstock demand.

Figure 3.5. Global cereal production concentration in 2033



Note: Presented numbers refer to shares in world totals of the respective variable.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/ymv6b8

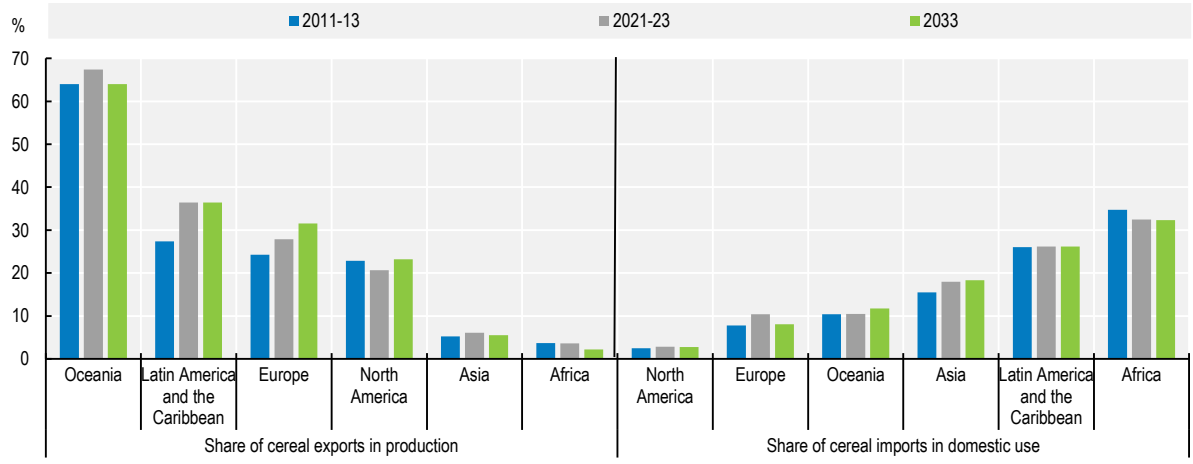
3.3.3. Trade

Trade in cereals will remain buoyant but with changing country shares

Trade in cereals currently accounts for about 17% of global consumption and is projected to slowly increase until 2033. Traditionally, the Americas and Europe supply cereals to Asia and Africa, where growing demand for food and feed from increasing populations and expanding livestock sectors is rising faster than domestic production. This buoyant trend is expected to continue over the next decade with exports of cereals increasing by 16% from the base period to 2033. Figure 3.6 illustrates the importance of cereal trade relative to production and consumption. Oceania and Latin America and the Caribbean are expected to have among the highest shares of cereal exports in national production, 64% and 37% respectively by 2033. Amongst all regions, it is Africa where imports of cereals contribute most to domestic consumption and by 2033 almost 32% of domestic cereal use in Africa will originate from non-African countries.

Wheat exports are expected to grow by 26 Mt to 220 Mt by 2033, with Russia expected to maintain its position as the main exporter, accounting for 26% of global exports by 2033 (Figure 3.7).

Figure 3.6. Trade as a percentage of production and consumption



Note: These estimates include intra-regional trade except for the European Union.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/g8eao7

The European Union is the second largest wheat exporter and will continue to account for 16% of global trade in 2033, with exports projected to surpass the record volumes of 2019. Canada is expected to regain export market share after a very bad harvest in 2021 and reach 13% of global wheat exports by 2033. The United States, Canada, Australia and the European Union are expected to retain the higher quality protein wheat markets, particularly in Asia. While Russia plays a role in these markets, it is expected to remain more competitive in soft wheat markets, such as North Africa, Sub-Saharan Africa, Western Asia and Central Asia. The North African and Near East regions are set to slightly increase their share of wheat imports in total trade from 25.7% currently to 26.4% over the next decade.

During the past decade, rice trade grew at 2.2% p.a. This is expected to increase to about 2.3% p.a., with overall export volumes rising by 12 Mt to reach 66 Mt by 2033. In the case of India, the world's largest rice exporter, projections assume that no change in its rice export policies will take place over the projection period, in particular that the bans on Indian exports of broken rice and on non-basmati white rice will remain in place. These are expected to keep overall Indian rice exports below the 22 Mt peak registered in 2022. At the same time, since instituting these export restrictions, the Indian Government has allowed exceptions to its rice exports bans on food security grounds. The projections assume that these exceptions will continue in the projection period, thereby sustaining a still sizeable volume of overall Indian rice exports through 2033. Amid prospects of sustained demand for these qualities, India's more limited participation in international broken and non-basmati white rice trade are expected to bolster shipments by other competitive rice exporters of these qualities, including Pakistan and Myanmar. In the case of Viet Nam, ongoing changes in the varietal make up of production and increased focus on cultivating higher quality and non-indica strains could also help Viet Nam expand its market share in regions other than Asia. Meanwhile, Thailand is projected to remain the second largest rice exporter but is to continue facing strong competition for markets.

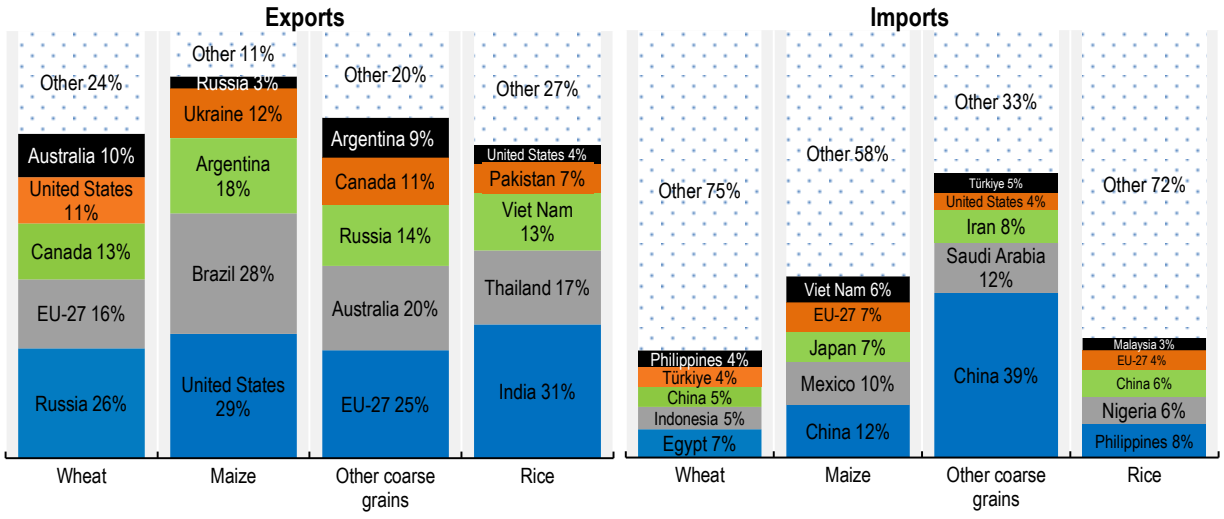
Less developed countries in Asia, particularly Cambodia and Myanmar, are projected to register strong export expansion, with their rice shipments collectively increasing by 146% from 4.3 Mt in the base period to 10.5 Mt by 2033, amid expectations that large exportable supplies will allow these countries to capture a greater share of Asian and African markets. Historically, Indica rice has accounted for the bulk of rice

traded internationally. However, demand for other varieties is expected to continue to grow over the next decade.

Imports by China, the largest importer of rice during the base period, are expected to decrease from 5 Mt in the base period to about 4 Mt in 2033, well below the peak in 2015. Imports are projected to increase significantly in African countries, where growth in demand continues to outpace production growth. Especially in Nigeria the third largest importer of rice, imports increase by 2.3 Mt to 4.0 Mt by 2033. Africa's share of world imports is projected to increase from 32% to 41%.

Maize exports are expected to grow by 35 Mt to 218 Mt by 2033. The export share of the top five exporters – the United States, Brazil, Argentina, Ukraine, and Russia will account for 89% of total trade by the end of the projection period. The United States is expected to regain the top maize exporter position, but the export share will stay below the average of the past decade. Brazil, which was the leading maize exporter in 2021 and 2022, benefitting from lower US exports, will be the second largest exporter. But exports of both countries are projected to be very close in 2033 at 63 and 61 Mt respectively. The LDC Sub-Saharan African region is expected to remain virtually self-sufficient in maize, with white maize continuing to play a key role for food security as a mainstay of local diets. South Africa will remain a regional supplier, but expansion will be limited as they produce genetically modified organisms (GMO) varieties that face import restrictions in neighbouring countries.

Figure 3.7. Global cereal trade concentration in 2033



Note: Presented numbers refer to shares in world totals of the respective variable
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/cp9ntu

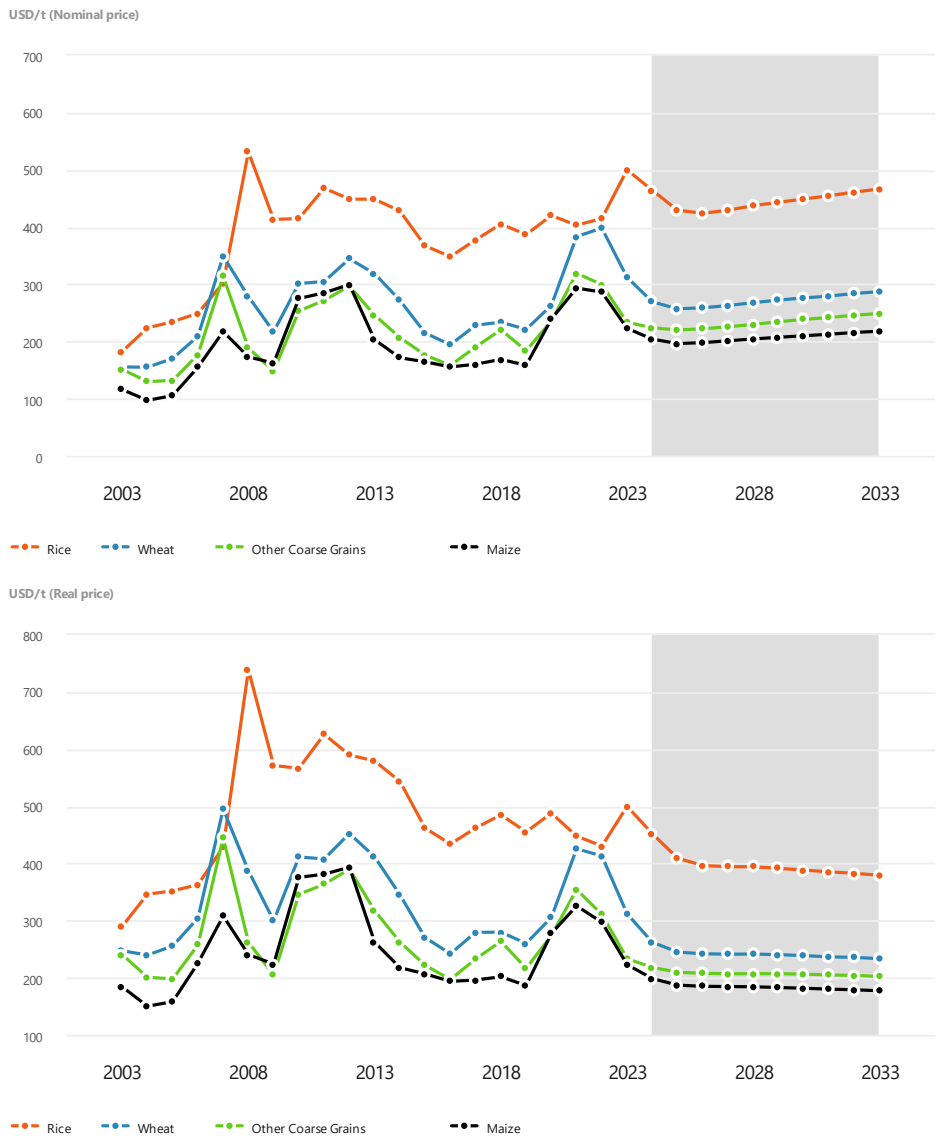
The international trade volume of *other coarse grains*, dominated by barley and sorghum, is much smaller than for maize or wheat. Global exports are expected to increase by 3.7Mt to reach 49 Mt in 2033. The top five exporters – the European Union, Australia, Russia, Canada and Argentina are projected to account for 80% of global trade by 2033, four percentage points above the share in the base period and mainly driven by export increases in Russia and the European Union. The five major importers – China, Saudi Arabia, the Islamic Republic of Iran, Türkiye, and the United States – absorb almost 67% of global trade, with China expected to account for 39% by 2033.

3.3.4. Prices

Prices for cereals in real terms are expected to decline over the next decade

Nominal wheat prices are expected to decrease further from their 2023 level before returning to their medium-term trend. The price is then projected to increase to USD 287/t by 2033. Similarly, maize and other coarse grain prices are also expected to return to their medium-term path. The global maize price is expected to reach USD 218/t and the price for other coarse grains (measured by the feed barley price fob Rouen) is projected to reach USD 249/t (Figure 3.8).

Figure 3.8. 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: 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 (2023=1). Prices refer to marketing years.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

The reference export price for milled rice (FAO All Rice Price Index normalised to India 5%) is also expected to decrease as exceptions to export restrictions allowed by India alongside a step-up of shipments from other competitively priced exporters of rice stabilize exportable supplies relative to 2023. Over the medium term, demand from countries in the Far East, Africa, and the Middle East is expected to grow, but rice supplies from exporters are expected to lead to concomitantly rise, thereby generating only a small increase in nominal prices to USD 467/t by 2033

Over the medium term, prices for wheat, maize, other coarse grains and rice are expected to decline to 2033 when adjusted for inflation (real terms).

3.4. Risks and uncertainties

A much more volatile market and policy environment in the next decade?

More than most other commodities, grain markets have been markedly affected by the effects of Russia's war against Ukraine given their major roles in international markets, especially for wheat and maize, as well as fertilisers and fossil fuels. While the tension on cereal markets has decreased and the reduced export expectations for cereals for Ukraine seem to be priced into current markets, this could change in the future.

Transport disruptions as experienced in recent events in the Panama and Suez Canals highlight the increasing importance of choke point. Such events together with increasing transport costs could form additional barriers to trade in the future.

Several other factors could impact on the cereals market that are not reflected in the current projections. While normal assumptions for weather lead to positive production prospects for the main grain-producing regions, extreme weather events accentuated by climate change may cause higher volatility in cereal yields, thereby affecting global supplies and prices. There are heightened risks in some regions of water scarcity constraining production. Increased regulations related to climate change or sanitary measures could increase costs.

The policy environment will be crucial. The reinforcement of food security and the focus on increased sustainability in anticipated reforms (e.g., the Farm to Fork Strategy in the European Union) as well as policies favouring biofuels will heighten competition in the demand for cereals. China's domestic policies, which are an increasing influence on import demand as well as domestic production, are also crucial for future developments in cereal markets. Trade restrictions could provoke market reactions and changes in trade flows similar to those provoked by grains and rice export measures in the past and could have significant effects on availability and affordability of food staples, especially in low and medium income countries. Export regulations in Argentina are a major uncertainty for the coming years. While the *Outlook* assumes export taxes of wheat and maize at their current levels of 12%, discussions of an increase to 15% and their eventual elimination are ongoing. These changes will clearly impact Argentina's export prospects.

For several years, China's grain imports have consistently exceeded official tariff rate quotas. The *Outlook* predicts that the country's feed net deficit will continue to grow in the medium term, leading to China maintaining significant shares of the grain trade. The projections in the *Outlook* are highly sensitive to this assumption.

The increasing reliance on grain imports for several countries, especially in the Near East and North Africa (NENA) region, as projected in this *Outlook* will increase their vulnerability to persistent trade disruptions that cannot be buffered by domestic stocks. A functioning and reliable trading system is therefore key for food security in these regions.

Crop pests and animal diseases pose ongoing threats that can disrupt markets, particularly in regions with limited resources to manage their impacts, and in regions where plant protection is increasingly restricted. Recent outbreaks of locusts and fall armyworms have severely affected food security in various Asian and African nations. Similarly, the African Swine Fever outbreak in Southeast Asia has led to decreased feed demand, illustrating the significant economic ramifications of such diseases.

4 Oilseeds and oilseed products

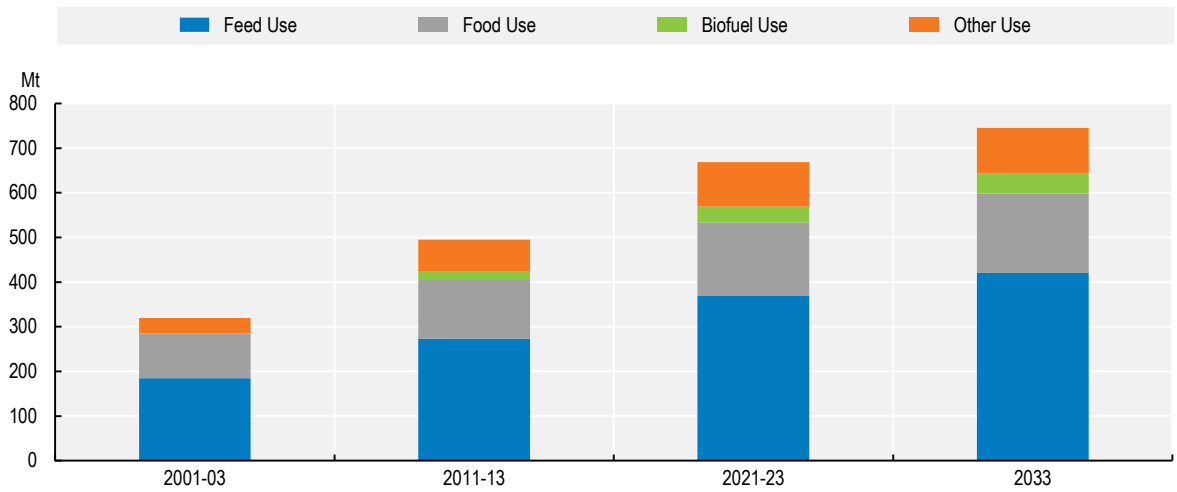
This chapter describes market developments and medium-term projections for world oilseed markets for the period 2024-33. Projections cover consumption, production, trade and prices for soybean, other oilseeds, protein meal, and vegetable oil. The chapter concludes with a discussion of key risks and uncertainties which could have implications for world oilseed markets over the next decade.

4.1. Projection highlights

Share of oilseeds and oilseeds products directly consumed as food to remain at 24%

About a quarter by weight of the production of oilseeds and other oil crops (e.g. palm oil) is used for direct human consumption as food. Most is used for animal feed which includes protein meal and a small amount of direct feeding of oilseeds (Figure 4.1). Industrial uses for biodiesel and varnish account for more than a tenth of total oilseed and other oil crops usage. Losses and waste occur at all stages from field to final consumption. In the case of palm oil, harvesting and extraction are critical to obtain food quality oils and timing and logistics determine the level of loss. At the other end of the food chain, waste for vegetable oil includes a particular factor as it is often used in the preparation of meals (e.g. for frying) and considerable parts of the calories contained are not consumed as food.

Figure 4.1. Oilseed and oilseed product use



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

Food use of vegetable oils is projected to account for 55% of total consumption in 2033, driven by population growth and increased per capita use of vegetable oil in lower – and middle-income countries. The vegetable oil aggregate in this *Outlook* includes oil obtained from the crushing of oilseeds (about 55% of world vegetable oil production) and palm oil (36%), as well as palm kernel, coconut, and cottonseed oils. The food use of vegetable oil also includes its use for frying where a considerable share becomes waste oil and is then used as feedstock for biodiesel. The direct use of vegetable oil for biodiesel, currently about 16% of global vegetable oil use, is projected to grow globally, especially in Indonesia, Brazil and in the United States, in the form of hydrotreated vegetable oil.

Protein meal utilisation is almost exclusively as livestock feed and will be constrained by slower growth in global livestock production, especially in high-income countries. Soybean meal accounts for about three-quarters of the global protein meal sector. Demand growth in the People's Republic of China (hereafter "China") is expected to slow down considerably, driven by improved feed efficiency combined with efforts to achieve lower protein meal shares in livestock feed rations. In the European Union, the second-largest user of protein meal, consumption is expected to decline as animal production declines and other protein sources are increasingly used in feed. By contrast, in Southeast Asia increasing animal production is projected to raise demand for imports of protein meal.

As a result of a slowdown in the expansion of the mature oil palm area and only a slight recovery in yields, palm oil production growth in Indonesia and Malaysia is projected to be limited. Indonesia and Malaysia are still projected to account for 82% of global palm oil production, although production in other tropical countries is expected to expand more strongly.

Growth in world exports of soybeans, about 42% of global production and dominated by the Americas, is expected to slow considerably over the next decade due to the projected slower growth in import demand by China. Indonesia and Malaysia, will continue to dominate the vegetable oil trade, jointly accounting for nearly 55% of global vegetable oil exports. India, one of the world's biggest consumers of vegetable oil, is projected to maintain its high import growth to satisfy growing domestic demand.

The ongoing downward adjustment of prices in the oilseed sector is expected to continue during the first years of the *Outlook* period. Thereafter, prices are expected to increase slightly in nominal terms, while declining in real terms following the long-term trend of agricultural commodity prices.

The future demand for protein meal in China depends on the balance between feed intensity and efficiency especially in restructuring the pig meat sector. The scope to increase palm oil output in Indonesia and Malaysia will increasingly depend on oil palm replanting activities and accompanying yield improvements (rather than area expansion), creating new challenges as yields of palm oil have been stagnant for several years. Sustainability concerns (i.e. deforestation and the use of sustainability certifications for vegetable oil) and concerns about the high saturated fat content of palm oil also influence the consumer acceptance and demand for palm oil. The use of vegetable oil as biodiesel feedstock is mostly determined by biofuel policies, which include countries' mandated blending ratios. In particular, the use by some countries of Sustainable Aviation Fuel (SAF) holds potential and could result in strong demand growth for vegetable oil.

4.2. Current market trends

Nominal prices declined from record highs and fluctuated in a narrow range

International prices for oilseeds have been fluctuating in a relatively narrow range since late 2023, mainly reflecting prospects of sufficient global supplies of soybean, rapeseed and sunflower seed in the 2023/24 season. Meanwhile, world vegetable oil prices stabilised after falling sharply from record highs to reach multi-month lows in mid-2023, as below-potential growth in palm oil outputs coincided with subdued global demand. For oil meals, international soymeal quotations declined in recent months, primarily underpinned by a favourable production outlook in Argentina.

Global soybean production in 2023/24 is anticipated to expand by about 5% from the previous season, mainly due to forecast output increase from South America. While unconducive weather in some major soybean regions in Brazil is seen as compromising its production outlook, largely favourable conditions in Argentina are expected to facilitate a significant output recovery there. World palm oil production is expected to increase marginally in 2024. Despite generally favourable weather conditions across Southeast Asia, production growth could be limited by subdued yields in both Indonesia and Malaysia.

There are many uncertainties that can affect the market in the coming months, such as adverse climatic conditions, changes in policies, and the evolution of ongoing conflicts.

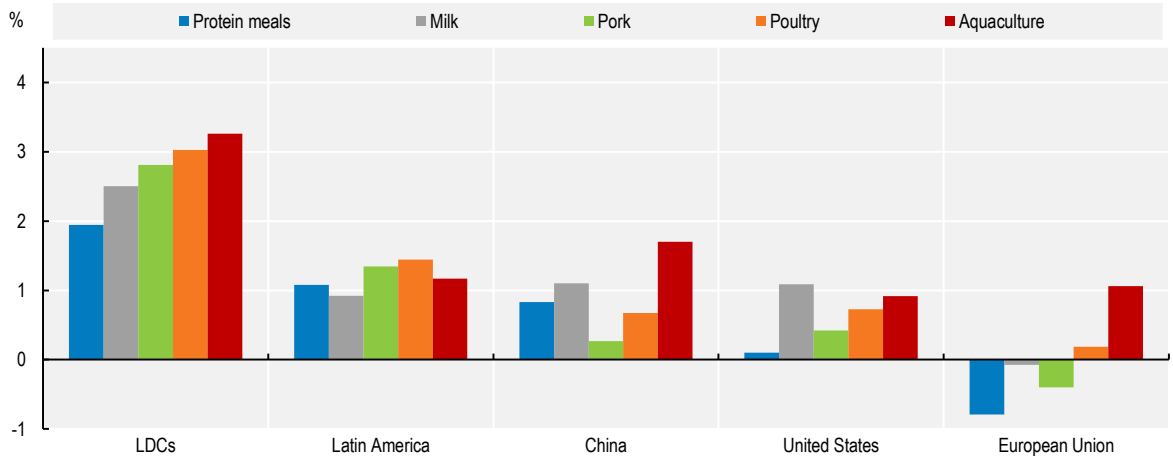
4.3. Market projections

4.3.1. Protein meal consumption

Feed demand is slowing, shaped by developments in China

Only a small proportion of oilseed supplies is consumed directly. Normally, oilseeds are crushed into vegetable oil and protein meal. The protein meal content of soybeans is about 80% 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 0.9% p.a., considerably below that of the last decade (2.4% p.a.).

Figure 4.2. Average annual growth in protein meal consumption and animal production, 2024-33



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

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 4.2). Lower income countries, which rely on backyard production, consume less protein meal, whereas higher income economies which employ intensive production systems use higher amounts of protein meal. Because of a shift to more feed-intensive production systems in developing countries in response to rapid urbanisation and increasing demand for animal products, growth in protein meal consumption tends to exceed growth in animal production.

China accounts for more than a quarter of global protein meal demand and is therefore shaping global demand. Growth in China's demand for compound feed is expected to be 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 it surged in the last decade but continues to exceed current levels in the United States and European Union.

In the European Union, and the United States, protein meal consumption is expected to grow at a slower rate (or decline faster) than animal production due to improving feeding efficiencies. In addition, in the European Union animal products, primarily poultry and dairy, are increasingly marketed by the large retail chains as produced without feed from genetically modified crops which also curbs demand for soybean meal.

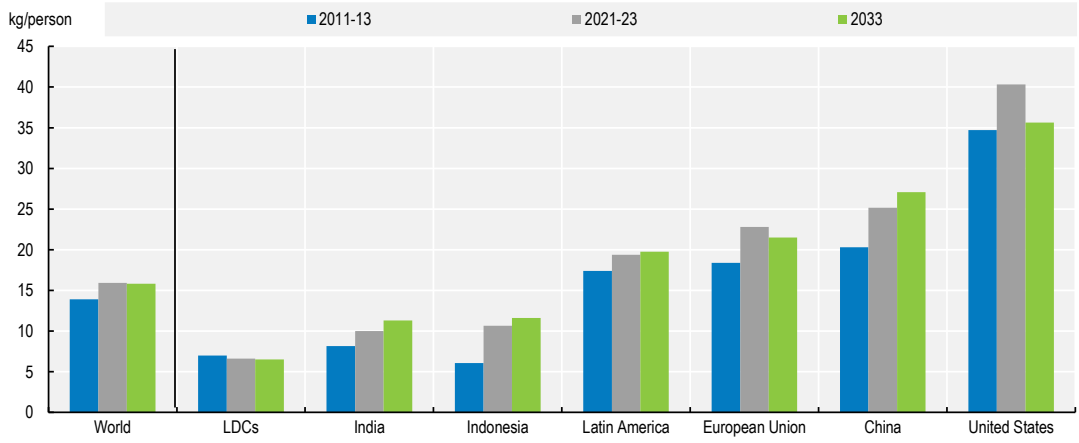
4.3.2. Vegetable oil consumption

Per capita demand for vegetable oil for food is slowing down

The two dominant uses of vegetable oil are for food and food preparation (55%) and as biodiesel feedstock (18%). A considerable share of food use is for frying rather than consuming directly which results in an amount of 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 decline slightly (-0.2%) due to declining food demand in high-income countries, while an increase of 0.8% p.a. increase was observed during 2014-23. In emerging markets such as China (27 kg/capita) and Brazil (28 kg/capita), the consumption of vegetable oil for food is set to reach levels comparable to those of wealthier economies (Figure 4.3).

Figure 4.3. Per capita food consumption of vegetable oil in selected countries



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

India, the world's second largest consumer and leading importer of vegetable oil, is projected to sustain a per capita consumption growth of 1.0% p.a., reaching 11 kg/capita by 2033. This substantial increase will be the result of both increases in its domestic production, crushing of increased domestic oilseed production, and imports of mainly palm oil from Indonesia and Malaysia. However, numerous programs have been implemented by the Indian government to increase local production and rely less on vegetable oil imports.

As urbanisation increases 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 (LDCs), the per capita demand for vegetable oil is projected to remain stable at 6.5kg/capita.

The global uptake of vegetable oil as feedstock for biodiesel (about 18% of global vegetable oil use) is projected to increase more slowly at 1.3% p.a. over the next ten years, compared to the 6.8% 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 (Chapter 9) and the relative price development of vegetable oil and crude oil (see below). In general, national targets for mandatory biodiesel consumption are expected to increase less than in previous years. In Indonesia, the growth in the use of vegetable oil to produce biodiesel is projected to remain strong and reach 14.5 Mt by 2033 due to supportive domestic policies. In

the United States, Hydrotreated Vegetable Oil (HVO) or Renewable Diesel is considered an advanced biofuel and is expected to drive the considerable growth of biodiesel production. In addition, used oils, tallow, and other non-feed and non-food feedstocks are increasing their share in the production of biodiesel, especially in the European Union and China, largely due to specific policies.

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

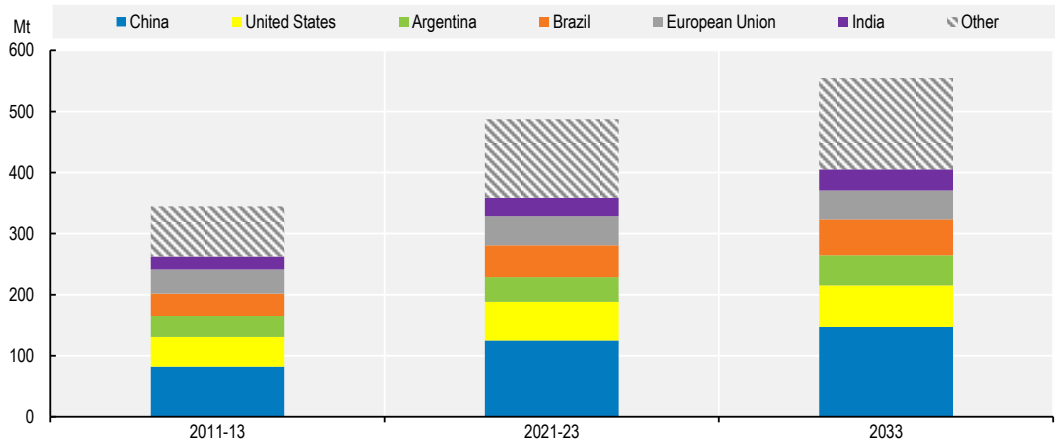
Slowing global oilseed crush and limited growth in palm oil production

Globally, the crushing of soybeans and other oilseeds into meal (cake) and oil accounts for about 90% of total usage. The demand for crush will increase faster than demand for other uses, notably direct food consumption of soybeans (including for meat and dairy replacements), groundnuts and sunflower seeds, as well as direct feeding of soybeans. The crush location depends on 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).

Soybean crush is projected to expand by 49 Mt over the *Outlook* period, significantly less than the 65 Mt in the previous decade. Chinese soybean crush is projected to increase by 16 Mt, accounting for about 33% of the world's additional crush, the bulk using imported soybeans. The growth in China, although large, is projected to be considerably lower than in the previous decade. 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.

World production of protein meals from oilseed crush is dominated by soybean meal, which accounts for more than two-thirds of world protein meal production. Production is concentrated in a small group of countries (Figure 4.4). 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 important producing countries – Argentina, Brazil, India, and the United States – domestically-produced soybeans and other oilseeds dominate.

Figure 4.4. Oilseed crush by country or region



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

Global *vegetable oil* production includes the crush of oilseeds as well as palm oil, palm kernel oil, coconut oil and cottonseed oil. Palm oil and palm kernels are joint products, and the latter is crushed into palm kernel oil meal. Coconut oil is mainly produced in the Philippines, Indonesia, and Oceanic islands. Palm

kernel oil and coconut oil have important industrial uses. Cottonseed oil is a by-product of cotton ginning (Chapter 10). Global palm oil output has outpaced the production of other vegetable oils over the past decade. However, growth in palm oil production is expected to weaken due to increasing sustainability concerns and the aging of oil palm trees in Indonesia and Malaysia, which 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 0.7%. Increasingly stringent environmental policies from the major importers of palm oil and sustainable agriculture norms (e.g. in line with the 2030 UN Agenda for Sustainable Development) 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 3.4 Mt by 2033, Colombia 2.0 Mt, and Nigeria 1.7 Mt. 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.

4.3.4. Oilseed production

Challenges remain for palm oil and rapeseed yield growth

The production of soybeans is projected to grow by 0.8% p.a., compared to 2.0% p.a. over the last decade. Growth will be dominated by yield increases, accounting for about 80% of production growth. Soybeans have the advantage of being fast growing 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 maize in Brazil and wheat in Argentina.

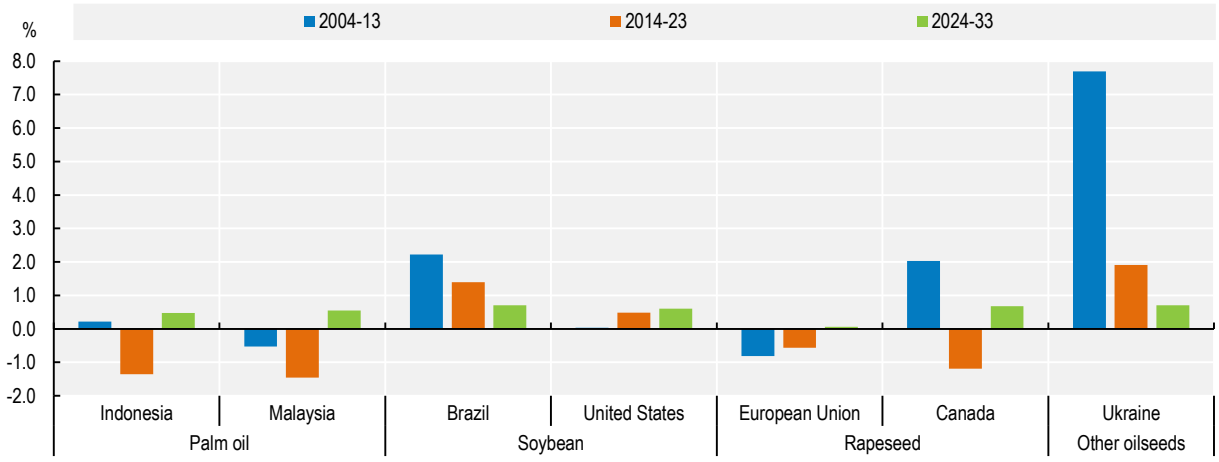
Brazil has in recent years been the largest producer of soybeans and production is expected to grow at 0.7% p.a. over the next decade – slightly stronger than the United States, the second largest producer, at 0.5% p.a., due to double cropping with maize. The production of soybeans is projected to grow strongly elsewhere in Latin America, with Argentina and Paraguay producing 49 Mt and 11 Mt, respectively, by 2033. In China, soybean production is expected to continue to increase in response to reduced policy support for the cultivation of cereals, but at slower pace than in the previous decade. Soybean production is also expected to increase in India, the Russian Federation (hereafter "Russia"), Ukraine, and Canada.

The production of other oilseeds (rapeseed, sunflower seed, and groundnuts) will also grow at a slower pace, at 0.8% p.a. compared to 2.9% p.a. over the previous ten years (2014-2023). 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 41 Mt and 30 Mt, respectively, by 2033. However, limited growth in output is projected for both regions (0.8% p.a. for China and 0.2% p.a. for the European Union) as relatively higher prices for cereals are expected to generate strong competition for limited arable land. Ukraine and Russia, major producers of rapeseed and leading producers of sunflower seed, are both expected to increase their production of other oilseeds beyond 20 Mt per year by 2033. Canada, the largest exporter of rapeseed, is projected to increase its production of other oilseeds by 1.1% p.a., to reach 21 Mt by 2033.

Yields for major producers of palm oil and for some major suppliers of rapeseed have fallen or grown slowly during the last decade (Figure 4.5). There are many reasons for this development: 1) a significant increase in production area so that less favourable land is used for production reducing average yields; 2) the ageing of oil palms as well as labour shortages has reduced yields; 3) restrictions in the use of pesticides adversely affected average rapeseed yields in the European Union; and 4) shifting weather patterns. It remains uncertain how this will play out over the coming decade, but lower area expansion could result in a recovery in yields over the *Outlook* period. If this is not the case it will be a challenge to satisfy growing demand, especially for vegetable oil.

Soybean stocks are projected to reach a stock-to-use ratio of almost 13% by 2033, which remains low compared to the past two decades, so harvest failures could quickly lead to market shortages.

Figure 4.5. Average annual yield growth for palm oil and oilseeds



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

StatLink https://stat.link/5jnflv

4.3.5. Trade

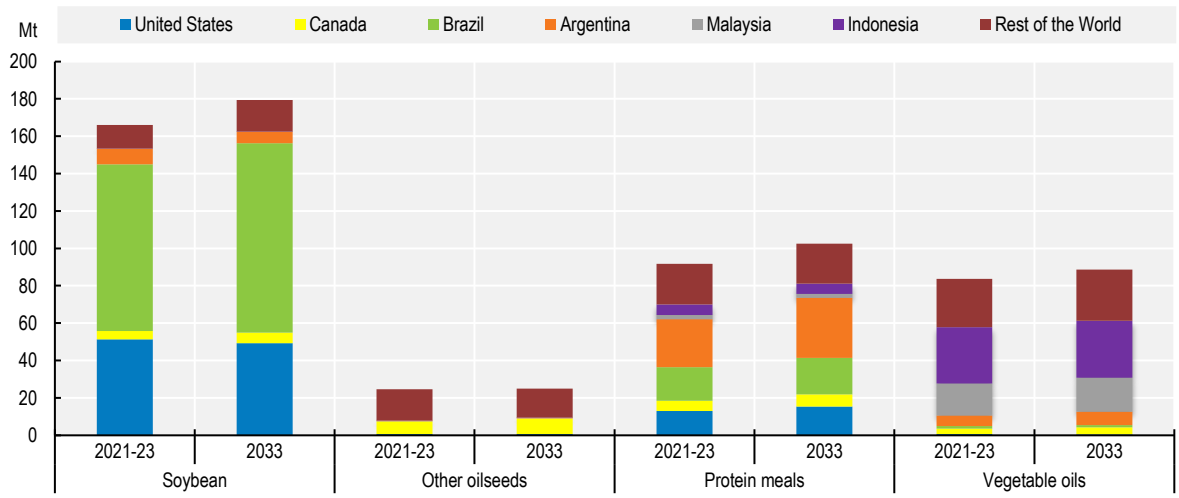
Trade is significant for oilseeds and products, but slowing down

Over 40% of world soybean production is traded internationally, a high share compared to other agricultural commodities. The expansion in world soybean trade is directly linked to projected slower growth of the soybean crush in China and Chinese imports are projected to grow by 0.8% p.a. to about 110 Mt by 2033 (down from 2.8% p.a. in 2014-2023), accounting for about 61% of world soybean imports. 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 56% of total global exports of soybean by 2033.

For other oilseeds, the internationally traded share of global production remains much lower at about 13% 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 71% of world exports by 2033. In Canada and especially in Australia, more than half of the production of other oilseeds (primarily rapeseed) is exported. Additionally, oilseeds are crushed in the production countries and exported in the form of vegetable oil or protein meal, which is of high importance for Argentina, Ukraine and Russia.

Vegetable oil exports, which amount to 35% of global vegetable oil production, continue to be dominated by a few players, namely Indonesia and Malaysia. These two countries are expected to continue to account for almost 55% of total vegetable oil exports during the *Outlook* period (Figure 4.6). However, the share of exports in production is projected to contract slightly in these countries 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 1.0% p.a., reaching 18 Mt by 2033, to meet increasing demand driven by population growth, urbanisation, and rising disposable incomes. At the same time, the Indian government is carrying out several projects in order to be less dependent on imports. These programs aim at implementing farm techniques and services to strengthen and support more local production.

Figure 4.6. Exports of oilseeds and oilseed products by region



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

StatLink https://stat.link/5xn4d7

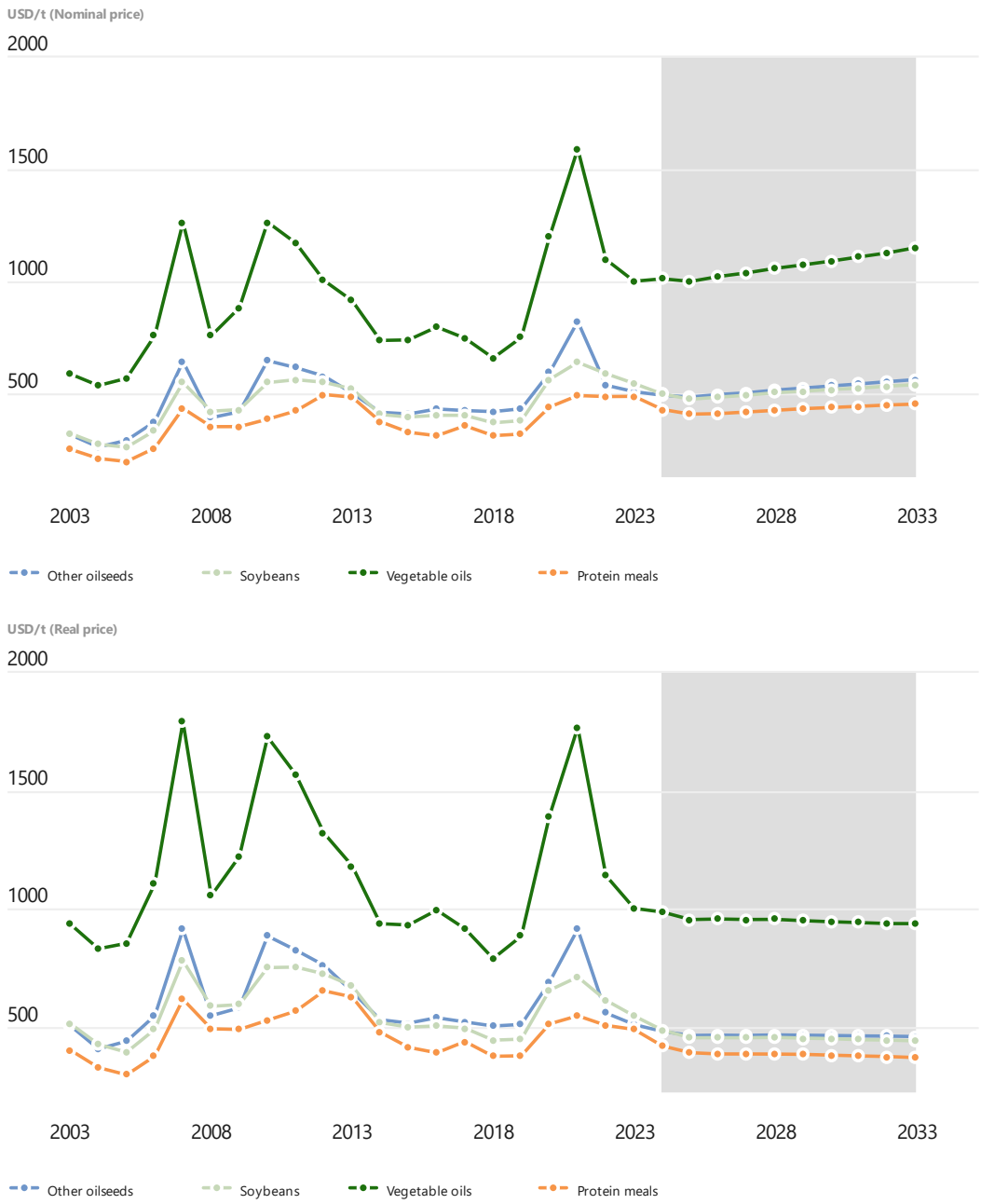
The projected growth in world trade of protein meal is 0.8% p.a. over the *Outlook* period and Argentina with its clear export orientation is expected to remain by far the largest meal exporter. The largest importer is the European Union, with imports expected to continue to decline due to reduced domestic demand for protein meal. More than 90% of the global import growth in protein meal is projected to occur in Asia, in particular in Southeast Asia with its increasing animal production. As the domestic crushing capacity in Asian countries is not expected to keep pace with protein meal demand, expansion of the livestock sector is expected to require imported feed.

4.3.6. Prices

Real prices 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 4.7). Due to expected stronger demand for vegetable oil than protein meal, prices of vegetable oil are projected to rise compared to protein meal. This will also favour other oilseeds prices over soybeans as they contain higher shares of vegetable oil.

Figure 4.7. Evolution of world oilseed prices



Note: 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 (2023=1).
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

4.4. Risks and uncertainties

Environmental concerns influence global oilseed supply chains

The integration of environmental sustainability consideration into trade regulations could influence global oilseed and oilseed product trade. On the one hand the trade share of soybeans and vegetable oils at around 40% of production is considerably higher than for most other agricultural commodities. On the other hand, palm oil and soybeans are often mentioned when the link between agriculture and deforestation is discussed. Both products are included in the European Union 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 concern, including certification of deforestation free production, have been implemented and increase in relevance for trade.

The scope for increasing palm oil output in Indonesia and especially in Malaysia will increasingly depend on replanting and yield improvements rather than new area expansion. In recent years, growth in production has been sluggish given the low profitability of the sector and rising labour costs in Malaysia. There has been some replanting progress by major palm oil companies in Indonesia. In addition to the slowdown in yields, 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 Malaysia and Indonesia.

Other consumer concerns regarding soybeans stem from the high share of production derived from genetically modified seeds. In the European Union in particular, retailer certification schemes of animal products based on feed free of genetically modified products are gaining momentum and may shift feed demand to protein sources other than soybean meal. This may further reduce protein meal demand as the European Union accounted for 13% of global demand in 2021-23.

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 given that about 16% of global vegetable oil supplies go to biodiesel production. In Indonesia, attaining the proposed 30% biodiesel mandate is doubtful given the need for government subsidies and possible medium-term supply constraints. In the United States Renewable Diesel or HVO receive considerable support in some states that show strong production growth rates. In particular, the California Low Carbon Fuel Standard favors expansion of renewable diesel over other types of biofuel. In the European Union, policy reforms, 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, Sustainable Aviation Fuels (SAF) are expected to be a substantial use of biofuels but the timing of introduction remains largely uncertain. The development of crude oil prices, which affects the competitiveness and profitability of biodiesel production, remains a major source of uncertainty.

The development of animal production in China remains the major driving force for global protein meal demand and soybean trade. Overall, the development of the meat demand is shaped by declining population and slower but still substantial economic growth. The pig meat industry recovery from ASF combined with its restructuring directly impacts demand for protein meal. Protein meals compete in part with other feed components in the production of compound feed, so changes in cereal prices will prompt adjustments in the balance between compound feed ingredients and hence protein meal demand.

5 Sugar

This chapter describes market developments and medium-term projections for world sugar markets for the period 2024-33. Projections cover consumption, production, trade and prices for sugar beet, sugarcane, sugar, molasses, and high-fructose corn syrup. The chapter concludes with a discussion of key risks and uncertainties which could have implications for world sugar markets over the next decade.

5.1. Projection highlights

Sugar consumption to grow further, maintaining dominance as the main sweetener

Sugar consumption growth is anticipated to double over the next ten years compared to the previous decade, mainly as a result of the faster economic growth projected in low- and middle-income countries across Asia and Africa. Per capita sugar consumption in these regions, is still expected to stay considerably below the level in high-income countries, as the consumption gap is only slightly narrowing. In other regions, encompassing countries across Europe and Oceania, where sugar intake is generally high but declining amid growing health concerns associated with sugar intake, the decline in per capita sugar consumption is projected to persist.

In the next decade, it is expected that sugar will continue to dominate the consumption of caloric sweeteners, accounting for 80% of global utilisation, despite ongoing efforts to find substitutes. Consumption of the main alternative caloric sweetener, high fructose corn syrup (HFCS), or isoglucose, is projected to maintain its share of around 8% of total consumption and will be primarily supplied domestically. Other caloric sweeteners, not covered by this *Outlook*, will be represented by other corn sweeteners such as glucose or dextrose and the less caloric High Intensive Sweeteners (HIS) such as saccharin, sucralose or aspartame.

Sugar production is expected to expand over the *Outlook* period by 14%. Sugarcane is projected to account for more than 85% of the total sugar crop output, with Brazil consolidating its position as the largest producer of sugarcane. Investment in Brazil has been steadily increasing in recent years and expansion mainly in area and yield is expected to rise over the next decade. Productivity gains, including varietal improvements and higher extraction rates, will drive sugar production growth in India and Thailand, with acreage projected to remain relatively fixed. In Africa, sugarcane production in the key producer country, South Africa, is anticipated to expand driven by government support measures to the sector, including financial assistance to sugarcane farmers and by support services provided by the South African Sugar Association (SASA). With regards to sugar beet, Europe is projected to remain the main producing region, although production increases are only expected in the Russian Federation (hereafter “Russia”). In the European Union, reduced availability of plant-protection products, the competition for land use by more profitable crops will limit production. In Egypt, the expansion of the sugar beet plantings and the adoption of higher-yielding seed varieties is expected to bolster sugar production over the next years, consolidating its position as the Africa’s largest sugar beet producer by 2033.

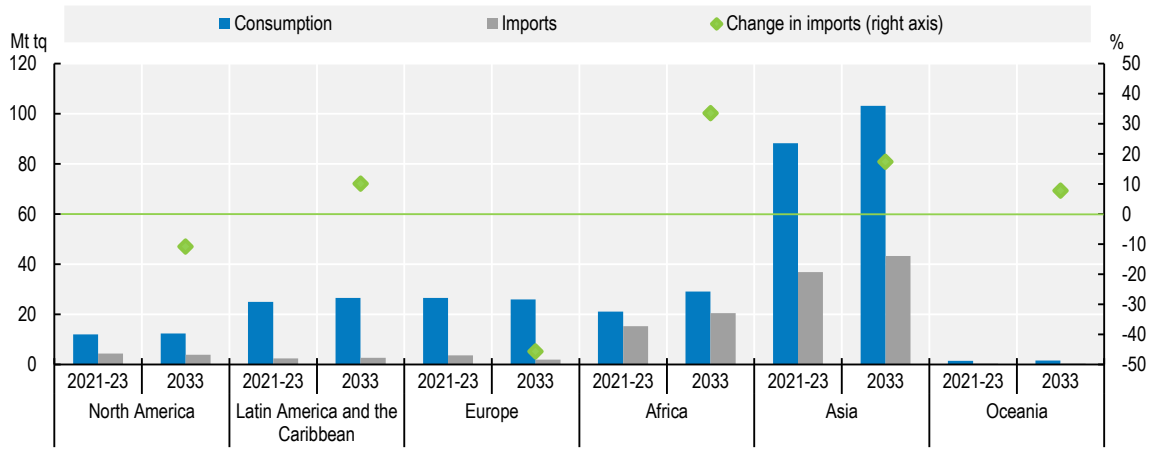
Over the next decade, the supply of sweeteners produced from sugar crops will continue to be challenged by competitive crops in key countries such as maize and soybeans in Brazil or cassava in Thailand. In addition, the production of ethanol from sugar crops will continue to influence sugar markets, depending on the profitability of sugar compared to ethanol. In Brazil, the built-in flexibility of the sugar sector allows for both sugar and ethanol production. However, market conditions are anticipated to favour export-oriented sugar production over the *Outlook* period. In some other countries, implementation of policies promoting the development of biofuels will also add some pressure to the availability of sugarcane for sugar production, especially in India, with the Ethanol Blended Petrol (EBP) Programme aimed at reaching a blending rate of 20% of ethanol in petrol (E20) by 2025/26.

In 2033, Brazil and India are foreseen to account for about 23% (46 Mt) and 19% (38 Mt) of the world's total sugar output, respectively. Better growth prospects are expected in Brazil, supported by profitable sales on the international market while in India, despite improving crop yields and extraction rates, the increase is projected lower given the diversion of sugarcane to ethanol production. Elsewhere, the largest significant increase in production, in absolute terms compared to the base period, is anticipated in Thailand (+ 4 Mt), which is expected to recover from the reduced level of the past few years.

International trade will continue to grow, reflecting expanding demand from deficit regions in low and middle-income economies (Figure 5.1). In the current season, Brazil is foreseen to secure 50% of the

global sugar trade, mainly in the form of raw sugar. Over the *Outlook* period, the global balance between shipments of raw and white sugar is expected to remain the same on average, with approximately 60% being raw sugar and 40% white sugar, as logistical challenges will persist and prevent significant changes in this distribution. In 2033, exports will originate from a handful of countries, with Brazil leading, followed by Thailand and India. Imports are anticipated to remain less concentrated. During the base period (October 2021-September 2024), major importing countries included the People's Republic of China (hereafter "China") and Indonesia as the top two, followed by the United States. Over the next ten years, the main increases in imports are projected in Asia and Africa, while the strongest declines are foreseen in the European Union, United States, and Russia on account of higher domestic production.

Figure 5.1. Evolution of sugar consumption and imports, by region



Note: Data are expressed on a tel quel basis (tq).
Source: OECD/FAO (2024), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/u6gi8c

International sugar prices in real terms are foreseen to fall from the current high levels, following an expected production recovery in India and Thailand, and then slightly decline over the Outlook period. However, the assumption of constant real international crude oil prices is foreseen to limit the downward pressure on prices, by encouraging the use of sugar crops for ethanol production. The white sugar premium (difference between white and raw sugar prices) was particularly high (on average USD 126 per tonne) during the base period due to concerns over tighter global supplies. Over the *Outlook* period, it is expected that the white sugar premium increases in nominal term due to stronger import demand for refined white sugar compared to raw sugar.

The dynamics of the sugar markets as presented in this *Outlook* are subject to many risks and uncertainties, including developments in the global macroeconomic context and implementation of new sugar-related policies. In addition, weather conditions, profitability of sugar vis-à-vis ethanol, and competition with other crops are sources of production uncertainty. On the demand side, shifts in the global economy impacting consumers' purchasing power, consumers' preferences and inflation levels are key factors that could modify the consumption patterns presented in this *Outlook*.

5.2. Current market trends

After reaching a multi-year high in September 2023, international sugar prices dropped later in the year driven by the strong pace of production and exports in Brazil, and slower demand. Prices rebounded in early 2024 amid concerns over the *Outlook* for the upcoming season in Brazil, prompted by below-average

rainfall. Unfavourable production prospects in India and Thailand, resulting from prolonged drier-than-normal weather conditions, also contributed to the upward pressure on world sugar prices.

Overall, world sugar production in the 2023/24 season is anticipated to increase from last year, mainly driven by expectations of a large output in Brazil. In addition, production in Europe is forecast to recover from last year's reduced level on account of both an increase in plantings and higher yields, while a rebound in production is also anticipated in China. On the demand side, despite high prices, world sugar consumption is foreseen to remain strong in 2023/24. The current production and consumption forecasts are expected to push the sugar market into a near balance situation. With larger exportable availabilities from Brazil more than offsetting lower shipments from Thailand and India, world sugar trade in 2023/24 is predicted to expand compared to the previous season. Global import demand is anticipated to increase mainly reflecting a recovery in purchases by China after the decline in 2022/23, and higher imports by India, driven byre-export returns.

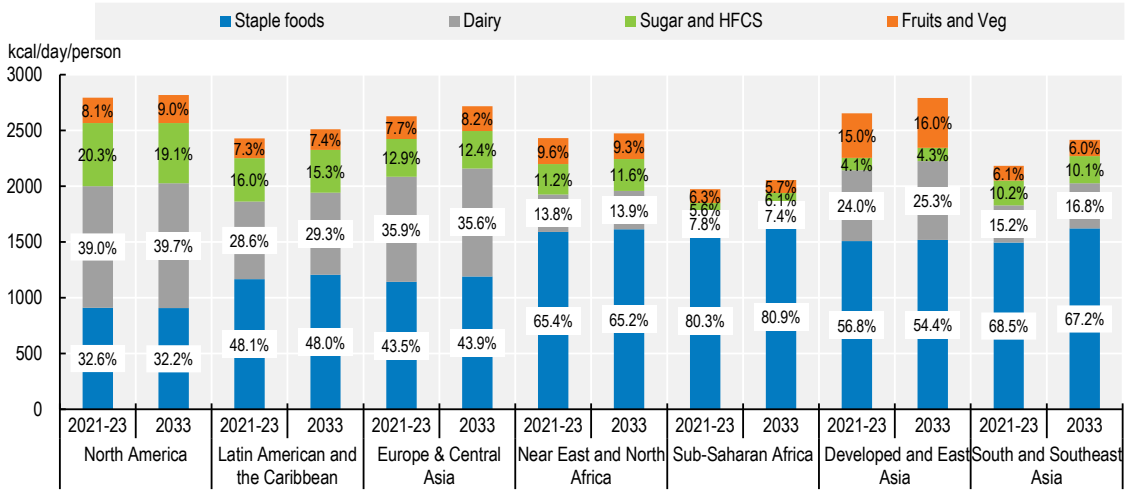
5.3. Market projections

5.3.1. Consumption

Over the next ten years, growth in global sugar consumption is projected to expand by 1.2% p.a. and reach 198 Mt by 2033, driven by population and income growth. World average per capita consumption is expected to reach 22.8 kg/capita in 2033, up 4% from the base period.

Sugar consumption is set to rise mainly in countries where the level of per capita intake is currently low. 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. High levels of sugar consumption are associated with health concerns; WHO recommends reducing the intake of free sugars (i.e. sugar added to foods during production or cooking plus sugars found in honey, syrups, and fruit juices) to less than 10% of the total daily energy intake. As a result, in countries, where per capita consumption of sugar is already high, a decline is expected over the next decade (Figure 5.2).

Figure 5.2. Daily per capita food consumption of calories from the different group carbohydrate sources, in the different regions



Note: Staple foods include cereals, roots and tubers, and pulses.
Source: OECD/FAO (2024), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/neay0s

Development prospects are stronger in Asia and Africa

Asia and Africa will be the regions that will contribute most to additional global demand compared to the reference period, accounting for 64% and 32% of the world total growth, respectively. Dietary shifts driven by urbanisation and increasing disposable incomes are expected to be key drivers of the increase in per capita consumption in these regions. However, despite the projected increase, per capita consumption by 2033 is anticipated to remain below the global average in both Asia and Africa.

In Asia, per capita consumption is foreseen to grow by 0.9% p.a. over the next decade compared with 0.5% in the last decade. It is expected that India, followed by China and Indonesia, will provide the largest contribution to the overall increase in sugar consumption. In India and Indonesia, population growth, although slower than in the past decade, and income growth associated with stronger demand for processed food and beverage products is expected to sustain the increase in overall sugar consumption over the next decade. In China, consumption has recently stagnated with the rise in prices. However, even if the population declines absolutely after 2023, demand is expected to resume growth during the *Outlook* period, mainly in second-tier, third-tier and lower-tier developing cities. Nevertheless, China per capita sugar consumption should remain well below the global average level in 2033 (12.8 kg/cap). Strong growth prospects are also expected in Least Developed Asian countries.

In Africa, Least Developed Sub-Saharan countries are foreseen to record the highest growth rate in per capita consumption across the region, primarily due to projected increases in disposable income associated with higher spending on processed foods and beverages. By contrast, in South Africa, the declining trend in per capita sugar consumption recorded in recent years amid government measures to discourage its use is expected to persist in the next decade; with many food manufacturers having already reduced their use of sugar, the decline is expected to be slower than in the past decade.

Over the coming decade, in terms of carbohydrate equivalents, Asia and Africa will remain the regions where the diet will include the greatest proportion of staple foods, (particularly Northeast and North Africa).

Downward trends will continue in other regions, high sugar consuming countries

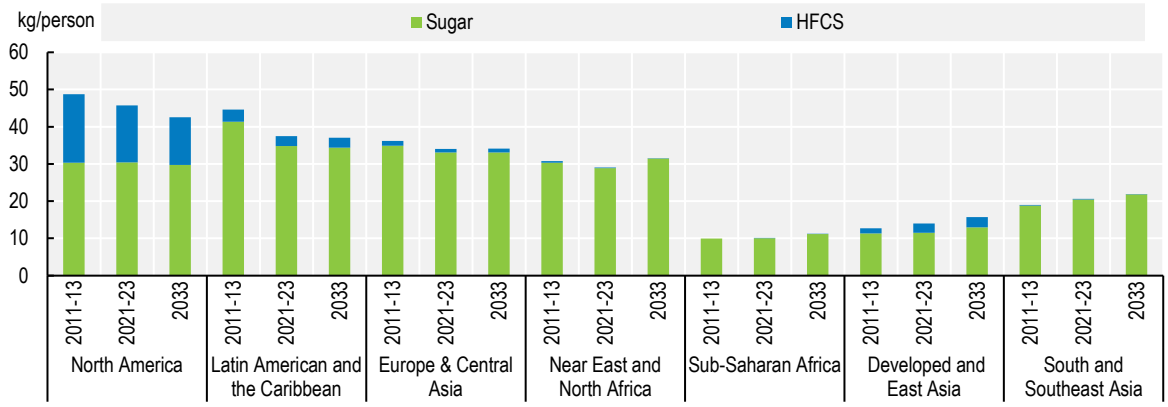
Traditionally, the Americas, the Caribbean and European countries record the highest level of per capita sugar consumption, and caloric sweeteners represent at least 12% of carbohydrates in the diet, more than 20% in the United States. Since 2010 globally, in those countries, caloric sweetener consumption has trended down with adverse health effects being highlighted. Over the next decade, the decline is projected to continue, although at a slower pace.

In Latin America, the world's largest sugar exporter, high per capita consumption levels have raised concerns about their negative effects on health. During the last decade, some countries, including Chile, Ecuador, Mexico, Peru and more recently Colombia, have introduced a tax on sugar-sweetened beverages in an attempt to reduce soft drink intake. Measures to limit the sale and/or the promotion of sugary drinks or sweet products to children under 18 years were also taken, and some countries such as Argentina have passed laws for mandatory front-of-package labelling with strict thresholds for healthier products. Over the next decade, per capita consumption is projected to weaken further in some countries, including Argentina, Brazil, Chile, Colombia, Mexico, and Paraguay, or to remain relatively stable.

During the last decade, Europe had the second highest sugar consumption among the seven regions considered in this *Outlook*, albeit far behind Asia. However, over the next ten years, it will be the only region that will experience a decline. For two decades, European countries have sought to take measures to avoid excessive consumption of sugar. Taxing sugar is among the measures implemented to encourage healthy eating habits, most recently introduced in Poland, and Russia. Food industries have also been looking for solutions to tackle the problem of obesity by changing the composition of their products. Per capita sugar consumption in Europe is expected to see a continuing decline, albeit at a slower pace than in the previous decade. In Ukraine, per capita consumption of sugar, after dropping markedly with the outbreak of the war in February 2022, is projected to recover over the next decade.

Among the other high sugar consuming countries, the level of consumption is projected to decline in Australia and New Zealand. This trend will also be visible in Canada and the United States (Figure 5.3). However, the United States, which has the highest per capita consumption of caloric sweeteners, 48.1 kg/capita during the base period, is expected to see an increase in the consumption of staple food or fruits and vegetables to the detriment of caloric sweeteners.

Figure 5.3. Per capita consumption of caloric sweeteners



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

StatLink https://stat.link/zqysx4

The High Fructose Corn Syrup market will grow slowly

High Fructose Corn Syrup, 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 does sugar is expected to continue, and the downward trend that started in the mid-2000s is expected to continue; by 2033, HFCS is foreseen to represent 32% of the caloric sweetener consumption compared to 36% during the base period. HFCS production in the United States is projected to remain relatively stable at 7 Mt. Per capita, Mexico is the second largest consumer and the efforts of the government to reduce caloric sweetener consumption are expected to continue over the next ten years.

China, the world's second largest producer, is expected to see the biggest changes as its per capita caloric sweetener consumption is very low compared to the rest of the world. Increasing corn prices since 2020 raised the costs of producing and consuming HFCS leading to some substitution by sugar or other alternative sweeteners in soft drinks (erythritol), depending on relative prices. Over the next decade, with more competitive corn prices, China HFCS production is projected to increase to meet some of the growth in domestic demand (2.8 kg/capita by 2033). No increase is foreseen in Japan and Korea with a consumption of about 6 kg/capita. In the European Union, HFCS will remain uncompetitive with sugar over the next decade, accounting for only 1.2 kg/capita in 2033.

5.3.2. Production

Sugar is a capital-intensive sector, which needs substantial input costs, including energy for sugar beet and fertilisers in both cane and beet to increase yield and sugar content. Over the coming decade, remunerative domestic prices are expected to continue supporting investments and developments, both in

crops and in sugar factories. Global sugar production is expected to increase by 14% over the *Outlook* period.

Global sugar production is expected to increase

Global sugar production is expected to grow from 178 Mt during the base period to 202 Mt by 2033 with 50% coming from Asia, and 27% from Brazil.

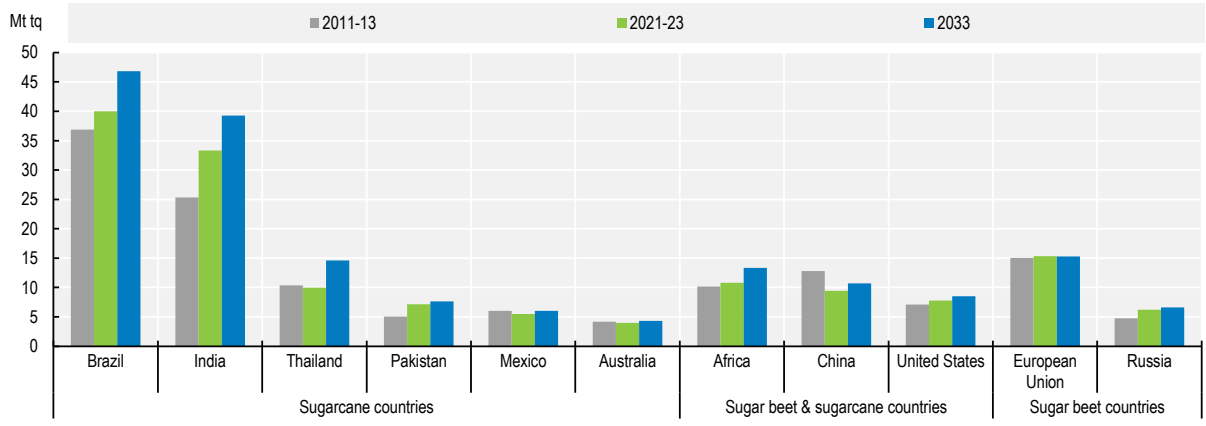
Asia will remain the leading region producing about 41% of the world output in 2033. India and Thailand are expected to provide the largest shares of the region's global sugar supply, increasing their sugar production by respectively 4.8 Mt and 4.4 Mt by 2033 compared to the base period (Figure 5.4). In Thailand, sugar production is expected to recover from the reduced level in recent years and to increase to a larger degree than sugarcane production thanks to higher sugar extraction rates. In India, the world's second largest sugar producer, the growth rate in sugar production is expected to be lower than in the past decade, reflecting a slower growth in sugarcane production and greater diversion to ethanol.

Brazil, the world's largest sugar producer makes Latin America the second largest sugar producing region. Higher investments in fields combined with better weather conditions helped the country's industry to recover from a long financial crisis. Considering the profitability of international sugar markets, sugar production is expected to increase by 6.5 Mt over the next decade.

Africa is expected to increase its share of global production mainly on account of Sub-Saharan African countries, where government support measures and foreign investments are expected to contribute to increased sugar production. Suitable conditions for growing sugarcane, potential for area expansion and lower costs of production, are expected to underpin the increase in production.

Production in OECD countries is foreseen to continue to lose market share. In 2033, the region will represent 20.8% of the global market, compared to 22.3% in the base period. Although it will retain its position as the main producer of this regional market in 2033 (36%), the European Union's sugar production is expected to decline while higher supply is foreseen in the United States (+0.7 Mt) bolstered by several government policies that support the domestic industry.[1]

Figure 5.4. Main sugar producing countries/regions classified by sugar crops



Note: Data are expressed on a tel quel basis (tq).
Source: OECD/FAO (2024), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/n8tk94

Sugarcane will maintain its position as the main sugar crop

Sugarcane will continue to account for more than 87% of sugar crops. Over the *Outlook* period, global sugarcane production is projected to grow by 1% p.a. and reach 2 016 Mt by 2033, with Brazil, India and Thailand anticipated to contribute the most to the change in global output volume (+135 Mt, +68 Mt and +18 Mt respectively). This mainly reflects relatively higher crop yields notably in India, Thailand and Philippines, while area expansion is mainly expected in Brazil with an additional 1.8 Mha.

Brazil is the leading sugarcane producer, but more than half is used to produce ethanol. In recent years, profitability has encouraged investments in cane fields and cane ratoons have improved. Over the next ten years, more sustainable sugarcane cultivation practices are expected to meet market needs. Some area expansion is foreseen, and the share of area cultivated with sugarcane in total arable land availability (12.0% during the base period) will increase to 13.5% in 2033. Little improvement in yields is foreseen due to drier climatic conditions. Sugarcane will continue to be used almost equally to produce sugar and ethanol.

In India, the growth in sugarcane production is projected to stem mostly from higher crop yields, as acreage is not expected to expand given competition from other agricultural crops. Government support measures, including remunerative prices paid to farmers, financial assistance to facilitate renovation and varietal developments, are expected to sustain sugarcane production over the next years. Similarly, in Thailand, sugarcane production over the next decade is also expected to come mainly from higher yields, while area is expected to remain relatively stable. In China, import tariffs will provide an incentive for authorities in the main producing regions to support farmers and millers in modernising and maximising their yields in the short term. However, only moderate growth is expected as rising input costs and competition for land with other crops will slow efforts and efficiency in the following years.

Prospects are less robust for sugar beet. Transforming this crop requires more energy and fertilisers to maximise yield and sugar content than the production of sugar from sugarcane and this negatively impacts profit margins. Only higher yields will help the crop keep market share, notably in the United States and China, where both sugar crops are cultivated, and beet accounts for 52% and 10% respectively of the totals. In the European Union, production is projected to decline mainly due to high input costs compared to other crops, and stricter environmental legislation of plant protection products; some farmers will turn to more profitable crops. Egypt, China, the United States, Türkiye, Ukraine, and Russia are expected to increase beet production.

In Egypt, remunerative procurement prices and a newly built beet factory are expected to boost plantings of sugar beet, while efforts are also being made to encourage the adoption of improved seed varieties. Government efforts to boost domestic agricultural production generally are expected to contribute to the overall increase in sugar beet area and crop yields and production is expected to increase by 6 Mt compared to the base period.

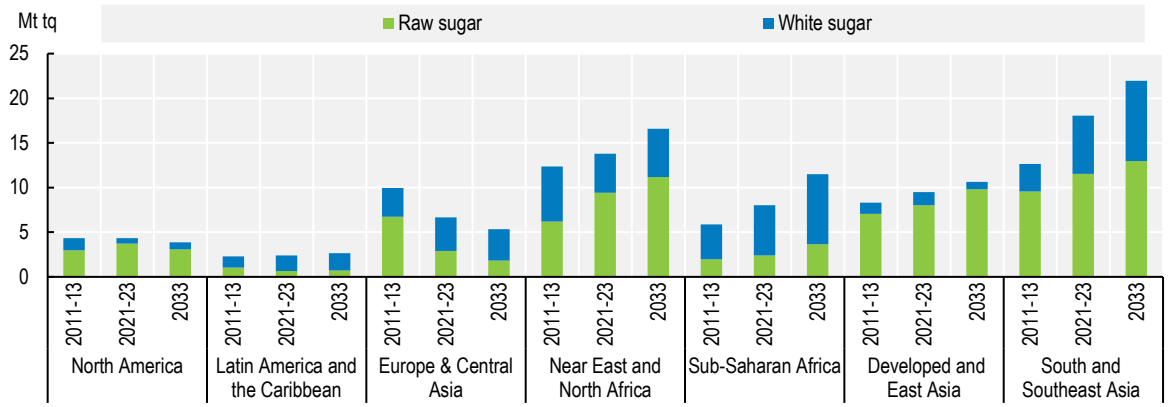
During the last decade, 81% of world sugar crops were used to produce sugar, but this share is expected to decline to 78% by 2033. In the major sugarcane producing countries, support for biofuel production will intensify competition between the main uses of sugarcane, sugar or ethanol, especially since factories often have the built-in option to switch from one to the other. By 2033, Brazil is expected to remain the main producer with 37% of the world's sugarcane, 23% of global sugar production and 81% of global sugarcane-based ethanol production.

5.3.3. Trade

Sugar trade to remain robust over the Outlook period

Sugar will remain a highly traded product. Although most trade will continue to be represented by raw sugar (59% in 2033), the share of white sugar imports will increase relatively faster (Figure 5.5).

Figure 5.5. Raw and white sugar imports, by regions



Note: Data are expressed on a tel quel basis (tq).
Source: OECD/FAO (2024), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/p3ckld

Imports are foreseen to account for 37% of global consumption in 2033 with Asia and Africa remaining the major importing regions, representing respectively 60% and 27% of global imports. In Africa, efforts to boost domestic production capacities will reduce its share of dependence on imports, but these will still represent 69% of consumption in 2033. The growth in consumption in Least Developed Sub-Saharan countries is expected to drive an increase in the share of imported white sugar for direct consumption. In Asia no significant changes are expected in terms of dependence; imports of raw sugar will continue to increase, mainly driven by key buyers, China and Indonesia.

A continued decline in sugar imports is expected over the coming decade, mainly in the United-States, and Russia due to improving supply prospects while in Japan, this will be due to reduced population. The United States is traditionally a sugar-deficit country where national policies[2] will continue to foster domestic production and limit import flows. Given the relatively higher sugar prices in the United States, Mexico will continue to export its sugar primarily to fulfil United States needs. In the European Union, sugar imports are foreseen to decrease to 1.1 Mt by 2033 because of lower demand.

On the export side, sugar markets are projected to remain highly concentrated, therefore reliant on market developments in limited number of countries. By 2033, the traditional three main sugar exporters are anticipated to account for about three quarters of the market: Brazil (64% of raw, 15% of white), Thailand (11% of raw, 14% of white), and India (5% of raw and 11% of white). In India and Thailand, exports of white sugar are projected to account for a larger share of their total sugar exports boosted by higher returns from the white sugar premium. Australia will follow with about 7% of the raw sugar market.

Brazil has initiated projects to develop its storage, port and vessel infrastructures, and gained importance during the blockade of Black Sea freight route. The country will remain the leading global supplier of sugar. Favourable returns for sugarcane-based ethanol production will continue to play a key role, but given the profitable prospects for sugar markets, Brazilian sugar exports are expected to increase by 6.5 Mt and reach 36 Mt in 2033, 19% of which in white shipments from 14% during the base period. The lack of

structural whites supply from Brazil, which prioritises raw exports at bulk terminals and faces high competition for empty containers from other export industries in case of white sugar shipments, is expected to persist by 2033.

In Thailand, the world's second largest sugar exporter, very little ethanol is produced directly from sugarcane (less than 2%) because molasses or cassava are mainly used. Thailand's share of sugar exports is expected to increase from 10.5% with a volume of 7 Mt in the base period to 15% and reach 11.5 Mt by 2033. In India, sugar exports are not expected to grow significantly amid the government's continued efforts to promote ethanol.

Box 5.1. Handling practices in raw and white sugar trade

Raw sugar is derived from sugarcane whereas white sugar can be derived from sugar beet or from sugarcane through refining processes. Raw sugar retains some of the natural molasses and impurities present in sugarcane, giving it a brown color and distinct flavor, it can still be refined into food-grade sugar through further processing steps including clarification, filtration, and crystallization to become white sugar. By contrast, white sugar from beet undergoes extensive refining to remove all molasses and impurities, resulting in its characteristic white color and neutral taste and it is a food-grade product. The quality of both sugars is often measured by the degree of polarization, with a higher value indicating a higher sucrose content and purity. A polarisation value of 100 indicates pure sucrose with no impurities. White or refined sugar, which is suitable for human consumption, typically has a degree of polarisation of at least 99.5. Sugar with a lower degree of polarisation, below 99.5, is often classified as raw sugar. Noteworthy, however, raw sugar that meets specific standards and criteria for purity and cleanliness is referred to as direct consumption raw sugar, or brown sugar, and is suitable for human consumption.

Common raw sugar is typically transported like any other bulk commodity, such as cereals and soybeans, in bulk form, meaning it is not packaged but rather loaded directly into trucks, rail cars, or the holds of ships destined for refineries.

White sugar as food product must be handled under strict hygiene protocols so as to maintain its quality. To ensure that white sugar remains a free-flowing commodity throughout all stages — storage, loading, transport, and delivery — it must be kept dry to prevent or limit clumping, ideally maintaining an ambient humidity level below 70%, and if possible, at a constant temperature. Refined sugar is typically transported in polypropylene bags, which provide protection against moisture and contamination during handling and transportation. For international destinations, white sugar can be loaded onto break-bulk cargo ships, but at a much slower load rate than raw sugar, or onto container ships. The same handling procedures used to transport white sugar also apply to brown sugar for direct human consumption, both being bagged at the time of production and shielded from contaminants during transportation.

Refineries are constructed not only in sugar producer countries but also in non-producer countries capable of capitalising on the white sugar premium by importing raw sugar to process it into refined sugar and thus meet national or regional demand. These countries have a comparative advantage in terms of costs, including freight, energy, processing expenses, and benefit, sometimes, from fiscal regimes and good port infrastructures, such as raw sugar storage capacities, particularly in regions like the Near East and North Africa (NENA) and India. In addition, some refineries are integrated into sugar beet and cane factories for utilisation during periods when the season concludes.

In Brazil, about three-quarters of sugar exports consists of raw sugar. Despite the global gradual transition of transportation methods from bulk vessels to containers over the last decade, bulk carriers for raw sugar continue to be dominant. This preference reflects logistical considerations, lagging refining capacity and trade regimes.

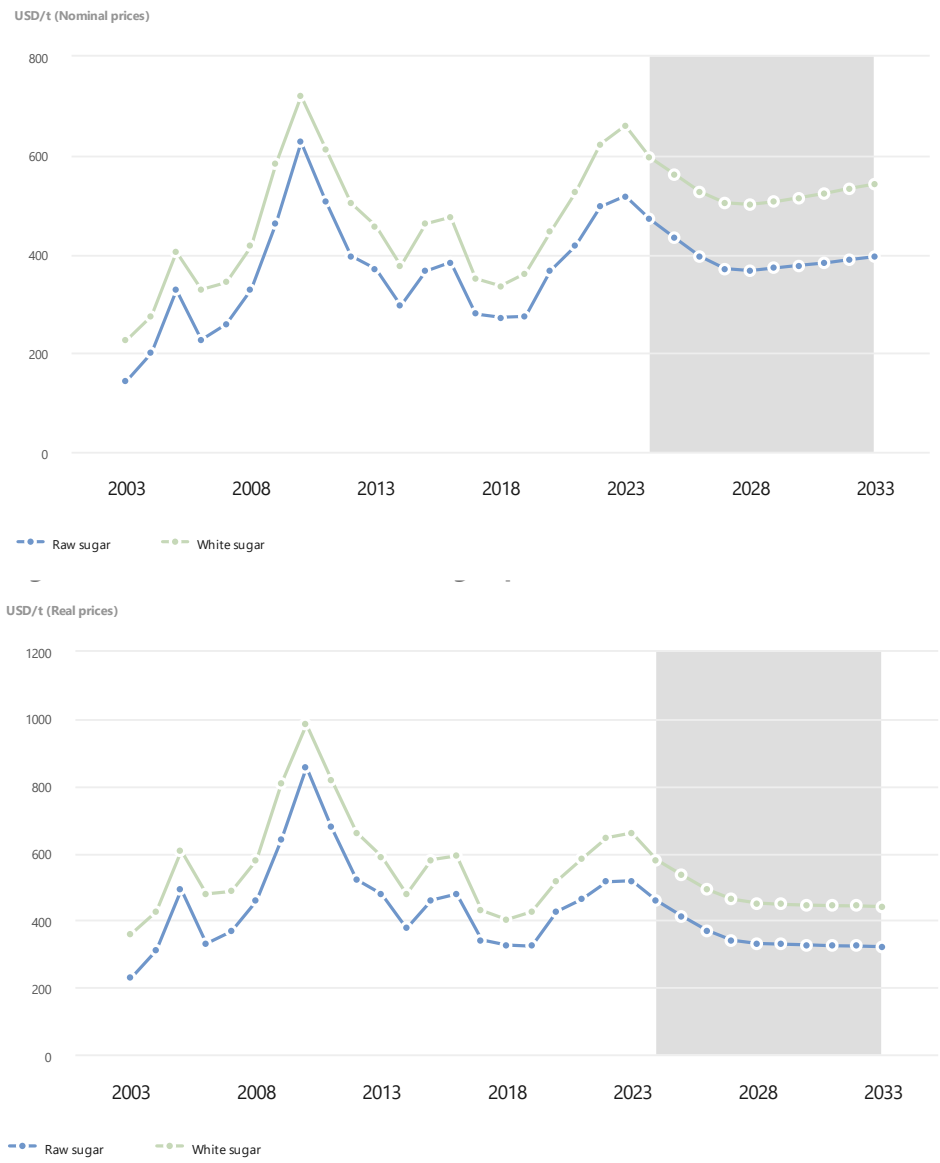
5.3.4. Prices

Sugar prices expected to fall in real terms

International sugar prices, in real terms, are foreseen to fall from the current high levels amid an improvement in global export availabilities and to decline during the projection period on account of productivity gains. The downward pressure on prices is expected to be partially offset by constant real international crude oil prices, as this would encourage the use of sugar crops for ethanol production.

The white sugar premium (difference between white and raw sugar prices), which was particularly high (on average USD 126/t during the base period) due to increasing energy costs and tightness on the white sugar market, is anticipated to increase slightly in nominal terms over the *Outlook* period, with the increase in the share of white sugar exports in total trade by 2033.

Figure 5.6. Evolution of world sugar prices



Note: Raw sugar world price, Intercontinental Exchange contract No.11 nearby futures price; Refined sugar world price, Euronext Liffe, Futures Contract No. 407, London. Real sugar prices are nominal world prices deflated by the US GDP deflator (2023=1).
Source: OECD/FAO (2024), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

5.4. Risks and uncertainties

This *Outlook* assumes normal climatic conditions which gives favourable prospects for sugar crop production. However, unfavourable weather events, such as those linked to climate change, could have a marked impact on output and prices, considering the relatively high market concentration for export. A change in returns compared to alternative crops could also influence planting decisions.

New investments in research and development in the sector including in new breeding techniques such as gene editing, and new diversification opportunities including bioethanol, bioplastics and biogas could also influence the dynamics of the market and availability of sugar for export.

Sugar crops are perishable products that can lose their sugar content if not quickly processed into sugar after harvest. Factors such as ambient temperature, humidity and period of storage also contribute to the decline in sugar recovery. The transport of refined sugar products needs to be done under appropriate conditions to avoid risks such as risks of contamination. Any enhancements in food loss and waste management within the sector might have impacts on the market.

Country-specific market developments may also affect global projections. Sugar markets will continue to be potentially vulnerable to any disruption in Brazil which is expected to play a major role over the *Outlook* period by representing over 45% of the global trade. In India, sugar exports are only allowed with permission from the Department of Food and Public Distribution since June 2022 to ensure adequate domestic availabilities and keep prices in check. The European Union has increased its raw sugar imports for refining and processed product re-exports, benefiting from the Inward Processing Relief. In addition, availability of shipping containers at country level and freight costs are crucial factors that significantly impact sugar trade on the global market. Finally, any deviation of the white sugar premium from the assumed increase in this *Outlook* could affect country decisions regarding refining and delivery capacity.

Given that 22% of global sugar crops are used for ethanol production, including 53% of the domestic crop in Brazil, the fluctuation of crude oil vis-à-vis sugar relative prices remains a major source of uncertainty as it affects the competitiveness and profitability of sugar production versus sugar crop-based ethanol production. In Brazil, when ethanol price is less than 70% of the gasoline price, it is more profitable for the driver at the gas station to use ethanol rather than gasoline. In India, the implementation of policies promoting the development of biofuels will add pressure on the availability of sugarcane for sugar, with the Ethanol Blended Petrol (EBP) Programme aimed at reaching a blending rate of 20% of ethanol in petrol (E20) by 2025/26. Any further policy development promoting ethanol production could have a consequential effect on sugar production.

Consumption projections could be influenced by several factors including high price elasticity of demand in countries with high growth prospects, and the potential shift in consumer preferences towards healthier products due to growing health concerns. Additionally, government initiatives such as imposing taxes on sweeteners to promote moderation, investments in research for lower-calorie substitutes, and product reformulation by the food industry could also impact consumption patterns.

Notes

[1] Including the Sugar Loan Program to supports prices paid to farmers; the Sugar Marketing Allotments for domestic production to cover up to 85% of domestic consumption; the Feedstock Flexibility Program to divert any sugar surplus to ethanol production, rather than sugar loan forfeitures to the USDA's Commodity Credit Corporation; and trade barriers to limit imports to domestic needs (through tariff rate quotas, regional agreements, and the Suspension Agreements on Sugar with Mexico).

[2] Tariff rate quota (TRQ) allocations under WTO or free trade agreements (FTAs), limited imports from Mexico due to the US Export Limit (set by the US Department of Commerce).

6 Meat

This chapter describes market developments and medium-term projections for world meat markets for the period 2024-33. Projections cover consumption, production, trade and prices for beef and veal, pig meat, poultry, and sheep meat. The chapter concludes with a discussion of key risks and uncertainties which could have implications for world meat markets over the next decade.

6.1. Projection highlights

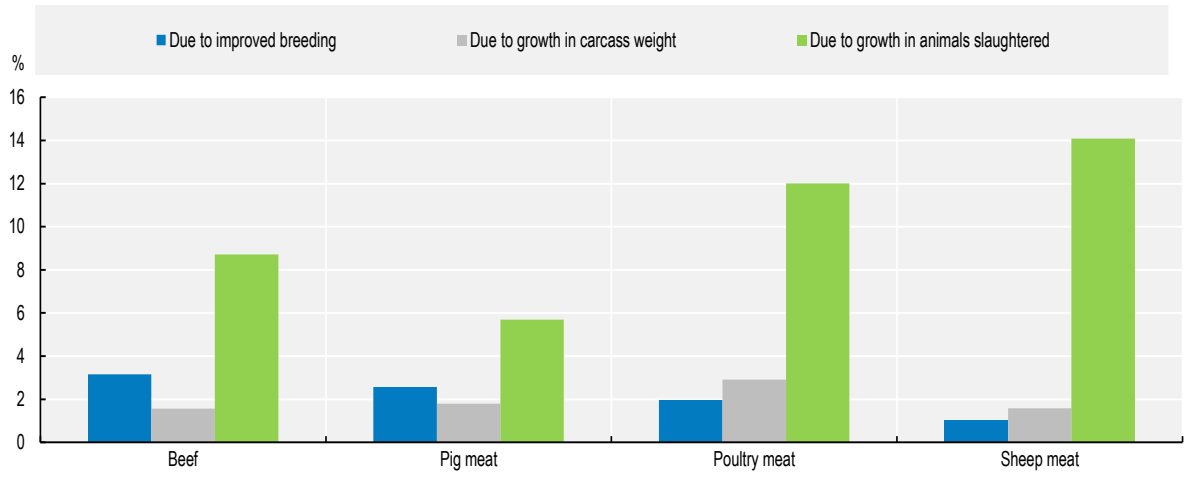
Global meat demand will slow

Over the medium term, the global average grams of daily meat protein consumed per capita is expected to increase by 3% or an additional 0.5 kg rwe (edible retail weight equivalent)/year by 2033, half the increase of the previous decade. The recent decrease in feed costs and reduction in general inflation in many parts of the world have not completely offset other higher production expenses, which will underpin retail meat prices, and restrain demand growth. In addition, reduced population growth and re-shaping demographics will diminish growth in aggregate meat demand. Global meat consumption is anticipated to rise 12% by 2033 relative to the *Outlook* 2021-23 base period.

The COVID-19 pandemic and economic downturn have significantly affected living costs, influencing consumer behaviors regarding meat consumption. Behaviour changes include include reduced dining out, increased home cooking due to remote work, and a trend towards more affordable proteins, elevating price as a key decision factor along with health or environmental concerns. Consumers have adjusted to higher meat prices and reduced purchasing power by shifting toward cheaper meats and meat cuts and a shift of out-of-home food expenditure towards the fast-food industry. However, following the general assumptions of the *Outlook* for modest growth with reduced inflation, and considering the emphasis on valuing healthy living, climate awareness, and lifestyle driven food choices, individuals with higher income will increasingly pay more for premium less processed meat options. This trend reflects a growing preference for quality over quantity in their dietary selections.

Advances in productivity, largely due to improved genetics and farm management, are expected to enhance breeding rates and animal slaughter weights, helping to ensure that supply keeps pace with demand (Figure 6.1). This balance will be maintained even as the industry navigates through challenges, such as the need for investment in production modernization, labour shortages, regulatory compliance, and environmental sustainability in the context of adverse weather and animal disease threats. These productivity advances, whether intensive or extensive production regimes, will play an increasingly critical role in planning and managing meat production, ensuring sustainability and limiting the environmental impact of livestock farming.

Figure 6.1. Sources of growth in the meat sector, 2033 vs base period 2021-23



Note: Improved breeding is calculated by the ratio of the number of animals marketed divided by the animal inventory.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

The *Outlook* anticipates a worldwide growth in livestock populations to be close to 2 billion cattle, 1 billion pigs, 32 billion poultry, and nearly 3 billion sheep. Consequently, the meat industry's greenhouse gas (GHG) emissions are predicted to rise 6% by 2033. This rise in emissions is smaller than the 12% growth in meat production, attributed to an increased proportion of poultry in the meat production mix and advances in productivity that allow for more meat to be produced per animal, with a decreasing amount of GHG emissions per unit of meat produced.

The economic growth of key meat markets remains relatively weak, and while the People's Republic of China (hereafter "China") will remain the biggest single market for meat, the pace of its economic recovery is uncertain. China's role in the global meat market remains crucial in the global meat economy, as its market share of trade, while declining from its recent high, will still represent 16% by 2033. There are growing signs the country will gradually become less dependent on non-ruminant meat imports. The reduction in China's pork imports since 2020 has contributed to decreased production among three of the four major exporters (the United States, the European Union, and Canada) starting in 2021, while Brazil has seen output growth due largely to real exchange rate depreciation, which has rendered its sector more competitive in the last decade. A less dramatic but similar decline in China's imports of poultry can also be observed.

This trade shift due to China is also causing global meat exports to return to the lower levels observed in 2019, mainly reflecting the significant impact on global pork market dynamics in particular, but also on the global meat sector's *Outlook*. Global meat trade is set to expand over the medium term, driven by rising demand linked to per-capita income growth in Asian countries and population-driven increases in Sub-Saharan Africa. The pace at which trade will increase will be moderate compared to the previous decade, with the proportion of globally traded meat output projected to rise back to the "African Swine Fever" induced high of 2021 toward the end of the projection period.

Meat prices started to decline in 2023 from historically high nominal levels. In real terms, the *Outlook* projects real prices of all meats to gradually return to their long-term downward trend levels influenced by reduced demand growth, lower real feed costs, and continuous improvements in productivity, particularly in genetics.

Animal disease outbreaks pose significant uncertainties for the meat sector, with economic impacts from such incidents often disrupting markets and requiring years for resolution. This underscores the importance of collaborative biosecurity efforts to ensure the sector's sustainability, particularly in the face of risks to exports and imports. The meat industry's environmental impact, notably its substantial resource consumption and GHG emissions, will be shaped by global demand trends, productivity improvements, and environmental policy implementation. Demographic changes, health awareness, and environmental concerns may gradually decrease meat consumption. In addition, the industry should aim to provide high-quality protein while pursuing sustainability, aligning with the United Nations Sustainable Development Goals through enhanced animal welfare, worker well-being, reduced packaging, and minimizing food loss and waste. Finally, the current disruptions in key maritime passages notably the Suez Canal, Panama Canal, and the Black Sea represent a complex challenge for trade. These disruptions, caused by geopolitical tensions, natural events, and logistical hurdles, have an impact on animal protein feed availability and global meat supply chains. They lead to increased transportation costs, delays, and supply chain inefficiencies, directly affecting the cost and availability of meat products.

6.2. Current market trends

Global Meat Supply Sluggish Amidst Persistent High Production Costs

In 2023, global meat production rose to an estimated 354 Mt, a modest 0.7% increase from the previous year. In Asia, especially China, the pig meat sector changed as small-scale farmers leaving the industry

liquidated their herds due to low profitability and tighter production regulations. In South America, production growth is due to increased competitiveness with depreciated exchange rates, while Oceania has benefited from an expanded supply of slaughter-ready animals. These gains are partially offset by lower production in Europe due to the higher cost of complying with stricter environmental legislation, reduced returns due to high inflation, animal diseases, and a declining herd population. Africa has faced adverse weather conditions and conflicts that disrupt livestock operations. Northern America is grappling with output declines responding to reduced returns for producers due to high production costs, including interest expenses.

Global meat trade fell to 39 Mt in 2023, 3% lower than the previous year. Imports are under pressure in Africa and Europe, limited by sluggish economic growth, high inflation, and currency depreciation affecting consumer purchases. Nevertheless, Asia and Oceania, import demand is rising modestly, driven by increased food services sales. For export, the United States and Australia have increased shipments due to their disease-free status and competitive prices. Global meat prices declined in 2023 after their nominal historical peak in 2022, mainly due to increased export availability from leading exporting regions and a slowdown in import demand by key meat-importing countries.

6.3. Market projections

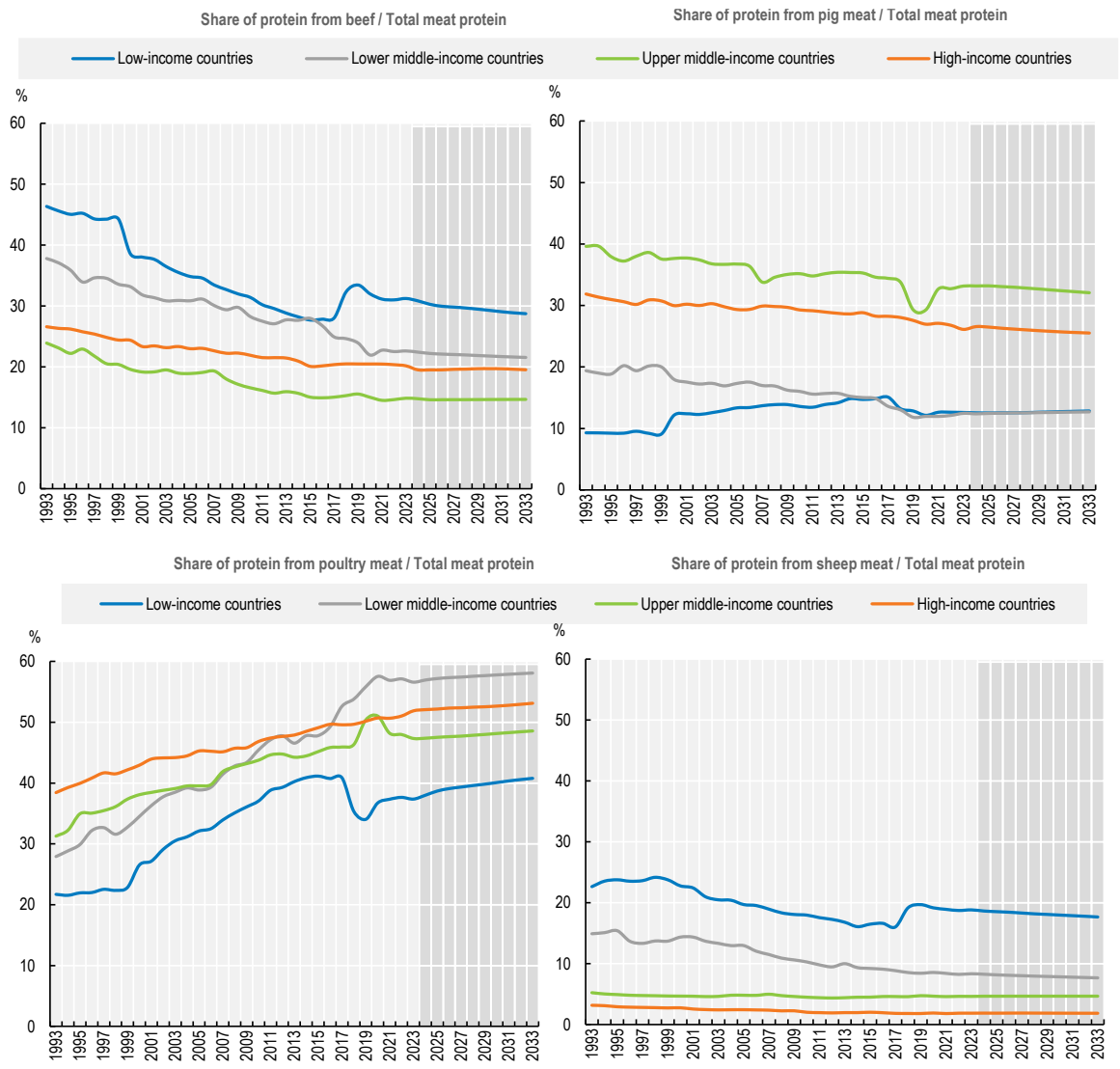
6.3.1. Consumption

Middle-income countries driving global increases in meat demand

Global poultry, pig meat, beef, and sheep meat consumption is projected to grow 16%, 8%, 11%, and 16%, respectively, by 2033. Per capita, meat consumption will rise by 2% by 2033, just 0.5 kg/year/person on an edible retail weight equivalent basis (hereafter “rwe”), reaching 28.6 kg/year/person rwe. This is only one-third of the growth rate in the previous decade. Consumption in most high-income countries (which represent 32% of total meat consumption for 16% of the population in 2023) will continue to stagnate, changing in composition based on the type and quality of the meat consumed[1]. Due to their lower base intake and more rapid increases in population and incomes, 79% of growth will be generated from middle-income countries. On a country basis, the growth in the volume of meat consumption, aside from China and India because of their vast population, is expected to be greatest in Viet Nam, the United States, and Brazil. Globally, there is a growing trend among consumers to become increasingly sensitive to animal welfare, environmental and health concerns. In some instances, shifts in preferences may lead to shrinking per capita meat consumption, as in the case of the European Union, for which the *Outlook* foresees an ongoing substitution of beef, pig meat, and sheep meat by poultry meat.

Global poultry consumption is projected to reach 160 Mt rtc, accounting for half of the additional meat consumed. The increase in poultry consumption in the last decade was driven by rising consumption in Asia, particularly in China, India, Indonesia and Viet Nam. These trends will continue, but consumption is projected to grow rapidly in other regions, including Brazil, Mexico, the European Union, and the United States. The global increase in protein from poultry consumption as a share of total protein from meat has been the main feature of the growth in meat consumption for decades, this trend is expected to continue (Figure 6.2). Poultry meat will account for 43% of the protein consumed from all meat sources in 2033, followed by pig, bovine and sheep meat. This is due to several factors and chief among them is price as poultry is by far the lowest priced meat. In addition, poultry contains a healthier combination of protein and fat than other meats. Environmental considerations also contribute to the shift towards poultry meat, as the production of red meat is more resource-intensive and leads to high greenhouse gas emissions. Poultry is therefore more attractive to sustainability/environment conscious consumers.

Figure 6.2. Share of proteins in total meat consumption



Note: Per capita consumption. The 38 individual countries and 11 regional aggregates in the baseline are classified into four income groups according to their respective per-capita income in 2018. The applied thresholds are: low: < USD 1 550, lower-middle: < USD 3 895, upper-middle: < USD 13 000, high: > USD 13 000.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/y8ism1

Global pig meat consumption is projected to grow in all regions, except in Europe, where consumption is already high, and health, environmental and societal concerns significantly impact consumer choice. However, pig meat will remain the most widely consumed meat in the European region. Pig meat will be the second largest contributor to the total growth in meat consumption and is projected to reach 131 Mt cwe by 2033. However, a decline of 2% will be recorded over the projection period in global per capita terms rwe. In Latin American countries per capita consumption is projected to increase by 1.3 kg/year rwe, due to favourable relative pig meat/beef prices. Elsewhere, per capita demand is anticipated to grow less or remain stagnant.

Global beef consumption is projected to reach 81 Mt cwe over the next decade, roughly in line with population growth, remaining stable at around 6 kg per capita rwe. Most regions are projected to reduce

their beef intake, apart from the Asia-Pacific region, where per capita beef consumption is projected to increase by 0.5 kg/year rwe. This is partly due to a growing middle class which has increased demand for meat, including beef. China, India and Pakistan, the world's second, fifth, and sixth largest beef (including carabeef) meat consumers, although relatively low in per capita terms are projected to see further increases in their per capita consumption by 2033. In contrast, Latin America, North America and Oceania, which historically have strongly preferred beef, are expected to see the most significant decrease in per capita consumption as beef prices move higher than those of substitutes. There are also growing concerns about the environmental impact of beef production, which is perceived as a significant contributor to greenhouse gas emissions.

While sheep meat consumption is a relatively small part of the global meat market, it remains an essential source of protein for many consumers in the Middle East and North Africa, where pig meat is not a substitute. While some change is occurring in global dietary patterns, the contribution of sheep meat to total protein from meat is projected to remain stable (Figure 6.2). It is often a traditional (cultural) food choice, although beef and poultry are more widely available and cheaper than sheep meat.

6.3.2. Production

Productivity growth is key to containing higher costs

High costs of production, increasingly stringent regulatory frameworks and various disease outbreaks have posed significant challenges for meat producers worldwide in recent years. While high feed costs have abated, rising operating and labour costs make it more difficult for meat producers and processors/retailers, especially at the beginning of the *Outlook* period, as inflation of input prices and interest rates also remain high. Environmental and animal health regulations are multiplying everywhere, with associated costs of compliance. In this setting, sector participants must strive for higher productivity in order to remain competitive. The *Outlook* anticipates that higher productivity will result from improved breeding and operational management practices and higher slaughter weights. Figure 6.1 elaborates on how these gains will evolve over the *Outlook*. Greater feed efficiency, with less feed required per kg of meat production as reported in Table 6.1,[2] is also projected to continue at trend rates.

World meat production is projected to rise 12% or 41 Mt cwe to an estimated 388 Mt cwe by 2033. Most of the growth in meat production will occur in Asia, globally led by a 19 Mt increase in poultry production (Figure 6.3). In China, the rebound in pig meat production following its past ASF outbreak will offset the projected decline in European pig output, where factors such as societal criticism, ASF outbreaks, stricter environmental laws and animal welfare regulations will impact markets. Meat supplies from Latin America will continue to increase production share, underpinned by more favourable competitive conditions.

Poultry will increase its dominance within the meat complex, accounting for half of the additional meat produced in the next decade. Driven by domestic demand, poultry production will expand most rapidly in developing countries. Rising demand for animal protein, including eggs for the bakery and confectionery sectors, is underpinning growth. Poultry has advantages over other meats in terms of production cycle, higher feed conversion ratio with lower costs, and proximity to fast-growing urban markets.

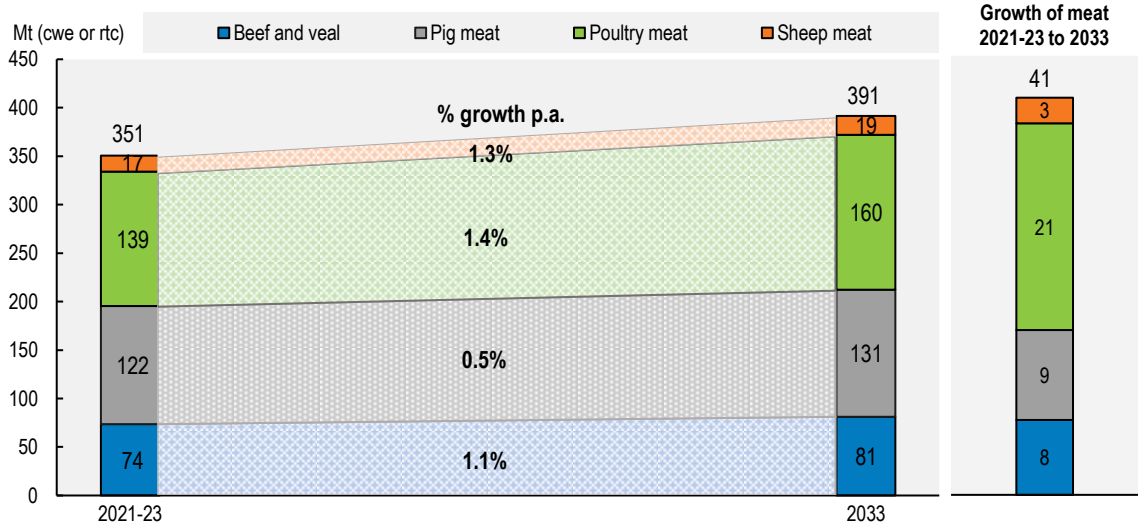
Several factors will constrain the growth of the poultry sector. The rising density of poultry production increases the risks of disease (e.g. HPAI), which, while improved detection and treatment make them more easily contained, also raises costs for the industry. Poultry production also faces environmental and health challenges, particularly regarding antibiotic use and animal welfare concerns.

Table 6.1. Trends in non-ruminant Feed Conversion Ratios in selected countries

Country	Commodity	Average 2021/2023	2014-2023	2024-2033
		kg of feed / kg of meat live weight	%/yr	%/yr
Argentina	Poultry	1.77	-0.13	-0.06
	Pork	3.62	-0.27	-0.17
Australia	Poultry	1.76	-0.15	-0.06
	Pork	3.60	-0.29	-0.14
Brazil	Poultry	1.73	-0.16	-0.05
	Pork	3.44	-0.35	-0.15
Canada	Poultry	1.73	-0.16	-0.05
	Pork	3.44	-0.35	-0.15
China	Poultry	1.24	0.71	0.46
	Pork	3.01	3.85	0.53
European Union	Poultry	1.77	-0.14	0.06
	Pork	3.53	-0.34	-0.14
India	Poultry	2.15	-0.01	-0.04
	Pork	4.48	-0.01	-0.04
South Africa	Poultry	2.1	0.03	-0.04
	Pork	4.38	0.03	-0.04
Thailand	Poultry	2.13	-0.03	-0.12
	Pork	4.43	-0.03	-0.12
United States	Poultry	1.73	-0.16	-0.05
	Pork	3.44	-0.35	-0.15
Viet Nam	Poultry	2.15	-0.02	-0.06
	Pork	4.47	-0.02	-0.06

Note: Trend growth rates are computed from trend regression over the period indicated.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database).

Figure 6.3. Growth of meat production by meat type, 2033 vs. 2021-23



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

StatLink https://stat.link/u6r4n0

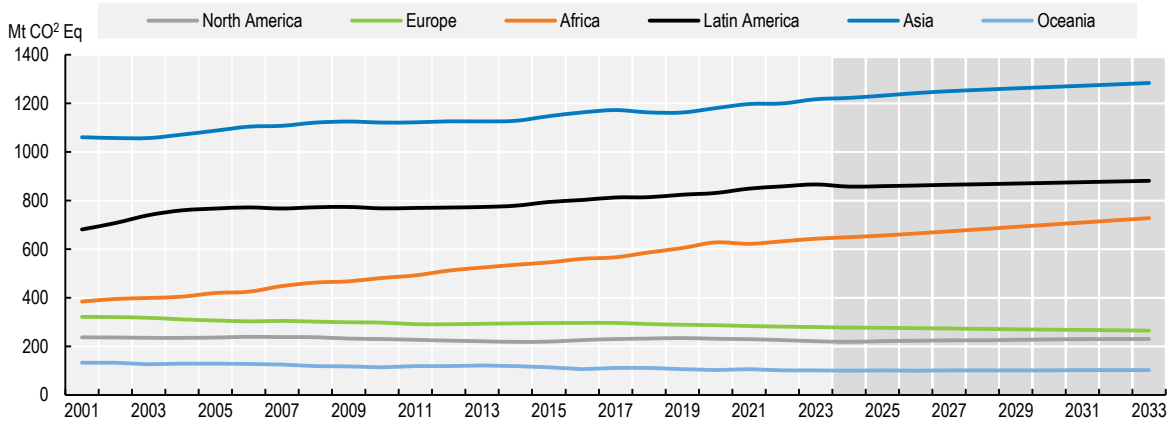
Recovery from ASF in Asian countries is assumed to occur during the first half of the *Outlook* projection, so global pig meat production is projected to increase by 0.5% p.a. during the next decade. Most of the increase will occur in the Asian ASF-affected regions, where conversion from largely small-scale backyard holdings to large-scale commercial enterprises with higher biosecurity standards is taking place.

Beef production will rise over the medium term with higher animal carcass weights, improved animal genetics and improved farm management. The output will reach 81 Mt cwe by the end of the *Outlook* period (Figure 6.3). The main contributor to this expansion in global beef supply is China's growth following technological improvements. India will also be one of the main contributors to the production expansion as efforts have been made to improve the infrastructure for the meat industry, including export-oriented integrated meat processing plants, as Indian buffalo meat has a huge demand in the international market. While the United States and Brazil's beef herd continue their destocking phase at the start of the *Outlook*, Australia's increasing slaughter capacity and profitability will trigger higher beef production over the *Outlook* period.

Global sheep production is anticipated to reach 19 Mt cwe by 2033 due to flock rebuilding and increased lambing rates in response to higher prices, particularly in China, which will contribute 16% of additional production. Production in the European Union is projected to increase marginally from the current level despite the continued decline in the EU countries that entered into the European Union before 2004 in spite of production-coupled income support and favourable producer prices in the main sheep-producing Member States. New Zealand's pledge to reduce GHG emissions is expected to constrain flock size as productive sheep land is converted into plantations for carbon credits.

The livestock sector will face rising concerns about its environmental footprint. GHG emissions from livestock are projected to rise by 6% by 2033. This increase is lower than that of meat production due to the shifts towards poultry production, national low-carbon emission initiatives, and increased productivity, which yields higher meat output from a given stock of animals. The strongest growth in meat-related greenhouse gas emissions will be in Africa, where they will be over 15% higher in 2033 than in the base period. Emissions in Europe and Oceania from meat production are expected to decline by 6% and 1%, respectively (Figure 6.4).

Figure 6.4. Strongest growth in GHG emissions from meat in Africa



Note: Estimates are based on historical time series from the FAOSTAT Climate Change: Agrifood systems emissions databases which are extended with the Agricultural *Outlook* projections. CO2 equivalents are calculated using the global warming potential of each gas, as reported in the IPCC Sixth Assessment Report (AR6).
Source: OECD calculations based on FAOSTAT-Emissions Totals, Statistical Division of the UN Food and Agriculture Organization (accessed December 2023). FAOSTAT Emissions-Agriculture Database, http://www.fao.org/faostat/en/#data/GT; OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

The *Outlook* implications for GHG emissions from meat production are broadly consistent with those of the IPCC. Looking beyond the medium term into the longer term, demographic trends and consumer preferences are anticipated to translate into a rise from 6.2 Gt CO2eq in 2015 to 9.1 Gt CO2eq by 2050 with no intervention in terms of GHG reduction assuming no change in the emission per unit of output and no efficiency improvement along the production chain (Box 6.1).

Box 6.1. Pathways towards lower emissions: A global assessment of the greenhouse gas emissions and mitigation options from livestock agrifood systems

A new FAO report presents a detailed analysis of greenhouse gas (GHG) emissions from livestock systems and explores various mitigation options. Utilising the Global Livestock Environmental Assessment Model (GLEAM), it quantifies emissions related to livestock, including direct emissions from enteric fermentation and manure management, and indirect emissions from the production of feed and other inputs. The report finds that in 2015, livestock systems contributed approximately 6.2 gigatonnes of CO2-equivalent emissions, accounting for around 12% of all anthropogenic GHG emissions. Cattle farming is the largest source of emissions, responsible for 62% of the sector's output. The report also highlights significant variations in emission intensity across different countries, species, and production systems, influenced by factors such as breeds, management practices, and environmental conditions. While there is no one-size-fits-all solution to lowering emissions from livestock, it stresses the importance of adopting sustainable practices to reduce emissions and mitigate the environmental impact of livestock systems by enhancing animal health, breeding practices, feed quality, and other targeted GHG mitigation measures such as rumen manipulation and feed additives. These measures can reduce emissions while meeting the 20% increase in livestock product demand mostly anticipated to originate from the Americas and Asia by 2050.

Source: FAO (2023), *Pathways towards lower emissions – A global assessment of the greenhouse gas emissions and mitigation options from livestock agrifood systems*. Rome https://doi.org/10.4060/cc9029en.

Measures to reduce food loss and waste (FLW) in the sector may also lower the need for production and, hence, reduce the sector's resource footprint. Global attention has been drawn to the issue of food loss and waste in the food value chain which is discussed extensively in Chapter 1 and was described relative to the livestock sector in last year's *OECD-FAO Agricultural Outlook* 2023-2032[3], Box 6.2 noted that estimates of food loss and waste differ depending on the methodology used. Current estimates used in the Aglink-Cosimo model assume that 20% of production (69 Mt) in cwe in the meat sector is assumed to be lost or wasted and estimates that household consumption accounts for 55% of total food waste, followed by distribution (25%) and post-slaughter losses (20%).[4]

Some benefits can be achieved by promoting a circular bioeconomy along livestock supply chains. Likely improvements also include better farm management education, adequate cold chain facilities, technological innovations like active packaging and Radio-Frequency Identification for longer shelf life, improved organisational strategies in distribution, such as a stock rotation strategy that ensures older stock (first in) is sold or used before newer stock (first out), and consumer education on food handling, planning and storage to mitigate waste effectively. Highlighting the importance of targeted interventions at each stage to mitigate food loss and waste in the meat sector may lead to improved policy approaches.

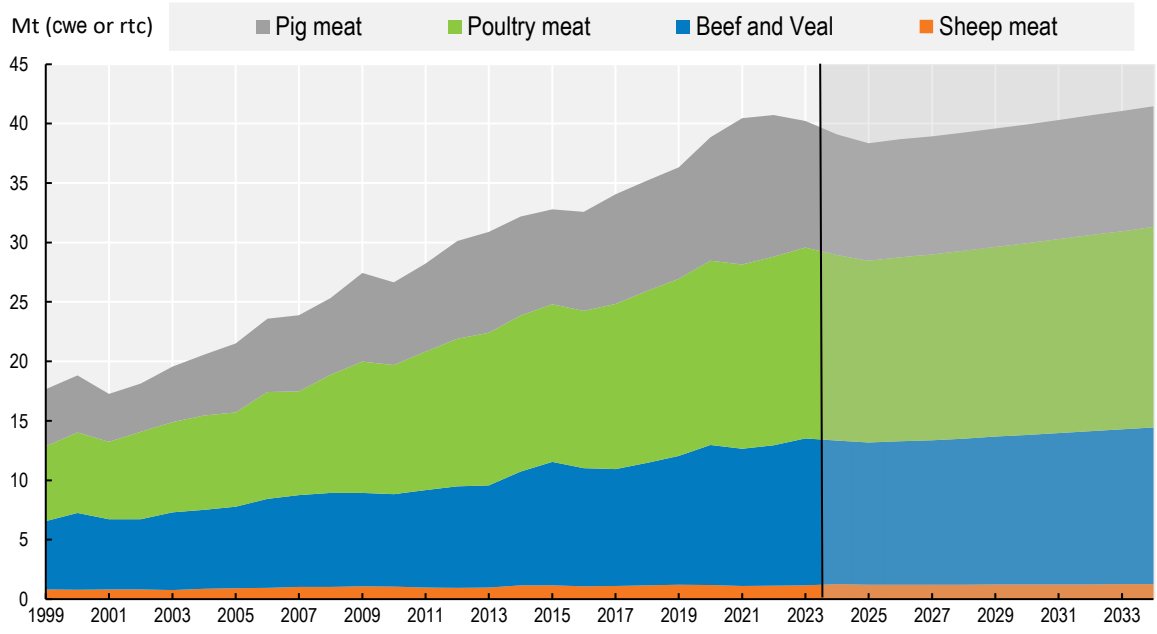
6.3.3. Trade

Meat exports will return to 2021 high by the end of the Outlook

Meat trade was at historically high levels in 2020-2021, largely due to high import demand by China during its ASF outbreak, when it accounted for almost one-quarter of global imports. With the recovery of China's

meat sector, China's self-reliance policy will underpin its production of pork as well as poultry, which has been affected by Avian Influenza. Given the importance of China's trade, global meat trade will continue to decline in the initial year of the *Outlook.* Nevertheless, with underlying growth in African markets, trade will return to their level of 40 Mt cwe last seen in 2021. (Figure 6.5).

Figure 6.5. Meat trade will decrease at the start of the *Outlook*



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

North and South America are expected to account for more than half (56%) of global meat exports by 2033, a share that will remain stable over the *Outlook* period. The share of the two major exporters, Brazil and the United States, each representing 20%, will also remain stable over the projection period.

Argentina, Australia, Brazil, and Thailand are expected to record the most significant increase in global meat exports, benefiting from favourable exchange rates and feed availability. India's meat exports decline are particularly notable as they consist of lower-priced buffalo meat, fulfilling consumers' demand for low-cost meat in developing countries.

The European Union's global meat export share will continue its decline, which started in 2021 to reach 15% in 2033. The most significant growth in import demand originates from Africa, which will account for 73% of additional imports of all meat types. While Chinese meat imports remain high in the early part of the projection period, a gradual decline is projected as poultry and pig meat production recovers from the disease outbreak. In terms of composition, poultry will account for 72% of the additional meat imports, bringing its share of total meat imports to 41% by 2033.

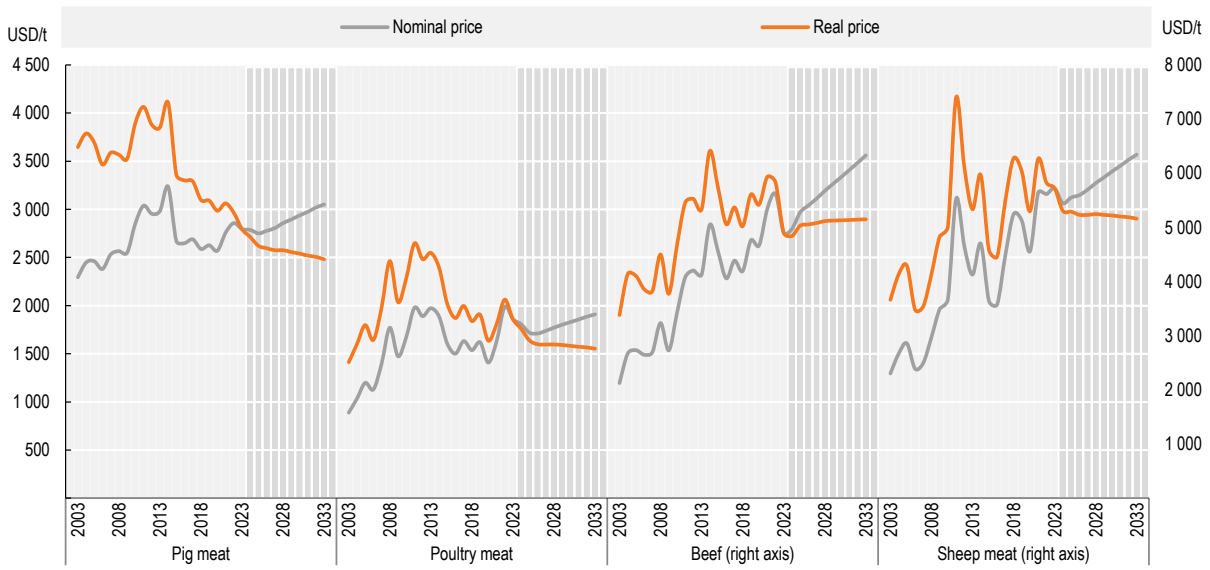
Australia and New Zealand will continue to lead global sheep meat markets. Australia is expected to increase lamb exports (of higher value) to high-end restaurants at the expense of mutton, while in New Zealand, exports will slowly decline as land use shifts from sheep farming. The rising middle-class consumer in the Middle East is the source of higher import demand.

6.3.4. Prices

Real prices of meat are expected to remain well below their 2013-2014 peaks

The *Outlook* projects that meat prices over the medium term, after recent years of high prices, are expected to decline gradually following the decrease in feed costs and general inflation, in both nominal and real terms at the start of the *Outlook* period. As incomes rise, consumer spending on meat, especially poultry, is likely to rebound. The *Outlook* projects real prices of meats to gradually return to their long-term trend levels influenced by lower real feed costs and continuous improvements in productivity, but reduced demand growth for red meat is expected to keep prices low. Meat prices in real terms are projected to be 7% to 19% lower than their 2021-2023 averages (Figure 6.6).

Figure 6.6. World reference prices for meat -rising in nominal, but falling in real terms



Note: Real prices are nominal world prices deflated by the US GDP deflator (2023=1). United States: Meat of Swine (Fresh, Chilled or Frozen) export unit value USD/t, Brazil: Meat and Edible Offal of Poultry (Fresh, Chilled or Frozen), export unit value USD/t, Beef (Australia), cow forequarters, 85% chemical lean, c.i.f. US imported USD/t, New Zealand: Lamb 17.5kg, USD/t cwe.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/rj8cx0

6.4. Risks and uncertainties

Biosecurity stands as a crucial concern for the meat industry

The meat sector faces several uncertainties in meeting the increasing demand for meat products while addressing concerns about animal disease, weather and environmental sustainability, consumer preferences, animal welfare, public health and trade policies.

Disease outbreaks are a continuous threat to markets. They have a variety of socio-economic costs, depending on the country and situation, including the loss of export markets, reduced imports from affected countries, or decreased consumer purchases due to health concerns. While these costs can be high globally, they can be mitigated by supplies from alternative disease-free markets or by following World Organization for Animal Health (WOAH) protocols that localise disease impacts on trade.[5]

Seasonal conditions and climate change will have negative but uncertain impacts on the *Outlook*. First, they will potentially reduce the availability of feed, water, and other resources critical to livestock production. Secondly, increased adoption of policies to address climate change may increase costs of production and adherence to regulations. Third, the growing shift in consumer preferences toward more environmentally conscious purchases may result in reduced demand for traditional meat products which could have significant implications for the meat industry.

Consumer increasingly prefer healthier food options.[6] It has already been noted that consumer preferences have shifted in favour of poultry meat as a high-protein/low-animal-fat meat. Concerns have also been raised about the health effects of consumption of red[7] versus white meat. Furthermore, public health concerns over antibiotic resistance are increasing, and there are pressures to reduce the use of antibiotics in animal agriculture.

Finally, international trade plays a vital role in the meat sector, and changes in trade policies—tariffs and trade bans—can also significantly impact national and global markets. After several decades of more liberal trade, recent tendencies toward more protectionism will reduce trade and generally lower trade prices.

Notes

[1] In the United States, for example. Kuck, G. and G. Schnitkey. "An Overview of Meat Consumption in the United States." farmdoc daily (11):76, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, 12 May 2021.

[2] More detailed analysis is reported in the OECD/FAO (2022), *OECD-FAO Agricultural Outlook 2022-2031*, OECD Publishing, Paris, https://doi.org/10.1787/f1b0b29c-en. Box 6.1"Productivity change in the meat sector".

[3] OECD/FAO (2023), *OECD-FAO Agricultural Outlook 2023-2032*, OECD Publishing, Paris, https://doi.org/10.1787/08801ab7-en.

[4] Average 2021-2023, with significant regional variations and disparities among food groups.

[5] Currently, a country affected by ASF is not obliged to completely stop its exports if it takes the measures recommended by the WOAH.

[6] "Affordability, freshness, taste and nutritional value figure among consumers' top priorities when making food purchases in the nine surveyed countries (Chapter 5)". OECD (2023), *How Green is Household Behaviour?: Sustainable Choices in a Time of Interlocking Crises,* OECD Studies on Environmental Policy and Household Behaviour, OECD Publishing, Paris, https://doi.org/10.1787/2bbbb663-en.

[7] Health effects of red and processed meat: WHO https://www.who.int/news-room/questions-and-answers/item/cancer-carcinogenicity-of-the-consumption-of-red-meat-and-processed-meat.

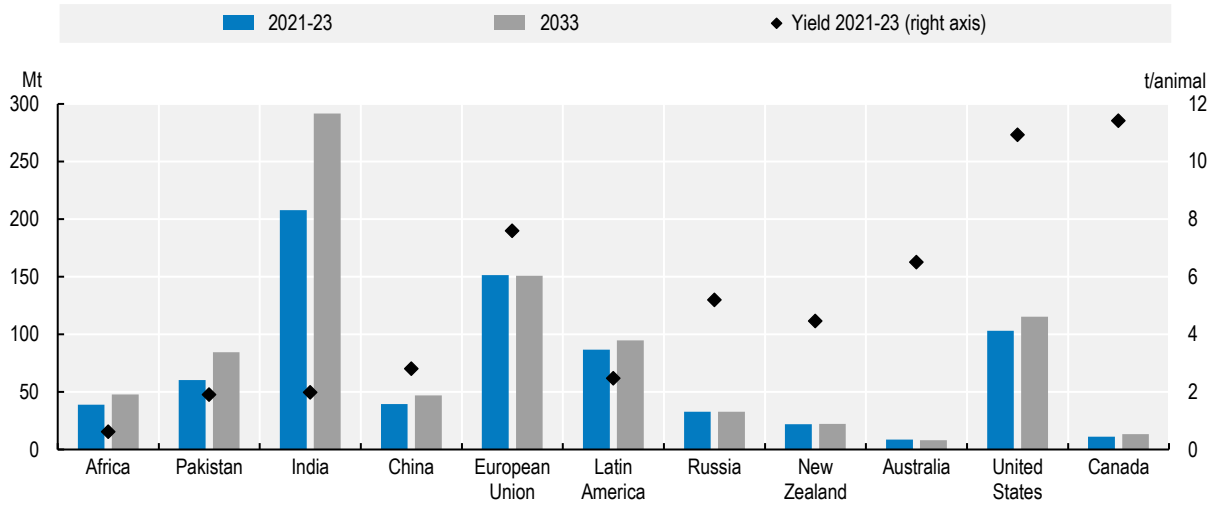
7 Dairy and dairy products

This chapter describes market developments and medium-term projections for world dairy markets for the period 2024-33. Projections cover consumption, production, trade and prices for milk, fresh dairy products, butter, cheese, skim milk powder and whole milk powder. The chapter concludes with a discussion of key risks and uncertainties which could have implications for world dairy markets over the next decade.

7.1. Projection highlights

Milk and dairy products are nutrient-rich foods, providing energy and high-quality protein with a range of essential micronutrients. The dairy sector supports the livelihoods for millions of people in its value chains across the world. World milk production (roughly 81% cow milk, 15% buffalo milk, and 4% for goat, sheep and camel milk combined) is projected to grow at 1.6% p.a. over the next decade (to 1085 Mt in 2033) supported by yield per animal. This rate of growth is faster than other main agricultural commodities. More than half of the growth in production is anticipated to come from India and Pakistan which will jointly account for over 30% of world production in 2033 (Figure 7.1). In the People's Republic of China (hereafter "China") and many African countries noticeable production growth is also projected. Production in the second largest milk producing region, the European Union (EU), is forecast to decline slightly due to the stagnating demand, production constraints due to environmental policies, and the expansion of alternative production systems (e.g. organic, pasture-based), which together cause a decline in cow numbers. In Oceania, the production is expected to continue a moderate growth, more slowly than in North America, due to policies on sustainable production and the expansion of organic production and pasture-based production systems. Globally, the projected growth in the number of cows is expected to be moderate. Over the projection period, yields across the world are expected to grow steadily with the strongest growth expected in Southeast Asian and some African countries, albeit from low base.

Figure 7.1. Milk production and yield in selected countries and regions



Note: The yield is calculated per cow/buffaloes.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

Although milk production in the three major dairy exporters, New Zealand, the European Union, and the United States increased modestly, their exports of dairy products remained strong due to stable domestic consumption. The largest milk producer, India, is expected to maintain relatively fast growth with almost all production being consumed domestically. The United States is forecast to remain the country with the fastest growing production of skim milk powder (SMP), while the European Union, the biggest producer of cheese is expected to continue its long-term growth of cheese production. With lower international demand and declining milk production, EU whole milk powder production (WMP) is expected to continue its downward trend over the next decade.

Dairy products continue to be highly valued by consumers as a key component to an overall 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 demand for fresh dairy products. Further increases in cheese consumption are expected in Europe and North America. After several years of growth, EU per capita consumption of butter is projected to remain flat over the next decade as consumers shift to diets with a lower fat content.

Milk is traded internationally mainly in the form of processed dairy products. The EU, New Zealand, and the United States are expected to remain the top exporters of processed dairy products and are projected to jointly account for nearly 70% of total exports. New Zealand is the leading exporter of butter and WMP, while the European Union is the main exporter of cheese. Since 2021, the United States has surpassed the EU as the world's dominant exporter of skim milk powder (SMP) and this trend is expected to continue over the medium term.

China is projected to remain the world's largest importer of milk products including cheese, butter and SMP. China is also the world's largest WMP importer but is anticipated to import less in response to the buildup of stocks, government subsidies to stabilise the domestic processing sector and developing consumer preferences for raw milk products over reconstituted products. The projected increase in import demand for dairy products in Southeast Asian countries and in African countries will be driven by population growth as well as an expanding middle class which consumes more livestock products in its diet. The Russian Federation (hereafter "Russia"), Mexico and countries in the Near East and North Africa (NENA) region will also continue to be important net importers of dairy products.

In 2023, prices dropped significantly from their high 2022 levels for all dairy products, mainly driven by a decrease in input costs and lower global consumption due to 2022's high prices. Overall, prices for dairy products are projected to develop in line with other major agricultural commodities and to resume a gradual nominal increase following a downward adjustment in the first projection years. Since 2015, the price of butter has been considerably higher than for the SMP and the gap 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.

The dairy sector in major exporting countries is facing several economic and environmental challenges which are expected to continue over the next decade. Although the growth rate of plant-based replacements is strong in certain regions, especially in East Asia, Europe, Oceania and North America, there are conflicting views regarding their environmental impact and health benefits which lead to uncertainties about their long-term impact on dairy demand. Nevertheless, per-capita consumption of fresh dairy products is expected to decline in Europe, Oceania and North America, partly displaced by an increasing consumption of plant-based alternatives. The introduction of a wide range of sustainable production policies and growing consumer concerns about the health implication of consumption of dairy products would impact the projections for the dairy sector. In some countries, dairy production accounts for a substantial share of overall greenhouse gas emissions (GHG), resulting in discussions on how adjustments to dairy production scale and technology could contribute to reducing such emissions. The risk of animal disease outbreaks in some countries could threaten production and trade and limit the development of dairy sector growth, especially in Western Europe. Despite its position as the world's largest milk producer, India has, so far, played only a minor role in the global dairy market. As such, any further integration of India into the international market could have a strong impact. This seems more and more plausible as some Indian dairy companies are actively exploring the prospects of exporting to neighboring countries.

7.2. Current market trends

Dairy prices in 2023 fell significantly from historical high levels

In 2023 the FAO Dairy Price Index value fell sharply by 21% from its high 2022 levels for all dairy products. International dairy prices declined slowly between mid-2022 and the end of 2023. The drivers of this sharp decline were mainly the decrease in input costs and lower global consumption due to the high prices.

World milk production grew 1.5% in 2023 to about 927 Mt. In India and Pakistan, production increased by 3% to reach 220 Mt and 63 Mt respectively, but with little impact on the world dairy market as they trade only marginal quantities of milk and dairy products. Among the three major exporters, the production in 2023 increased in the United States and the European Union but declined in New Zealand. The decrease in milk production in New Zealand is partly explained by dry weather, lower farmgate milk prices, higher production costs and a shrinking dairy herd.

World dairy trade fell in 2023 for a second consecutive year by around 0.2% due to the considerably smaller import demand from China, especially for whole milk powder (WMP). However, other major importers of dairy products-Saudi Arabia and Mexico- increased their imports. Of the major exporters, the United States would be a strong beneficiary of any additional export demand due to production constraints in the European Union and New Zealand.

7.3. Market projections

7.3.1. 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 demand growth in India and Pakistan, which in turn is driven by income and population growth. World per capita consumption of fresh dairy products is anticipated to growth by 1.0% p.a. over the coming decade, primarily driven by higher per-capita income growth.

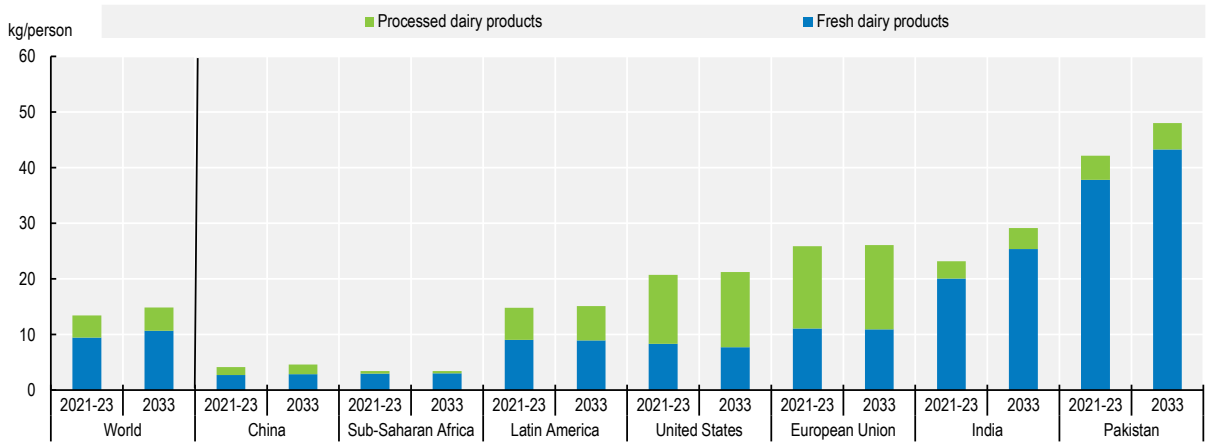
Milk consumption per capita (in terms of milk solids) varies widely across countries (Figure 7.2), driven by varying growth in incomes and regional preferences. The most significant growth is expected in India and Pakistan, where consumption is expected to increase to 25 and 45 kg per capita, respectively. The average fresh dairy consumption per capita in China is significantly lower than in the European Union and North America. In low- and lower middle-income countries most of the production is consumed in the form of fresh dairy products.

In Europe and North America, overall per capita demand for fresh dairy products is stable or declining but the composition of demand has been shifting over recent years against dairy fat such as full-fat drinking milk and cream. Plant-based dairy replacements are increasingly established and competing 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. Butter consumption has seen a recovery in North America and Southeast Asia due to shifting preferences. Consumers may be influenced by recent studies that have shed a more positive light on the health impact from butter consumption, contrary to earlier messaging. In Southeast Asian

countries, butter is not only the most consumed processed dairy product, accounting for almost half of all processed dairy consumption in terms of milk solids, but it also has the strongest projected growth (Figure 7.3). Most of it will be used as an ingredient in a wide range of products including cookies, cakes, pies and other baked goods.

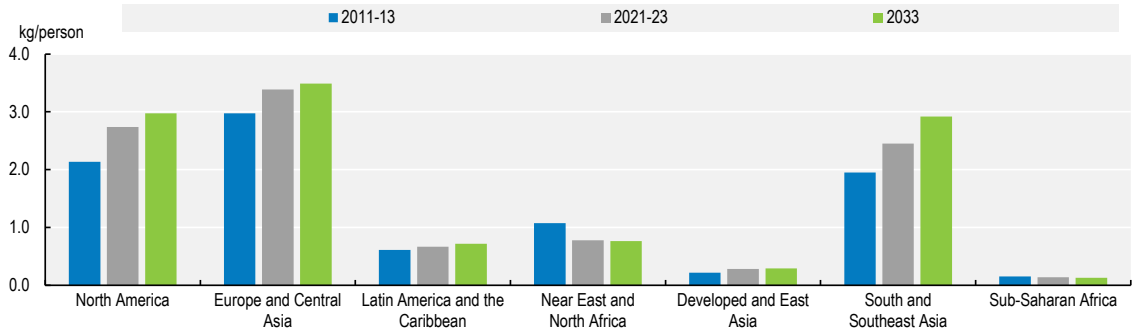
Figure 7.2. Per capita consumption of processed and fresh dairy products in milk solids



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

StatLink https://stat.link/7p59yv

Figure 7.3. Per capita consumption of butter in selected regions



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

The dominant use of 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 import alternative for reconstituted fresh dairy products, such as milk and yogurt especially in Africa and other regions with limited milk production.

In contrast to non-perishable commodities, dairy products experience relatively higher levels of food loss and waste, especially for fresh milk due to its highly perishable nature. Approximately 4.5% is lost during processing. At retail level, distribution waste reduces global food availability by an additional 2.5%, while household waste estimates reach 12%. Over the next decade, food waste volumes in the dairy sector are projected to rise by 17% by 2033, while loss volumes are expected to increase by 13% and 24%, at distribution and at household level respectively compared to current levels.

7.3.2. Production

Greater efficiency in milk production from yield growth

World milk production is projected to grow at 1.6% p.a. (to 1 085 Mt by 2033) over the next decade, faster than most other important agricultural commodities. Growth in the number of cows is expected to be moderate in North America and China but strong in Sub-Saharan Africa and in major milk-producing countries such as India and Pakistan – where yields are low. Yields across the world are expected to grow steadily over the next decade. Nevertheless, in most regions, yield growth is expected to contribute more to production increases than herd growth (Figure 7.4). This yield growth will be achieved through optimising milk production systems, improved animal health and feed efficiencies and improved genetics.

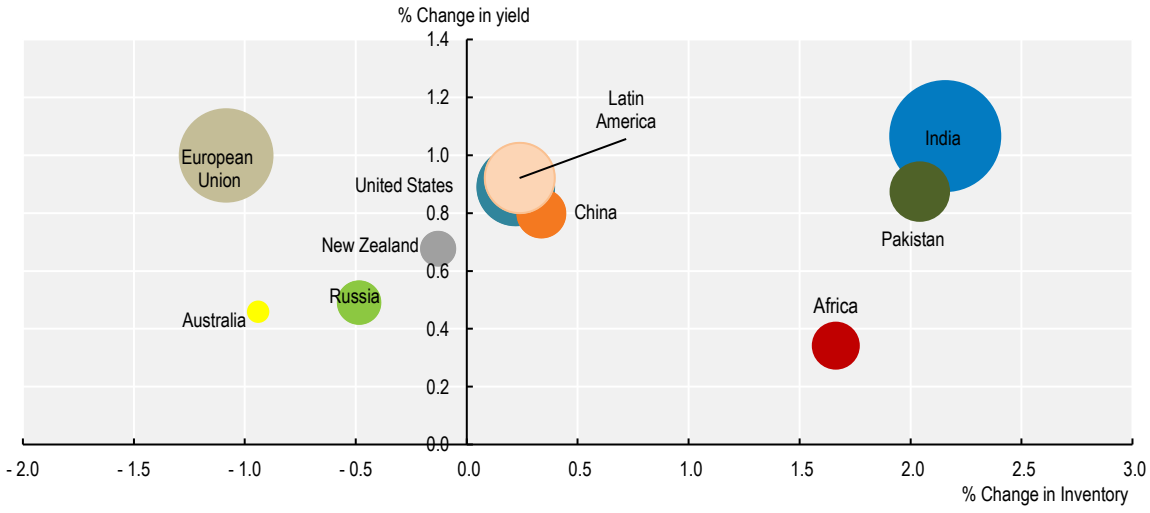
India is the largest producer of milk and is expected to experience a continued strong production growth. Production is based on small households connected to cooperatives for processing and distribution. This integration into the wider supply chains is also important for the value added to dairying in India. The growth is expected to come from more milking cows and buffaloes as well as from yield increases.

Production in the European Union is projected to decline 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. Germany, France and Italy have also seen an increase in organic dairy production. However, as organic yields are about a quarter lower than in conventional production systems and organic systems incur higher production costs, they need to command a substantial price premium to compensate.

The average yields per cow in North America is four times higher than the global average, as their share of grass-based production is low, and feeding is focused on high yields from specialised dairy herds (Figure 7.4). Dairy herds in the United States and Canada 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.

Although the share of New Zealand in world milk production is only 2.5%, it is the most export-orientated country. After expanding milk production strongly over the last twenty years, milk output growth has stalled in recent years, and is projected to grow at 0.5% 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. The main constraining factors for growth are land availability, increasing environmental restrictions and the pricing of enteric methane from 2025 (Zero Carbon Amendment Act of 2019 to the Climate Change Response Act of 2002). Nevertheless a shift to more feed-based production systems is not likely.

Figure 7.4. Annual changes in inventories of dairy herd and yields between 2024 and 2033



Note: The size of the bubbles refers to the total cow milk production in the base period 2021-23.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/wakdbc

Strong production growth is expected in Africa, mostly due to larger herds. 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). Additional grazing occurs on the same pasture, leading to a more intensive use which may lead to local over-grazing. Over the projection period, about a third of the global dairy animal population is projected to be in Africa and to account for around 6% of world milk production.

Globally, around 30% 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, most of the milk production is transformed into dairy products. Butter and cheese currently account for a large share of consumption of milk solids in Europe and North America due to the significant direct food demand for these products. SMP and WMP are largely produced for trade, for use in the food processing sector, notably in confectionery, infant formulae, and bakery products. In low- and lower middle-income countries most of the milk production goes into fresh dairy products.

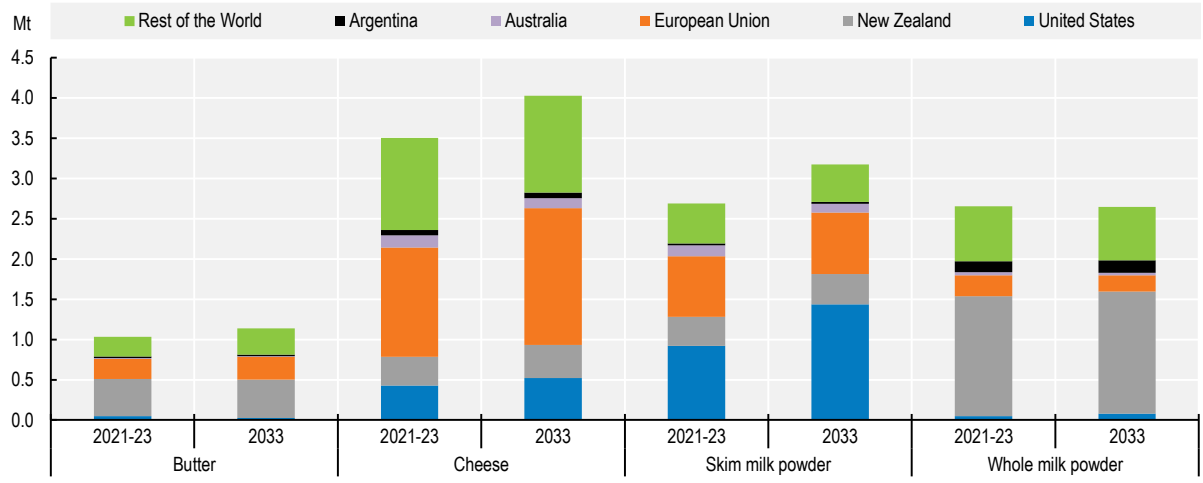
7.3.3. Trade

Trade growth will be driven by an increasing import demand from diversified destination countries

Most dairy products are domestically consumed. Only a small share (around 7%) of world milk production, is traded internationally, primarily due to its perishability and high-water content (more than 85%). Over 50% of world production of WMP and SMP is traded since these products are often produced only to store and trade milk over a longer time period or distance. Fresh dairy products such as fermented milk products are traded in small amounts between neighbouring countries Canada and the United States, or the European Union and Switzerland, for example. An exception is imports of liquid milk by China from the European Union and New Zealand, due to Ultra-High Temperature milk and cream products capable of being shipped long distances, but also favourable Chinese freight rates in some cases. China's net imports of fresh dairy products over the base period reached 1.2 Mt, and this is not projected to increase much over the next decade.

World dairy trade is projected to expand over the next decade to reach 13.9 Mt in 2033, 12% higher than during the base period. Most of this growth will be met by increased exports from the United States, the European Union and New Zealand. These three countries are projected to jointly account for around 65% of cheese, 70% of WMP, 75% of butter, and 80% of SMP exports in 2033 (Figure 7.5). Australia has lost market shares although 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 2033. 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 7.5. Exports of dairy products by region



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

StatLink https://stat.link/ov142f

The European Union will continue to be the main world cheese exporter, followed by the United States and New Zealand. The United Kingdom, Russia, Japan, Saudi Arabia and China are projected to be the top five cheese importers in 2033. Since consumers value variety, these countries are often also exporters of cheese and international trade is expected to offer wider 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 45% and 60%, respectively, by 2033. China is the principal importer of WMP from New Zealand, but trade between the two countries is projected to be less dynamic over the projection period. The expected growth in domestic milk production in China will limit the growth in WMP imports. However, as China removed imports tariffs on milk powder from New Zealand this year, some exporters may start taking advantage. It is also expected that New Zealand will diversify and slightly increase its production of cheese over the *Outlook* period. Russia, the second largest importer of butter, together with China are expected to account for 25% of world 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 disperse globally as it is often the easiest dairy product to trade for use in food processing.

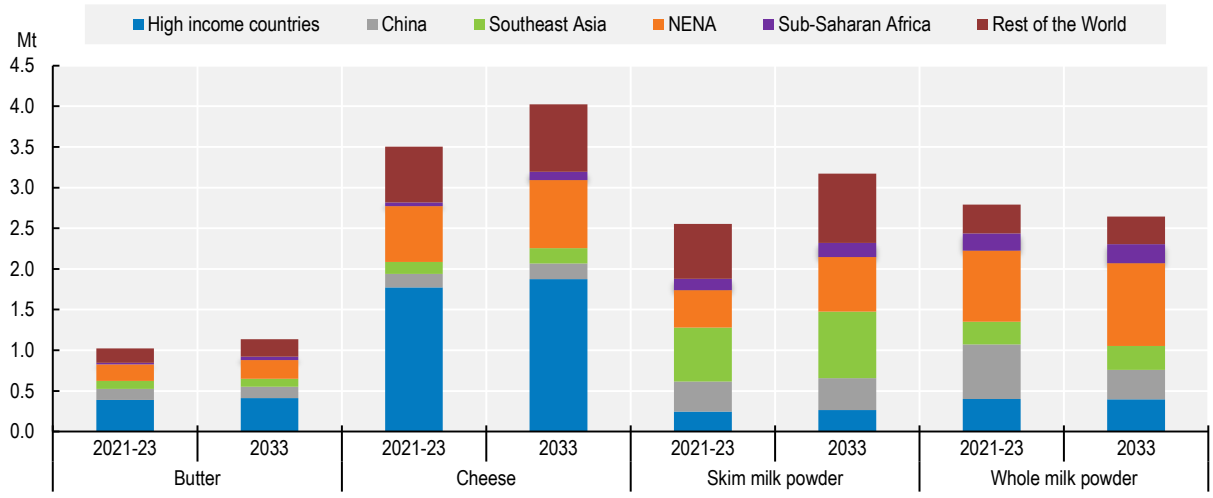
Imports are spread more widely across countries, with the dominant destinations for all dairy products being the NENA, high-income countries, Southeast Asia, and China (Figure 7.6). China is expected to continue to be the world's major dairy importer. WMP imports from China are projected to represent 14% of global imports in 2033, a 10% drop from the base period. Africa is expected to surpass China as a main

destination of WMP in 2033. 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.

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 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 account for more than 40% of the world exports.

While some regions, such as India and Pakistan, are self-sufficient, total dairy consumption in Africa, Southeast Asian countries, and the NENA is projected to grow faster than production, leading to an increase in dairy imports. As liquid milk is expensive to trade (high volume/value ratio), this additional demand growth is expected to be met with milk powders, where water is added for final consumption or further processing. Imports by NENA 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.

Figure 7.6. Imports of dairy products by region



Note: NENA stands for Near East and North Africa, and is defined as in Chapter 2. Southeast Asia contains Indonesia, Malaysia, Philippines, Thailand and Viet Nam.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/nehftm

7.3.4. Prices

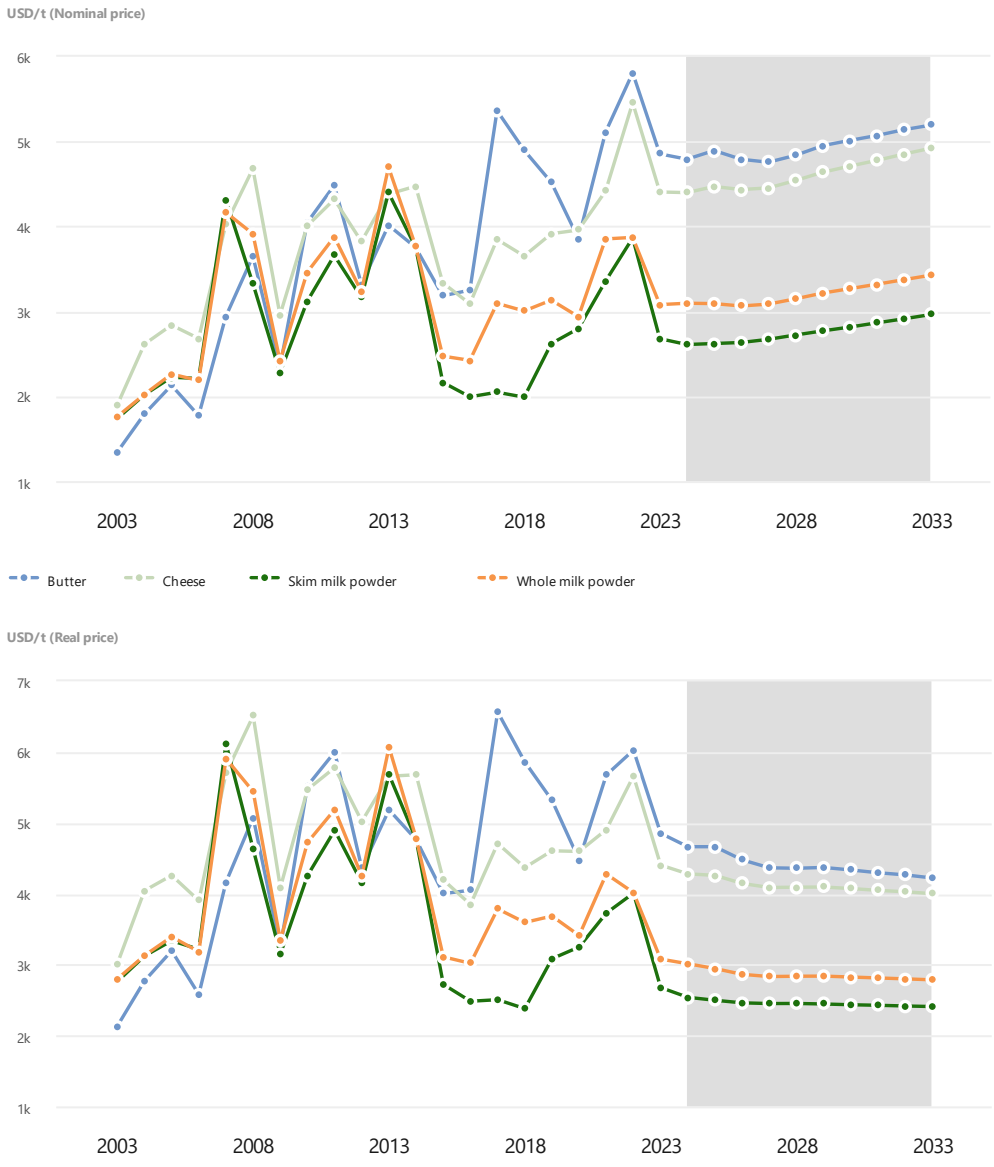
Nominal international dairy prices will gradually and slightly increase

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. Since 2015, the price of butter has increased considerably more than SMP. Increased demand for milk fat resulted in a price gap emerging between the two products and the price of butter will continue to be supported by stronger demand for milk fat compared to other milk solids on the international market. Therefore, the gap between the price of butter and SMP is assumed to remain a defining feature over the coming decade (Figure 7.7). Prices of butter and SMP are foreseen to increase

slightly in nominal terms over the projection period after a significant drop in 2023 from historically high levels as input prices are expected to resume with a gradual increase. 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.

The strong 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 as compared to that which is fermented or pasteurised.

Figure 7.7. Dairy product prices, 2003-2033



Note: Butter, FOB export price, 82% butterfat, Oceania; Skim 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 (2023=1).
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

7.4. Risks and uncertainties

Environmental and health concerns are becoming more significant

Plant-based dairy alternatives (e.g. soya, 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 health concerns and increasing consumer 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, although the evidence regarding their environmental impact and relative health benefits is contested. The sustainability of popular replacements such as almond and soya drinks have been questioned as more consumers consider other environmental issues in addition to GHG emissions, such as water usage and deforestation. Similarly, lactose intolerance is a concern for some consumers with a range of lactose-free dairy products becoming available for those who do not prefer plant-based replacements. Overall, there is uncertainty surrounding the long-term impact of plant-based replacements on the dairy sector.

Environmental legislation could have a strong impact on the future development of dairy production. GHG emissions from dairy activities make up a significant share of total emissions in some countries, such as New Zealand and Ireland, and more stringent environmental policies and initiatives such as the Pathways to Dairy Net Zero launched in September 2021 by the dairy sector 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 on dairy production. Nevertheless, stricter environmental legislation could also lead to innovative solutions that improve the long-term competitiveness of the sector. Overall, the global level of GHG emissions will largely depend on efficiency gains in India and other countries with high cattle populations and extensive production. In addition, climate change and extreme weather events, already experienced in some countries and regions, could aggravate the viability of milk production in the affected countries.

Russia's war against Ukraine has significantly heightened the uncertainty of energy, fertiliser and other agricultural supplies and may slow down economic growth. Market impacts could be felt in related sectors such as dairy through increased input costs for these products. It could also increase the interest in circular agriculture with a focus on using fewer external inputs, an option available and widely used in dairy production.

Changes in domestic polices remain an uncertainty. Under the United States-Mexico-Canada Agreement (USMCA), Canada has reorganised SMP exports, allowing increased market access. In the European Union, intervention buying of SMP and butter at fixed prices remains possible under certain circumstances, and this already had a considerable market impact in recent years.

Dairy trade flows could be substantially altered by changes in the trade environment. Modifications to existing trade agreements or the creation of new ones, could affect dairy demand and trade flows. In addition, India and Pakistan, the big dairy consuming countries, have not integrated into the international dairy market as domestic production is projected to expand fast enough to respond to growing home demand. Future investment in cold chain infrastructure in these regions will contribute to increase their degree of dairy self-sufficiency. Another challenge faced by the sector is the risk of disease outbreak. As the world is increasingly inter-connected through trade, including trans-boundary movement of animals, animal disease could rapidly spread across the borders and disrupt the dairy industry growth.

Note

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

8 Fish

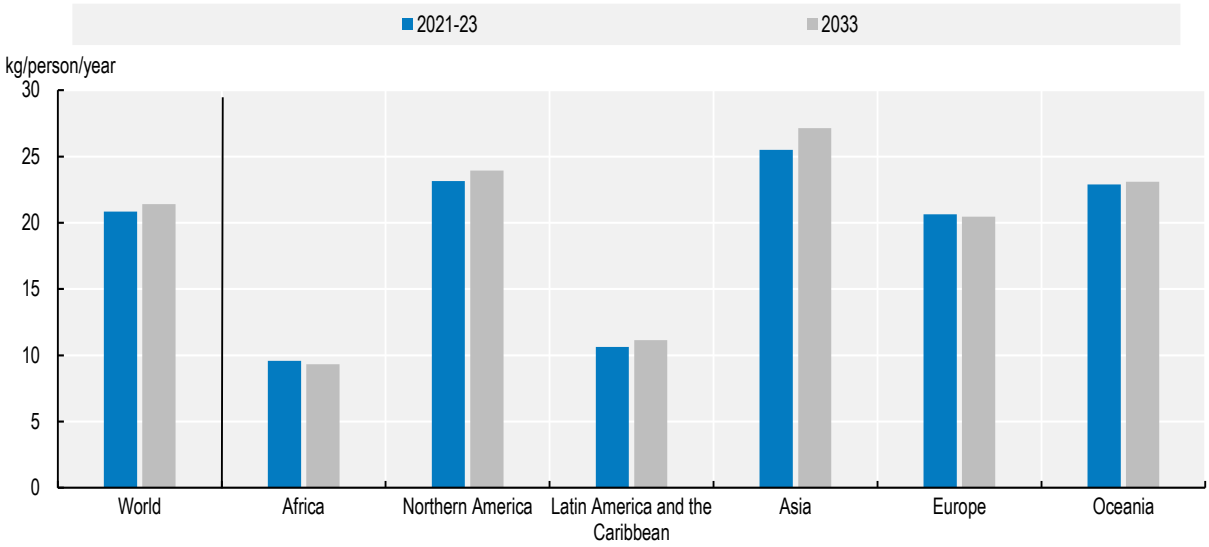
This chapter describes recent market developments and highlights the medium-term projections for world fish markets for the period 2024-33. Price, production, consumption and trade developments for fish from capture fisheries and aquaculture are discussed. The chapter concludes with a discussion of important risks and uncertainties that might affect world fish markets over the next ten years.

8.1. Projection highlights

Slower growth ahead for fish production, consumption, and trade

Food fish[1] consumption is expected to increase globally, although at a slower pace than in the previous decade. Asia is projected to account for 77% of the additional fish available for human consumption over the *Outlook* period, despite slower growth compared to the previous decade, followed by Africa (16%), and the Americas (8%). Contrastingly, fish food supply in Europe is expected to decline, albeit at a slower rate than in the previous decade. On a per capita basis, average global apparent food fish consumption is anticipated to be 21.4 kg (live weight equivalent) by 2033, up from 20.8 kg in the base period (average 2021-2023). Nonetheless, there is considerable variation in both level and trend of per capita fish consumption among countries and regions (Figure 8.1). Specifically, per capita fish consumption is projected to increase in all continents over the *Outlook* period, except in Europe and Africa. In the case of Africa, this decline is mainly due to population growing faster than supply and is expected to occur despite its already low level of per capita fish consumption. The major increase is expected in Asia with a further rise in its already high per capita fish consumption level. The proportion of fish utilised for food consumption in total fisheries and aquaculture production is projected to stay relatively constant at around 90% throughout the *Outlook* period. The remaining 10% of production will be allocated for non-food purposes, mainly for the production of fishmeal and fish oil.

Figure 8.1. Per capita consumption of fish



Note: Data are expressed in live weight equivalent.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

The prices of all product groups (aquaculture, capture fisheries, fish food traded, fishmeal and fish oil) are expected to fall over the *Outlook* period in real terms. The fish oil price is expected to experience the largest decline, falling 18% over the coming decade. The price of fish oil grew by 112% between 2021 and 2023 to reach exceptionally high levels, driven in part by the high price of vegetable oils and supply issues, and is expected to return to more normal levels in the early part of the next decade. While slower demand growth for fish and fish products, particularly in Asia, will drive declines in real prices for both capture and aquaculture sectors, slower productivity growth in aquaculture and limited growth of capture fisheries production will mitigate these impacts to some extent. Therefore, the real price declines are expected to be relatively modest over the *Outlook* period.

Global fish production is anticipated to rise over the *Outlook* period, reaching 206 Mt by 2033, an increase of 22 Mt from the base period (average 2021-2023). However, the pace of growth is expected to be slower compared to the previous decade. The rise in production is driven by the ongoing expansion of aquaculture, particularly in Asia. Over 85% of the additional projected production will stem from aquaculture, elevating its share in global fish production to 55%, up from 51% in the base period. The largest production increases are expected in China, India, and Indonesia, accounting for nearly 80% of the additional aquaculture output. Capture fisheries production is anticipated grow modestly, with volumes ranging between 89 Mt in *El Niño*[2] years and 94 Mt. The fish projections explicitly factor in the *El Niño* phenomenon, acknowledging its significant impact on capture fisheries production and consequently on fishmeal production in Peru and other South American countries. World production of fishmeal and fish oil are projected to grow slightly faster than global fish production over the *Outlook* period. This growth represents a recovery from low levels observed during the base period, primarily due to restrictions in the anchoveta fishing season in Peru, in addition to a growing share of fishmeal and fish oil produced from fish waste.

Global exports of fish for human consumption are expected to keep growing over the *Outlook* period, although at a slower rate compared to the previous decade. This trend reflects both a long-term slowing of trade expansion and a short-term effect related to the COVID-19 pandemic. Traded quantities were particularly high during the base period, primarily due to the strong rebound in trade following the low levels seen in 2020 as a result of the COVID-19 pandemic's impact. Asia, led by China, will continue to be the main force behind the rise in exports, followed by the Americas. Conversely, exports from Africa and Oceania are expected to decline over the *Outlook* period. Africa and the Americas will absorb the majority of the import growth, while import levels for Asia and Europe are anticipated to decline over the *Outlook* period, as demand is increasingly met by domestic production in these regions and due to a lower per capita consumption in Europe.

Climate change is one of the main sources of uncertainty facing the capture fisheries sector over the next decade. In 2023, sea surface temperatures were the highest on record and the trend looks set to continue. Rising sea surface temperatures will have negatives impacts on global capture fisheries production, but these impacts will be unevenly distributed. Improving fisheries management adopting proper adaptation methods and tools may also offset these impacts in some regions. Moreover, the conclusion of the next round of fisheries subsidy negotiations at the World Trade Organization (WTO) will also create uncertainty for global capture fisheries production. In aquaculture, policy reforms are the main source of uncertainty. Recent tax reforms in Norway will likely impact the production of farmed salmon, and the effects of policy reforms in China, the world's largest aquaculture producer, will become more apparent over the next decade.

8.2. Market situation

Return to pre-pandemic trends following strong recovery from COVID-19 pandemic

Global fish production remained broadly stable in 2023 at 186 Mt, with a growth in aquaculture production while capture fisheries production decreased. The decline in capture fisheries production was particularly strong in Peru, where the fishing season was shortened to guarantee the sustainability of the anchoveta biomass, a species mainly used for the production of fishmeal and fish oil.

According to the FAO Fish Price Index,[3] international fish prices were 1.5% lower in 2023 compared to 2022, following a 19% rise in 2022. In 2023, following the surge in 2022, prices for aquaculture products experienced a decline. This drop in prices was primarily driven by lower prices for shrimps and prawns, and for farmed whitefish species such as tilapia. Conversely, prices for wild-caught species continued to rise throughout 2023, reflecting the lower production volumes.

Between 2020 and 2022, the global international trade landscape has been significantly influenced by the COVID-19 pandemic, and fish and fish products were no exception. Following a decline in 2020, global fish export volumes rebounded rapidly over 2021 and 2022 driven by a robust recovery in global demand. The recovery in value term, was even more pronounced driven by increasing prices. However, in 2023 global exports of fish for human consumption were down again reflecting a reduction in both quantities traded and prices.

8.3. Market projections

8.3.1. Consumption

Fish can be utilised in various forms for both food and non-food purposes. Those not consumed as food are processed into fishmeal and fish oil or utilized for other non-food purposes, such as ornamental fish, fingerlings and fry, bait, pharmaceutical inputs, and as direct feed for aquaculture, livestock, and other animals. The bulk of fisheries and aquaculture production is used for human consumption and this share is projected to remain broadly stable, reaching 90% by 2033. Overall, the fish available for human consumption is projected to increase by 21 Mt (live weight equivalent) by 2033, reaching 186 Mt. This represents an overall increase of 13% compared to the base period, which is a slower pace compared to the 25% growth experienced in the previous decade. This deceleration primarily reflects the smaller amount of additional production available, a deceleration in population growth and saturated demand in some countries, particularly high-income ones.

Growth in demand will stem mostly from low- and middle-income countries, which will be responsible for 95% of the increase in consumption and will consume 82% of the fish available for human consumption by 2033. In addition to growing populations, demand in low- and middle-income countries, will also be strengthened by income growth and urbanisation, which will increase the demand for animal proteins, including fish, at the expense of plant-based foods. Overall, in low- and middle-income countries the amount of fish food consumption will increase by 15% by 2033 compared with the base period, which is a much slower rate than the 33% observed over the previous decade. Conversely, in high-income countries, food fish consumption is expected to show little growth (+3.0% by 2033), mainly due to slowdowns in population and economic growth, together with ageing populations.

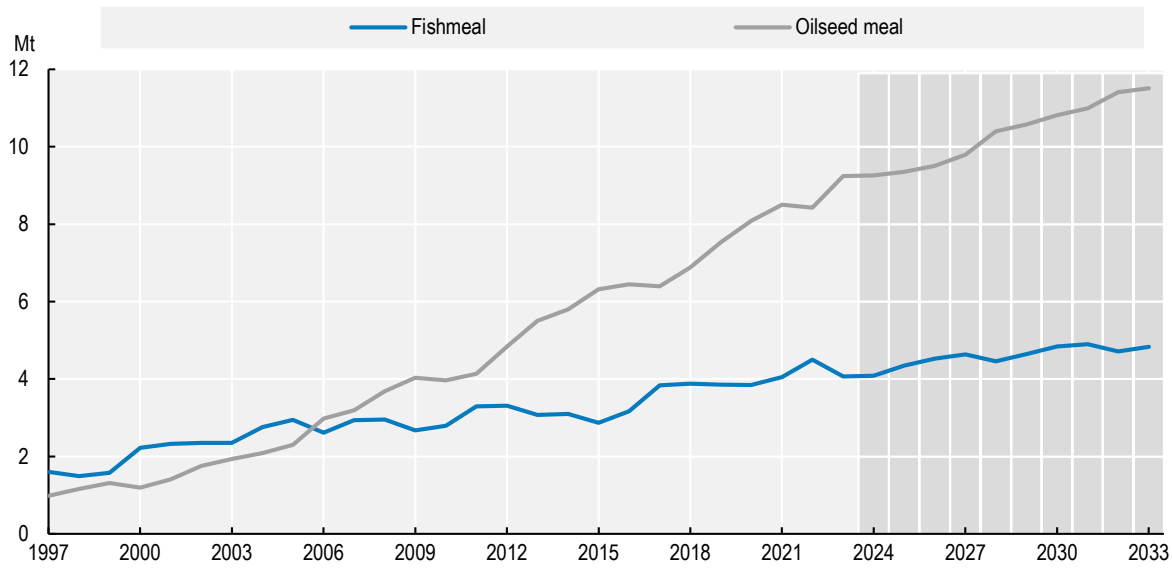
Fish available for human consumption is expected to increase on all continents, except in Europe, where it is expected to decrease by 2.2% by 2033. This decline is attributed to a slight reduction in fish consumption in the European Union, as observed in the previous decade, and a significant decline in fish food consumption in Russia, primarily due to higher exports combined with lower imports. Conversely, substantial growth is expected in Africa (+25%), followed by Oceania (+14%), Asia (+13%), and the Americas (+11%). Asia is anticipated to account for 77% of the additional amount of fish consumed by 2033, with China alone contributing 33% of that additional volume. The proportion of fish originating from aquaculture in the total amount of fish available for food is projected to continue increasing year after year. By 2033, 60% of the fish available for human consumption is projected to come from aquaculture, up from 57% in the base period.

On a per capita basis, apparent fish consumption is projected to be 21.4 kg in live weight equivalent in 2033, up 2.7% from 20.8 kg in the base period. This represents a lower increase than in previous decades. Per capita fish consumption is projected to increase in Asia, the Americas, and Oceania while it is expected to decline in Africa and Europe. In Africa, fish consumption per capita is projected to decrease to 9.3 kg live weight equivalent by 2033, down from 9.6 kg in the base period, mainly due to population growing faster than fish supply. While per capita fish consumption is expected to rise in North Africa, the decline is expected to be particularly sharp in Sub-Saharan Africa. This situation is of particular concern because the region has the highest prevalence of undernourishment in the world and because fish plays a major role

in the region, providing valuable micronutrients and protein, at higher levels than the world average in the case of protein.

Of the 21 Mt live weight equivalent of fish utilized for non-food uses in 2033, fishmeal and fish oil are projected to represent 85%. The rest will serve other non-food uses such as ornamental fish, fingerlings and fry, bait, pharmaceutical inputs, or as direct feed for farming. By 2033, it is projected that 83% of fishmeal and 70% of fish oil will be consumed as aquaculture feeds. Globally, since aquaculture production is growing faster than fishmeal production, a greater amount of oilseed meals is used in aquaculture feed rations (Figure 8.2) By 2033, the projected amount of oilseed meal used in aquaculture is expected to rise by 32% to reach 12 Mt, while the amount of fishmeal used in aquaculture is projected to reach 4.8 Mt, up 15% on the base period. China will continue to be the main consumer of fishmeal, with a projected share of 37% of the total by 2033. The consumption of fish oil is slightly less concentrated than for fishmeal with Norway, the European Union and Chile expected to account for 43% of total fish oil consumption by 2033.

Figure 8.2. Quantities of fishmeal and oilseed meal used in aquaculture



Note: data are expressed in product-weight equivalent.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

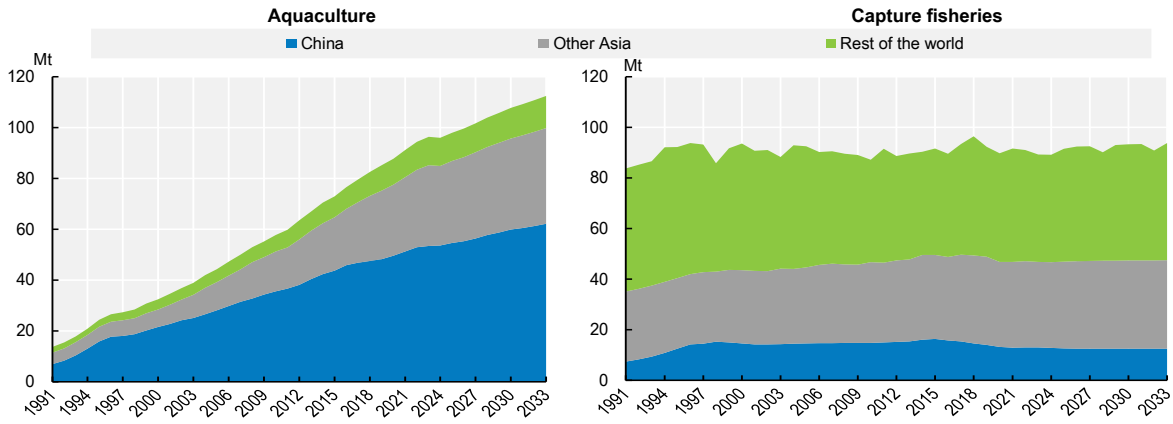
8.3.2. Production

Global fish production, encompassing both capture fisheries and aquaculture, is anticipated to rise from 185 Mt during the base period to 206 Mt by 2033. While the total quantity being produced continues to increase, both the rate and absolute level of growth continue to fall. Global fish production is expected to expand by 12% (or 22 Mt) over the next decade compared with 21% (or 32 Mt) during the previous decade. Aquaculture will drive the deceleration of growth, while still maintaining its role as the primary force of the overall expansion of global fish production. By 2033, aquaculture is expected to account for 55% of global fish production, compared with a share of 51% in the base period.

Aquaculture production is projected to be 112 Mt by 2033, an increase of 20% relative to the base period, compared with 52% in the previous decade. This lower aquaculture production growth is expected to result from the anticipated decrease in productivity gains at the world level, due to environmental regulations and a reduction in the availability of optimal production locations. China will remain the largest aquaculture producer, however its share of world aquaculture production is expected to stabilize at about 55%, which

reflects the anticipation for strong growth in aquaculture production in other countries such as India and Indonesia (Figure 8.3). Aquaculture production is expected to grow on all continents, and in nearly every country throughout the projection period. However, the distribution of aquaculture production will continue to remain unbalanced, with Asia projected to account for 89% of world aquaculture production by 2033, the Americas for 5%, Europe and Africa for 3% each, and a negligible share for Oceania.

Figure 8.3. Aquaculture and capture fisheries production



Note: Data are expressed in live-weight equivalent.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/amywqk

At the level of species groups, all types of aquaculture production will continue to rise, albeit with varying rates of growth. Carp is projected to retain its position as the primary species group in terms of volumes, making up 33% of total aquaculture production by 2033. Nonetheless, its proportion of total aquaculture production is anticipated to decline further over the *Outlook* period. The downward trend reflects the increasing demand for a wider selection of aquatic species particularly in Asian countries, where carp is primarily consumed. Likewise, the share of salmonoids in total aquaculture production is set to decline marginally to 4% from 5% in the base period, reflecting slower growth than in other farmed species, mainly attributed to production constraints in Norway, the leading producer, as linked to the implementation of additional taxes (more information available in the risks and uncertainties sub-section). Molluscs will maintain a stable share, accounting for 20% of total aquaculture production, while shrimps and prawns (10%), tilapia (7%), and other freshwater fish such as catfish and pangas (16%) are projected to rise faster than the other species groups. This growth is anticipated to result in an increase in their share of total aquaculture production.

Capture fisheries production is projected to reach 94 Mt by 2033, an increase of 3.5% relative to the base period. While some of this rise is related to the particularly low anchoveta production in Peru in 2023 for stock management reasons, it does reflect rising production, particularly in Africa and the Americas over the *Outlook* period. The distribution of capture fisheries production across continents is expected to remain broadly unchanged over the *Outlook* period, with Asia accounting for just over half of world capture fisheries production by 2033, followed by the Americas (20%), Europe (15%), Africa (12%) and Oceania (2%). China will remain the top producing country, accounting for 13% of world capture fisheries production by 2033 (Figure 8.3).

The proportion of world capture fisheries production reduced to fishmeal and fish oil is expected to remain stable over the *Outlook* period, at about 19%. Nevertheless, the production of fishmeal and fish oil are

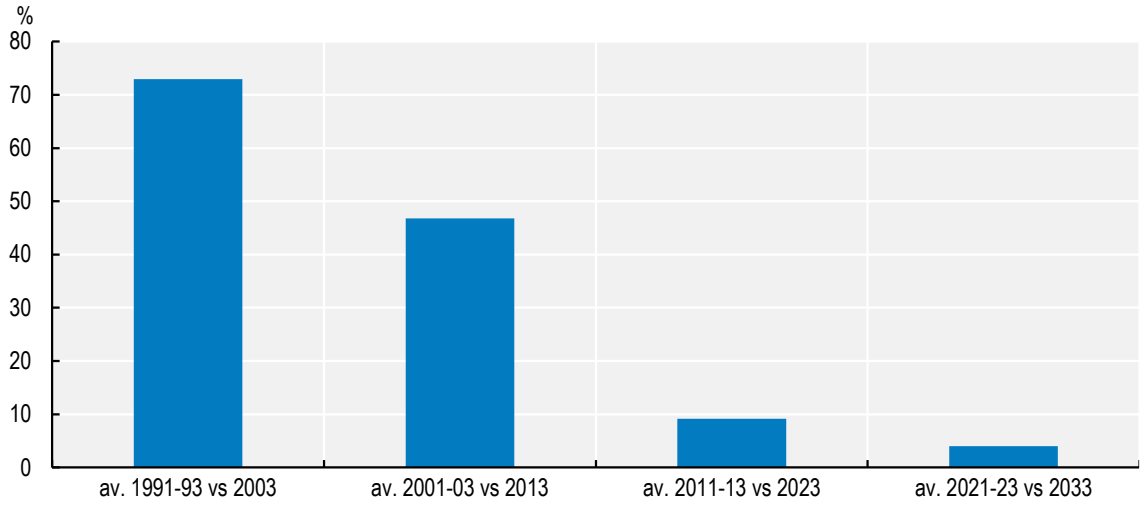
expected to grow by 15% and 17% respectively by 2033, reaching 6.0 Mt and 1.7 Mt in product weight. This rise predominantly reflects the increase in capture fisheries production over the *Outlook* period and the growing share of fishmeal obtained from fish waste. By 2033, the proportion of fishmeal being produced from fish offal is projected to increase from 29% in the base period to 30% by 2033, while for fish oil it is projected to stabilise at 58%. Peru will remain the top producer of fishmeal over the *Outlook* period, and Chile the top producer of fish oil.

8.3.3. Trade

Aquatic products will continue to be highly traded, boosted by increased consumption, improved storage, preservation, transportation and liberalization policies. Such trends have facilitated the emergence of complex supply chains in which fish and fish products often cross several national boundaries before final consumption. About 35% of total fisheries and aquaculture production is expected to enter international trade (31% excluding intra-EU trade) in the form of products for human consumption or for non-food purposes by 2033. A share of this trade consists of repeated trading of products in different processing stages among countries and regions.

World exports of fish for human consumption are projected to total 45 Mt live weight by 2033, up 4.0% (or 1.7 Mt) on the base period. However, this growth rate represents a slowdown compared to the 9.1% growth observed in the previous decade, influenced by both long-term and short-term factors (Figure 8.4). Trade growth has decelerated sharply since the 2010s, and this trend is expected to continue over the *Outlook* period, with short term factors further supporting this trend. Traded quantities were particularly high during the base period, calculated as an average of 2021 to 2023, which tends to lower the growth rate projected over the *Outlook* period. This high level of traded quantities in the base period primarily reflects the strong rebound in trade following the low levels seen in 2020 as a result of the COVID-19 pandemic.

Figure 8.4. Growth rates in world exports of fish for human consumption



Note: Growth rates calculated on world exports of fish for human consumption expressed in live weight equivalent.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

The bulk of the growth in fish exports for human consumption is projected to originate from Asian countries, which will account for 57% of the additional exports by 2033. Asian countries, being the main producers, are expected to remain the major exporters. By 2033, Asia is projected to account for nearly half of the world exports for human consumption. China will remain the largest exporter of fish for human

consumption, accounting for 19% of the total by 2033, compared with 17% in the base period. Strong growth is also expected from Russia and Ecuador, while strong decreases are expected in North African countries.

The European Union, the United States, China, and Japan are anticipated to maintain their positions as the primary importers of fish for human consumption. By 2033, these countries are projected to collectively represent 50% of global imports, a slight decrease from 52% in the base period. This decline in the share of the traditional importers reflects the increasing demand for fish food products from other regions worldwide. Africa is expected to witness the most substantial growth in imports (+38%) over the *Outlook* period. Import growth in Africa is predicted to surpass production growth, leading to a higher reliance on imports for fish for human consumption. The share of imports in Africa's fish food supply is projected to rise to 38% by 2033, compared with 34% in the base period.

Trade of fishmeal is projected to be rather stable throughout the projection period, with a limited growth of 4.0%, totalling 3.6 Mt product weight in 2033. Peru is expected to remain, by far, the main exporter of fishmeal, despite its exports nearly halving in 2023 due to the shortening of the fishing season. However, expectations are for the anchoveta stock to recover rapidly allowing for production and export volumes to rebound from 2024. The European Union, Viet Nam and Chile are anticipated to remain the other largest fishmeal exporters. China will remain the main fishmeal importer, accounting for nearly half of total imports by 2033, underscoring the significance of its aquaculture production, as fishmeal is a key ingredient in feed manufacturing. Driven by increased production, fish oil exports are projected to increase by 12% over the next decade reaching 1.1 Mt product weight in 2033. Norway and the European Union will remain the main importers with shares of global fish oil imports of 24% and 22% respectively by 2033.

8.3.4. Prices

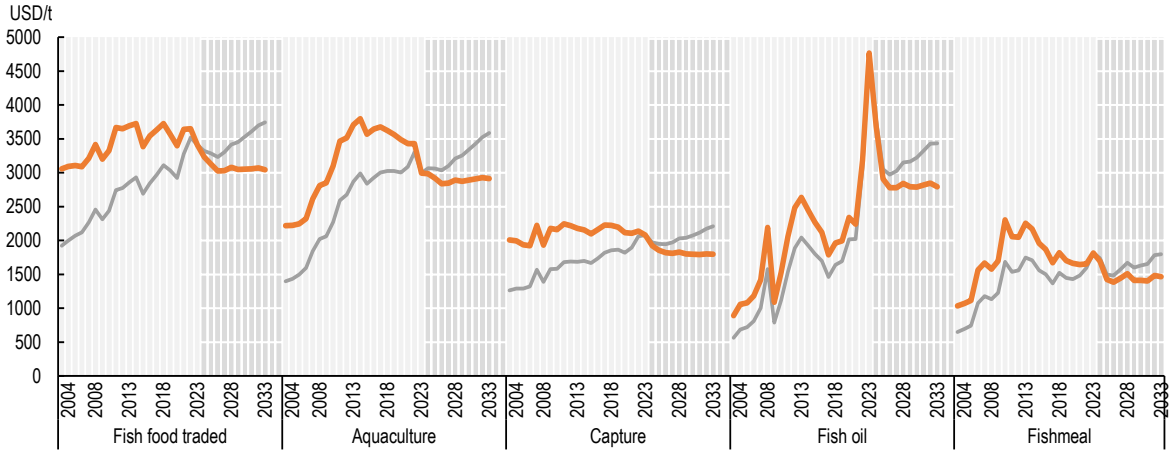
Prices are expected to decline across the Outlook period

The prices of all product groups are expected to decline over the *Outlook* period in real terms. In 2023, the price of traded fish products declined following increases driven by the recovery from the COVID-19 pandemic and inflationary pressure. Across all product groups, fish prices are expected to fall in both nominal and real terms until 2025-27, before returning to slow growth. Fish oil prices are expected to remain high relative to historic values, but in the other product groups (fishmeal, aquaculture, capture and fish food traded) the prices will be slightly lower than historic levels. Overall, the price declines in the *Outlook* period are similar in size to the previous decade, except in the case of fish oil (Figure 8.5).

Prices of aquaculture and capture fisheries products will experience real term declines of 11% and 15% respectively. In both cases the declines are driven by increased competition from other protein sources, most notably poultry where prices are expected to decline by 20% over the *Outlook* period (driven by increased production). This softening of demand for fish and fish products is balanced by the limited production growth of capture fisheries and the slowing of aquaculture production growth, which will limit the impact of reduced demand in the second half of the production period.

In nominal terms, aquaculture prices are expected to grow by 15% (+2.0% p.a.) during the *Outlook* period, which equates to a real term decline of 11% (-0.0% p.a.). This is a larger nominal price growth than seen in the previous decade (+10.5% at +0.8% p.a.) and smaller real price decline (-16% at -1.8% p.a.). The smaller decline in real prices reflects the slower growth in production over the *Outlook* period when compared to the previous decade. While prices are expected to decline overall during the next decade, they are actually projected to increase from 2027 as demand catches up with and then exceeds production growth.

Figure 8.5. World fish prices



Note: Fish food traded: world unit value of trade (sum of exports and imports) of fish for human consumption. Aquaculture: FAO world unit value of aquaculture fisheries production (live weight basis). Capture: FAO estimated value of world ex-vessel value of capture fisheries production excluding for reduction. Fishmeal: 64-65% protein, Hamburg, Germany. Fish oil: N.W. Europe. Real price: US GDP deflator and base year = 2023.

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

StatLink https://stat.link/9cw8l7

Capture fisheries prices in real terms are projected to decline by more in the *Outlook* period (-15% at -0.6% p.a.) than the previous decade (-6.1% at -0.3% p.a.). This difference is driven by the modest production increase that is expected during the *Outlook* period and the increased competition from cheaper sources of protein (e.g. poultry). Prices are expected to decline more rapidly until 2027 before stabilising for the rest of the *Outlook* period. The shape of the decline is the result of prices receding from the high point in the base period caused by the post COVID-19 pandemic inflationary pressure.

Fish oil prices experienced an exceptional 112% real price growth through 2022 and 2023. This was driven by several different factors including the cancellation of the 2023 anchovy season in Peru, one of the world's largest producers, and the exceptionally high prices of vegetable oil, again caused by supply chain issues. Consequently, the high prices in the base period mean fish oil prices are expected to decline 18% (-1.6% p.a.) over the *Outlook* period, compared to a 99% price increase (+5.8% p.a.) in the last decade. Fish oil prices are expected to experience a sharp decline until 2027 as supply returns to more normal levels. However, after 2027 prices are expected to begin increasing slowly, reflecting continued strong demand for both aquaculture feed and human consumption. In contrast to the other product groups, the price of fish oil is expected to remain high relative to historic levels.

Fishmeal prices are projected to experience a slower decline of 14% (-0.7% p.a.) in real terms when compared to the previous decade (-14% at -2.1% p.a.). Contrary to fish oil, the price of fishmeal had not increased as much as the price of oilseed meals in the aftermath of the COVID-19 pandemic. A return to a more normal level of substitution between fishmeal and oilseed meals combined to the lower catch of anchoveta in Peru in 2023 brought the price ratio closer to historical levels. In the first half of the *Outlook*, the fishmeal price will remain low compared to historical levels, due to expected low prices of oilseed meals, with small price rises expected in years of El Niño. Due to continued demand from the aquaculture sector, the fishmeal prices and the ratio with oilseed meal prices are expected to return to historical levels by the end of the *Outlook* period.

8.4. Risks and uncertainties

Climate change, regulatory changes and international negotiations on fisheries subsidies are among the largest sources of uncertainty facing the fisheries and aquaculture sectors. Climate change has become one of the most pressing stressors for aquatic life, including fisheries and aquaculture resources (Barange et al., 2018[1]). Last year was the hottest on record for sea surface temperatures (Copernicus, 2023[2]), and the trend looks set to continue in 2024. The increased sea surface temperatures will lead to a decline in overall fisheries catch potential and a redistribution of marine fisheries resources, with some regions benefitting while others lose. The distribution and productivity shifts challenge fisheries managers as they undermine the stationary assumptions of biological models which form the basis of management decisions. Aquaculture and freshwater fisheries are also facing pronounced climate stress, affecting their viability. Additionally, climate-driven extreme events (e.g. marine heatwaves, cyclones, droughts, floods) are increasing in frequency and severity, with impacts which are hard to predict, can occur quickly and have rapid and long-lasting impacts on both capture fisheries and aquaculture. Climate impacts and the outcomes of the adaptation strategies implemented to address them introduce significant sources of uncertainty to the projections.

Climate mitigation policies may also impact capture fisheries and aquaculture production in hard-to-predict ways. Technological responses and policies implemented to reduce the greenhouse gas emissions (GHG) from fisheries and aquaculture might change the way producers operate. On the one hand, improved fisheries management is an effective mitigation strategy for capture fisheries and could lead to increased production or reduced production in the short term, while on the other, strategies to move away from emissions intensive fishing methods might reduce production in some areas. In the case of aquaculture, mitigation policies could impact production growth and investment over the next decade. For both capture fisheries and aquaculture where and how these impacts will manifest is difficult to capture in projections. The OECD is currently working with countries to understand the challenges facing the sector and to identify policy best practices for climate change adaptation and mitigation in capture fisheries and aquaculture.

To help vulnerable states mitigate the often-devastating effects of climate change, the FAO Blue Transformation can provide a pathway for hunger reduction and sustainable management of oceans, seas, and marine resources through reconciling environmental sustainability, food security and livelihood priorities. The Blue Transformation takes a systemic approach that focuses on more efficient, resilient, sustainable and gender-responsive and inclusive fisheries and aquaculture promoted through improved policies and programmes for integrated science-based management, technological innovation, and private-sector engagement. The FAO Blue Transformation roadmap[4] provides a short summary of this initiative developed around three global objectives that reflect FAO's vision for what aquatic food systems transformation must achieve by 2030 and beyond, aligning its policies and priority actions accordingly.

Beyond climate change, the ongoing fisheries subsidies negotiations at the World Trade Organization (WTO) create uncertainty for the capture fisheries projections. The binding disciplines on fisheries subsidies that are currently being negotiated could have significant impacts for global fishing fleets, in particular the distant water fleets. However, countries failed to agree at the most recent round of negotiations at the WTO Ministerial meeting in February 2024, but did agree to continue discussions, meaning the timing and magnitude of such impacts is unclear. Further, the first WTO agreement on fisheries subsidies is likely to come into force during the *Outlook* period, with potential impacts on capture fisheries production despite the smaller scope of subsidies disciplines.

Regulatory changes also create uncertainty in the aquaculture projections. Shifting government policies, particularly related to environmental impacts could alter the distribution and rate of growth of aquaculture. In particular the 14th five-year plan in China (2021-2025), builds on the regulatory changes already made in the 13th five-year plan to improve the sustainability of the aquaculture sector, including by stabilising the aquaculture acreage, encouraging water recycling, better treating effluent and reducing the use of antibiotics in production. These regulations and the current economic turbulence in China are likely to

impact national production and have global level implications given the importance of China as both a producer and trader of fish and fish products. Outside of China, the resource tax on the profits of salmon farms in Norway (so-called “salmon tax”) implemented in 2023 is expected to reduce profitability and represents an additional source of uncertainty given Norway is the world’s largest producer of farmed salmon. The projections assume the elimination of the tax in 2026, leading to an 9% increase in Norwegian aquaculture production over the *Outlook* period compared to the base period. Alternatively, scenario analysis suggests that if the tax was to be maintained, Norwegian aquaculture production could potentially decrease by 8% by 2033. The variations between these scenarios effectively demonstrate the degree of uncertainty surrounding salmon production resulting from this tax.

References

Barange, M. et al. (2018), *Impacts of Climate Change on Fisheries and Aquaculture. Synthesis of Current Knowledge, and Mitigation Options*. [1]

Copernicus (2023), *October 2023 - Exceptional temperature anomalies; 2023 virtually certain to be warmest year on record*, Copernicus Climate Bulletins Newsflash, European Commission, https://climate.copernicus.eu/copernicus-october-2023-exceptional-temperature-anomalies-2023-virtually-certain-be-warmest-year. [2]

Notes

[1] In this chapter, the term “fish”, “seafood”, “fisheries and aquaculture production/products” or “aquatic animal products” are used to indicate fish, crustaceans, molluscs and other aquatic animals, but exclude aquatic mammals, crocodiles, caimans, alligators, seaweeds and aquatic plants. All quantities are expressed in live weight equivalent, except those of fishmeal and fish oil.

[2] The years of the *El Niño* are set in the model to occur in 2024, 2028 and 2032.

[3] Calculated in nominal terms and covering fisheries and aquaculture products.

[4]The FAO Blue Transformation roadmap is found at https://www.fao.org/3/cc6646en/cc6646en.pdf.

9 Biofuels

This chapter describes market developments and medium-term projections for world biofuel markets for the period 2024-33. Projections cover consumption, production, trade and prices for ethanol and biodiesel. The chapter concludes with a discussion of key risks and uncertainties which could have implications for world biofuel markets over the next decade.

9.1. Projection highlights

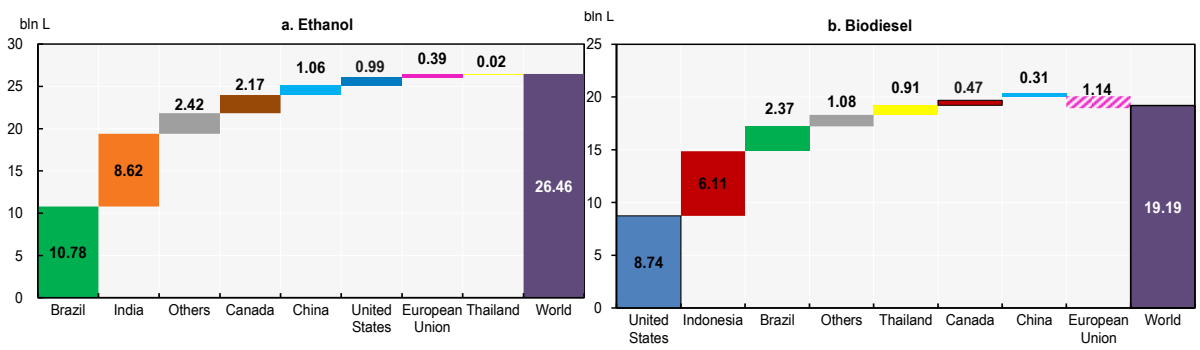
Emerging economies lead the expansion in biofuel use

The continued increase in global biofuel use relies on two key factors: the rising demand for transport fuel[1] and the sustained support from public policies. Overall, biofuels are expected to remain important renewable alternatives to fossil fuels within the transportation sector, with demand projected to increase by 1.2% annually over the coming decade. This growth rate is less than half that over the last ten years. The slowdown in demand growth is attributed to slower economic growth in high-income countries, where demand growth for biofuels is expected to decrease fourfold, dropping to 0.6% annually. This reduction is primarily due to the diminished demand for transport fuel, which is a result of the increasing prevalence of electric vehicles and improvements in vehicle efficiency. However, middle-income countries are expected to offset this decline by increasing their demand for biofuels, achieving an average annual growth rate of 1.9%. This increase is primarily driven by greater demand for transport fuels, growing energy security concerns, and objectives to reduce greenhouse gas emissions.

In the United States the focus is expected to shift towards biodiesel (including renewable diesel) over the next decade (Figure 9.1). Renewable diesel is similar to biodiesel but can be used as a drop-in fuel that does not need to be blended with petroleum diesel. This shift is driven by higher targets for renewable fuel programs and the extension of biomass-based diesel tax credits. Conversely, the European Union's contribution to global biofuel use is expected to decline. The inclusion of sustainability criteria in its revision of the Renewable Energy Directive (RED III) has led the bloc to shift away from first-generation biodiesel by setting a maximum limit for biofuels from food and feed crops. Additionally, feedstocks with a high risk of land use change should not account to fulfill the biofuel targets anymore by 2030. Furthermore, the anticipated efforts towards encouraging the adoption of electric vehicles will limit the expansion of traditional transport fuels and, consequently, the use of biofuels.

Figure 9.1. Regional contribution of growth in biofuel consumption

2033 to base period



Note: panel b. for biodiesel includes renewable diesel
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/i18fm3

Emerging economies, notably Brazil, Indonesia, and India, are anticipated to drive most of the new biofuel demand (Figure 9.1), as biofuels continue to serve as the primary decarbonisation option in these regions. All three countries have mandated biofuel shares, rising transport fuel demand, and abundant feedstock potential. Indonesia's biodiesel blending rate is assumed to stay above 30% (B30), with diesel type fuel use expected to rise. In other Southeast Asian nations, biodiesel use is expected to increase due to the growth in transportation fuel demand and industrial use. In India sugarcane-based ethanol is projected to

contribute significantly towards the goal of achieving an ethanol blend rate of 15% by 2025, whereas the E17 target would be met by 2033.

First generation biofuels are projected to remain the dominant biofuel type, with maize and sugar products making up most of the feedstock for ethanol, while biodiesel production mainly relies on vegetable oils (soybean, rapeseed, and palm oil). With stronger support, advanced biodiesel production from used cooking oil is projected to gain importance in the European Union, United States and Singapore. Public policies related to production and mandated use usually result in self-sufficient domestic markets, leaving a small international market. The *Outlook* projects that by 2033, the amount of biodiesel traded internationally will decrease from 13% to 11% of total production, while the amount of ethanol traded internationally will remain the same around 8% of total production.

The price of both ethanol and biodiesel have eased in 2023 due to lower oil prices and ample feedstock supply. Thereafter a rise in nominal terms throughout the projection period is expected, with a slight decline in real terms for ethanol and a slight increase for biodiesel. Policies will continue to compensate the higher production cost of biofuels compared to fossil fuels.

The complexity of biofuel-related policies constitutes the primary source of uncertainty in projecting biofuel market developments. The priority focus shifts towards sustainability, making advanced biofuels or sustainable aviation fuel (SAF) increasingly appealing. However significant investments are still required to scale up production, manage the sustainable certification of feedstocks and enable marketing. Policies ensuring the supply of sustainable feedstocks are imperative, particularly as the focus on finding alternatives for the use of residues and byproducts of agriculture production grows to promote a circular economy approach in production of biofuels.

Without establishing more sustainable production and consumption systems by reusing waste and residue resources, there is a risk that renewable biodiesel will face a feedstock supply crunch if current trends persist. The *Outlook* projects increasing use of vegetable oils in the food sector, which may lead to a potentially increase in the supply of recycled oil; however, uncertainty remains regarding the development of countries' capacity to collect recycled oil.

9.2. Current market trends

In 2023, global biofuel consumption marked its third consecutive year of steady growth following the lows experienced in 2020. This growth was facilitated by easing biofuel prices worldwide, attributed to a combination of lower oil prices, which boosted demand for transport fuel, and decreased feedstock prices, consequently reducing the production costs of biofuels. These factors collectively sustained incentives for the ongoing adoption and potential expansion of biofuel usage.

Governments encourage the use of biofuels primarily to bolster energy security and to advance the reduction of GHG emissions. With the costs of producing biofuels still exceeding those of their fossil fuel counterparts, biofuel production has been made possible by public support policies and future growth is expected that it will continue to depend on them. While the implication for energy prices of the Russia's war against Ukraine has underscored the significance of the energy security rationale, its impact on the biofuels markets remains limited. The expansion of biofuels aligns with their critical role in the global strategy for decarbonising the transport sector.

9.3. Market projections

9.3.1. Consumption and production

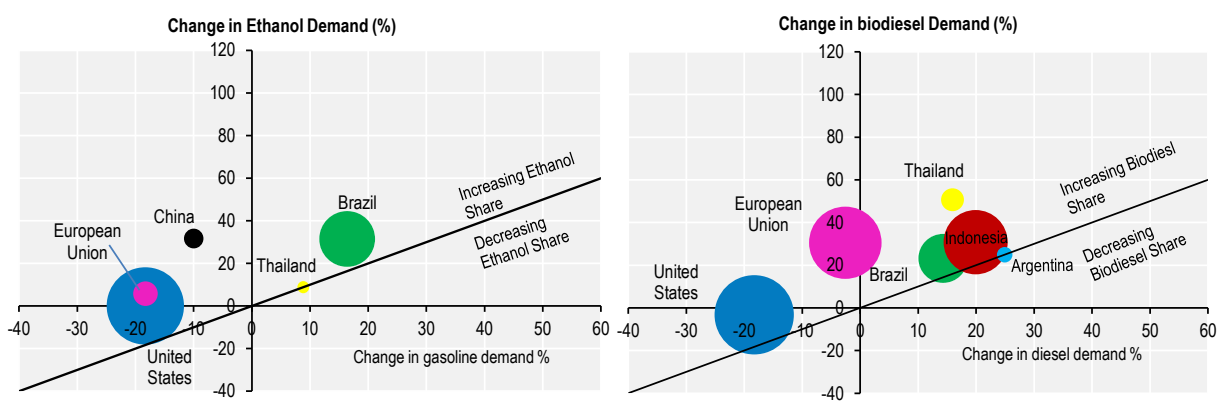
Asian countries are driving biofuel supply and demand

This *Outlook* expects a slower growth rate of biofuel consumption and production globally, both projected at 1.5% p.a. during the projection period. This is less than half the pace observed in the previous decade, primarily as result of reducing support policies in developed countries for conventional biofuels. With nearly two-thirds of the anticipated growth in biofuel demand expected to take place in emerging economies (Figure 9.1), notably in India, Brazil, and Indonesia, shifts in market shares are anticipated. In 2023, for ethanol, 55% of supply and demand is currently held by high income countries. However, it is anticipated that over the next decade, this share will decrease to 49%, with middle-income countries gaining prominence. For biodiesel, market shares are projected to remain relatively stable, with consumption slightly converging as middle-income countries gain a 4 percentage-point share over the next ten years, while their share in global production is expected to slightly increase.

The IEA *World Energy Outlook 2023* projects a decline in the total transport fuel use in both the European Union and the United States, suggesting limited growth potential for biofuel use. However, despite this trend, global demand for biofuels is anticipated to rise. This increase is attributed to developments in transportation fleets in certain countries where total fuel consumption is projected to grow, coupled with domestic policies favouring higher blends. As depicted in Figure 9.2, biofuel use is expected to expand faster than total transport fuel demand globally, signaling a rise in the biofuel share within total transport fuels.

Global ethanol and biodiesel production is projected to increase to 155 bln L and 79 bln L, respectively, by 2033. In 2023, ethanol's total feedstock was made up of 59% maize, 24% sugarcane, 6% molasses and 2% wheat, with the remaining 9% being a mix of assorted grains, cassava, and sugar beets. Biodiesel's total feedstock consisted of 65% vegetable oils (30% palm oil, 20% soybean oil, 11% rapeseed oil) and 27% used cooking oils, with the other 8% being made up of non-edible oils and animal fats.

Figure 9.2. Biofuel demand trends in major regions

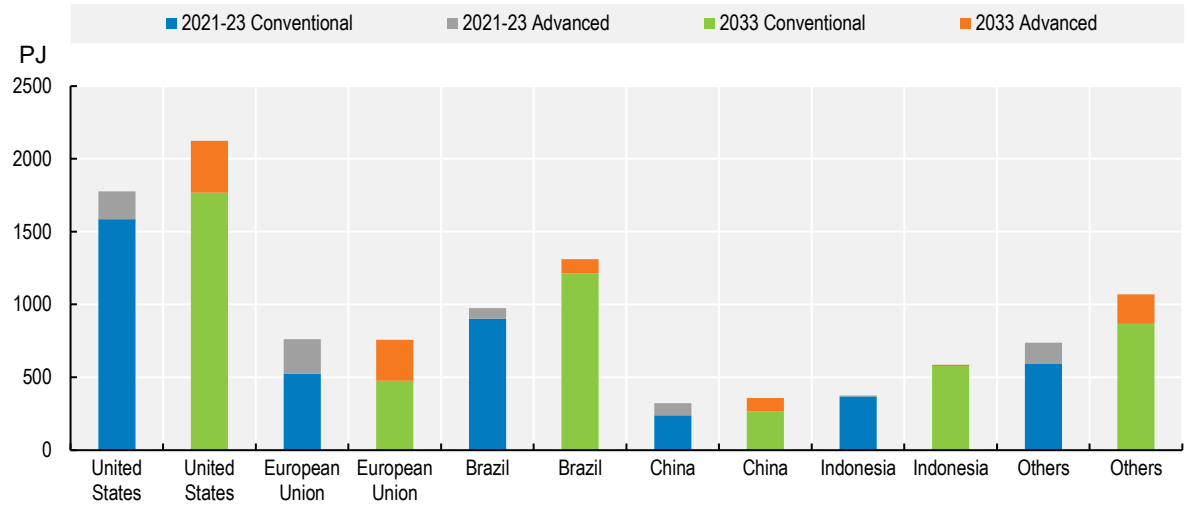


Note: Shares calculated on demand quantities expressed in volume. The size of each bubble relates to the consumption volume of the respective biofuel in 2023.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/d6znbx

Despite the increasing scrutiny of the sustainability of biofuel production witnessed in many countries, and notwithstanding significant variations in feedstock composition (Table 9.1), conventional (or food-related) feedstocks are expected to remain predominant in the industry (Figure 9.3). 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 9.3. World biofuel production from conventional and advanced feedstocks



Note: Conventional feedstocks are here defined as food and feed crop based biofuels. Values in Petajoules = 1015 Joules.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

United States

Biofuel policies in the United States revolved around the Renewable Fuel Standard (RFS) program and various state policies The program mandates a specific annual volume of renewable fuels to be blended into conventional transportation fuels. Current mandates were set for 2023 through 2025 by the Environmental Protection Agency (EPA). Despite an anticipated decline in gasoline consumption, largely due to better vehicle efficiency and an increase in the number of electric vehicles, ethanol production and consumption are expected to increase. This growth is attributed to the expected rise in the ethanol blend rate to 13% by 2033, although the standard 10% blend rate will persist. However, petroleum refiner preference for renewable diesel in meeting EPA mandates and infrastructure limitations will constrain the expansion in use of fuels with greater ethanol inclusion.

Maize is expected to continue as the primary feedstock for ethanol production, comprising 99% of production by 2033. 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 (

Table 9.1), its share is projected to decline from 46% to 41%. Biodiesel production is projected to increase by 2.2% p.a., to account for 25% of global production in 2033. 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 (LCFS) in California.

Table 9.1. Biofuel production ranking and major feedstock

	Production #ranking in 2021-2023 (market shares)		Major feedstock used in base period 2021-2023	
	Ethanol	Biodiesel	Ethanol	Biodiesel
United States	#1 (46.9%)	#2 (19.2%)	Maize	Soybean oil, used cooking oils
European Union	#4 (4.9%)	#1 (31.3%)	Maize / wheat / sugar beet	Rapeseed oil /Palm oil/ used cooking oils
Brazil	#2 (24.9%)	#4 (11.7%)	Sugarcane / maize / molasses	Soybean oil / used cooking oils
China	#3 (8%)	#5 (4.2%)	Maize / cassava	Used cooking oils
India	#5 (4.8%)	#15 (0.3%)	Sugarcanes / molasses / maize / wheat / rice	Used cooking oils
Canada	#6 (1.5%)	#12 (0.7%)	Maize / wheat	Used cooking oils / Canola oil/ soybean oil
Indonesia	#18 (0.1%)	#3 (18.9%)	Molasses	Palm oil
Argentina	#8 (1%)	#6 (3.1%)	Maize / sugarcane/ molasses	Soybean oil
Thailand	#7 (1.2%)	#7 (2.6%)	Molasses / cassava/ sugarcane	Palm oil
Colombia	#15 (0.3%)	#9 (1.3%)	Sugarcane	Palm oil

Notes: #numbers refer to country ranking in global production; percentages refer to the production share of countries in the base period.
In the *OECD-FAO Agricultural Outlook 2024-2033*, biodiesel includes renewable diesel (also known as Hydrotreated Vegetable Oil or HVO), although these are different products.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

The European Union

The Renewable Energy Directive (RED) serves as the legal framework governing the advancement of clean energy across multiple sectors, including transportation, within the European Union. This directive has undergone two significant revisions: initially amended under Directive (EU) 2018/2001 (RED II), and subsequently under Directive (EU) 2023/2413 (RED III). Under the RED, specific targets are set for the share of renewable energy within total energy consumption of each European Member state, currently aiming for 29% by 2030. 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. Since RED II, there are 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. While palm oil is not explicitly mentioned and can be certified for low-risk ILUC, it is the only feedstock that falls under the high-risk category under the current regulation. Additionally, RED III has raised 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 utilisation of advanced biofuels derived from waste or residues.

The anticipated reduction in both diesel and gasoline demand, in line with the projections of the *European Union Agricultural Outlook* 2023-33 report, is expected to significantly dampen the growth of ethanol and biodiesel consumption. Projections indicate a marginal increase of only 0.4% p.a. for ethanol consumption and negligible decrease for biodiesel. The proportion of biodiesel within the total diesel fuel supply is expected to rise from its current level of 10% to 12%, while the share of ethanol in gasoline consumption is projected to climb to 8%, up from the current 6%. While biodiesel production will remain stable, there will be a notable shift in its feedstock composition due to the RED III. Specifically, the proportion derived from palm oil is projected to decrease from the current 17% to 7% by 2033, driven by sustainability concerns. Biodiesel production from used cooking oils is projected to increase by 2.8% p.a., albeit at a slower compared to the previous decade due to constraints in feedstock availability. As a result, its global production share is projected to decrease from 29% to 23% over the coming decade, with the United States surpassing its leading position as the foremost biodiesel producing region.

Brazil

Brazil has 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 price relationship between domestic sugar (the main feedstock) and ethanol. Since 2015, the mandated ethanol percentage stands at 27%. In 2022, fuel tax exemptions and declining gasoline prices led consumers to favor gasoline over hydrous ethanol, benefiting anhydrous ethanol inclusion. The biodiesel blending target decreased from 15% to 10% since 2021 but returned to 15% in 2023, a policy likely to persist until 2033 according to current projections by Brazil's National Energy Policy Council.

Unlike the United States and the European Union, Brazil is projected to witness an increase in total fuel consumption of gasoline and diesel over the next decade, suggesting potential growth in blending biofuels with these fuels. 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 2.1% p.a., driven by the National Biofuels Policy (RenovaBio) program. Launched in 2017, the program plays a pivotal role in fulfilling Brazil’s commitments under the Paris Climate Agreement. While sugarcane is anticipated to remain the primary feedstock for ethanol production, maize usage has surged in recent years, rising from below 0.5 bln L to over 4 bln L in 2023. The *Outlook* predicts maize will continue gaining ground in the feedstock mix, reaching nearly 7 bln L by 2033.

Indonesia

The implementation of B35 and B40 (Biodiesel 35% and 40% blend) aims at reducing the country’s dependency on imported fossil fuels, stabilising palm oil price, reducing GHG emissions and sustaining the domestic economy as it accounts for nearly half a million jobs in the country. In recent years, biodiesel production has steadily increased due to a national biodiesel programme, which provides support to biodiesel producers. This programme is financed by the crude palm oil (CPO) fund, which is sustained by levies imposed on CPO exports. In 2023 the CPO fund revenue from the export levy stood at around USD 2.5 billion. The CPO funds depend on the stablished reference price which changes often over time. In 2024, the reference price has been set around USD 750 per tonne. The *Outlook* assumes producer prices will stay above USD 1 000 per tonne in nominal terms, well above the current reference, thus allowing replenishment of the CPO fund which will continue to subsidize domestic biodiesel production. At the same time, the level of the subsidy relies to some extent on the cost of fossil fuels so oil prices increasing over the projection period will help to reduce the subsidy per unit of biodiesel.

Based on these assumptions, biodiesel production in Indonesia is projected to increase to nearly 18 bln L by 2033. While currently the blending rate stays slightly above 30%, the *Outlook* assumes it could reach around B35 in 2033. Achieving B40 would require increasing support to biodiesel producers. Such support can only be achieved by means of higher vegetable oil world prices and increasing exports.

India

India has accelerated its ethanol production aiming to achieve the ambitious target of E20 (Ethanol 20% blend) by 2025 rather than 2030. However, the *Outlook* foresees limitations on the feedstock supply to increase biofuel production to reach the target levels over the *Outlook* period. While the *Outlook* assumes molasses and sugar cane juice would remain as the primary feedstocks, other crops such as rice, wheat and other coarse grains will help to accelerate domestic production. In particular, sugar cane for which, aided by soft loans, sugar mills are investing and developing the capacity to produce ethanol from sugarcane juice. In 2023 it is estimated that about 35% of ethanol was produced by sugarcane, this share is projected to remain stable. However, given the accelerating gasoline demand, the blending target of E20 would be met only in 2032. Ethanol production is expected to reach nearly 15 bln L in 2033. The limited

supply of vegetable oils, for which India is a net importer, combined with high international prices, will remain the main constraints on significantly increasing biodiesel production.

China

China's biofuel policies have experienced volatility in recent years, hindering significant consumption growth. Biofuels are not explicitly mentioned in the country's pledge to achieve a peak in carbon dioxide emissions by 2030. This *Outlook* assumes that the ethanol blending rate which was around 1.6% in recent years will increase to 2.5% in 2033. This increase is anticipated to offset the projected decline in total gasoline usage, thereby sustaining a 1.1% annual growth in ethanol consumption over the next decade. Similarly, biodiesel consumption is projected to grow by 2% p.a. The *Outlook* assumes that most ethanol demand will be met by domestically produced feedstock.

Canada

The Canadian Clean Fuels Standard (CFS) which became a law in 2022 promotes biofuels use in Canada by increase incentives for the development and adoption of clean fuels, technologies, and processes. CFS aims at a 15% reduction (below 2016 levels) in carbon intensity of transport fuels by 2030. Effective January 2023, 10% renewable content in gasoline and 15% in diesel are requires.

Argentina

In Argentina, the Biofuels Law of 2021 mandated biodiesel blend rate with diesel at a minimum of 5% but can be reduced to 3% when prices of feedstock increase in such a way that is deemed to distort fuel prices. In June 2022, the government passed a resolution to increase the biodiesel mandate from B5 to B7.5 but allowing it to be temporarily increased as high as B12.5 to be able to react on diesel shortages. The *Outlook* assumes B7.5 as blending target. With limited additional export possibilities, biodiesel production is projected to increase only marginally over the next ten years.

The ethanol blending target has been maintained at 12% despite a push from bioethanol producers to have it increased to 15%. The *Outlook* assumes the rate will remain at this target and with total gasoline use projected to increase, ethanol fuel use is projected to increase by 0.7% p.a.

Thailand

Despite the targets set in the Alternative Energy Development Plan (AEDP) 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. On average, blending is expected to be around 11% over the *Outlook* period and production is projected to remain stagnant around 1.5 bln L over the next decade. Biodiesel demand is expected to be supported by the mandatory blending. However, palm oil supply and high vegetable oil prices will constrain domestic supply and demand will increase to 2.5 bln L by 2033.

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 return to 10%. This *Outlook* assumes sugarcane will continue to be the main feedstock. By 2033 biofuels use will account for about 30% of sugarcane production against about 15% in the base period, thus consolidating ethanol as an important element in sustaining the Colombian sugarcane industry. The biodiesel blending rate has been above 10% and is expected to remain so over the projection period.

Other countries

Other relatively important producers of ethanol include Paraguay, the Philippines, and Peru, where production could reach nearly 1 bln L, 0.6 bln L and 0.2 bln L, respectively, by 2033. The blending rate in Paraguay is assumed to recover and reach 30% in 2033. Malaysia, the Philippines and Peru are also major biodiesel producers, where production could reach 1.4 bln L, 0.3 bln L and 0.3 bln L, respectively, by 2033. In Malaysia, blending is projected to remain around 9%, whereas in Peru and the Philippines it will be around 7% and 4%, respectively. Other Asian countries, in particular Singapore, could increase production to reach around 0.9 bln L of biodiesel from UCO in 2033. Unlike most countries where biofuels are domestically used to reduce GHG emissions and to reduce national dependency on imported oil, production of biodiesel in Singapore is largely for export.

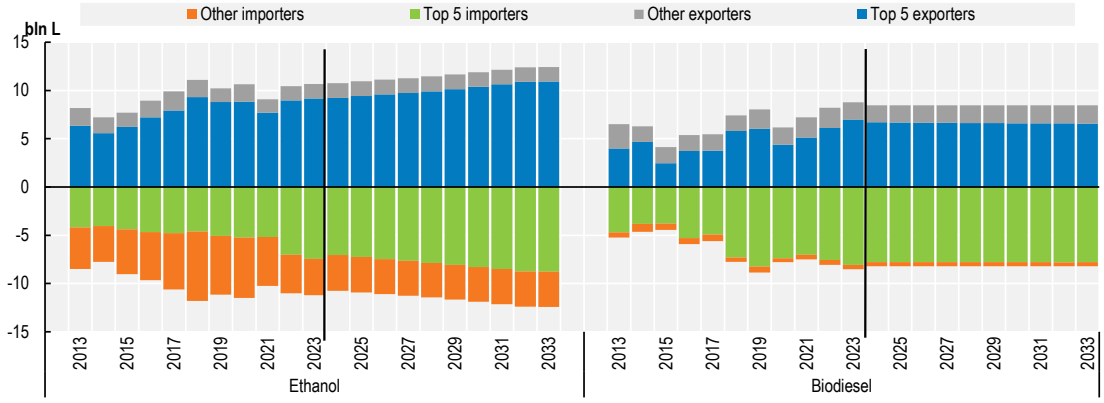
9.3.2. Trade

Global biofuel trade is expected to remain constant

World ethanol trade is projected to increase from 10.7 bln L to 12.4 bln L by 20233, with its total share of production staying around 8% throughout the projection period. The United States and Brazil are expected to remain the main exporters of maize- and sugarcane-based ethanol. The export share of both countries together is expected to remain at about 75%, with the United States gaining some export shares from Brazil.

Globally, biodiesel trade accounts for 13% of production and is projected to decrease from 8.8 bln L to 8.4 bln L by 2033 reducing the share in production to 11%. Indonesian biodiesel exports fell dramatically in 2020 and have remained low since. Reflecting high domestic demand, the *Outlook* does not expect Indonesia to return to international markets with significant biodiesel exports. The top five exporters of biodiesel – China, the European Union, the United States, Argentina, and Indonesia – are projected to increase their market share from 75% in the base period to 78% in 2033 (Figure 9.4).

Figure 9.4. Biofuel trade dominated by a few global players



Note: Top five ethanol exporters in 2033: United States, Brazil, European Union, Pakistan, Paraguay. Top five ethanol importers in 2033: Canada, European Union, Japan, United Kingdom, the Philippines. Top five biodiesel exporters in 2033: China, European Union, United States, Argentina, Indonesia. Top five biodiesel importers in 2033: European Union, United States, United Kingdom, China, Canada. Classification of biofuels by domestic policies can result in simultaneous exports and imports of biofuels in several countries.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

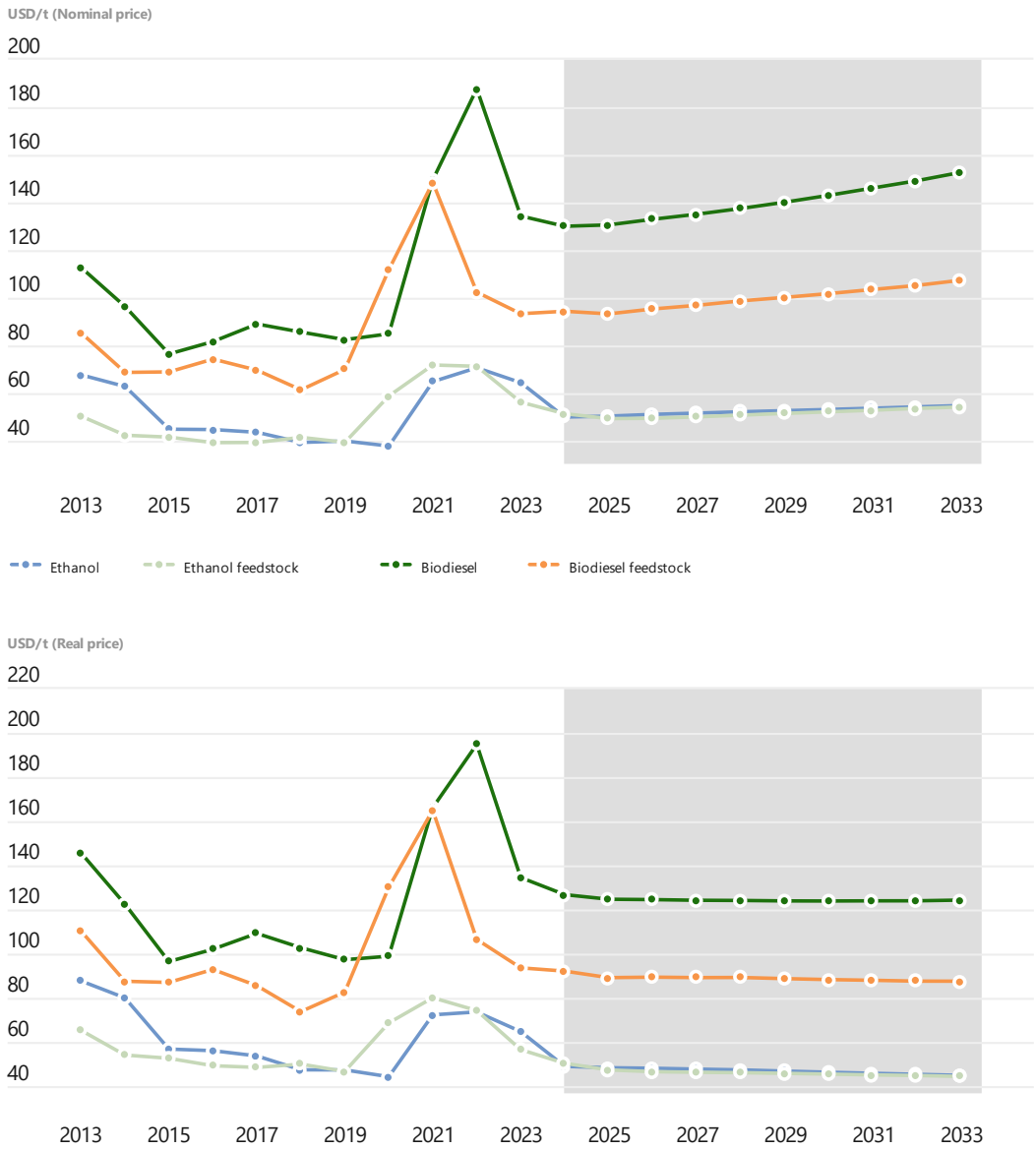
StatLink https://stat.link/26od8r

9.3.3. *Prices*

Prices in real terms are expected to decrease

Following their peak in 2022, nominal prices for both biodiesel and ethanol experienced a decline in 2023, a trend expected to persist into 2024 and primarily attributed to lower feedstock and oil prices. Subsequently, projections indicate a gradual increase in nominal biofuel prices up to 2033. However, in real terms, ethanol and biodiesel prices are anticipated to decrease over the next decade (Figure 9.5).

Figure 9.5. The evolution of biofuel prices and biofuel feedstock prices



Note: Ethanol: wholesale price, US, Omaha; Biodiesel: Producer price, Germany, net of biodiesel tariff and energy tax. Real prices are nominal world prices deflated by the US GDP deflator (2023=1). As proxy for the biodiesel feedstock price, the world vegetable oil price is used and for ethanol a weighted average between raw sugar and maize is applied.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

9.4. Risks and uncertainties

Evolution of policies and relative prices are key

Uncertainties stem from the policy landscape, feedstock availability, and oil prices. Policy uncertainty includes fluctuations in mandate levels, enforcement mechanisms, investment in non-traditional biofuel feedstock, tax exemptions and subsidies for both biofuels and fossil fuels, as well as policies promoting electric vehicles (EVs) and sustainable aviation fuel (SAF) technology.

Fluctuations in fossil fuel prices directly impact the competitiveness of biofuels, often linked to subsidies for the sector. Volatility in oil markets tend to disrupt the biofuels market structure, potentially leaving long-lasting effects. Additionally, uncertainty surrounds feedstock supply, as countries typically prioritise surplus commodities for biofuel production to safeguard food availability and security. While blending mandates are anticipated to drive biofuel production in emerging economies, recent price surges in cereal and vegetable oil markets have reignited debates on the ethical implications of fuel versus food production. Exploring advanced biofuels presents opportunities beyond conventional crops, with cellulosic feedstocks like agricultural residues and energy crops offering potential for expanded production without compromising food supplies. Waste-based feedstocks like municipal solid waste and used cooking oil also offer sustainable alternatives, providing additional benefits for waste management.

The global EV stock has steadily risen since the mid-2000s, with over 20 countries committing to phase out internal combustion engine vehicle sales and eight countries plus the European Union pledging net-zero emission vehicles within the next 10-30 years. Governments worldwide have introduced EV deployment targets, purchase incentives, and supportive programs to boost EV adoption and research. However, EV are currently experiencing reduced sales in the Unites States compared to initial market reaction, possibly attributable to the slower than expected progress in infrastructure development. Moreover, recent discussions among countries concerning protection of domestic markets from imported EV to protect their domestic industry could increase the uncertainty about EV adoption. While SAF consumption and production are not modeled explicitly in the *Outlook*, any significant increase in their use in the long term may have important impact on the use of advanced feedstocks, contingent upon technological advancements and ambitious policies. Biofuels may also play an important role in the decarbonisation of the maritime industry. Technological advancements and regulatory changes in the transportation sector could significantly impact biofuel market projections. Countries are expected to implement policies promoting new technologies to reduce GHG emissions, introducing uncertainty into agricultural markets and influencing future biofuel demand. The private sector's response to these measures, particularly industries investing in EVs and SAFs, will shape biofuel usage trends over the coming decade and beyond.

Note

[1] Global transport fuel use in this *Outlook* is based on the *IEA World Energy Outlook 2023*.

10 Cotton

This chapter describes market developments and medium-term projections for world cotton markets for the period 2024-33. Projections cover consumption, production, trade and prices developments for cotton. The chapter concludes with a discussion of key risks and uncertainties which could have implications for world cotton markets over the next decade

10.1. Projection highlights

Over the next ten years, global consumption of raw cotton, also known as lint, is projected to increase by an annual rate of 1.7%, on account of population growth and increasing incomes in middle- and low-income countries. Demand in the textiles and apparels sectors, as well as competition from substitutes, will remain key elements influencing raw cotton consumption. Asian countries, notably Bangladesh and Viet Nam, are projected to experience the fastest growth in cotton consumption over the next decade. Due to competitive labour and production costs, a further expansion in the milling capacity of Viet Nam, Bangladesh and India is expected over the next decade. Nevertheless, China is expected to remain the largest cotton processing country in 2033, followed by India.

In the coming decade, global lint cotton production is expected to increase by 1.3% p.a., reaching 29 Mt by 2033. This growth is primarily expected to be supported by improved yields, estimated at 1.1% p.a., with a smaller contribution from the expansion of harvested areas at 0.2% p.a. The anticipated increase in yields is set to be spurred by advancements in genetics, enhanced agricultural practices, the adoption of new technologies, and the implementation of digitalization to support precision agriculture.

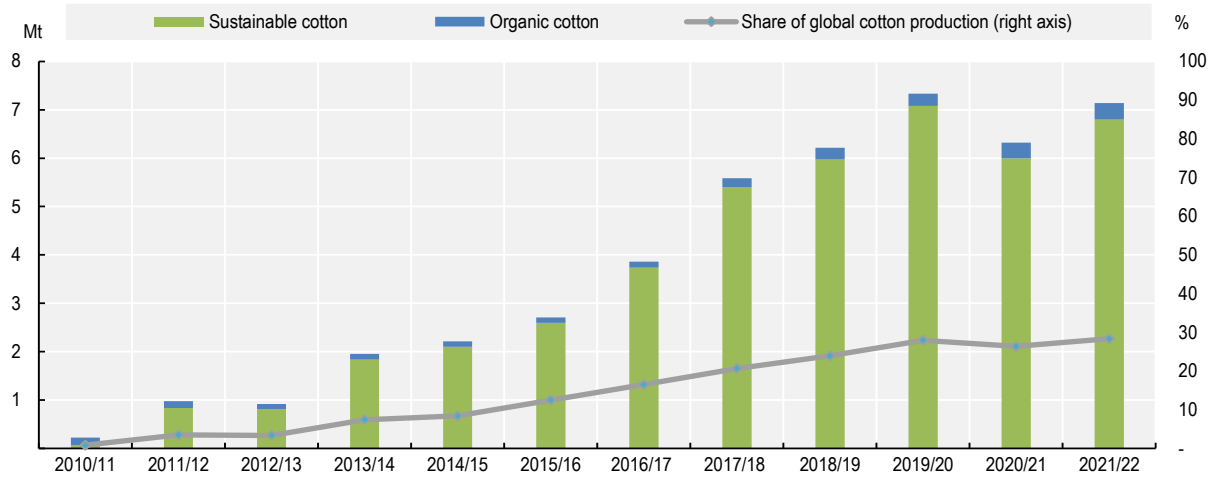
Cotton production is expected to be supported marginally by area expansion in Brazil and in the United States. Conversely, a decline in area is expected in China, while production is projected to remain relatively stable due to higher yields. Nevertheless, China, is expected to retain its position as the world's largest cotton producer, alongside India. Together, these two countries are projected to account for almost half of the global production by the end of the *Outlook* period.

Over the next ten years, global trade of lint is expected to increase by 2.1% p.a., reaching 12.4 Mt by 2033. This growth is expected to be driven by strong demand from countries with expanding textile industries such as Bangladesh and Viet Nam, which heavily rely on imports due to insufficient domestic production capacity. In addition, the stagnant growth rate of production in China is expected to spur imports over the next decade. The growing gap will be filled mainly by top producing countries, such as Brazil and United States, which will export an increasing share of their production. Overall, the global cotton market structure is expected to remain relatively stable in the next decade, with the United States and Brazil set to persist as the largest exporters of raw cotton in 2033.

Prices will continue to be influenced by competition from synthetic fibres along with changes in consumers preferences. International cotton prices in real terms are foreseen to trend slightly downward in the medium term.

The demand for cotton is closely tied to global economic conditions, affecting demand for textile products, while competition from synthetic fibres and the increasing trend for fast and athleisure fashion also affect demand for cotton. However, consumers' concerns about the environment and the growing demand for sustainable and organic cotton are expected to boost demand for cotton (Figure 10.1), although this may be partly offset by the impact of circular economy business models, particularly recycling and second-hand. On the supply side, the main source of uncertainty is yield risk, due to extreme weather events, unsustainable water usage and pest infestations. Finally, policy measures affecting the production and consumption of cotton (e.g. Product Environmental Footprint (PEF) and the Strategy for Sustainable circular textiles in the European Union), trade developments and geopolitical tensions, as it was with the enforcement in June 2022 in the United States of the Uyghur Forced Labor Prevention Act (UFLPA),[1] can also have important implications for the world cotton market.

Figure 10.1. Evolution of global sustainable and organic cotton



Source: Author's calculations based on Textile Exchange Materials market report 2023, Organic cotton market report 2022, and Better Cotton Annual Report 2022-23.

10.2. Current market trends

The slowdown in the global economy is seen affecting global cotton consumption in 2023/24

Global cotton production in the 2023/24 (August/July) season is expected to be slightly lower that the previous season. The decline is largely attributed to expectations of reduced outputs in key producing countries, China and India, due to lower plantings and crop yields, affected by unfavourable weather conditions. A sharp decline in production is also forecast in the United States, where prolonged dry weather conditions are anticipated to curb yields. By contrast, cotton production is expected to increase in Brazil, with the country currently forecast to overtake the United States as the third world's largest cotton producer. A strong rebound is anticipated in Pakistan and also in West African countries after the drop in 2022/23 mainly caused by a significant Jassids infestation.

Global cotton consumption in 2023/24 is forecast only slightly above its level in 2022/23 season, which was the lowest in ten years. The slowdown in the global economy is seen to affect global demand for cotton-related products. The year-on-year increase is mainly driven by forecasts of higher cotton use in Pakistan, Türkiye, and Viet Nam. By contrast, in the world's largest cotton-spinning countries, mill use is projected at the 2022/23 level in China, while in India, a relatively small decrease is anticipated.

International cotton prices have generally declined since the start of the season in August 2023, pressured downwards by concerns over weak global demand for textiles and clothing, due to the slowdown in global growth. In 2023, cotton prices averaged 27% below their multi-year high levels in 2022, affecting planting decisions in key producing countries, including in India and the United States.

World trade of raw cotton is foreseen to increase by around 10% compared to the previous season. On the supply side, exports from Brazil are expected to rebound significantly in line with the bumper crop expected and to more than offset a decline in the United States, the worlds' larger exporter. A rebound in exports is also forecast from West African countries. On the demand side, the forecast of higher purchases by China, mainly based on an expected decline in domestic production, along with increased imports from Bangladesh and Viet Nam are foreseen to drive the overall increase in global imports in the current season.

10.3. Market projections

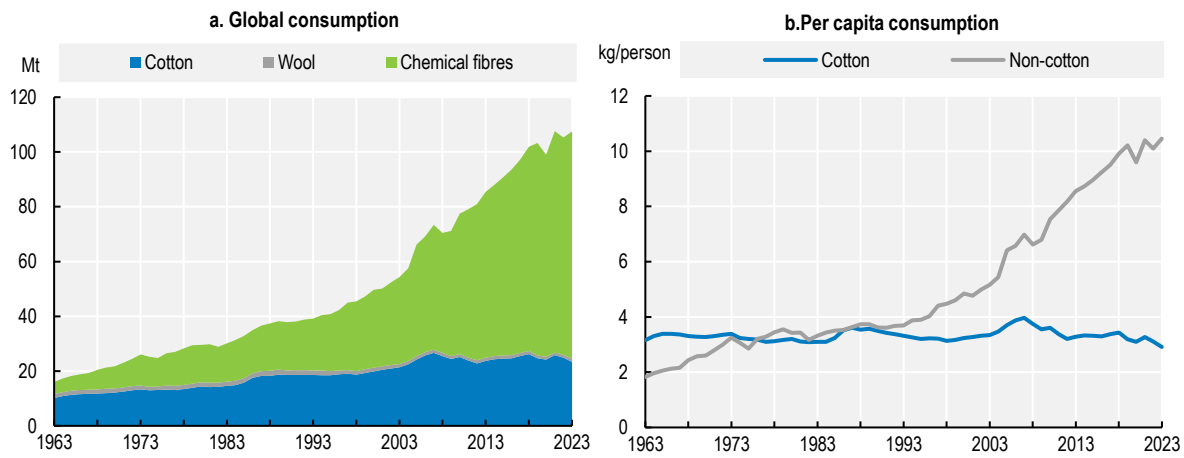
10.3.1. Consumption

Viet Nam to take the lead in annual growth of mill use, but China projected to retain its position as the world's largest cotton processing country

Cotton consumption refers to the use of cotton fibres by mills to transform it into yarn. Cotton mill-use depends largely on two major factors: global textile demand and competition from synthetic fibres. Over the past decades, global demand for textiles fibres has sharply increased, driven mainly by population and income growth, particularly in low- and middle-income countries. This expanding demand has been largely supplied by chemical fibres (Figure 10.2, Panel a). The diverse advantages of synthetics compared to cotton including durability, wrinkle resistance, moisture-wicking, and/or competitive prices have boosted textile manufacture industry to favour synthetic over cotton fibres. As a result, global consumption of natural fibres peaked in 2007 at 26.5 Mt and shrank to around 24.4 Mt in 2021-23.

From the early 1990's, non-cotton fibres have gained solid ground in the textile industry. In 2023, the end-use market-share reached 78.2% for chemical fibres and only 21.8% for cotton. Likewise, per capita consumption of non-cotton fibres has strongly outpaced per capita consumption of cotton fibres and continues to strongly increase. In contrast, per capita consumption of cotton has remained stagnant over time and trended downwards in recent years (Figure 10.2, Panel b).

Figure 10.2. Historical trends in consumption of textile fibres



Source: ICAC World Textile Demand estimates, December 2023.

StatLink https://stat.link/ep3xbf

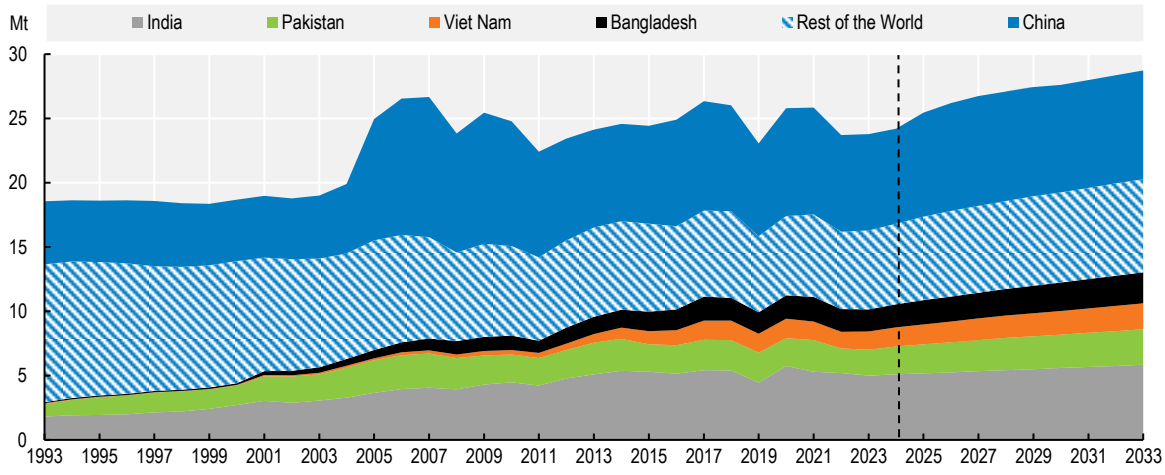
The prospects for global cotton use relies mainly on its evolution in developing and emerging economies. Demand from these regions with lower absolute levels of consumption but higher income responsiveness is projected to exert upward pressure on global demand for cotton as the incomes and population of these countries are projected to increase. Global mill use is projected to grow by around 1.7% p.a. over the next decade.

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.

Higher labour costs and more stringent labour and environmental regulations 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 provoked a move to other Asian countries, notably Viet Nam and Bangladesh. Mill consumption has regained some lost ground in China since 2016, in part because domestic cotton prices have become more competitive when compared to polyester, which appears to have suffered a setback due to government measures to combat industrial pollution. Furthermore, significant government investments and incentives directed towards the textile industry, coupled with large availabilities of domestically-produced cotton, are poised to boost spinning mill use over the next decade.

In India, the growing textile industry coupled with competitive labour costs, and government support to the sector are expected to result in continuous growth in cotton mill use. Cotton plays an important role in the Indian economy as the country's textile industry is predominantly cotton based while absorbing around 90% of the cotton produced domestically. The textile industry, however, faces several challenges, including technological obsolescence, high input costs, and poor access to credit. The government has implemented heavy investments in increased spinning capacity and has launched several schemes over the past few years aimed at promoting the textile industry, fostering innovation, and improving the livelihood of the people involved.

Figure 10.3. Cotton mill consumption by region



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

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, was initially expected to favour Chinese textile producers over smaller Asian countries. However, countries such as Bangladesh and Viet Nam 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 partly driven by its accession to the World Trade Organization in 2007 and by foreign direct investment (FDI), notably by Chinese entrepreneurs. In addition, Free Trade Agreements (FTAs) including the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) and the EU-Viet Nam Free Trade Agreement (EVFTA) have also facilitated greater market access to Vietnamese textile exports. Similarly, foreign investments and FTAs have boosted the textile industry in Bangladesh, contributing to its emergence as a major player in the global textile market. The escalation of the United States-China trade dispute has spurred additional mill use in Bangladesh and Viet Nam. The expansion of textiles industries in Viet Nam, Bangladesh, and other central Asia economies, is foreseen to keep boosting mill consumption growth over the coming

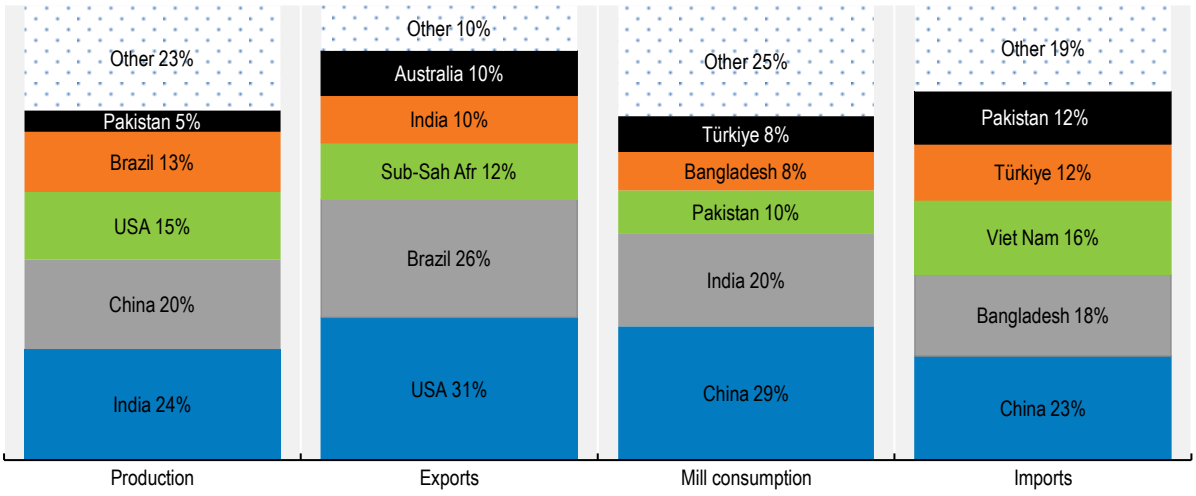
decade. Viet Nam will take the lead in annual growth of mill use at 3.3% p.a. In Bangladesh, growing demand for yarn and fabric from the domestic garment and textile industries is prompting investments in spinning capacity and cotton fibres consumption is expected to rise 3.3% p.a. This growth has not only consolidated their positions as key players in the global textile market but also significantly contributed to their overall economic development. Nevertheless, China is expected to remain the largest cotton processing country in 2033, followed by India, with consumption projected to grow 0.9% and 1.5% p.a. respectively over the next decade.

10.3.2. Production

Production to grow as a result of improved yields while higher compliance with sustainable standards is also anticipated.

Cotton is grown in subtropical and seasonally dry tropical areas in both the northern and southern hemispheres, although most of the world's production takes place north of the equator. The leading producing countries are India, China, the United States, Brazil, and Pakistan. Jointly, these countries are expected to account for around 77% of global output in 2033 (Figure 10.4).

Figure 10.4. Global players in cotton markets in 2033

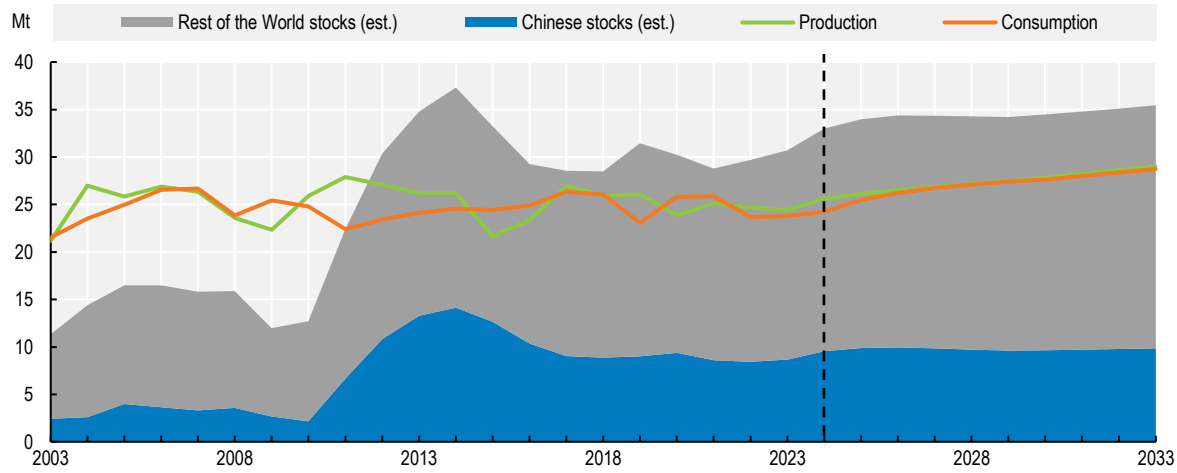


Note: Presented numbers refer to shares in world totals of the respective variable
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*" OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/b97q3g

Global production of cotton is expected to grow steadily and reach 29 Mt by 2033, 17% higher than in the base period (Figure 10.5). The foreseen increase will mostly come from growth in the main cotton producers: India will account for about 38% of the global increase, followed by the United States (27%), and Brazil (21%). Overall, gains in cotton production are predominantly driven by higher yields, and to a lesser extent, on expansion in area harvested.

Figure 10.5. World cotton production, consumption, and stocks

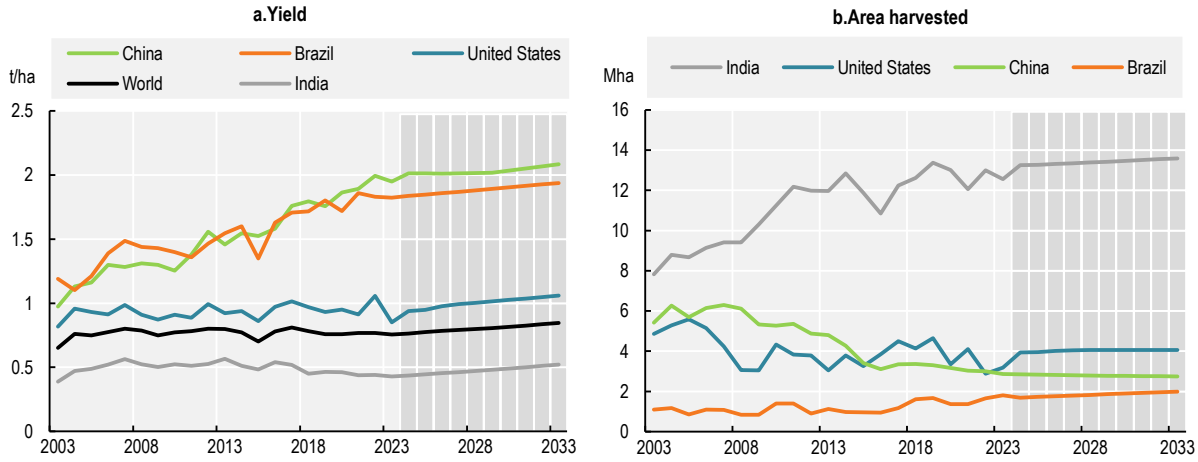


Note: est. stands for estimate.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*" OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

Average global yields are projected to increase by 11% compared to the base period. Factors such as improvements in genetics, better agricultural practices, and digitalization supporting precision agriculture will significantly contribute to enhance productivity and sustainability. Over the past two decades, global average yields have been stagnant, suggesting static or decreasing yields in some of the major producers due to various factors including climatic constraints, limited uptake of efficient agricultural practices, unfavourable conditions for the application of new technology and high input costs. The yield gap between main producers in 2023 is projected to remain constant over the *Outlook* period. By 2033, yields in China and Brazil are projected to double the world average, while in India, the largest cotton producer, yields are expected to remain below it. (Figure 10.6, Panel a). Cotton area is projected to expand by 6% compared to the base period, with the highest growth occurring in Brazil (23% compared to the base period), where the prospect of growing exports encourages producers to invest in increasing the planted area.

Production in India is estimated to grow by around 2.3% p.a. over the next decade, mainly on account of yield improvements rather than area expansion, since cotton already competes for acreage with other crops, such as soybeans and pulses. Raw cotton productivity has remained stagnant 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, which hinders yields. This reduced plant density is partially compensated for by multiple manual pickings, rather than machine harvesting. To tackle this issue, researchers are developing production schemes with higher plant populations, aiming to improve yields. However, growing demand from the domestic apparel industry continues to spur investments in the sector and various federal and state government agencies and research institutions are engaged in cotton varietal development, seed distribution, crop surveillance and integrated pest management activities. Based on that, the *Outlook* assumes a growth in yields that are projected to grow by 2% p.a. over the next decade. Nonetheless, climate change, with most cotton grown under rain-fed conditions, may undermine the yield growth potential.

Figure 10.6. Cotton yields and area harvested in major producing countries



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

StatLink https://stat.link/4mdwpg

Chinese cotton is currently produced with the highest global yield (1.90 t/ha average in 2021-23), which are more than double of the world's average. Over the past two decades, the cotton area in China has been declining, mostly due to changing government policies. Nevertheless, this trend seems to have slowed down since 2016. It is expected that the cotton area will decrease by 0.4% p.a. during the *Outlook* period, against a near 3% decline in the past decade, while cotton production is expected to remain stable thanks to improvements in yields, mainly as a result of the increasing rates of mechanization, investments in irrigation and improved agricultural practices in general.

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 70% of Brazilian cotton is currently harvested. Cotton output is foreseen to increase by 2.4% p.a. Production gains are mostly coming from higher yields and the use of genetically engineered (GE) seeds and fertilisers. 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 soybeans, the planted area depends widely on the profitability of cotton compared to other commodities.

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 climate change and socio-environmental considerations, new initiatives have been introduced to promote sustainability along the supply chain. In the season 2021/22, the market share of cotton covered by programs recognised by the 2025 Sustainable Cotton Challenge[2] reached 27% of global cotton production (Figure 10.1). Among the existing standards, Better Cotton, a not-for-profit organisation, dominates globally, at around 21% of all cotton in the season 2021/22. Alternative strategies promote better agricultural practices to mitigate climate change and provides guidance to textile brands and retailers to source their cotton inputs from recognised and certified sustainable producers. It is expected that demand for more sustainable cotton continues 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 around 78% of total cotton output already complies with the sustainable standards. In India and Pakistan, cotton programs accounted for 21% and 68% of total cotton production in 2021/22, respectively. It is expected that the Sub-Saharan region will also benefit from higher compliance with sustainable standards, with programmes such as Cotton Made in Africa (CMIA) currently accounting for 10% of global sustainable output.

10.3.3. Trade

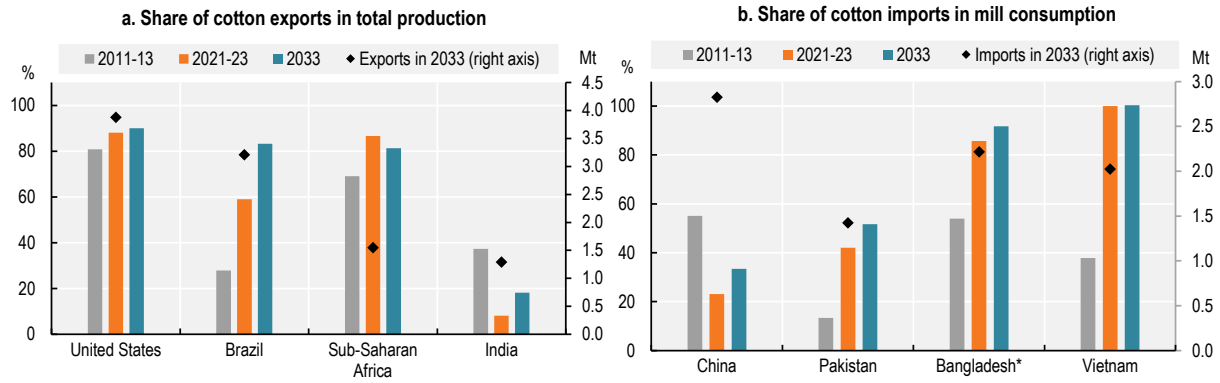
Viet Nam and Bangladesh driving trade growth over the next decade

World cotton trade is projected to expand steadily over the next decade by 2.1% p.a. and reach 12.4 Mt in 2033. The increase reflects the substantial growth in mill use in Asian countries, particularly Viet Nam and Bangladesh, which source virtually all their cotton from imports to support their growing domestic textiles sector. Moreover, the stagnant production growth rate in China is anticipated to drive an increase in lint imports over the next decade to fulfil the demand of local mills and replenish state reserves. By 2033, raw cotton imports are projected to increase by 0.7% p.a., reaching 2.8 Mt (Figure 10.7, Panel b), which remains well below the over 3% growth projected in Viet Nam and Bangladesh.

The United States will remain the world's largest exporter throughout the *Outlook* period. Exports from the United States have stabilised in recent years, recovering from the lows in 2015. It is projected that its share of world trade will reach 31% in 2033 (around 3.9 Mt). Despite the major changes in the Chinese textile industry, the United States remains its main trade partner.

Brazilian exports are expected to grow strongly over the next decade, consolidating the country's position as the second largest exporter by 2033, with Sub-Saharan Africa as a whole following behind (Figure 10.7, Panel a). In Sub- Saharan Africa, cotton is an essential export crop, accounting for around 16% of global exports.

Figure 10.7. Trade as a percentage of cotton production and mill consumption



Note: * Includes mill consumption and imports from other countries such as Cambodia, Myanmar, Bhutan and Nepal.
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/icojaq

Sub-Saharan African exports are projected to continue growing at around 0.7% p.a. in the coming decade, with South and Southeast Asia being the major export destinations. However, the textile and apparel industry is expanding in countries such as Ethiopia, where the textile and clothing sector primarily relies on cotton, supported by FDI flows and government investments. In the long run, the increase in mill use may affect the net export status of Sub-Saharan Africa.

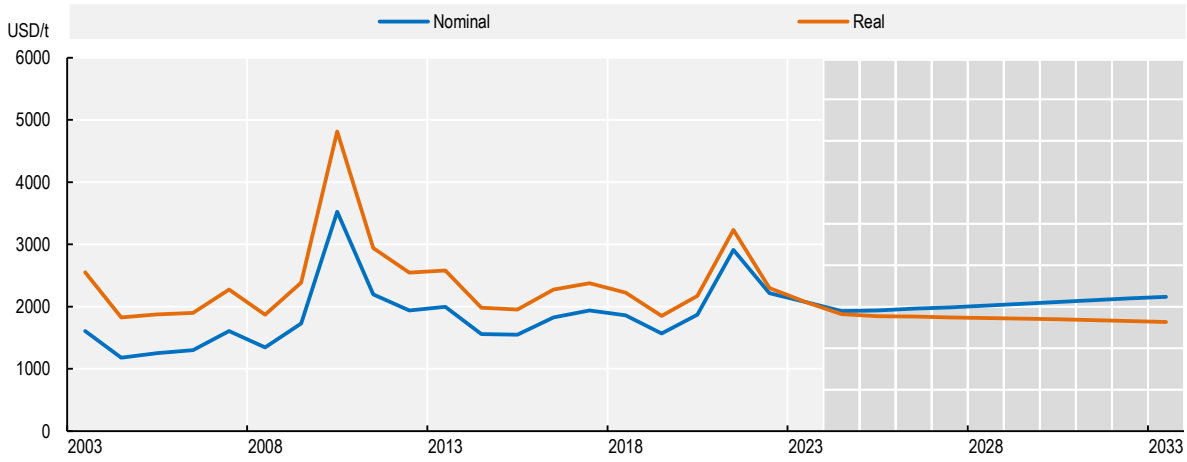
10.3.4. Prices

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

International cotton prices in real terms are foreseen to trend slightly downward in the medium term (Figure 10.8). Prices will continue to be influenced by competition from man-made fibres along with changes in consumers preferences.

From the early 1970s, when polyester became price-competitive, cotton prices tended to follow polyester prices. For example, cotton prices were only 6% above polyester staple fibre prices between 1972 and 2009. Since 2010, however, cotton prices have been on average around 70% above the polyester price, in nominal terms. It is assumed that the relative price competitiveness between these two types of fibre will not change drastically over the projection period.

Figure 10.8. World cotton prices



Note: Real prices are nominal world prices deflated by the US GDP deflator (2023=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).
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*" OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

10.4. Risks and uncertainties

Regulatory shifts and innovation as key challenges shaping the cotton sector

Key drivers of per capita textile demand in emerging economies, notably economic expansion and urbanisation, will continue to exert substantial influence on cotton fibre demand. Additional demand trends affecting projections encompass the growing adoption of recycling in the textile sector. Notably, recycled cotton, which had an estimated production of 0.3 Mt in 2022 compared to 25 Mt of newly produced cotton, is expected to experience significant growth in the coming years.[3] 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 offers potential stimulation to cotton demand amid mounting environmental concerns.

Changes in climate factors, water availability, and pest infestations remain significant risks to cotton production, necessitating innovative pest management strategies, optimization of water use, and climate-resilient agricultural practices. Precision agriculture technologies, such as soil moisture sensors and drip irrigation systems, are increasingly adopted to optimise water usage in cotton fields, while improving cotton

yields. Initiatives such as China's extensive irrigation programs demonstrate efforts to mitigate water scarcity's impact on cotton cultivation, essential for ensuring sustainability and resilience in cotton farming.

Further factors such as harvest losses and supply chain disruptions, such as transportation bottlenecks or trade restrictions, can also negatively affect cotton production and hinder market availability.

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 Product Environmental Footprint (PEF) and the Strategy for Sustainable Circular Textiles in the European Union exemplify initiatives driving this shift. Additionally, policy measures that affect consumption, such as the decision by several East African countries to discourage 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 in this regard 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 both challenges and opportunities for the cotton industry. 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. External factors, including the US-China dispute and the Uyghur Forced Labor Prevention Act,[4] further complicate matters, resulting in disruptions along the supply chain.

Notes

[1] The Uyghur Forced Labour Prevention Act forbids the import of goods produced in China’s Xianjiang region. The importer must clearly prove that the merchandise coming from this region was not produced with forced labour.

[2] See Materials Market Report 2023 - Textile Exchange.

[3] See Materials Market Report 2023 - Textile Exchange.

[4] The Uyghur Forced Labour Prevention Act forbids the import of goods produced in China’s Xianjiang region. The importer must clearly prove that the merchandise coming from this region was not produced with forced labour.

11 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, lentils), and banana and major tropical fruits (mango, mangosteen and guava, pineapple, avocado, and papaya) markets. It also provides the medium term (2024-33) projections for production, consumption and trade for these products and describes the main drivers shaping these projections.

11.1. Roots and tubers

11.1.1. Market overview

Roots and tubers are plants that yield starch derived from either their roots (e.g. cassava, sweet potato and yams) or stems (e.g. potatoes and taro). They are destined mainly for human consumption (as such or in processed form) and, like most other staple crops, can also be used for animal feed or industrial processing, notably in the manufacturing of starch, alcohol, and fermented beverages. Unless they are processed, they are highly perishable once harvested due to their low dry-matter content (20 to 40%). This limits the opportunities for trade and storage and makes roots and tubers a particularly important commodity in terms of food loss and waste.

Within the roots and tubers family, potato dominates in worldwide production, with cassava a distant second. With respect to global dietary importance, potato ranks fourth after maize, wheat and rice. This crop provides more calories, grows more quickly, uses less land, and can be cultivated in a broad range of climates. However, potato production, which forms the bulk of the root and tuber sectors in high-income countries, has been declining over several decades, with growth in production falling well below that of population.

Output of cassava is growing at well over 3% p.a., almost three times the rate of population growth. Cultivated mainly in the tropical belt and in some of the world's poorest regions, cassava production has doubled over two decades. Once considered a subsistence crop, it is now seen as a commodity and key for value-addition, rural development and poverty alleviation, food security, energy security; and for bringing important macroeconomic benefits. These factors are driving rapid commercialization of this crop and major investments in upscaling the processing of cassava, both which have contributed significantly to its global expansion.

11.1.2. Current market situation

The largest producing regions of roots and tubers in the base period are Asia (112 Mt) and Africa (90 Mt). In Sub Saharan Africa, roots play a significant role as a staple crop. Globally, about 138 Mt are used as food, 45 Mt as feed, and 32 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 19 Mt are currently traded internationally, mostly in processed or dried form. Thailand and Viet Nam are the leading exporters and the People's Republic of China (hereafter "China") is the main destination.

Global production of roots and tubers reached 250 Mt (dry matter) in the base period (2021-23); about 6 Mt has been added annually in the past years and consumed mainly as food. The prices of roots and tubers (measured by the Cassava (flour) wholesale price in Bangkok) increased again significantly in 2023 as demand was strong, in particular in China. Global quantities traded increased by 1.3 Mt.

11.1.3. Main drivers for projections

Producing cassava requires few inputs and affords farmers greater flexibility in terms of timing the harvest as the crop can be left on the ground well after reaching maturation. Cassava's tolerance to erratic weather conditions, including drought, makes it an important part of climate change adaptation strategies. Compared to other staples, cassava competes favorably in terms of price and diversity of uses. In the form of High-Quality Cassava Flour (HQCF), cassava is increasingly targeted by governments in Africa as a strategic food crop which does not exhibit the same levels of price volatility as other imported cereals.

Mandatory blending with wheat flour helps reduce the volume of wheat imports, thereby lowering import bills and conserving precious foreign exchange. The drive towards energy security in Asia, combined with mandatory blending requirements with gasoline, has led to the establishment of ethanol distilleries that use

cassava as a feedstock. With regard to trade, processed cassava manages to compete successfully in the global arena, e.g. with maize-based starch and cereals for animal feeding applications.

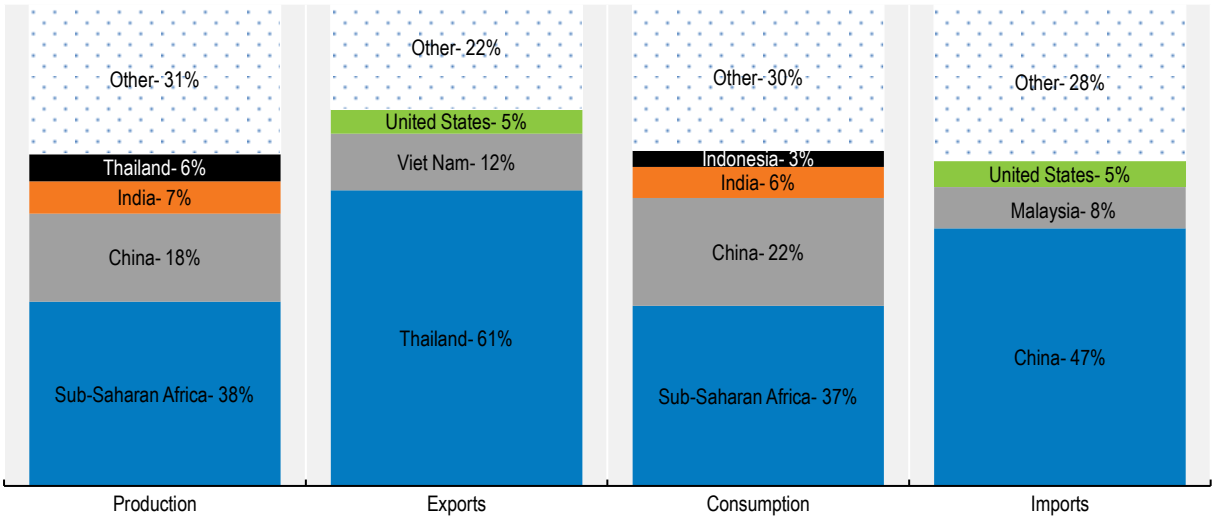
Potatoes are generally used only for food and are a substantial component of diets in high-income regions, particularly in Europe and North America. As overall food intake of potato in these regions is very high and may have reached saturation, the scope for consumption increases to outpace population growth remains limited. However, low-income regions provide some growth momentum to potato production at the world level.

Global sweet potato cultivation has declined in recent years, mostly due to a sharp decline in acreage (which shows no sign of abating) in China, the world's foremost producer. Food demand largely defines the growth potential of sweet potato and other less prominent roots and tuber crops given the limited commercial viability for diversified usage. Consequently, consumer preferences along with prices play important roles in shaping consumption.

11.1.4. Projection highlights

World production and utilization of roots and tubers is projected to increase by about 22% over the next decade. Production growth in low-income regions could reach 2.9% p.a. while supply in high-income countries should grow at only 0.3% annually. Global land use is projected to increase by 4 Mha to 65 Mha, but there will be some regional shifts. African countries are expected to increase their cultivation area, while reductions are projected for Europe and America. Moreover, many farmers in Thailand shifted from cassava to rice which had better production incentives. Production growth is mainly attributed to investments in yield improvements in Africa and Asia, and, to a lesser extent, an intensification of land use in Africa.

Figure 11.1. Global players in roots and tubers markets in 2033



Note: Presented numbers refer to shares in world totals of the respective variable
Source: OECD/FAO (2024), "OECD-FAO Agricultural *Outlook*", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink https://stat.link/nfahvc

By 2033, an additional 1.9 kg/capita per year of root crops will enter diets at the global level, driven mostly by consumers in Africa where per capita intake of roots and tubers could surpass 38 kg per year. Biofuel use, albeit from a low basis (4% of use), is expected to grow by 31% over the next ten years driven by the

Chinese biofuel industry. Feed and other industrial use will remain significant, albeit with slower growth of about 19% and 14% respectively, over the *Outlook* period.

International trade in roots and tubers comprises about 7% of global market production. Over the medium term, this share is expected to remain constant. Exports from Thailand and Viet Nam are growing and are expected to reach a combined total of 16 Mt, mainly to supply the growing biofuel and starch industries in China.

After a decrease expected in 2024 partly due to lower demand in China, prices of roots and tubers are projected to follow a similar path to cereal prices in the medium term given the substitutability between roots and tubers and cereals on food and feed markets; namely, an increase in nominal prices but a decline in real terms.

11.2. Pulses

11.2.1. Market overview

Pulses are the edible seeds of plants in the legume family. Commonly, eleven types are recognized.[1] They provide high level of protein, dietary fibre, vitamins, minerals, phytochemicals, and complex carbohydrates. Apart from their contribution to calorie intake, pulses help to improve digestion, reduce blood glucose, minimise inflammation, lower blood cholesterol, and prevent chronic health issues such as diabetes, heart disease, and obesity. However, their consumption levels differ from region to region depending on dietary patterns and availability. Compared to other crops, pulses have a low contribution to total food wastage. Pulses can be stored for extended period without spoiling or reduction in nutritional quality. This characteristic helps minimise the risk of food waste caused by spoilage and makes pulses a wise option for households facing food insecurity.

Cultivation of pulses has a long tradition in almost all regions of the world. For centuries, legumes have played a fundamental role in the functioning of traditional agricultural systems. Prior to 2000, global production of pulses stagnated due to the widespread disappearance of traditional crop rotation systems in low-income countries. Production was further hampered by of their weak resilience to diseases due to a lack of genetic diversity, limited access to high-yield varieties, and limited policy support to pulses growers. The sector began to recover in the early 2000s and has since seen an average annual increase of about 3% globally, led by Asia and Africa. These two regions combined accounted for more than half of the 12 Mt production increase in the past decade.

Global per capita consumption of pulses started to decline in the 1960s (Figure 11.2) as slow growth in yields pushed up prices. Income growth and urbanization shifted preferences away from pulses as human diets became richer in animal proteins, sugar, and fats. Nevertheless, pulses have remained an important source of protein in low-income countries, and average global per capita food consumption has increased to about 7 kg/year to date. This growth has been driven mainly by income gains in countries where pulses are an important source of protein; this is particularly true of India where vegetarians account for about 30% of the population.

Pulses can be processed into different forms such as whole pulses, split pulses, pulse flours, and pulse fractions like protein, starch and fibre. The flour and fractions have diverse applications in industries related to meat and snack foods, bakery and beverages, and batter and breading.

11.2.2. Current market conditions

India is by far the largest producer of pulses, accounting for about 28% of global production in the base period. Canada, China and the European Union are the next largest producing countries, with around 5% of global production. The Asian market accounts for 52% of all consumption but only about 43% of

production, making it the most significant import destination. About 20% of global production is traded internationally with Canada (23% of global trade) by far the largest exporter and China the largest importer (14% of global trade). Africa has further expanded its production and consumption in the past decade and has remained largely self-sufficient.

In 2023, the global pulses market reached a volume of 95 Mt, after an average annual growth of 1.9% p.a. during the previous decade. This growth was led by Asia and Africa. World trade volumes were registered at 18.8 Mt, 1 Mt lower than in 2022.International prices for pulses, approximated by the Canadian field pea price, have continued to fall from their peak value of 2021 to USD 310/t in 2023.

11.2.3. Main drivers for projections

As pulses are associated with various health benefits and represent an important meat substitute due to their high protein content, health and environmentally conscious consumers are increasingly integrating them into their daily diets, which in turn is propelling the growth of the global pulses market. Rapid urbanization, changing lifestyles, and hectic work schedules are also making healthy snack foods popular amongst the working population, and pulses are increasingly used in the processing of ready-to-eat (RTE) food products.

The health and environmental benefits attributed to pulses are reasons why governments of pulses-producing countries are providing assistance to farmers, and thus supporting growth of the market. Support to the production of pulses production plays an important role in the Protein Strategy of the European Union where pulses are a major ingredient in products such as meat substitutes. Depending on the future dynamics of demand for such products, this could significantly change the future importance of pulses in the agricultural production mix.

11.2.4. Projection highlights

Pulses are expected to regain importance in diets in many regions of the world. This *Outlook* foresees this global growth to continue and projects global average annual per capita food use to increase to 8.6 kg by 2033. Per capita food consumption is projected to increase in almost all regions over the coming decade, with the largest increase expected in Europe (+3% p.a.) (Figure 11.2).

Global supply is projected to increase by 25 Mt. Almost 40% of this increase is expected to come from Asia, particularly India, the world's largest producer. Sustained yield improvements are projected to raise India's domestic production by an additional 8 Mt by 2033. India has introduced high-yielding hybrid seeds, supported mechanization, and implemented a minimum support price aimed at stabilizing farmer's income. In addition, the central government and some state governments have included pulses in their procurement programs, although not with the same geographical coverage as for wheat and rice.

This expected production expansion is driven by the assumption of continued intensification of pulses production systems due to improved yields and intensified land use. Almost 60% of production growth can be attributed to land use intensification during the projection period, and the remaining 40% to yield improvements. Particularly in Africa, a combination of area expansion and yield growth is estimated to add about 0.8 Mt annually to the region's production.

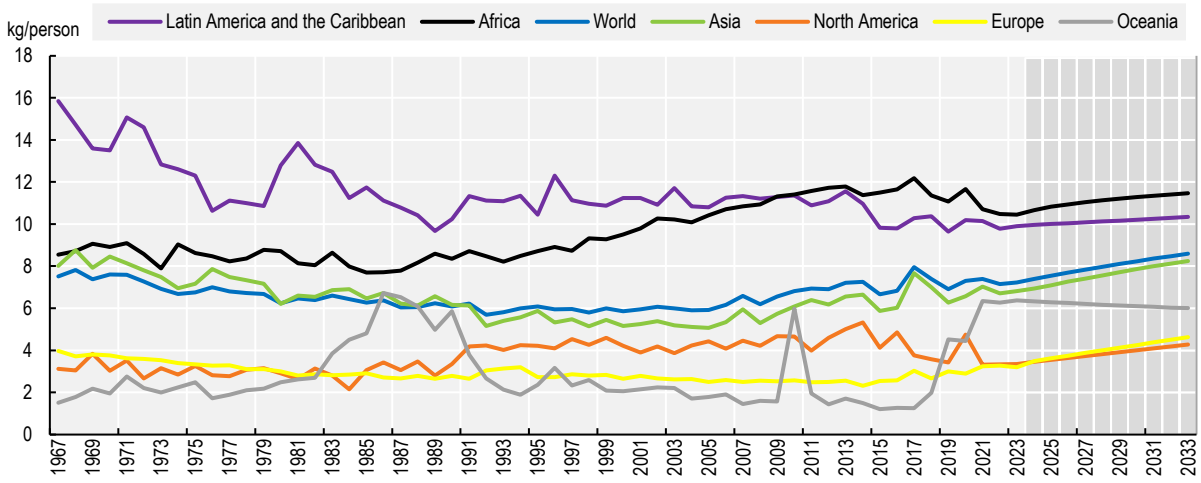
This *Outlook* assumes that growth will be sustained by increased intercropping of pulses with cereals, especially in Asia and Africa where smallholder farmers represent a large share of producers. The projected yield improvements for pulses will continue to lag behind those for cereals and oilseeds because in most countries pulses are not overlooked in the development of high-yielding varieties, improved irrigation systems, and agricultural support policies.

World trade in pulses grew from 15 Mt to 19 Mt over the past decade and is projected to reach 22 Mt by 2033. Canada will remain the main exporter of pulses, with volumes expected to grow from 4.4 Mt at

present to 5.7 Mt by 2033, followed by Australia and Russia with 2.8 Mt and 2.1 Mt of exports by 2033, respectively.

International prices in nominal terms are expected to decrease further until 2025 then increase slightly over the coming decade, while real prices will decline.

Figure 11.2. Per capita food consumption of pulses per continent



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

11.3. Bananas and major tropical fruits

11.3.1. Projection highlights

Bananas and the four major fresh tropical fruits – mango, pineapple, avocado and papaya – play a vital role in agricultural markets, especially in securing the nutrition and 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 both consumption and international trade in these commodities.

Global production of bananas and major tropical fruits generates some USD 100 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 11 billion and USD 12 billion per year in export revenues (provisional 2023 figures). In exporting countries, which are mostly low- or middle-income economies, production and trade revenues can weigh substantially in agricultural GDP, particularly for tropical Latin American countries. For instance, bananas represented about 50% of agricultural export revenue in Ecuador in 2022, 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.

As with other agricultural commodities, price variations for bananas and tropical fruits increased substantially following the COVID-19 pandemic and shocks to the energy and fertiliser sectors associated with Russia's war against Ukraine. While the sector has shown relative resilience, in the medium-term, it is anticipated to first adjust to these shocks and then return to longer term trends in consumer behaviour and preferences. This will be characterised by future growth in per capita consumption and further expansion in exports from tropical regions toward developed and emerging developing economies.

Bananas

Market situation

Preliminary data and information on developments in 2023 indicate that global trade in bananas showed signs of recovery from the more severe supply shortages in the previous two years. Total exports reached some 19.2 Mt in 2023. However, developments diverged significantly among key global trade partners, as weather conditions and the economic backdrop proved to be beneficial to some and adverse to others. Ecuador and Guatemala reported greater supplies during the first eight months of the year, where favourable climatic conditions related to *El Niño* spurred production growth. Conversely, excessive rainfall, flooding and tropical storms reduced export supplies from Colombia, Mexico, Costa Rica and the Dominican Republic. Industry sources reported that reduced fertiliser application by farmers in 2022 continued to hamper the productivity and quality of banana production in the first half of 2023. The spread of plant diseases, particularly the Banana Fusarium Wilt Tropical Race 4 (TR4) disease in the Philippines, Peru and the Bolivarian Republic of Venezuela, continued to cause production losses as well as financial strain from the substantial costs of disease prevention. Suppliers in some Latin American countries also suffered losses and mitigation expenditures stemming from the placement of illegal substances in banana containers.

Import demand for bananas, meanwhile, remained firm in most key markets, with global imports reaching 18.7 Mt. Amid inflationary pressures, bananas benefited from their relative affordability, particularly in the European Union and the United States. Average import unit values displayed increases ranging from some 8 to 15% over the first nine months of 2023 in most key markets. Importers into the European Union attributed improved profitability to the appreciation of the Euro against the United States Dollar as well as lower freight costs, which had returned to near pre-pandemic levels by September 2023. The *Outlook* for 2024 and beyond therefore looks more positive than in the previous two years, provided that price variations in real terms will continue to be favourable and price increases at the export and import stages can be passed on to producers and to suppliers.

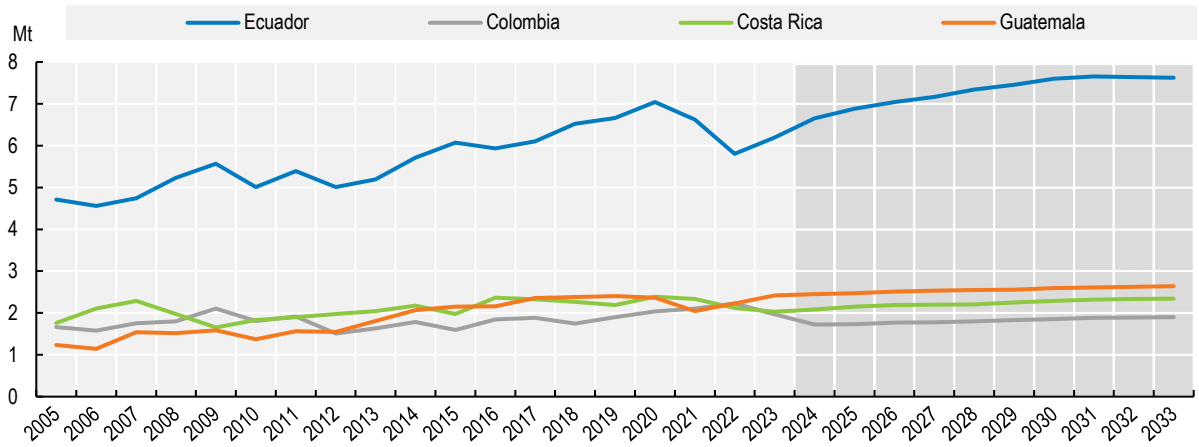
Projection highlights

Assuming normal weather conditions and no further spread of banana plant diseases, global banana production is expected to reach 160 Mt by 2033, from 135 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 1.5% p.a. over the *Outlook* period. At the same time, in some emerging economies – principally in India and China – 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 share of over 50%, with India projected to reach an output of 43 Mt and a per capita consumption of 28 kg by 2033.

Production from the leading exporting region of Latin America and the Caribbean is projected to reach 37 Mt by 2033, encouraged by rising demand from key markets, most importantly the European Union and the United States. With economic pressures expected to continue in 2024 and potentially beyond, demand for bananas is likely to be supported by the fruit's relative affordability. Rising import demand from China, where domestic production growth is likely to remain relatively low, is assumed to be an additional factor driving production growth in Latin America and the Caribbean. The largest exporters from the region – Ecuador, Guatemala, Colombia, and Costa Rica – are likely to benefit from this growth, provided that output can be shielded from the adverse effects of erratic weather events and disease outbreaks. Rising demand from the European Union and the United Kingdom is expected to benefit some Caribbean exporters, most notably the Dominican Republic and Belize, as well as exports from Africa, which are

projected to expand at 0.3% p.a. over the *Outlook* period – led by Ivory Coast – to reach a total quantity of approximately 0.7 Mt in 2033. Against this background, world exports of bananas are projected to reach some 22.6 Mt by 2033.

Figure 11.3. Exports of bananas by the four major LAC exporters



Source: FAO data.

Mango, mangosteen and guava

Market situation

Global exports of mango, mangosteen and guava have grown to 2.3 Mt in 2023, an increase of 1% from the previous year. Higher exports of mangosteen from Thailand in the first half of the year, as well as of mangoes from Brazil, Peru and Mexico, were the main driving factors behind this. In terms of export quantities by type at the global level, mango accounted for 85% of global shipments and mangosteen for around 15%. Guava continued to have limited availability in import markets, in particular due to its lower suitability for transport.

Total global import quantities of fresh mangoes, mangosteens, and guavas rose to 2.3 Mt in 2023. The United States and the European Union remained the two leading global importers, with expected import shares of 27% and 17%, respectively. In both markets, consumer demand for mangoes increased slightly, driven by a growing awareness of the assumed nutritional health benefits of these fruits. Import growth in these markets was further supported by strong supply from Mexico, Peru and Brazil, the three leading origins for mangoes in the United States and the European Union. Overall, imports into the United States were expected to grow by some 4% in 2023 to approximately 0.61 Mt. Imports into the European Union, meanwhile, were estimated to rise by 2%, to some 0.39 Mt.

Projection highlights

Global production of mangoes, mangosteens and guavas is projected to increase at 3.6% p.a. over the next decade, to reach 86 Mt by 2033, from 60 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 over 70% of global production in 2033. 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 over 38 Mt in 2033, or 45% of global production, destined largely for local, informal markets. As such, India is

projected to experience increases in per capita consumption of 2.6% p.a. over the *Outlook* period, reaching 24.7 kg in 2033, compared to 18.6 kg in the base period, while average per capita consumption in Asia overall is expected to reach 14.1 kg in 2033, compared to 10.4 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 22% share of production in Mexico by 2033, and 34% in Thailand. However, at projected production quantities of 3.1 and 1.7 Mt in 2033, respectively, Mexico and Thailand will account for comparatively small shares in global production.

Global exports of mangoes, mangosteens and guavas are projected to reach 3.2 Mt in 2033, compared to 2.3 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, and reach a 24% share of world exports in 2033. Shipments from Thailand, almost exclusively mangosteens, will cater mainly to rising import demand from China, while supplies from Peru and Brazil, two emerging exporters, will be mostly mangoes destined for the European Union. While Thailand is projected to reach a share in global exports of 20% by 2033, Brazil and Peru are expected to hold some 14% and 8%, respectively. China, whose per capita mango, mangosteen and guava consumption of 2.7 kg in the base period is relatively low compared to other Asian countries, is expected to experience a rise in imports of 2.4% p.a., to some 0.8 Mt in 2033. This will be mainly due to a strong, income-driven increase in Chinese import demand for mangosteen, as domestic production of this fruit remains low in China.

Pineapple

Market situation

Based on preliminary trade data, global exports of pineapples grew by some 4% in 2023, to 3.2 Mt, driven largely by higher supplies from Costa Rica, the world's largest exporter at a market share of some 65%. According to industry information, weather conditions in key Costa Rican growing areas were favourable for the cultivation of pineapples during the first half of the year, resulting in higher yields and thus higher export supplies. Lower freight costs, especially to the United States, also supported Costa Rican export growth and shipments were expected to increase by some 3% in 2023, to around 2 Mt, in strong contrast with the near 5% drop experienced in 2022. In terms of leading destinations, pineapple shipments from Costa Rica continued to be almost exclusively destined for the United States and the European Union, where demand remained firm.

Preliminary trade data point to an increase in global imports of pineapples by approximately 1% in 2023 to 3 Mt. Demand in the United States and the European Union continued to be firm. A large share of pineapples is consumed outside of the home and aided by relatively stable sales in the hospitality sector, imports by the United States were expected to grow by some 1% in 2023 to 1.1 Mt. Conversely, imports by the European Union, the second largest importer, were expected to contract slightly due to supply procurement issues in Costa Rica. Over the full year, imports by the European Union were anticipated to stand at approximately 0.76 Mt, some 17% below their previous five-year average. Estimates suggest that the United States procured about 39% of global export supplies over the full year of 2023, and the European Union some 26%.

Projection highlights

Over the next decade, global production of pineapple is projected to grow at 1.5% p.a., to reach 35 Mt in 2033, from 30 Mt in the base period, on account of a 1.1% expansion in harvested area. Asia is expected to remain the largest producing region accounting for 44% of global production, with sizeable pineapple production in the Philippines, Indonesia, China, India 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 India, Indonesia and China. Similarly, pineapple production in Latin America and the Caribbean, the second largest producing region at a projected 33% of world production in 2033, 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 accounting for approximately 68% of fresh pineapple production in Costa Rica and 24% in the Philippines in 2033.

Global exports of fresh pineapple are set to grow at 1% p.a., to 3.6 Mt in 2033, predominantly driven by demand from the United States and the European Union. With projected imports of 1.3 Mt in 2033 – equivalent to a 37% global share – the United States is expected to remain the largest importer. The European Union is expected to account for some 24% 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 drive further expansion in global exports. By 2033, China is projected to reach import quantities of some 0.34 Mt per year, with supplies primarily sourced in the Philippines.

Avocado

Market situation

Global exports of avocado were expected to expand by approximately 20% in 2023, to around 3 Mt, on account of a positive supply situation in Mexico, the world's leading exporter. Preliminary data indicate that exports from several other origins, notably Peru and Kenya, also grew at fast rates. These developments marked a strong recovery from the weather-induced production losses and shortages in export supplies experienced in 2022.

Alongside significant growth in global supplies, continuously firm import demand in the United States and the European Union, which respectively accounted for some 44% (or 1.2 Mt) and 27% (or 0.8 Mt) of global imports in 2023, further supported this fast expansion in global trade. In both markets, consumption continued to gain in popularity, with avocados widely perceived as a highly nutritious fruit. While the United States imports 90% of avocados from Mexico, the European Union receives supplies mostly from Peru, Kenya, Israel and Morocco.

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 most rapidly growing 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 2033, production is therefore projected to grow at 3.5% p.a. and reach 14 Mt p.a. – more than three times its level in 2013. 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 60% of global production by 2033. Output in Mexico, Colombia and Peru is set to increase by 60 to 80% from base period levels, so about 70% 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, overtaking both pineapples and mangoes as early as 2025 and reaching 4.3 Mt of exports by 2033. The total value of global avocado exports would thus reach an estimated USD 10.4 billion in constant 2021-2023 value terms, making avocado one of the most valuable fruit commodities. Despite increasing competition from emerging exporters, Mexico is expected to retain its leading position in global exports with a 53% quantity share in

2033. This will be supported by output growth of 3.6% p.a. over the coming decade and continued growth in demand in the United States. Exports from Peru, the second leading exporter, will reach 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 claimed health benefits, are expected to remain the main importers, with 46% and 25% of global imports in 2033, respectively. However, imports are also set to rise substantially 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, the Dominican Republic and Indonesia.

Papaya

Market situation

Preliminary trade data indicate a contraction in global exports of papayas by an estimated 3% in 2023, to some 0.365 Mt. Exports from Mexico, the largest global exporter of papayas, declined by about 4% over the full year, to some 0.19M t, on account of adverse weather conditions. Virtually all Mexican papaya exports are destined for the United States. However, the bulk of Mexican papaya production is for domestic consumption.

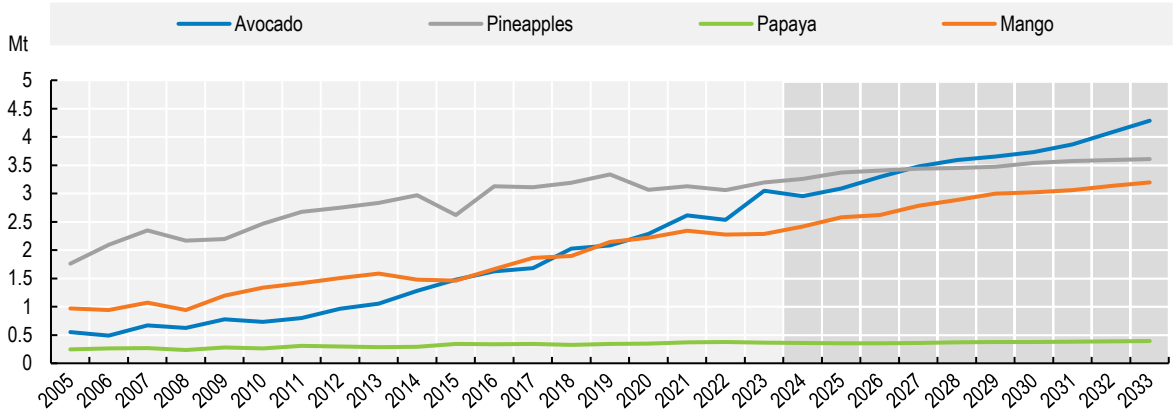
Global imports remained largely stable at some 0.35 Mt in 2023, with the United States remaining the largest importer with about 62% of global imports. Industry sources stated that demand for papayas in the United States remained solid over the first seven months of 2023, benefiting from their reputation of being a rich source of vitamin C. The European Union account for 9% of global imports, or 0.03 Mt in 2023.

Projection highlights

Global papaya production is projected to rise by 1.5% p.a., to 17 Mt in 2033, from 14 Mt in the base period. The share of exports in production sits at some 2% in the base period and 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 60% by 2033, from 58% in the base period. India, the world's single largest producer, is projected to increase production at a rate of 1% p.a., expanding its share of global output to 35% by 2033. Income and population growth will be the main factors behind this rise, with Indian per capita consumption of papayas expected to reach 4.1 kg in 2033, up slightly from 3.9 kg in the base period. In Indonesia, production is projected to grow by 2.3% p.a. over the *Outlook* period, primarily on account of increasing domestic demand as per-capita incomes are expected to expand at 4% 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 1.2%, global papaya exports are projected to reach just under 0.4 Mt by 2033. A major obstacle to a significant expansion in international trade has so far been the fruit's high perishability and sensitivity in transport, which makes produce 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 11.4. Global exports of the four major tropical fruits



Source: FAO data.

11.3.2. Uncertainties

The *Outlook* for global production, trade and consumption of bananas and major fresh tropical fruits is subject to several potentially significant obstacles and uncertainties. Elevated inflation rates, high interest expenses and exchange rate fluctuations threaten to hinder demand in domestic and import markets, especially for poorer consumers. Given the typically high unit values and high income and price elasticities of demand for 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 large effects on domestic and global markets are of further concern. A recent example was the temporary discontinuation of banana imports by the Russian Federation from Ecuador.

On the supply side, the effects of climate change 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 most of tropical fruits are produced in remote, informal settings disconnected from major transport routes, where cultivation is highly dependent on rainfall and prone to the adverse effects of increasingly erratic weather events. With several ongoing wars affecting the global economy, the risks of potential future disruptions to local and global supply chains, fertiliser markets, transport routes and access to export markets add further uncertainties to the *Outlook*.

In the face of rising temperatures, more rapid and severe spreads of plant pests and diseases such as Banana Fusarium Wilt are being observed. The currently expanding strain of this disease, Tropical Race 4 (TR4), poses particularly high risks to global banana supplies as it can affect a much broader range of banana and plantain cultivars than other strains. Furthermore, despite recent breakthroughs in the engineering of resistant varieties, no effective fungicide or other eradication method is currently available. According to official information, TR4 is currently confirmed in 22 countries, predominantly in South and Southeast Asia, but also in the Middle East, Africa, Oceania and Latin America. 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.

Given the popularity of bananas, pineapples and avocados in import markets, their global value chains have been characterised by intense competition among market actors all the way to the retail level. For bananas and pineapples, this has exerted downward pressure on prices at each stage, keeping producer prices low and with little fluctuation. Rising production costs, low prices and tight profit margins greatly hinder the adequate remuneration of workers and smallholder farmers in these industries and act as a

major obstacle for producers in coping with emerging challenges and supply chain disruptions. The prospects for production are therefore further threatened by elevated competitive pressures, with smallholder producers discouraged from continuing their operations by low or even negative producer margins, potentially reducing supplies to world markets and consequently causing higher prices. Data and information on developments in world export markets in recent years already point in this direction, with lower value fruits such as bananas and pineapples being particularly affected.

Note

[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).

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/)
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 standard measure used to compare the weight of livestock carcasses, including bones and other components.
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).
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.

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: $Ln(xt) = a + r * t$ and is calculated as [exp (r) – 1].
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: 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 2021, this is short for 2021/22 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.
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.

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 program for 2010 and beyond.
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 policy makers 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).
United States-Mexico-Canada Agreement (USMCA)	A trilateral agreement on trade (called CUSMA in Canada), including agricultural trade, between Canada, Mexico, and the United States that entered into force on 1 July 2020. The USMCA substituted the North America Free Trade Agreement (NAFTA) which entered into force on 1 January 1994, preserving existing agriculture commitments, eliminating tariffs for certain additional products and providing new market access opportunities.
Uruguay Round Agreement on Agriculture (URAA)	An international agreement negotiated as part of the Uruguay Round of the General Agreement on Tariffs and Trade. The URAA entered into force simultaneously with the establishment of the World Trade Organization in 1995. The URAA contains commitments to improve market access, reduce distorting domestic support, and reduce export subsidies. A separate agreement covers sanitary and phyto sanitary measures known as the SPS Agreement.
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 April of the following year. 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. 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 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 forms a global equilibrium for all commodity markets. 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 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. 114 (November 2023). For other economies, historical macroeconomic data were obtained from the IMF, *World Economic Outlook* (October 2023). Assumptions for 2024 to 2033 are based on the projections of the IMF *World Economic Outlook*, October 2023, 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 2022 is taken from the short-term update of the *OECD Economic Outlook* No. 114 (November 2023). For 2023, the annual average daily spot price is used, while the December average daily spot price is used for 2024. 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 markets 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. Section 1.4 of the chapter "Trends and Prospects" 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 have been 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 reference value used throughout the report and tables; and food intake, which represents the quantity after accounting for household waste.

In 2024, the Secretariat adopted a standardized 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 standardized 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.

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.

The methodology of stochastic simulations with Aglink-Cosimo

The partial stochastic analysis highlights how alternative scenarios diverge from the baseline by treating a number of variables stochastically. The selection of those variables aims at identifying the major sources of uncertainty for agricultural markets. In particular, country specific macroeconomic variables, the crude oil price, and country- and product-specific yields are treated as uncertain within this partial stochastic framework. Apart from the international oil price, four macroeconomic variables are considered in all countries: the consumer price index (CPI), the gross domestic product index (GDPI), the gross domestic product deflator (GDPD) and the US-Dollar exchange rate (XR). The yield variables considered contain crop and milk yields in all model regions.

The approach applied to determine the stochastic draws of these variables is based on a simple process which captures the historical variance of each single variable. The three main steps of the partial stochastic process are briefly explained below.

(i) The quantification of the past variability around the trend for each macroeconomic and yield variable separately

The first step is to define the historical trend of stochastic variables. Often a linear trend does not represent adequately observed dynamics. Consequently, a non-linear trend is estimated by applying a Hodrick-Prescott filter, which seeks to separate short-term fluctuations from long-term movements.[2] The filter is applied to the yield time series directly and to year-on-year changes for macro variables.

(ii) The generation of 1 000 sets of possible values for the stochastic variables

The second step involves generating 1 000 sets of possible values for the stochastic variables. For each year of the 2024-2033 projection period, one year of the historical period 1995-2023 is drawn. The relative deviation between the actual variable value of that year and the respective trend value estimated in step 1 is then applied to the value of the variable in the actual projection year. All variables thereby receive the value of the same historical year. The process, however, handles macro variables separated from yields, as both are not strongly correlated.

(iii) The execution of the Aglink-Cosimo model for each of these 1 000 possible alternative sets of values (uncertainty scenarios)

The third step involves running the Aglink-Cosimo model for each of the 1 000 alternative “uncertainty” scenarios generated in step 2. When both macroeconomic and yield uncertainty were included, this procedure yielded 98% successful simulations. The model does usually not solve all stochastic simulations as the complex system of equations and policies may lead to infeasibilities when exposed to extreme shocks in one or several stochastic variables.

Notes

[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.

[2] The filter was popularised in the field of economics in the 1990s in Robert Hodrick and Edward C. Prescott (1997), "Postwar U.S. Business Cycles: An Empirical Investigation", *Journal of Money, Credit, and Banking*, Vol. 29 (1), pp. 1–16, JSTOR 2953682.

Annex C. Statistical Annex

Table C.1. World cereal projections

Marketing year

		Average 2021-23est	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
WHEAT												
World												
Production	Mt	788.3	798.4	803.0	810.8	819.0	827.8	836.8	845.9	854.6	863.1	871.7
Area	Mha	222.1	223.1	222.9	223.3	223.7	224.2	224.7	225.2	225.6	226.0	226.5
Yield	t/ha	3.55	3.58	3.60	3.63	3.66	3.69	3.72	3.76	3.79	3.82	3.85
Consumption	Mt	781.7	797.3	805.4	814.2	822.3	828.7	837.5	845.4	853.8	862.8	871.2
Feed use	Mt	151.5	156.0	156.7	158.3	160.0	161.5	163.0	164.7	166.1	167.4	168.7
Food use	Mt	506.9	518.0	523.8	529.6	535.5	541.4	547.5	553.5	559.5	565.3	571.1
Biofuel use	Mt	8.2	8.5	8.7	8.8	8.9	9.0	9.1	9.2	9.2	9.3	9.3
Exports	Mt	193.9	196.5	196.6	197.5	201.2	204.6	207.8	211.0	214.3	217.0	220.2
Closing stocks	Mt	305.1	310.5	308.0	304.6	301.3	300.3	299.7	300.1	300.9	301.2	301.7
Price[1]	USD/t	364.5	269.3	257.1	258.9	262.8	267.9	272.4	276.1	279.3	283.9	287.1
Developed countries												
Production	Mt	410.2	411.2	412.3	415.9	419.4	423.2	427.0	431.0	434.8	438.6	442.5
Consumption	Mt	270.4	270.8	271.9	273.8	274.9	274.2	275.7	276.2	277.4	279.3	280.6
Net trade	Mt	133.1	142.4	142.1	142.6	145.8	148.6	151.2	153.8	156.4	158.5	161.1
Closing stocks	Mt	84.8	87.7	86.0	85.5	84.2	84.6	84.8	85.7	86.8	87.6	88.4
Developing countries												
Production	Mt	378.0	387.2	390.6	394.9	399.5	404.6	409.8	414.8	419.8	424.5	429.2
Consumption	Mt	511.3	526.5	533.5	540.4	547.4	554.6	561.8	569.2	576.4	583.5	590.6
Net trade	Mt	-132.0	-142.4	-142.1	-142.6	-145.8	-148.6	-151.2	-153.8	-156.4	-158.5	-161.1
Closing stocks	Mt	220.4	222.8	222.0	219.2	217.1	215.7	214.9	214.4	214.1	213.6	213.3
OECD[2]												
Production	Mt	285.2	293.9	293.4	294.7	296.1	297.6	299.4	301.2	302.9	304.5	306.1
Consumption	Mt	223.9	226.3	225.3	225.6	225.7	225.7	226.4	227.1	227.8	228.4	228.9
Net trade	Mt	60.4	69.2	67.8	67.9	69.9	71.2	72.3	73.4	74.3	75.3	76.5
Closing stocks	Mt	59.4	57.3	57.6	58.8	59.4	60.0	60.7	61.5	62.3	63.0	63.7
MAIZE												
World												
Production	Mt	1214.7	1261.7	1273.0	1289.5	1305.1	1321.7	1337.2	1353.2	1369.2	1385.5	1401.7
Area	Mha	206.0	209.7	210.4	211.7	212.5	213.6	214.4	215.4	216.3	217.3	218.2
Yield	t/ha	5.90	6.02	6.05	6.09	6.14	6.19	6.24	6.28	6.33	6.38	6.42
Consumption	Mt	1219.2	1257.7	1267.3	1283.4	1297.6	1312.7	1328.6	1344.5	1360.7	1377.2	1393.3
Feed use	Mt	678.1	696.0	707.4	713.0	721.5	730.4	739.7	749.0	758.5	767.6	777.1
Food use	Mt	141.7	146.6	148.9	151.6	154.2	157.0	159.7	162.4	165.1	167.8	170.4
Biofuel use	Mt	188.2	193.2	195.3	196.8	198.3	199.7	201.2	202.8	204.4	206.0	207.3
Exports	Mt	182.6	187.0	188.7	192.5	195.5	199.4	202.9	206.5	210.1	213.9	217.7
Closing stocks	Mt	296.2	291.9	293.0	294.4	297.3	301.6	305.6	309.6	313.5	317.1	320.9
Price[3]	USD/t	267.6	204.0	196.4	198.0	201.2	204.4	207.3	210.0	212.6	215.7	218.0
Developed countries												
Production	Mt	523.7	537.7	540.5	545.9	548.6	553.3	557.4	562.3	566.6	570.9	575.1
Consumption	Mt	466.7	477.2	482.5	487.9	491.7	494.6	498.2	502.0	505.6	509.2	512.6
Net trade	Mt	57.4	57.8	56.8	55.9	56.9	57.9	58.6	59.1	59.8	60.6	61.5
Closing stocks	Mt	90.6	93.0	94.1	96.3	96.4	97.2	97.8	99.0	100.2	101.3	102.3
Developing countries												
Production	Mt	666.7	682.6	696.0	707.6	715.8	727.4	737.8	749.1	760.1	770.9	780.3
Consumption	Mt	728.9	747.4	755.8	763.1	775.8	787.4	798.6	809.8	821.2	832.8	843.7
Net trade	Mt	-61.8	-62.2	-61.2	-60.2	-61.3	-62.3	-63.0	-63.5	-64.2	-65.0	-65.9
Closing stocks	Mt	213.0	206.1	207.5	212.3	213.7	216.0	218.2	221.1	224.2	227.4	229.8
OECD[2]												
Production	Mt	481.3	499.6	501.8	506.3	507.9	511.2	513.9	517.3	520.2	522.9	525.7
Consumption	Mt	501.5	512.3	517.7	523.2	526.8	529.8	533.6	537.4	541.1	544.8	548.5
Net trade	Mt	-13.2	-17.7	-18.8	-18.9	-19.3	-19.6	-20.3	-21.1	-22.0	-22.9	-23.6
Closing stocks	Mt	71.3	69.8	72.8	74.8	75.1	76.1	76.7	77.8	78.8	79.7	80.5

Table C.1. World cereal projections *(cont.)*

Marketing year

		Average 2021-23est	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
OTHER COARSE GRAINS												
World												
Production	Mt	299.0	307.8	309.9	312.3	314.7	317.2	319.4	321.9	324.2	326.5	328.7
Area	Mha	147.6	148.4	148.2	148.3	148.1	148.0	147.8	147.7	147.6	147.5	147.4
Yield	t/ha	2.03	2.07	2.09	2.11	2.12	2.14	2.16	2.18	2.20	2.21	2.23
Consumption	Mt	298.8	301.4	308.7	312.1	314.1	316.1	318.1	320.4	322.8	325.2	327.4
Feed use	Mt	166.4	163.3	168.0	169.1	169.9	170.7	171.5	172.4	173.4	174.5	175.5
Food use	Mt	77.9	79.6	81.5	83.1	84.5	85.8	87.2	88.6	90.0	91.4	92.7
Biofuel use	Mt	5.7	5.9	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.0
Exports	Mt	45.4	44.5	45.0	45.3	45.5	46.0	46.5	47.2	47.8	48.5	49.1
Closing stocks	Mt	57.9	63.4	63.6	62.9	62.6	62.7	63.0	63.5	63.9	64.3	64.7
Price[4]	USD/t	284.1	224.0	220.1	222.2	225.6	229.7	234.7	238.5	242.0	245.8	249.0
Developed countries												
Production	Mt	181.8	181.2	181.3	182.0	182.5	183.2	183.6	184.3	185.0	185.6	186.2
Consumption	Mt	148.5	145.8	149.1	149.8	149.7	149.6	149.3	149.2	149.1	149.0	148.9
Net trade	Mt	32.5	31.5	32.1	32.5	32.9	33.6	34.2	34.9	35.6	36.4	37.1
Closing stocks	Mt	29.8	34.1	34.2	33.9	33.8	33.9	34.0	34.2	34.4	34.6	34.8
Developing countries												
Production	Mt	117.2	126.6	128.6	130.3	132.2	134.0	135.8	137.5	139.2	140.9	142.5
Consumption	Mt	150.3	155.5	159.5	162.3	164.4	166.6	168.8	171.3	173.7	176.2	178.5
Net trade	Mt	-31.5	-30.6	-31.2	-31.6	-32.0	-32.6	-33.3	-34.0	-34.7	-35.4	-36.1
Closing stocks	Mt	28.1	29.2	29.4	29.0	28.7	28.8	29.1	29.3	29.5	29.7	29.9
OECD[2]												
Production	Mt	150.6	152.1	152.0	152.4	152.6	152.9	153.0	153.3	153.6	153.9	154.2
Consumption	Mt	130.2	127.4	130.9	131.5	131.4	131.3	131.0	130.8	130.8	130.7	130.6
Net trade	Mt	20.9	20.6	20.5	20.7	21.0	21.5	21.9	22.3	22.7	23.1	23.4
Closing stocks	Mt	19.7	22.2	22.8	23.0	23.2	23.3	23.4	23.5	23.6	23.8	23.9
RICE												
World												
Production	Mt	526.4	541.1	545.4	548.8	554.3	560.1	566.0	571.6	577.0	581.7	586.6
Area	Mha	166.3	168.0	168.0	168.0	168.1	168.3	168.5	168.6	168.8	169.0	169.1
Yield	t/ha	3.17	3.22	3.25	3.27	3.30	3.33	3.36	3.39	3.42	3.44	3.47
Consumption	Mt	525.5	539.1	547.0	551.8	558.3	563.1	567.8	573.0	578.2	583.0	587.6
Feed use	Mt	21.4	19.5	20.4	21.0	21.3	21.6	21.9	22.3	22.5	22.7	23.0
Food use	Mt	401.9	418.1	424.3	428.1	433.5	437.2	440.8	444.9	448.9	452.5	455.9
Exports	Mt	53.9	51.8	53.7	54.9	56.1	57.5	58.9	60.2	61.6	62.9	64.2
Closing stocks	Mt	196.5	201.3	201.2	199.6	197.0	195.5	195.1	195.1	195.3	195.6	196.1
Price[5]	USD/t	439.4	464.3	429.4	424.0	429.6	437.4	443.3	449.1	454.7	461.2	466.5
Developed countries												
Production	Mt	17.0	17.2	17.2	17.3	17.3	17.3	17.4	17.4	17.4	17.5	17.5
Consumption	Mt	21.5	21.7	21.7	21.7	21.8	21.8	21.9	21.9	21.9	22.0	22.0
Net trade	Mt	-4.3	-4.3	-4.4	-4.3	-4.3	-4.4	-4.4	-4.4	-4.5	-4.5	-4.5
Closing stocks	Mt	4.8	4.7	4.5	4.4	4.2	4.1	4.0	4.0	4.0	4.0	4.0
Developing countries												
Production	Mt	509.4	523.8	528.2	531.5	537.0	542.7	548.6	554.1	559.6	564.2	569.1
Consumption	Mt	504.0	517.5	525.2	530.1	536.6	541.3	545.9	551.1	556.3	561.0	565.5
Net trade	Mt	4.1	2.8	2.9	2.9	2.9	2.9	2.9	3.0	3.0	3.0	3.1
Closing stocks	Mt	191.7	196.6	196.6	195.2	192.8	191.3	191.0	191.1	191.3	191.6	192.0
OECD[2]												
Production	Mt	21.9	22.1	22.1	22.1	22.1	22.1	22.1	22.1	22.1	22.1	22.2
Consumption	Mt	26.5	27.0	27.0	27.1	27.1	27.1	27.1	27.2	27.2	27.2	27.3
Net trade	Mt	-4.7	-4.8	-4.9	-4.9	-4.9	-4.9	-5.0	-5.0	-5.1	-5.1	-5.1
Closing stocks	Mt	6.3	6.5	6.4	6.3	6.2	6.1	6.0	6.0	6.0	6.0	6.0

Note : Marketing year: See Glossary of Terms for definitions. Average 2021-23est: Data for 2023 are estimated. Prices are in nominal terms.

1. No.2 hard red winter wheat, ordinary protein, United States FOB Gulf Ports (June/May).
2. Excludes Iceland and Costa Rica but includes all current European Union member countries.
3. No.2 yellow corn, United States FOB Gulf Ports (September/August).
4. Feed barley, Europe, FOB Rouen (July/June).
5. FAO all rice price index normalised to India, indica high quality 5% broken average 2014-2016 (January/December).

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

Table C.2. World oilseed projections

Marketing year

		Average 2021-23est	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
SOYBEAN												
World												
Production	Mt	379.9	399.7	403.1	405.8	409.3	413.1	416.8	420.0	423.4	426.5	429.9
Area	Mha	135.6	138.6	138.8	138.9	139.1	139.4	139.7	139.9	140.0	140.2	140.4
Yield	t/ha	2.80	2.88	2.90	2.92	2.94	2.96	2.98	3.00	3.02	3.04	3.06
Consumption	Mt	375.7	397.3	402.2	405.4	408.7	412.3	415.8	419.3	422.8	426.2	429.5
Crush	Mt	335.8	355.6	360.2	363.1	366.1	369.4	372.6	375.8	379.1	382.2	385.3
Closing stocks	Mt	43.2	49.3	50.1	50.5	51.2	51.9	52.9	53.6	54.2	54.5	55.0
Price[1]	USD/t	591.5	498.4	475.0	484.4	493.3	504.2	510.9	518.9	524.6	533.7	540.3
Developed countries												
Production	Mt	140.0	139.2	140.2	140.9	142.0	143.1	144.4	145.4	146.5	147.4	148.5
Consumption	Mt	100.9	103.7	104.4	104.7	105.1	105.5	106.1	106.5	107.0	107.3	107.8
Crush	Mt	92.0	94.4	95.0	95.3	95.7	96.1	96.6	97.0	97.5	97.8	98.2
Closing stocks	Mt	11.9	13.1	13.2	13.2	13.3	13.5	13.7	13.9	14.1	14.2	14.3
Developing countries												
Production	Mt	239.8	260.5	262.9	264.9	267.3	269.9	272.4	274.7	276.9	279.1	281.4
Consumption	Mt	274.8	293.5	297.8	300.7	303.5	306.8	309.7	312.7	315.8	318.8	321.7
Crush	Mt	243.8	261.2	265.2	267.8	270.3	273.3	276.0	278.8	281.6	284.4	287.1
Closing stocks	Mt	31.3	36.2	36.9	37.3	37.9	38.5	39.2	39.8	40.1	40.4	40.7
OECD[2]												
Production	Mt	126.9	124.6	125.4	126.0	126.9	127.8	128.9	129.7	130.6	131.4	132.3
Consumption	Mt	101.3	103.5	104.1	104.4	104.8	105.2	105.7	106.2	106.6	106.9	107.4
Crush	Mt	93.3	95.1	95.7	95.9	96.3	96.7	97.2	97.7	98.1	98.4	98.8
Closing stocks	Mt	10.9	11.4	11.6	11.7	11.9	12.0	12.2	12.4	12.6	12.7	12.8
OTHER OILSEEDS												
World												
Production	Mt	180.9	186.5	187.3	189.0	190.7	192.2	193.8	195.2	196.7	198.1	199.7
Area	Mha	96.8	98.1	98.4	98.4	98.6	98.8	98.9	99.0	99.2	99.3	99.4
Yield	t/ha	1.87	1.90	1.90	1.92	1.93	1.95	1.96	1.97	1.98	2.00	2.01
Consumption	Mt	179.4	186.2	187.1	188.8	190.5	192.2	193.7	195.1	196.6	198.1	199.7
Crush	Mt	151.4	157.7	158.3	159.9	161.5	162.9	164.3	165.5	166.9	168.2	169.6
Closing stocks	Mt	41.6	43.6	45.2	46.4	46.8	47.5	48.4	49.1	49.9	50.2	50.7
Price[1]	USD/t	622.9	492.8	485.4	496.2	504.0	515.8	525.0	534.6	543.6	553.7	563.0
Developed countries												
Production	Mt	102.0	106.4	106.5	107.4	108.3	109.0	109.7	110.3	110.9	111.6	112.3
Consumption	Mt	93.2	97.2	97.3	98.1	98.8	99.4	99.9	100.3	100.9	101.3	101.9
Crush	Mt	86.0	89.8	89.9	90.7	91.3	91.9	92.4	92.8	93.3	93.8	94.3
Closing stocks	Mt	7.3	6.6	6.8	7.0	7.2	7.2	7.3	7.4	7.4	7.4	7.4
Developing countries												
Production	Mt	78.9	80.1	80.8	81.6	82.4	83.2	84.1	84.9	85.7	86.5	87.4
Consumption	Mt	86.2	89.0	89.8	90.7	91.7	92.8	93.8	94.8	95.8	96.8	97.8
Crush	Mt	65.4	67.9	68.5	69.2	70.2	71.0	71.9	72.7	73.6	74.5	75.3
Closing stocks	Mt	2.8	2.6	2.6	2.6	2.7	2.7	2.7	2.7	2.7	2.7	2.7
OECD[2]												
Production	Mt	61.0	63.7	63.4	63.7	64.0	64.3	64.6	64.8	65.0	65.3	65.6
Consumption	Mt	61.4	63.3	63.1	63.5	63.8	64.1	64.2	64.4	64.6	64.7	65.0
Crush	Mt	56.0	57.8	57.5	58.0	58.2	58.5	58.6	58.8	59.0	59.1	59.3
Closing stocks	Mt	4.4	4.6	4.8	5.0	5.1	5.2	5.3	5.3	5.3	5.3	5.3
PROTEIN MEALS												
World												
Production	Mt	369.6	389.0	393.2	396.6	399.9	403.5	406.8	410.2	413.6	417.0	420.3
Consumption	Mt	370.0	388.3	392.9	396.5	400.0	403.4	406.7	410.0	413.4	416.8	420.1
Closing stocks	Mt	15.2	16.3	16.6	16.7	16.6	16.7	16.9	17.1	17.2	17.4	17.6
Price[4]	USD/t	488.9	429.4	408.6	410.9	418.3	425.6	433.1	438.3	443.6	449.5	453.5
Developed countries												
Production	Mt	118.0	122.1	122.6	123.3	124.0	124.6	125.3	125.9	126.5	127.0	127.6
Consumption	Mt	126.4	130.9	131.4	131.5	131.4	131.3	131.2	131.1	131.0	130.9	130.8
Closing stocks	Mt	3.2	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.1	3.1
Developing countries												
Production	Mt	251.7	266.9	270.6	273.2	275.9	278.8	281.5	284.3	287.1	289.9	292.6
Consumption	Mt	243.6	257.4	261.5	265.0	268.5	272.0	275.5	278.9	282.4	285.9	289.3
Closing stocks	Mt	12.0	13.3	13.6	13.7	13.6	13.7	13.9	14.0	14.2	14.4	14.5
OECD[2]												
Production	Mt	107.9	110.7	111.0	111.6	112.2	112.7	113.2	113.7	114.1	114.5	114.9
Consumption	Mt	132.9	136.8	137.2	137.4	137.4	137.4	137.2	137.2	137.1	137.0	136.9
Closing stocks	Mt	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0

Table C.2. World oilseed projections *(cont.)*

Marketing year

		Average 2021-23est	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
VEGETABLE OIL												
World												
Production	Mt	224.7	233.6	235.8	237.9	240.0	241.9	243.6	245.3	247.1	248.8	250.6
of which palm oil	Mt	80.6	83.1	84.0	84.7	85.5	86.1	86.6	87.1	87.6	88.1	88.7
Consumption	Mt	224.9	233.8	236.2	238.1	240.0	241.8	243.5	245.2	247.0	248.8	250.5
Food	Mt	126.3	130.2	130.9	131.7	132.7	133.5	134.2	135.0	136.0	136.8	137.8
Biofuel	Mt	36.2	40.7	41.7	42.4	42.9	43.5	44.0	44.6	44.9	45.4	45.8
Exports	Mt	83.7	86.4	86.7	86.9	87.2	87.4	87.6	87.8	88.1	88.4	88.6
Closing stocks	Mt	21.0	21.2	20.9	20.8	20.8	20.8	20.9	21.0	21.1	21.1	21.2
Price[5]	USD/t	1 230.5	1 012.4	1 000.6	1 022.6	1 038.9	1 058.9	1 074.6	1 091.6	1 110.2	1 128.3	1 151.5
Developed countries												
Production	Mt	55.4	57.4	57.6	58.0	58.4	58.7	59.0	59.3	59.6	59.8	60.1
Consumption	Mt	59.1	60.9	60.8	60.7	60.6	60.6	60.4	60.4	60.3	60.3	60.3
Closing stocks	Mt	5.8	6.0	5.9	5.7	5.6	5.6	5.5	5.5	5.4	5.4	5.4
Developing countries												
Production	Mt	169.4	176.2	178.3	179.9	181.6	183.2	184.6	186.1	187.5	189.0	190.5
Consumption	Mt	165.8	172.8	175.3	177.3	179.3	181.3	183.1	184.9	186.7	188.5	190.2
Closing stocks	Mt	15.2	15.2	15.1	15.1	15.2	15.3	15.4	15.5	15.6	15.7	15.8
OECD[2]												
Production	Mt	45.7	47.0	47.0	47.3	47.5	47.8	48.0	48.1	48.3	48.5	48.7
Consumption	Mt	61.9	63.6	63.4	63.4	63.3	63.2	63.2	63.1	63.1	63.1	63.2
Closing stocks	Mt	5.6	5.9	5.8	5.6	5.6	5.5	5.4	5.4	5.4	5.3	5.3

Note : Average 2021-23est: Data for 2023 are estimated. Prices are in nominal terms.

1. Soybean, U.S., CIF Rotterdam (October/September).
2. Excludes Iceland and Costa Rica but includes all current European Union member countries.
3. Rapeseed, Europe, CIF Hamburg (October/September).
4. Weighted average protein meal, European port (October/September).
5. Weighted average price of oilseed oils and palm oil, European port (October/September).

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

Table C.3. World sugar projections

Marketing year

		Average 2021-23est	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
WORLD												
SUGARBEET												
Production	Mt	262.8	268.9	268.5	268.7	268.3	268.0	268.3	268.8	269.7	270.6	271.6
Area	Mha	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Yield	t/ha	61.49	62.54	62.49	62.47	62.44	62.47	62.59	62.75	62.95	63.16	63.38
Biofuel use	Mt	9.2	9.4	9.3	9.3	9.2	9.2	9.1	9.1	9.0	8.9	8.8
SUGARCANE												
Production	Mt	1 768	1 857	1 884	1 908	1 923	1 939	1 956	1 973	1 991	2 001	2 016
Area	Mha	25.0	25.6	25.8	26.0	26.2	26.3	26.4	26.5	26.6	26.7	26.8
Yield	t/ha	70.77	72.46	72.93	73.24	73.53	73.85	74.18	74.52	74.86	75.02	75.19
Biofuel use	Mt	367.8	412.1	427.8	441.5	451.9	461.2	470.6	479.3	487.6	494.8	504.9
SUGAR												
Production	Mt tq	177.7	183.4	185.8	187.9	189.4	191.3	193.4	195.7	198.1	200.0	202.1
Consumption	Mt tq	174.3	177.9	180.4	183.0	185.5	188.0	190.2	192.3	194.4	196.3	198.3
Closing stocks	Mt tq	89.4	92.4	94.2	95.5	95.9	95.6	95.3	95.1	95.3	95.4	95.7
Price, raw sugar[1]	USD/t	476.7	470.3	432.7	395.7	370.9	367.0	372.3	377.7	382.3	389.2	395.0
Price, white sugar[2]	USD/t	602.5	595.2	561.2	526.4	504.1	500.8	506.3	514.7	523.1	533.4	541.8
DEVELOPED COUNTRIES												
SUGARBEET												
Production	Mt	212.1	213.0	212.5	212.6	212.3	211.8	211.4	211.2	211.2	211.1	211.3
SUGARCANE												
Production	Mt	79.6	80.8	81.9	81.5	81.1	81.3	81.4	81.7	82.0	82.3	82.7
SUGAR												
Production	Mt tq	40.3	41.2	41.4	41.3	41.3	41.3	41.4	41.5	41.7	41.8	42.1
Consumption	Mt tq	46.0	45.7	45.8	45.8	45.8	45.8	45.8	45.8	45.8	45.7	45.7
Closing stocks	Mt tq	14.2	14.3	14.8	15.1	15.1	15.0	14.8	14.7	14.6	14.6	14.6
HFCS												
Production	Mt dw	8.7	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.7	8.7	8.7
Consumption	Mt dw	7.7	7.8	7.7	7.7	7.7	7.6	7.6	7.6	7.5	7.5	7.5
DEVELOPING COUNTRIES												
SUGARBEET												
Production	Mt	50.7	55.9	56.0	56.1	55.9	56.2	56.9	57.6	58.5	59.5	60.3
SUGARCANE												
Production	Mt	1 688.9	1 776.3	1 802.5	1 826.1	1 842.1	1 857.3	1 874.5	1 891.8	1 908.6	1 918.9	1 933.7
SUGAR												
Production	Mt tq	137.5	142.2	144.5	146.6	148.2	150.0	152.0	154.2	156.4	158.1	160.0
Consumption	Mt tq	128.3	132.1	134.7	137.2	139.7	142.2	144.4	146.5	148.6	150.6	152.6
Closing stocks	Mt tq	75.2	78.1	79.4	80.4	80.7	80.6	80.5	80.4	80.7	80.8	81.1
HFCS												
Production	Mt dw	5.4	5.5	5.5	5.5	5.6	5.6	5.7	5.7	5.8	5.9	5.9
Consumption	Mt dw	6.3	6.5	6.6	6.6	6.7	6.8	6.9	6.9	7.0	7.1	7.1
OECD[3]												
SUGARBEET												
Production	Mt	172.1	173.5	172.6	172.5	171.9	171.4	171.0	170.7	170.6	170.6	170.9
SUGARCANE												
Production	Mt	135.2	136.7	139.3	140.2	141.3	142.1	142.7	143.1	143.6	144.1	144.2
SUGAR												
Production	Mt tq	39.7	40.5	40.8	40.8	40.9	41.1	41.2	41.4	41.6	41.8	42.0
Consumption	Mt tq	45.5	45.3	45.3	45.4	45.5	45.5	45.6	45.6	45.6	45.6	45.7
Closing stocks	Mt tq	14.1	13.9	14.5	14.9	14.9	14.9	14.8	14.7	14.7	14.6	14.6
HFCS												
Production	Mt dw	9.6	9.7	9.7	9.7	9.7	9.6	9.6	9.6	9.6	9.5	9.5
Consumption	Mt dw	9.3	9.4	9.4	9.4	9.3	9.3	9.3	9.3	9.2	9.2	9.2

Note : Marketing year: See Glossary of Terms for definitions. Average 2021-23est: Data for 2023 are estimated. HFCS: High fructose corn syrup. Prices are in nominal terms.

1. Raw sugar world price, ICE contract No11 nearby (October/September).
2. Refined sugar price, White Sugar Futures Contract No. 407, Euronext market, Liffe, London, Europe (October/September).
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.

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

Table C.4. World meat projections

Calendar year

		Average 2021-23est	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
WORLD												
BEEF AND VEAL												
Production	Mt cwe	73.6	73.9	74.3	75.2	76.2	77.2	78.1	79.0	79.8	80.5	81.2
Consumption	Mt cwe	73.3	73.9	74.3	75.2	76.2	77.2	78.1	79.0	79.8	80.5	81.2
PIGMEAT												
Production	Mt cwe	121.8	124.8	125.9	126.6	127.3	127.9	128.6	129.2	129.8	130.4	131.1
Consumption	Mt cwe	121.7	124.9	125.9	126.6	127.3	127.9	128.6	129.2	129.8	130.4	131.0
POULTRY MEAT												
Production	Mt rtc	138.7	141.3	143.4	145.5	147.5	149.6	151.6	153.7	155.8	157.9	159.9
Consumption	Mt rtc	138.0	141.3	143.4	145.5	147.5	149.6	151.6	153.7	155.8	157.9	159.9
SHEEP MEAT												
Production	Mt cwe	16.6	17.1	17.3	17.6	17.9	18.1	18.3	18.6	18.8	19.0	19.3
Consumption	Mt cwe	16.6	17.1	17.3	17.6	17.9	18.1	18.3	18.6	18.8	19.0	19.3
TOTAL MEAT												
Per capita consumption[1]	kg rwt	28.1	28.2	28.3	28.3	28.4	28.4	28.5	28.5	28.5	28.6	28.6
DEVELOPED COUNTRIES												
BEEF AND VEAL												
Production	Mt cwe	31.0	30.0	30.2	30.5	30.8	31.1	31.4	31.6	31.8	31.9	32.0
Consumption	Mt cwe	29.8	28.9	29.0	29.2	29.5	29.7	30.0	30.1	30.2	30.3	30.3
PIGMEAT												
Production	Mt cwe	46.2	45.7	45.9	45.9	46.0	46.0	46.0	46.0	46.1	46.1	46.1
Consumption	Mt cwe	40.9	41.3	41.3	41.3	41.4	41.4	41.4	41.4	41.4	41.4	41.4
POULTRY MEAT												
Production	Mt rtc	53.3	54.4	54.8	55.3	55.7	56.2	56.6	57.0	57.4	57.9	58.3
Consumption	Mt rtc	50.3	51.7	52.0	52.4	52.8	53.1	53.5	53.8	54.1	54.5	54.8
SHEEP MEAT												
Production	Mt cwe	3.5	3.6	3.6	3.6	3.7	3.7	3.7	3.7	3.8	3.8	3.8
Consumption	Mt cwe	2.8	2.8	2.8	2.9	2.9	2.9	2.9	3.0	3.0	3.0	3.0
TOTAL MEAT												
Per capita consumption[1]	kg rwt	55.7	55.8	56.0	56.1	56.3	56.5	56.7	56.8	56.9	57.0	57.1
DEVELOPING COUNTRIES												
BEEF AND VEAL												
Production	Mt cwe	42.6	43.9	44.1	44.7	45.4	46.1	46.7	47.3	48.0	48.6	49.3
Consumption	Mt cwe	43.5	45.0	45.3	46.0	46.7	47.5	48.2	48.9	49.6	50.3	51.0
PIGMEAT												
Production	Mt cwe	75.7	79.2	80.0	80.6	81.3	81.9	82.6	83.1	83.8	84.4	85.0
Consumption	Mt cwe	80.9	83.6	84.5	85.2	86.0	86.6	87.2	87.8	88.4	89.0	89.6
POULTRY MEAT												
Production	Mt rtc	85.4	86.9	88.5	90.2	91.8	93.4	95.0	96.7	98.4	100.0	101.6
Consumption	Mt rtc	87.7	89.6	91.4	93.1	94.7	96.5	98.1	99.9	101.6	103.4	105.1
SHEEP MEAT												
Production	Mt cwe	13.1	13.5	13.8	14.0	14.2	14.4	14.6	14.8	15.0	15.2	15.4
Consumption	Mt cwe	13.8	14.3	14.5	14.7	15.0	15.2	15.4	15.6	15.8	16.0	16.3
TOTAL MEAT												
Per capita consumption[1]	kg rwt	22.0	22.2	22.3	22.4	22.4	22.5	22.6	22.6	22.7	22.8	22.9
OECD[2]												
BEEF AND VEAL												
Production	Mt cwe	30.6	29.7	30.0	30.2	30.6	30.9	31.2	31.4	31.6	31.6	31.7
Consumption	Mt cwe	29.6	28.9	29.0	29.2	29.5	29.7	29.9	30.1	30.2	30.2	30.2
PIGMEAT												
Production	Mt cwe	43.8	43.1	43.3	43.3	43.3	43.4	43.4	43.4	43.4	43.5	43.5
Consumption	Mt cwe	40.0	40.4	40.4	40.3	40.4	40.4	40.4	40.4	40.4	40.5	40.5
POULTRY MEAT												
Production	Mt rtc	53.8	54.9	55.4	56.0	56.4	56.9	57.4	57.9	58.3	58.8	59.3
Consumption	Mt rtc	51.1	52.6	52.9	53.4	53.7	54.2	54.5	54.9	55.3	55.7	56.1
SHEEP MEAT												
Production	Mt cwe	3.0	3.1	3.1	3.2	3.2	3.2	3.3	3.3	3.3	3.3	3.3
Consumption	Mt cwe	2.3	2.4	2.4	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
TOTAL MEAT												
Per capita consumption[1]	kg rwt	56.4	56.6	56.7	56.8	57.1	57.2	57.4	57.5	57.6	57.7	57.7

Note : Calendar Year; except year ending 30 June for New Zealand in aggregates. Average 2021-23est: Data for 2023 are estimated. Prices are in nominal terms.

1. Per capita consumption is expressed in edible retail weight equivalent basis. Carcass weight equivalent to edible retail weight equivalent conversion factors are 0.67 for beef and veal, 0.73 for pig meat, 0.6 for poultry meat and 0.66 for sheep meat.
2. Excludes Iceland and Costa Rica but includes all current European Union member countries.

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

Table C.5. World dairy projections: Milk, butter and cheese

Calendar year

		Average 2021-23est	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
MILK												
World												
Production (Total milk)	Mt pw	915.3	942.9	955.2	975.3	992.6	1 006.7	1 021.3	1 038.3	1 054.8	1 070.4	1 086.1
Production (Cow milk)	Mt pw	884.2	911.1	922.8	942.4	959.3	973.0	987.0	1 003.4	1 019.4	1 034.5	1 049.7
Inventory (Cow milk)	Mn hd	340.6	343.6	349.7	358.2	362.3	365.3	370.3	375.7	380.2	384.4	388.8
Yield (Cow Milk)	t/head	2.60	2.65	2.64	2.63	2.65	2.66	2.67	2.67	2.68	2.69	2.70
Developed countries												
Production (Total milk)	Mt pw	411.4	415.0	416.1	419.2	421.3	423.5	425.2	427.5	429.6	431.5	433.5
Production (Cow milk)	Mt pw	407.7	411.3	412.3	415.4	417.5	419.7	421.3	423.6	425.6	427.5	429.5
Inventory (Cow milk)	Mn hd	63.3	62.2	62.1	62.2	62.1	61.8	61.6	61.5	61.3	61.2	61.0
Yield (Cow Milk)	t/head	6.45	6.61	6.64	6.68	6.73	6.79	6.84	6.89	6.94	6.99	7.04
Developing countries												
Production (Total milk)	Mt pw	503.9	527.9	539.0	556.1	571.3	583.2	596.1	610.8	625.2	638.9	652.6
Production (Cow milk)	Mt pw	476.5	499.8	510.4	527.1	541.8	553.3	565.6	579.8	593.8	606.9	620.2
Inventory (Cow milk)	Mn hd	277.3	281.4	287.6	295.9	300.2	303.5	308.6	314.2	318.9	323.3	327.8
Yield (Cow Milk)	t/head	1.72	1.78	1.77	1.78	1.80	1.82	1.83	1.85	1.86	1.88	1.89
OECD[1]												
Production (Total milk)	Mt pw	375.3	379.3	380.5	382.8	384.3	386.4	388.1	390.4	392.6	394.5	396.6
Production (Cow milk)	Mt pw	370.7	374.8	375.7	378.0	379.5	381.6	383.2	385.5	387.6	389.5	391.4
Inventory (Cow milk)	Mn hd	53.7	53.2	53.0	52.9	52.6	52.4	52.3	52.2	52.1	52.0	51.9
Yield (Cow Milk)	t/head	6.90	7.04	7.09	7.15	7.21	7.28	7.33	7.39	7.44	7.50	7.55
FRESH DAIRY PRODUCTS												
World												
Consumption	Mt pw	481.5	499.6	509.0	520.2	529.8	538.9	548.2	558.3	568.1	577.6	587.4
Developed countries												
Consumption	Mt pw	141.0	141.2	141.3	142.2	142.1	142.1	142.0	142.1	142.0	141.9	141.8
Developing countries												
Consumption	Mt pw	340.5	358.4	367.7	378.0	387.7	396.8	406.2	416.2	426.1	435.7	445.5
OECD[1]												
Consumption	Mt pw	106.0	106.3	106.4	107.2	107.1	107.0	107.0	107.1	106.9	106.7	106.5
BUTTER												
World												
Production	Mt pw	13.1	13.5	13.6	14.0	14.4	14.5	14.7	15.0	15.3	15.5	15.7
Consumption	Mt pw	13.0	13.5	13.6	14.0	14.4	14.5	14.7	15.0	15.3	15.5	15.7
Price[2]	USD/t	5 258	4 792	4 894	4 791	4 757	4 838	4 951	5 014	5 071	5 140	5 194
Developed countries												
Production	Mt pw	4.9	5.0	5.0	5.0	5.1	5.1	5.1	5.1	5.1	5.1	5.2
Consumption	Mt pw	4.4	4.5	4.5	4.5	4.5	4.6	4.6	4.6	4.6	4.6	4.6
Developing countries												
Production	Mt pw	8.1	8.5	8.6	9.0	9.3	9.4	9.6	9.9	10.1	10.3	10.6
Consumption	Mt pw	8.6	9.0	9.1	9.5	9.8	10.0	10.1	10.4	10.7	10.9	11.1
OECD[1]												
Production	Mt pw	4.9	5.0	5.0	5.0	5.0	5.1	5.1	5.1	5.1	5.2	5.2
Consumption	Mt pw	4.4	4.5	4.5	4.5	4.5	4.5	4.6	4.6	4.6	4.6	4.6
CHEESE												
World												
Production	Mt pw	25.6	26.1	26.4	26.7	27.1	27.4	27.6	27.9	28.2	28.5	28.8
Consumption	Mt pw	25.7	26.1	26.4	26.7	27.0	27.4	27.6	27.9	28.2	28.5	28.8
Price[3]	USD/t	4 760	4 399	4 471	4 435	4 454	4 541	4 638	4 711	4 778	4 853	4 922
Developed countries												
Production	Mt pw	21.1	21.5	21.7	21.9	22.2	22.4	22.6	22.8	23.1	23.3	23.5
Consumption	Mt pw	19.9	20.3	20.4	20.6	20.8	21.0	21.2	21.4	21.5	21.7	21.9
Developing countries												
Production	Mt pw	4.5	4.6	4.7	4.8	4.9	5.0	5.0	5.1	5.2	5.2	5.3
Consumption	Mt pw	5.7	5.9	6.0	6.1	6.2	6.3	6.5	6.6	6.7	6.8	6.9
OECD[1]												
Production	Mt pw	20.4	20.8	21.0	21.2	21.4	21.6	21.8	22.0	22.2	22.4	22.6
Consumption	Mt pw	19.4	19.7	19.9	20.1	20.3	20.4	20.6	20.8	20.9	21.1	21.3

Note : Calendar Year; except year ending 30 June for New Zealand in aggregates. Average 2021-23est: Data for 2023 are estimated. Prices are in nominal terms.

1. Excludes Iceland and Costa Rica but includes all current European Union member countries.
2. FOB export price, butter, 82% butterfat, Oceania.
3. FOB export price, cheddar cheese, 39% moisture, Oceania.

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

Table C.6. World dairy projections: Powders and casein

Calendar year

		Average 2021-23est	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
SKIMMED MILK POWDER												
World												
Production	Mt pw	4.6	4.6	4.7	4.8	4.9	5.0	5.0	5.1	5.2	5.3	5.4
Consumption	Mt pw	4.5	4.6	4.7	4.8	4.9	5.0	5.0	5.1	5.2	5.3	5.4
Price[1]	USD/t	3 300.2	2 609.9	2 621.8	2 633.8	2 671.1	2 722.1	2 770.2	2 815.5	2 865.0	2 912.8	2 963.6
Developed countries												
Production	Mt pw	3.8	3.7	3.8	3.8	3.9	4.0	4.0	4.1	4.1	4.2	4.3
Consumption	Mt pw	1.6	1.5	1.6	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Developing countries												
Production	Mt pw	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.1	1.1	1.1
Consumption	Mt pw	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.6	3.7	3.8
OECD[2]												
Production	Mt pw	3.6	3.6	3.6	3.7	3.8	3.8	3.9	3.9	4.0	4.1	4.1
Consumption	Mt pw	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9
WHOLE MILK POWDER												
World												
Production	Mt pw	5.0	5.0	5.1	5.2	5.3	5.4	5.4	5.5	5.6	5.7	5.8
Consumption	Mt pw	5.1	5.0	5.1	5.2	5.3	5.4	5.4	5.5	5.6	5.7	5.8
Price[3]	USD/t	3 601.6	3 096.2	3 091.7	3 063.7	3 085.8	3 148.0	3 215.8	3 267.5	3 319.9	3 373.8	3 427.0
Developed countries												
Production	Mt pw	2.5	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4
Consumption	Mt pw	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Developing countries												
Production	Mt pw	2.6	2.7	2.8	2.9	2.9	3.0	3.1	3.2	3.3	3.3	3.4
Consumption	Mt pw	4.5	4.4	4.5	4.6	4.7	4.8	4.8	4.9	5.0	5.1	5.2
OECD[2]												
Production	Mt pw	2.7	2.6	2.6	2.5	2.6	2.6	2.6	2.6	2.6	2.6	2.6
Consumption	Mt pw	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
WHEY POWDER												
Price[4]	USD/t	1 134.9	832.9	820.7	808.5	817.7	832.1	848.7	864.0	879.0	893.1	908.4
CASEIN												
Price[5]	USD/t	10 620.7	10 878.6	10 693.8	10 654.5	10 755.5	10 927.1	11 108.9	11 288.1	11 463.9	11 629.3	11 802.9

Note : Calendar Year; except year ending 30 June for New Zealand in aggregates. Average 2021-23est: Data for 2023 are estimated. Prices are in nominal terms.

1. FOB export price, non-fat dry milk, 1.25% butterfat, Oceania.
2. Excludes Iceland and Costa Rica but includes all current European Union member countries.
3. FOB export price, WMP 26% butterfat, Oceania.
4. FOB export price, sweet whey non-hygroscopic, Western Europe.
5. Export price, New Zealand.

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

Table C.7. World fish and seafood projections

Calendar year

		Average 2021-23est	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
FISH[1]												
World												
Production	Mt	184.6	185.2	189.5	192.0	194.3	194.1	198.8	201.0	202.7	201.6	206.2
of which aquaculture	Mt	94.0	96.0	98.0	99.6	101.7	104.0	105.8	107.7	109.2	110.8	112.4
Consumption	Mt	186.1	186.8	191.0	193.3	195.6	195.3	199.9	202.0	203.6	202.4	206.9
of which for food	Mt	165.4	167.6	170.1	172.5	174.7	176.3	179.0	181.1	182.7	183.4	186.3
of which for reduction	Mt	16.8	15.6	17.4	17.5	17.5	15.6	17.6	17.6	17.7	15.9	17.5
Price												
Aquaculture[2]	USD/t	3 129.9	3 065.2	3 063.6	3 036.1	3 101.4	3 210.0	3 253.8	3 342.3	3 430.8	3 524.8	3 585.2
Capture[3]	USD/t	2 011.9	1 973.9	1 947.8	1 944.8	1 972.8	2 028.7	2 039.8	2 076.0	2 114.2	2 172.2	2 210.5
Product traded[4]	USD/t	3 403.1	3 321.4	3 285.2	3 234.3	3 302.2	3 416.5	3 452.3	3 530.9	3 609.6	3 700.6	3 745.0
Developed countries												
Production	Mt	28.4	28.4	28.1	28.4	28.5	28.8	28.9	29.0	29.2	29.3	29.5
of which aquaculture	Mt	5.2	5.1	5.1	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8
Consumption	Mt	37.0	36.1	36.9	37.2	37.2	37.0	37.3	37.5	37.6	37.4	37.9
of which for food	Mt	31.2	30.5	31.3	31.6	31.6	31.3	31.6	31.8	31.9	31.6	32.1
of which for reduction	Mt	4.8	4.9	4.8	4.8	4.8	4.9	4.9	5.0	5.0	5.1	5.1
Developing countries												
Production	Mt	156.2	156.8	161.4	163.5	165.8	165.3	169.8	172.0	173.5	172.3	176.7
of which aquaculture	Mt	88.8	90.9	92.9	94.4	96.5	98.7	100.4	102.2	103.6	105.1	106.7
Consumption	Mt	149.1	150.6	154.2	156.2	158.4	158.3	162.6	164.5	165.9	165.0	169.0
of which for food	Mt	134.2	137.1	138.8	140.8	143.0	145.0	147.4	149.3	150.8	151.8	154.2
of which for reduction	Mt	12.0	10.7	12.6	12.6	12.7	10.7	12.7	12.7	12.7	10.8	12.4
OECD[5]												
Production	Mt	28.3	27.8	28.1	28.5	28.6	28.1	28.7	29.0	29.2	28.5	29.4
of which aquaculture	Mt	7.6	7.6	7.5	7.6	7.6	7.8	7.8	8.0	8.1	8.3	8.3
Consumption	Mt	38.4	37.5	38.6	38.9	38.9	38.2	39.0	39.3	39.4	38.8	39.8
of which for food	Mt	32.5	32.0	32.7	33.0	33.0	32.7	33.1	33.3	33.5	33.2	33.7
of which for reduction	Mt	5.2	4.8	5.2	5.2	5.2	4.8	5.3	5.3	5.3	4.9	5.4
FISHMEAL[6]												
Monde												
Production	Mt	5.2	5.1	5.6	5.7	5.7	5.3	5.9	5.9	5.9	5.5	6.0
from whole fish	Mt	3.7	3.6	4.1	4.1	4.1	3.7	4.2	4.2	4.2	3.7	4.2
Consumption	Mt	5.3	5.2	5.5	5.7	5.8	5.5	5.7	5.9	5.9	5.7	5.8
Variation in stocks	Mt	-0.13	-0.06	0.14	0.02	-0.01	-0.16	0.16	0.01	0.00	-0.16	0.15
Price[7]	USD/t	1 630.8	1 741.1	1 497.2	1 481.4	1 572.1	1 673.3	1 598.4	1 629.6	1 655.6	1 784.3	1 799.4
Developed countries												
Production	Mt	1.6	1.7	1.7	1.7	1.7	1.8	1.8	1.8	1.8	1.8	1.9
from whole fish	Mt	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.2
Consumption	Mt	1.8	1.6	1.7	1.7	1.6	1.5	1.6	1.6	1.6	1.5	1.6
Variation in stocks	Mt	-0.1	-0.1	0.1	0.0	0.0	-0.2	0.2	0.0	0.0	-0.2	0.2
Developing countries												
Production	Mt	3.6	3.4	3.9	4.0	4.0	3.6	4.1	4.1	4.1	3.7	4.1
from whole fish	Mt	2.7	2.5	3.0	3.0	3.0	2.5	3.0	3.1	3.1	2.6	3.0
Consumption	Mt	3.8	3.6	3.8	4.0	4.1	3.9	4.1	4.3	4.3	4.1	4.2
Variation in stocks	Mt	-0.09	-0.05	0.10	0.02	0.00	-0.12	0.12	0.00	0.00	-0.12	0.12
OECD[5]												
Production	Mt	1. 6	1. 5	1. 7	1. 7	1. 7	1. 6	1. 7	1. 7	1. 7	1. 7	1. 8
from whole fish	Mt	1.	1.	1. 1	1. 1	1. 1	1. 1	1. 2	1. 2	1. 2	1. 1	1. 2
Consumption	Mt	1. 9	1. 8	1. 9	1. 9	1. 9	1. 8	1. 9	1. 9	1. 9	1. 8	1. 9
Variation in stocks	Mt	-0.03	-0.03	0.04	0.01	-0.01	-0.04	0.05	0.00	0.00	-0.04	0.04

Table C.7. World fish and seafood projections *(cont.)*

Calendar year

		Average 2021-23est	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
FISH OIL[6]												
World												
Production	Mt	1.3	1.4	1.4	1.5	1.5	1.4	1.5	1.5	1.5	1.5	1.5
from whole fish	Mt	0.5	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.6	0.7
Consumption	Mt	1.3	1.4	1.4	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Variation in stocks	Mt	0.03	-0.08	0.03	0.00	0.00	-0.06	0.05	0.00	0.00	-0.05	0.05
Price[8]	USD/t	3 284.7	3 788.8	3 051.4	2 973.7	3 025.9	3 153.4	3 164.4	3 222.2	3 324.9	3 430.2	3 436.4
Developed countries												
Production	Mt	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6
from whole fish	Mt	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Consumption	Mt	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8
Variation in stocks	Mt	0.01	-0.04	0.02	0.00	0.00	-0.02	0.02	0.00	0.00	-0.02	0.02
Developing countries												
Production	Mt	0.8	0.8	0.9	0.9	0.9	0.9	1.0	1.0	1.0	0.9	1.0
from whole fish	Mt	0.4	0.4	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.4	0.5
Consumption	Mt	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Variation in stocks	Mt	0.02	-0.04	0.01	0.00	0.00	-0.03	0.03	0.01	0.00	-0.03	0.03
OECD[5]												
Production	Mt	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
from whole fish	Mt	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Consumption	Mt	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.0
Variation in stocks	Mt	0.04	-0.05	0.00	0.00	0.00	-0.03	0.02	0.00	0.00	-0.03	0.02

Note : The term "fish" indicates fish, crustaceans, molluscs and other aquatic animals, but excludes aquatic mammals, crocodiles, caimans, alligators and aquatic plants. Average 2021-23est: Data for 2023 are estimated. Prices are in nominal terms.

1. Data are in live weight equivalent.
2. World unit value of aquaculture fisheries production (live weight basis).
3. FAO estimated value of world ex vessel value of capture fisheries production excluding for reduction.
4. World unit value of trade (sum of exports and imports).
5. Excludes Costa Rica.
6. Data are in product weight.
7. Fishmeal, 64-65% protein, Hamburg, Germany.
8. Fish oil, any origin, N.W. Europe.

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

Table C.8. World biofuel projections

Calendar year

		Average 2021-23est	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
ETHANOL												
World												
Production	bln L	127.2	135.0	138.3	140.9	143.0	144.9	147.0	149.0	151.0	152.9	154.7
Consumption	bln L	127.8	135.0	138.2	140.8	142.9	144.8	146.8	148.8	150.8	152.6	154.3
Exports	bln L	10.1	10.8	10.9	11.1	11.3	11.5	11.7	11.9	12.1	12.4	12.4
Price[1]	USD/hl	66.7	50.1	50.5	51.2	51.7	52.3	52.7	53.2	53.8	54.3	54.9
Developed countries												
Production	bln L	70.3	71.9	72.3	72.5	72.8	73.1	73.4	73.7	74.0	74.4	74.6
Consumption	bln L	71.2	72.3	72.7	73.1	73.5	73.8	74.2	74.5	74.8	75.1	75.0
Net trade	bln L	- 0.7	- 0.4	- 0.4	- 0.6	- 0.7	- 0.9	- 0.9	- 1.0	- 1.0	- 1.0	- 0.9
Developing countries												
Production	bln L	56.9	63.2	66.0	68.3	70.1	71.8	73.6	75.3	77.0	78.5	80.1
Consumption	bln L	56.6	62.7	65.5	67.7	69.4	71.0	72.6	74.3	76.0	77.5	79.2
Net trade	bln L	- 0.1	0.4	0.4	0.6	0.7	0.9	0.9	1.0	1.0	1.0	0.9
OECD[2]												
Production	bln L	69.8	71.5	72.0	72.3	72.6	72.9	73.2	73.5	73.8	74.2	74.4
Consumption	bln L	72.1	73.2	73.7	74.1	74.5	74.9	75.2	75.5	75.8	76.1	76.1
Net trade	bln L	- 2.0	- 1.7	- 1.7	- 1.9	- 2.0	- 2.1	- 2.2	- 2.2	- 2.2	- 2.2	- 2.1
BIODIESEL												
World												
Production	bln L	60.0	68.8	70.3	71.5	72.4	73.6	74.7	76.0	76.8	77.8	78.7
Consumption	bln L	59.3	68.7	70.2	71.4	72.2	73.4	74.5	75.8	76.6	77.6	78.5
Exports	bln L	8.1	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
Price[3]	USD/hl	157.2	130.1	130.7	133.0	135.1	137.5	140.2	143.0	146.1	149.2	152.7
Developed countries												
Production	bln L	31.4	35.7	36.1	36.5	36.8	37.3	37.8	38.6	38.9	39.3	39.7
Consumption	bln L	35.2	40.1	40.4	40.8	41.0	41.5	42.0	42.7	43.0	43.3	43.7
Net trade	bln L	- 4.5	- 4.3	- 4.2	- 4.2	- 4.1	- 4.1	- 4.1	- 4.0	- 4.0	- 4.0	- 3.9
Developing countries												
Production	bln L	28.6	33.1	34.2	35.0	35.6	36.3	36.8	37.4	37.9	38.5	39.0
Consumption	bln L	24.1	28.6	29.7	30.6	31.2	31.9	32.5	33.1	33.6	34.3	34.8
Net trade	bln L	4.5	4.5	4.5	4.4	4.4	4.4	4.3	4.3	4.2	4.2	4.2
OECD[2]												
Production	bln L	32.9	37.2	37.7	38.1	38.3	38.9	39.5	40.2	40.6	41.0	41.4
Consumption	bln L	36.7	41.6	41.9	42.3	42.5	43.0	43.6	44.3	44.6	45.0	45.4
Net trade	bln L	- 4.5	- 4.3	- 4.2	- 4.2	- 4.1	- 4.1	- 4.0	- 4.0	- 4.0	- 3.9	- 3.9

Note : Average 2021-23est: Data for 2023 are estimated. Prices are in nominal terms.

1. Wholesale price, United States, Omaha.
2. Excludes Iceland and Costa Rica but includes all current European Union member countries.
3. Producer price Germany net of biodiesel tariff and energy tax.

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

Table C.9. World cotton projections

Marketing year

		Average 2021-23est	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
WORLD												
Production	Mt	24.7	25.6	26.1	26.5	26.8	27.1	27.5	27.8	28.2	28.6	29.0
Area	Mha	32.4	33.6	33.7	33.8	33.9	34.0	34.1	34.1	34.2	34.3	34.3
Yield	t/ha	0.76	0.76	0.77	0.78	0.79	0.80	0.81	0.82	0.83	0.84	0.84
Consumption[1]	Mt	24.4	24.2	25.5	26.2	26.7	27.1	27.4	27.6	28.0	28.4	28.7
Exports	Mt	8.9	10.2	10.5	10.8	11.0	11.2	11.5	11.7	11.9	12.1	12.4
Closing stocks	Mt	21.2	23.4	24.1	24.4	24.5	24.6	24.6	24.8	25.1	25.3	25.6
Price[2]	USD/t	2 400.2	1 931.3	1 938.9	1 967.6	1 988.7	2 017.3	2 047.2	2 076.6	2 104.8	2 131.9	2 157.2
DEVELOPED COUNTRIES												
Production	Mt	5.8	6.2	6.4	6.5	6.6	6.7	6.8	6.8	6.9	7.0	7.1
Consumption	Mt	1.5	1.5	1.5	1.5	1.6	1.6	1.6	1.6	1.7	1.7	1.7
Exports	Mt	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Imports	Mt	4.6	5.1	5.2	5.4	5.4	5.5	5.5	5.6	5.6	5.6	5.7
Closing stocks	Mt	2.2	1.8	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1
DEVELOPING COUNTRIES												
Production	Mt	19.0	19.4	19.7	20.0	20.2	20.4	20.7	21.0	21.3	21.6	22.0
Consumption	Mt	22.9	22.7	23.9	24.7	25.2	25.5	25.8	26.0	26.3	26.7	27.0
Exports	Mt	4.3	5.1	5.4	5.5	5.6	5.8	5.9	6.1	6.3	6.5	6.7
Imports	Mt	8.6	9.8	10.2	10.5	10.7	10.9	11.1	11.3	11.5	11.8	12.0
Closing stocks	Mt	18.9	21.6	22.2	22.5	22.6	22.6	22.6	22.8	23.0	23.3	23.5
OECD[3]												
Production	Mt	5.7	6.1	6.3	6.4	6.5	6.6	6.7	6.7	6.8	6.9	6.9
Consumption	Mt	2.9	2.9	3.0	3.1	3.1	3.2	3.2	3.2	3.3	3.3	3.4
Exports	Mt	4.5	5.1	5.1	5.3	5.4	5.5	5.5	5.6	5.6	5.7	5.7
Imports	Mt	1.7	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2
Closing stocks	Mt	3.2	2.8	3.0	3.2	3.3	3.3	3.4	3.4	3.5	3.5	3.6

Note : Marketing year: See Glossary of Terms for definitions. Average 2021-23est: Data for 2023 are estimated. Prices are in nominal terms.

1. Consumption for cotton means mill consumption and not final consumer demand.
2. Cotlook A index, Middling 1 1/8", c.f.r. far Eastern ports (August/July).
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.

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

Table C.10. Economic assumptions

Calendar year

		Average 2021-23est	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
REAL GDP[1]												
Australia	%	3.6	1.4	2.1	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Canada	%	3.2	0.8	1.9	1.8	1.7	1.7	1.7	1.7	1.7	1.7	1.7
Chile	%	4.5	1.6	2.3	2.4	2.4	2.4	2.1	2.0	1.9	1.8	1.8
Colombia	%	6.6	2.0	2.9	3.3	3.3	3.3	2.4	2.3	2.3	2.3	2.2
European Union	%	3.2	1.3	1.6	1.5	1.5	1.5	1.4	1.3	1.3	1.3	1.3
Japan	%	1.6	1.0	1.2	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Korea	%	2.8	2.3	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1
Mexico	%	4.4	2.5	2.0	1.8	2.0	2.1	2.1	2.1	2.1	2.1	2.1
New Zealand	%	3.3	1.3	1.9	2.2	2.4	2.4	2.4	2.4	2.4	2.4	2.4
Norway	%	2.8	0.7	1.5	1.5	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Switzerland	%	3.0	0.9	1.4	1.8	1.2	1.8	1.8	1.8	1.8	1.8	1.8
Türkiye	%	6.7	0.1	1.7	1.9	2.0	2.1	2.2	2.5	2.6	2.7	2.7
United Kingdom	%	4.5	0.7	1.2	2.1	1.8	1.5	1.5	1.5	1.5	1.5	1.5
United States	%	3.4	1.5	1.7	2.1	2.1	2.1	1.6	1.6	1.6	1.6	1.6
Brazil	%	3.8	1.8	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0
China	%	5.5	4.7	4.2	4.1	3.7	3.4	3.4	3.4	3.4	3.4	3.4
Egypt	%	4.7	3.6	5.0	5.4	5.8	6.0	2.5	2.4	2.4	2.3	2.3
India	%	7.5	6.3	6.3	6.3	6.3	6.3	6.5	6.3	6.1	5.8	5.5
Indonesia	%	4.7	4.4	4.7	5.3	5.4	5.3	4.9	4.5	4.2	4.0	3.9
Iran	%	3.8	2.5	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1
Malaysia	%	5.3	4.3	4.4	4.4	3.9	3.9	3.8	3.6	3.5	3.4	3.3
Pakistan	%	3.8	2.5	3.6	4.5	5.0	5.0	3.0	3.0	3.0	3.0	3.0
Peru	%	5.7	2.7	3.1	3.0	3.0	3.0	3.4	3.3	3.3	3.2	3.2
Russia	%	1.6	1.1	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9
Saudi Arabia	%	4.5	4.0	4.2	3.3	3.3	3.1	2.6	2.2	2.0	1.8	1.6
South Africa	%	2.5	1.8	1.6	1.4	1.4	1.4	1.8	1.8	1.8	1.8	1.8
Ukraine	%	- 7.9	3.2	6.5	5.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0
OECD[2,3]	%	3.5	1.4	1.7	1.8	1.8	1.8	1.6	1.6	1.6	1.6	1.6
PCE DEFLATOR[1]												
Australia	%	4.1	3.5	2.8	3.1	2.7	2.6	2.6	2.6	2.6	2.6	2.6
Canada	%	4.1	2.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Chile	%	8.0	3.6	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Columbia	%	8.4	5.2	3.6	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
European Union	%	5.5	2.7	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Japan	%	2.1	2.4	2.0	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Korea	%	3.4	2.7	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Mexico	%	5.6	3.6	3.1	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
New Zealand	%	5.0	3.5	2.5	2.3	2.1	2.0	2.0	2.0	2.0	2.0	2.0
Norway	%	4.5	3.9	3.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Switzerland	%	1.6	2.1	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Türkiye	%	48.6	53.7	24.0	12.8	10.1	8.1	5.8	5.3	5.3	5.3	5.3
United Kingdom	%	5.6	2.4	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
United States	%	4.8	2.8	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0
Brazil	%	8.1	4.0	3.7	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
China	%	4.1	3.5	2.8	3.1	2.7	2.6	2.6	2.6	2.6	2.6	2.6
Egypt	%	12.2	32.2	19.9	13.8	11.5	9.5	3.3	3.2	3.1	3.0	2.9
India	%	5.9	4.6	4.1	4.1	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Indonesia	%	3.1	2.3	2.6	3.2	3.3	3.2	3.1	3.1	3.1	3.1	3.1
Iran	%	4.8	2.8	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0
Malaysia	%	2.9	2.7	2.3	2.1	1.8	1.9	1.8	1.8	1.8	1.7	1.7
Pakistan	%	16.7	23.6	12.2	7.9	6.5	6.5	3.0	3.0	3.0	3.0	3.0
Peru	%	6.1	2.9	2.1	2.0	2.0	2.0	2.5	2.5	2.5	2.5	2.5
Russia	%	8.6	6.3	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Saudi Arabia	%	2.7	2.2	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0
South Africa	%	5.8	4.8	4.5	4.5	4.5	4.5	4.9	4.9	4.9	4.9	4.9
Ukraine	%	15.7	13.0	8.6	6.7	5.5	5.0	3.0	3.0	3.0	3.0	3.0
OECD[2,3]	%	10.1	13.6	8.4	5.6	4.9	4.3	3.5	3.3	3.3	3.4	3.4

Table C.10. Economic assumptions *(cont.)*

Calendar year

		Average 2021-23est	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
GDP DEFLATOR[1]												
Australia	%	5.7	3.0	2.7	2.9	2.6	2.6	2.6	2.6	2.6	2.6	2.6
Canada	%	5.5	3.0	1.9	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1
Chile	%	7.1	3.3	3.3	3.2	3.0	3.0	3.1	3.2	3.2	3.2	3.2
Columbia	%	10.5	3.9	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
European Union	%	4.0	2.6	1.9	1.6	1.7	1.7	1.8	1.9	2.0	2.0	2.0
Japan	%	1.2	2.6	2.2	1.7	1.7	1.8	1.8	1.8	1.8	1.8	1.8
Korea	%	2.0	3.5	2.7	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1
Mexico	%	5.0	3.6	2.7	3.4	3.0	3.0	3.0	3.0	3.0	3.0	3.0
New Zealand	%	4.8	3.4	2.2	3.5	3.0	2.0	2.0	2.0	2.0	2.0	2.0
Norway	%	11.8	2.4	2.7	0.3	0.6	0.8	0.8	0.8	0.8	0.8	0.8
Switzerland	%	1.6	1.9	1.6	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Türkiye	%	62.2	41.6	21.3	10.4	6.2	5.5	5.4	5.4	5.4	5.4	5.4
United Kingdom	%	4.1	2.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
United States	%	5.1	2.7	2.1	1.9	1.8	1.9	2.1	2.1	2.1	2.1	2.1
Brazil	%	7.7	3.7	3.1	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
China	%	2.3	1.7	2.0	2.0	2.1	2.2	2.2	2.2	2.2	2.2	2.2
Egypt	%	13.7	33.2	19.7	13.4	11.1	9.1	3.3	3.2	3.1	3.0	2.9
India	%	6.9	4.1	4.1	4.1	4.0	4.0	3.7	3.7	3.6	3.6	3.6
Indonesia	%	5.9	0.9	1.9	1.9	2.5	3.2	3.8	3.6	3.4	3.3	3.3
Iran	%	5.1	2.7	2.1	1.9	1.8	1.9	2.1	2.1	2.1	2.1	2.1
Malaysia	%	4.9	3.5	2.9	2.2	1.6	1.7	1.7	1.6	1.6	1.6	1.6
Pakistan	%	17.1	23.8	12.5	8.2	6.3	6.5	3.0	3.0	3.0	3.0	3.0
Peru	%	6.0	2.4	2.2	2.2	2.1	2.0	2.5	2.5	2.5	2.5	2.5
Russia	%	12.8	8.1	5.7	3.1	2.4	2.5	2.5	2.5	2.5	2.5	2.5
Saudi Arabia	%	9.0	- 0.2	- 0.5	0.0	0.3	0.6	2.4	2.4	2.4	2.3	1.9
South Africa	%	5.2	4.7	4.5	4.6	4.9	5.0	4.8	4.8	4.9	4.9	4.9
Ukraine	%	27.3	15.0	9.9	6.5	5.0	5.0	3.0	3.0	3.0	3.0	3.0
OECD[3]	%	11.8	12.7	8.3	5.0	3.6	3.3	3.4	3.4	3.5	3.5	3.5
WORLD INPUT PRICES												
Brent crude oil[4]	USD/barrel	84.6	77.5	79.2	80.7	82.2	83.7	85.5	87.2	89.1	90.9	92.8
Fertiliser[5]	USD/t	427.5	335.2	342.4	349.0	355.4	362.0	369.5	377.2	385.1	393.1	401.3
EXCHANGE RATES												
Australia	AUD/USD	1.43	1.57	1.57	1.57	1.58	1.58	1.58	1.58	1.59	1.59	1.59
Canada	CAD/USD	1.30	1.38	1.38	1.37	1.36	1.35	1.34	1.33	1.33	1.32	1.31
Chile	CLP/USD	816.46	833.13	837.44	844.20	852.04	859.41	858.81	862.13	867.07	872.78	878.94
Columbia	COP/USD	4 153.81	4 605.54	4 670.01	4 726.05	4 773.32	4 821.05	4 868.00	4 916.00	4 964.44	5 013.35	5 062.72
European Union	EUR/USD	0.91	0.94	0.94	0.94	0.94	0.94	0.95	0.95	0.95	0.96	0.96
Japan	JPY/USD	127.48	151.38	151.38	148.58	146.64	141.57	136.67	131.94	127.38	122.97	118.71
Korea	KRW/USD	1 247.90	1 316.70	1 316.70	1 315.02	1 315.41	1 315.65	1 315.88	1 316.11	1 316.34	1 316.57	1 316.81
Mexico	MXN/USD	19.34	17.48	17.48	17.62	17.78	17.94	18.09	18.24	18.40	18.55	18.71
New Zealand	NZD/USD	1.54	1.70	1.70	1.71	1.72	1.71	1.70	1.70	1.69	1.69	1.68
Switzerland	CHF/USD	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8
Brazil	BRL/USD	5.19	4.92	4.92	4.95	4.92	4.93	4.94	4.95	4.96	4.97	4.98
China	CNY/USD	6.76	7.29	7.29	7.27	7.27	7.26	7.24	7.22	7.21	7.19	7.17
Egypt	EGP/USD	19.34	39.61	43.56	46.16	47.89	48.96	50.48	52.00	53.51	55.03	56.55
India	INR/USD	78.51	81.17	81.74	82.43	83.18	83.93	84.03	84.28	84.54	84.80	85.05
Indonesia	'000 IDR/USD	14.82	16.21	16.35	16.84	17.34	17.85	18.38	18.93	19.49	20.07	20.67
Malaysia	MYR/USD	4.32	4.43	4.41	4.40	4.39	4.37	4.35	4.33	4.31	4.28	4.26
Pakistan	PKR/USD	195.53	256.01	263.69	271.60	279.74	288.14	296.78	305.68	314.86	324.30	334.03
Peru	PEN/USD	3.84	3.83	3.85	3.86	3.87	3.88	3.89	3.91	3.93	3.95	3.97
Russia	RUB/USD	76.47	92.28	92.28	94.54	97.09	99.56	102.09	104.69	107.35	110.08	112.88
Saudi Arabia	SAR/USD	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
South Africa	ZAR/USD	16.50	18.55	18.92	19.39	20.04	20.69	21.06	21.44	22.07	22.75	23.41
Ukraine	UAH/USD	32.37	41.40	46.05	48.86	51.33	53.85	55.47	57.13	58.85	60.61	62.43
United Kingdom	GBP/USD	0.78	0.82	0.82	0.80	0.78	0.77	0.75	0.74	0.72	0.71	0.70

Table C.10. Economic assumptions *(cont.)*

Calendar year

		Average 2021-23est	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
POPULATION[1]												
Australia	%	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8
Canada	%	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7
Chile	%	0.6	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.4
Columbia	%	0.8	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5
European Union	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	- 0.1	- 0.1	- 0.1	- 0.1
Japan	%	- 0.5	- 0.5	- 0.5	- 0.6	- 0.6	- 0.6	- 0.6	- 0.6	- 0.6	- 0.6	- 0.6
Korea	%	0.0	- 0.1	- 0.1	- 0.1	- 0.1	- 0.2	- 0.2	- 0.2	- 0.2	- 0.3	- 0.3
Mexico	%	0.6	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.5
New Zealand	%	1.1	0.8	0.8	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.5
Norway	%	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6
Switzerland	%	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.4	0.4
Türkiye	%	0.7	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
United Kingdom	%	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2
United States	%	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4
Argentina	%	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5
Brazil	%	0.5	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.3
China	%	0.0	0.0	- 0.1	- 0.1	- 0.1	- 0.1	- 0.1	- 0.2	- 0.2	- 0.2	- 0.2
Egypt	%	1.6	1.6	1.6	1.5	1.5	1.5	1.5	1.4	1.4	1.4	1.4
India	%	0.8	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.7
Indonesia	%	0.7	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.6	0.6	0.6
Iran	%	0.7	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.5	0.4	0.4
Malaysia	%	1.1	1.1	1.0	1.0	1.0	0.9	0.9	0.9	0.8	0.8	0.8
Pakistan	%	1.9	2.0	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.7	1.7
Peru	%	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9
Russia	%	- 0.3	- 0.3	- 0.3	- 0.3	- 0.3	- 0.3	- 0.3	- 0.3	- 0.3	- 0.3	- 0.3
Saudi Arabia	%	0.9	1.4	1.4	1.3	1.3	1.3	1.2	1.2	1.2	1.1	1.1
South Africa	%	0.9	1.0	1.1	1.0	1.0	0.9	0.9	0.9	0.9	0.8	0.8
Ukraine	%	- 5.7	3.2	2.2	0.9	- 0.1	- 0.5	- 0.7	- 0.7	- 0.7	- 0.7	- 0.7
OECD[3]	%	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
World	%	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8

		Average 2021-23est	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
PER CAPITA GDP in constant 2010 USD[1]												
Australia	%	2.6	0.4	1.1	1.2	1.4	1.4	1.4	1.4	1.5	1.5	1.5
Canada	%	2.4	0.0	1.1	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Chile	%	3.9	1.5	2.1	2.2	2.2	2.2	1.8	1.7	1.5	1.4	1.4
Columbia	%	5.8	1.5	2.4	2.8	2.7	2.7	1.8	1.8	1.7	1.8	1.8
European Union	%	3.0	1.7	2.0	1.8	1.7	1.7	1.7	1.5	1.5	1.5	1.6
Japan	%	2.2	1.6	1.7	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Korea	%	2.8	2.3	2.2	2.4	2.3	2.3	2.3	2.3	2.3	2.4	2.4
Mexico	%	3.7	1.8	1.3	1.1	1.3	1.4	1.4	1.4	1.5	1.5	1.5
New Zealand	%	2.2	0.5	1.1	1.5	1.7	1.7	1.7	1.8	1.8	1.8	1.8
Norway	%	2.2	0.0	0.8	0.8	0.6	0.7	0.7	0.7	0.7	0.7	0.8
Switzerland	%	2.3	0.3	0.8	1.2	0.6	1.3	1.3	1.3	1.3	1.4	1.4
Türkiye	%	6.0	- 0.4	1.2	1.4	1.5	1.6	1.7	1.9	2.1	2.2	2.2
United Kingdom	%	4.2	0.3	0.8	1.7	1.5	1.2	1.2	1.3	1.3	1.3	1.3
United States	%	3.0	1.0	1.2	1.5	1.6	1.6	1.1	1.1	1.1	1.1	1.1
Brazil	%	3.3	1.2	1.5	1.4	1.5	1.5	1.6	1.6	1.6	1.6	1.7
China	%	5.5	4.7	4.3	4.2	3.8	3.5	3.5	3.6	3.6	3.6	3.6
Egypt	%	3.0	2.0	3.4	3.8	4.3	4.4	1.0	1.0	1.0	0.9	0.9
India	%	6.7	5.3	5.4	5.4	5.5	5.4	5.7	5.5	5.3	5.0	4.8
Indonesia	%	4.0	3.6	3.9	4.5	4.7	4.5	4.2	3.8	3.5	3.4	3.3
Iran	%	3.1	1.8	1.3	1.4	1.4	1.4	1.6	1.6	1.6	1.7	1.7
Malaysia	%	4.2	3.2	3.3	3.4	2.9	3.0	2.9	2.8	2.7	2.6	2.5
Pakistan	%	1.9	0.5	1.6	2.5	3.1	3.1	1.1	1.2	1.2	1.2	1.3
Peru	%	4.6	1.8	2.1	2.0	2.0	2.0	2.4	2.4	2.4	2.4	2.3
Russia	%	1.9	1.4	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Saudi Arabia	%	3.6	2.5	2.8	1.9	2.0	1.8	1.4	0.9	0.8	0.7	0.5
South Africa	%	1.6	0.8	0.5	0.4	0.4	0.4	0.9	0.9	1.0	1.0	1.0
Ukraine	%	- 2.6	0.0	4.2	4.1	4.1	4.6	3.7	3.7	3.7	3.7	3.7
OECD[3]	%	3.0	1.0	1.4	1.5	1.5	1.5	1.2	1.2	1.2	1.3	1.3

Note : For OECD member countries, as well as Brazil, China and Russia, historical data for real GDP, private consumption expenditure deflator and GDP deflator were obtained from Outlook No. 114, November 2023. For other economies, historical macroeconomic data were obtained from the IMF, World Economic Outlook, October 2023. Economic Assumptions for the OECD on the historical update of the OECD Economics Department, projections of the IMF, and for population, projections from the United Nations World projection period draw Population Prospects Database, (medium variant). Data for the European Union are euro area aggregates except for population.
Average 2021-23est and 2023est: Data for 2023 are estimated.

1. Annual per cent change.
2. Annual weighted average real GDP and CPI growth rates in OECD countries are based on weights using purchasing power parities (PPPs).
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Short-term update for crude oil price from the OECD Economic Outlook N°114 (October 2023).
   For 2023, the annual average daily spot price is used and the December 2023 average spot price is used for 2024. The oil prices are constant in real term during the projection period.
5. World Bank. Data for 2024 are estimated, projections by OECD and FAO Secretariats.

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

Tableau C.11. World prices

Nominal price

		Average 2021-23est	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
CEREALS												
Wheat[1]	USD/t	364.5	269.3	257.1	258.9	262.8	267.9	272.4	276.1	279.3	283.9	287.1
Maize[2]	USD/t	267.6	204.0	196.4	198.0	201.2	204.4	207.3	210.0	212.6	215.7	218.0
Other coarse grains[3]	USD/t	284.1	224.0	220.1	222.2	225.6	229.7	234.7	238.5	242.0	245.8	249.0
Rice[4]	USD/t	439.4	464.3	429.4	424.0	429.6	437.4	443.3	449.1	454.7	461.2	466.5
Distiller's dry grains[5]	USD/t	227.1	172.1	150.5	152.1	154.6	157.0	159.6	161.9	164.2	166.6	168.5
OILSEEDS												
Soybean[6]	USD/t	591.5	498.4	475.0	484.4	493.3	504.2	510.9	518.9	524.6	533.7	540.3
Other oilseeds[7]	USD/t	622.9	492.8	485.4	496.2	504.0	515.8	525.0	534.6	543.6	553.7	563.0
Protein meals[8]	USD/t	488.9	429.4	408.6	410.9	418.3	425.6	433.1	438.3	443.6	449.5	453.5
Vegetable oils[9]	USD/t	1 230.5	1 012.4	1 000.6	1 022.6	1 038.9	1 058.9	1 074.6	1 091.6	1 110.2	1 128.3	1 151.5
SWEETENERS												
Raw sugar[10]	USD/t	476.7	470.3	432.7	395.7	370.9	367.0	372.3	377.7	382.3	389.2	395.0
Refined sugar[11]	USD/t	602.5	595.2	561.2	526.4	504.1	500.8	506.3	514.7	523.1	533.4	541.8
Molasses[12]	USD/t	225.6	183.3	184.9	188.2	185.0	183.2	186.7	189.8	192.6	196.1	196.7
MEAT												
Beef and Veal[13]	USD/t pw	5 289.0	4 972.9	5 278.0	5 405.5	5 533.3	5 674.8	5 804.0	5 930.5	6 060.8	6 195.4	6 331.2
Pig meat[14]	USD/t pw	2 801.7	2 785.3	2 748.9	2 775.8	2 803.7	2 855.9	2 893.5	2 935.7	2 972.3	3 017.6	3 049.2
Poultry meat[15]	USD/t pw	1 823.6	1 806.2	1 719.0	1 709.4	1 737.3	1 770.2	1 800.7	1 828.1	1 854.9	1 884.5	1 908.3
Sheep meat[16]	USD/t cwe	5 660.0	5 450.4	5 551.4	5 596.8	5 695.8	5 818.6	5 923.3	6 034.5	6 137.3	6 248.3	6 346.1
FISH AND SEAFOOD												
Product traded[17]	USD/t	3 403.1	3 321.4	3 285.2	3 234.3	3 302.2	3 416.5	3 452.3	3 530.9	3 609.6	3 700.6	3 745.0
Aquaculture[18]	USD/t	3 129.9	3 065.2	3 063.6	3 036.1	3 101.4	3 210.0	3 253.8	3 342.3	3 430.8	3 524.8	3 585.2
Capture[19]	USD/t	2 011.9	1 973.9	1 947.8	1 944.8	1 972.8	2 028.7	2 039.8	2 076.0	2 114.2	2 172.2	2 210.5
Meal[20]	USD/t	1 630.8	1 741.1	1 497.2	1 481.4	1 572.1	1 673.3	1 598.4	1 629.6	1 655.6	1 784.3	1 799.4
Oil[21]	USD/t	3 284.7	3 788.8	3 051.4	2 973.7	3 025.9	3 153.4	3 164.4	3 222.2	3 324.9	3 430.2	3 436.4
DAIRY PRODUCTS												
Butter[22]	USD/t	5 258.3	4 792.2	4 894.4	4 791.3	4 756.7	4 837.6	4 951.3	5 013.6	5 071.2	5 140.3	5 193.8
Cheese[23]	USD/t	4 759.9	4 398.6	4 470.5	4 435.0	4 454.2	4 540.9	4 638.4	4 710.6	4 777.9	4 853.2	4 921.7
Skim milk powder[24]	USD/t	3 300.2	2 609.9	2 621.8	2 633.8	2 671.1	2 722.1	2 770.2	2 815.5	2 865.0	2 912.8	2 963.6
Whole milk powder[25]	USD/t	3 601.6	3 096.2	3 091.7	3 063.7	3 085.8	3 148.0	3 215.8	3 267.5	3 319.9	3 373.8	3 427.0
Whey powder[26]	USD/t	1 134.9	832.9	820.7	808.5	817.7	832.1	848.7	864.0	879.0	893.1	908.4
Casein[27]	USD/t	10 620.7	10 878.6	10 693.8	10 654.5	10 755.5	10 927.1	11 108.9	11 288.1	11 463.9	11 629.3	11 802.9
BIOFUEL												
Ethanol[28]	USD/t	66.7	50.1	50.5	51.2	51.7	52.3	52.7	53.2	53.8	54.3	54.9
Biodiesel[29]	USD/t	157.2	130.1	130.7	133.0	135.1	137.5	140.2	143.0	146.1	149.2	152.7
COTTON												
Cotton[30]	USD/t	2 400.2	1 931.3	1 938.9	1 967.6	1 988.7	2 017.3	2 047.2	2 076.6	2 104.8	2 131.9	2 157.2
ROOTS AND TUBERS												
Roots and tubers[31]	USD/t	470.1	462.0	457.3	456.0	461.2	469.7	474.7	482.3	489.5	497.7	504.8
PULSES												
Pulses[32]	USD/t	373.0	280.2	269.0	272.9	274.7	277.5	282.4	287.1	292.6	298.4	303.5

Table C.11. World prices *(cont.)*

Real price

		Average 2021-23est	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
CEREALS												
Wheat[1]	USD/t	383.7	262.1	245.0	242.0	241.3	241.5	240.5	238.9	236.7	235.7	233.5
Maize[2]	USD/t	282.0	198.6	187.2	185.1	184.8	184.3	183.1	181.7	180.2	179.1	177.3
Other coarse grains[3]	USD/t	299.6	218.1	209.8	207.8	207.1	207.1	207.3	206.4	205.1	204.1	202.5
Rice[4]	USD/t	459.5	452.0	409.3	396.5	394.5	394.3	391.5	388.5	385.4	382.9	379.4
Distiller's dry grains[5]	USD/t	237.9	167.5	143.5	142.2	141.9	141.6	140.9	140.1	139.1	138.3	137.1
OILSEEDS												
Soybean[6]	USD/t	622.5	485.2	452.8	453.0	452.9	454.5	451.2	448.9	444.6	443.1	439.4
Other oilseeds[7]	USD/t	659.9	479.7	462.6	463.9	462.7	465.0	463.6	462.5	460.7	459.7	457.9
Protein meals[8]	USD/t	513.1	418.1	389.5	384.2	384.1	383.7	382.5	379.2	375.9	373.2	368.8
Vegetable oils[9]	USD/t	1 303.0	985.5	953.7	956.1	953.9	954.6	949.0	944.4	940.9	936.8	936.5
SWEETENERS												
Raw sugar[10]	USD/t	498.3	457.8	412.4	369.9	340.5	330.8	328.8	326.7	324.0	323.1	321.3
Refined sugar[11]	USD/t	629.7	579.4	534.9	492.2	462.9	451.4	447.2	445.2	443.3	442.9	440.6
Molasses[12]	USD/t	236.8	178.4	176.2	176.0	169.8	165.2	164.9	164.2	163.2	162.8	160.0
MEAT												
Beef and Veal[13]	USD/t pw	5 556.7	4 841.0	5 030.7	5 054.1	5 080.8	5 115.9	5 125.8	5 130.6	5 136.5	5 143.7	5 149.0
Pig meat[14]	USD/t pw	2 939.2	2 711.4	2 620.1	2 595.4	2 574.4	2 574.6	2 555.3	2 539.7	2 519.0	2 505.4	2 479.9
Poultry meat[15]	USD/t pw	1 908.6	1 758.3	1 638.4	1 598.3	1 595.3	1 595.8	1 590.3	1 581.5	1 572.0	1 564.6	1 552.0
Sheep meat[16]	USD/t cwe	5 938.7	5 305.9	5 291.3	5 233.0	5 229.9	5 245.5	5 231.1	5 220.5	5 201.4	5 187.7	5 161.1
FISH AND SEAFOOD												
Product traded[17]	USD/t	3 568.2	3 233.3	3 131.2	3 024.1	3 032.1	3 080.0	3 048.8	3 054.6	3 059.1	3 072.4	3 045.7
Aquaculture[18]	USD/t	3 285.3	2 983.9	2 920.0	2 838.7	2 847.8	2 893.8	2 873.5	2 891.4	2 907.6	2 926.5	2 915.8
Capture[19]	USD/t	2 107.7	1 921.6	1 856.5	1 818.4	1 811.5	1 828.9	1 801.5	1 796.0	1 791.8	1 803.5	1 797.8
Meal[20]	USD/t	1 705.5	1 694.9	1 427.1	1 385.1	1 443.6	1 508.5	1 411.6	1 409.8	1 403.1	1 481.5	1 463.4
Oil[21]	USD/t	3 397.7	3 688.3	2 908.4	2 780.4	2 778.4	2 842.8	2 794.6	2 787.6	2 817.8	2 848.0	2 794.7
DAIRY PRODUCTS												
Butter[22]	USD/t	5 519.8	4 665.1	4 665.0	4 479.8	4 367.7	4 361.1	4 372.7	4 337.4	4 297.8	4 267.8	4 224.0
Cheese[23]	USD/t	4 991.4	4 281.9	4 261.1	4 146.7	4 089.8	4 093.6	4 096.4	4 075.2	4 049.3	4 029.4	4 002.7
Skim milk powder[24]	USD/t	3 472.5	2 540.7	2 499.0	2 462.6	2 452.6	2 454.0	2 446.5	2 435.7	2 428.1	2 418.4	2 410.3
Whole milk powder[25]	USD/t	3 792.4	3 014.1	2 946.8	2 864.5	2 833.4	2 837.9	2 840.0	2 826.8	2 813.6	2 801.1	2 787.1
Whey powder[26]	USD/t	1 196.9	810.8	782.2	755.9	750.8	750.2	749.5	747.5	744.9	741.5	738.8
Casein[27]	USD/t	11 092.5	10 590.1	10 192.7	9 961.9	9 875.8	9 850.8	9 810.7	9 765.5	9 715.5	9 655.3	9 599.1
BIOFUEL												
Ethanol[28]	USD/t	70.0	48.7	48.1	47.9	47.5	47.1	46.6	46.1	45.6	45.1	44.6
Biodiesel[29]	USD/t	165.1	126.6	124.5	124.4	124.1	124.0	123.8	123.7	123.8	123.8	124.2
COTTON												
Cotton[30]	USD/t	2 535.4	1 880.0	1 848.0	1 839.7	1 826.1	1 818.6	1 807.9	1 796.5	1 783.8	1 770.0	1 754.4
ROOTS AND TUBERS												
Roots and tubers[31]	USD/t	492.3	449.8	435.9	426.3	423.5	423.4	419.3	417.2	414.8	413.2	410.6
PULSES												
Pulses[32]	USD/t	394.6	272.8	256.3	255.2	252.2	250.2	249.4	248.4	248.0	247.7	246.8
USA GDP Deflator (2023=1)	**Index**	**0.955**	**1.027**	**1.049**	**1.070**	**1.089**	**1.109**	**1.132**	**1.156**	**1.180**	**1.204**	**1.230**

Note : This table is a compilation of price information presented in the detailed commodity tables further in this annex. Prices for crops are on marketing and those for other products on calendar year basis. See Glossary of Terms for definitions. Average 2021-23est: Data for 2023 are estimated. year basis. Real prices year basis are deflated using USA GDP base year 2023=1.

1. No.2 hard red winter wheat, ordinary protein, United States FOB Gulf Ports (June/May).
2. No.2 yellow corn, United States FOB Gulf Ports (September/August).
3. Feed barley, Europe, FOB Rouen (July/June).
4. FAO all rice price index normalised to India, indica high quality 5% broken average 2014-2016 (January/December).
5. Wholesale price, Central Illinois (September/August).
6. Soybean, U.S., CIF Rotterdam (October/September).
7. Rapeseed, Europe, CIF Hamburg (October/September).
8. Weighted average meal price, European port (October/September).
9. Weighted average price of oilseed oils and palm oil, European port (October/September).
10. Raw sugar world price, ICE contract No11 nearby (October/September).
11. Refined sugar price, Euronext, Liffe, Contract No.407 London, Europe (October/September).
12. Unit import price, Europe (October/September).
13. Beef meat – Beef (Australia), cow forequarters, 85% chemical lean, c.i.f. U.S. imported USD/t cwe
14. United States of America: Meat of Swine (Fresh, Chilled Or Frozen), export unit value USD/t cwe.
15. Brazil: Meat And Edible Offal Of Poultry (Fresh, Chilled Or Frozen), export unit value USD/t cwe.
16. New Zealand: Lamb 17.5kg, USD/t cwe.
17. World unit value of trade (sum of exports and imports).
18. World unit value of aquaculture fisheries production (live weight basis).
19. FAO estimated value of world ex-vessel value of capture fisheries production excluding for reduction.
20. Fishmeal, 64-65% protein, Hamburg, Germany.
21. Fish oil any origin, N.W. Europe.
22. FOB export price, butter, 82% butterfat, Oceania.
23. FOB export price, cheddar cheese, 39% moisture, Oceania.
24. FOB export price, non-fat dry milk, 1.25% butterfat, Oceania.
25. FOB export price, WMP 26% butterfat, Oceania.
26. FOB export price, sweet whey non-hygroscopic, Western Europe.
27. Export price, New Zealand.
28. Wholesale price, United States, Omaha.
29. Producer price Germany net of biodiesel tariff and energy tax.
30. Cotlook A index, Middling 1 1/8", c.f.r. far Eastern ports (August/July).
31. Thailand, Bangkok, Cassava (flour), wholesale.
32. Field peas price, Canada (August/July).

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

Table C.12.1 World trade projections, imports

		Average 2021-23est	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Wheat												
World Trade	**kt**	**192 800**	**196 532**	**196 608**	**197 495**	**201 166**	**204 558**	**207 809**	**211 033**	**214 289**	**216 984**	**220 185**
OECD[1]	kt	45 673	42 436	42 611	42 768	42 726	42 808	42 870	42 964	43 116	43 228	43 375
Developing countries	kt	158 718	166 027	165 652	166 666	170 242	173 511	176 620	179 652	182 723	185 346	188 400
Least Developed Countries	kt	19 121	21 419	21 498	21 914	22 663	23 363	24 029	24 651	25 259	25 820	26 410
Maize												
World Trade	**kt**	**185 403**	**182 303**	**184 087**	**187 808**	**190 868**	**194 780**	**198 265**	**201 853**	**205 456**	**209 227**	**213 012**
OECD[1]	kt	85 183	80 867	81 531	82 401	82 914	83 653	84 422	85 171	85 872	86 571	87 184
Developing countries	kt	140 486	143 125	144 963	148 860	151 802	155 409	158 551	161 883	165 290	168 888	172 523
Least Developed Countries	kt	4 906	3 459	3 714	3 875	3 990	4 147	4 284	4 445	4 608	4 803	5 028
Other coarse grains												
World Trade	**kt**	**44 437**	**43 532**	**44 076**	**44 347**	**44 604**	**45 022**	**45 554**	**46 236**	**46 851**	**47 535**	**48 177**
OECD[1]	kt	10 239	8 448	8 785	8 758	8 831	8 800	8 807	8 898	8 965	9 057	9 121
Developing countries	kt	36 745	36 695	37 388	37 753	38 027	38 465	39 012	39 700	40 347	41 065	41 751
Least Developed Countries	kt	1 530	594	323	322	362	543	670	760	875	1 010	1 164
Rice												
World Trade	**kt**	**54 085**	**53 231**	**55 150**	**56 345**	**57 606**	**58 962**	**60 359**	**61 706**	**63 066**	**64 360**	**65 682**
OECD[1]	kt	7 949	8 330	8 432	8 484	8 527	8 607	8 707	8 804	8 872	8 962	9 050
Developing countries	kt	46 322	45 232	47 047	48 199	49 400	50 666	51 967	53 226	54 520	55 723	56 955
Least Developed Countries	kt	11 080	11 292	11 430	11 611	12 093	12 497	12 911	13 424	14 013	14 552	15 128
Soybean												
World Trade	**kt**	**162 204**	**170 710**	**172 705**	**173 485**	**174 514**	**175 360**	**176 527**	**177 072**	**177 977**	**178 517**	**179 310**
OECD[1]	kt	31 706	31 506	31 530	31 283	31 149	30 981	30 917	30 767	30 691	30 541	30 475
Developing countries	kt	139 683	148 584	150 736	151 859	153 145	154 278	155 647	156 452	157 550	158 345	159 319
Least Developed Countries	kt	2 418	2 537	2 678	2 760	2 812	2 851	2 895	2 932	2 975	3 010	3 048
Other oilseeds												
World Trade	**kt**	**23 374**	**24 193**	**24 084**	**24 142**	**24 265**	**24 404**	**24 521**	**24 646**	**24 774**	**24 910**	**25 010**
OECD[1]	kt	14 682	13 968	13 797	13 745	13 727	13 686	13 627	13 576	13 524	13 479	13 400
Developing countries	kt	10 308	11 768	11 860	12 005	12 180	12 378	12 558	12 737	12 919	13 102	13 283
Least Developed Countries	kt	256	250	254	260	263	266	268	270	273	275	278
Protein meals												
World Trade	**kt**	**92 695**	**95 005**	**95 672**	**96 308**	**97 006**	**97 947**	**98 638**	**99 697**	**100 470**	**101 477**	**102 417**
OECD[1]	kt	46 980	48 163	48 266	48 258	48 137	48 068	47 889	47 872	47 696	47 601	47 466
Developing countries	kt	54 187	55 789	56 522	57 279	58 207	59 350	60 319	61 568	62 664	63 928	65 126
Least Developed Countries	kt	1 586	1 482	1 419	1 432	1 466	1 533	1 586	1 654	1 713	1 786	1 862
Vegetable oils												
World Trade	**kt**	**84 848**	**86 384**	**86 650**	**86 921**	**87 178**	**87 402**	**87 582**	**87 773**	**88 067**	**88 373**	**88 572**
OECD[1]	kt	24 899	25 274	25 045	24 769	24 497	24 256	23 991	23 762	23 689	23 581	23 464
Developing countries	kt	62 509	63 702	64 215	64 768	65 295	65 763	66 210	66 636	67 007	67 430	67 752
Least Developed Countries	kt	6 921	7 059	7 201	7 361	7 518	7 671	7 830	7 988	8 142	8 299	8 444
Sugar												
World Trade	**kt**	**62 923**	**64 340**	**65 658**	**67 170**	**68 267**	**69 096**	**69 889**	**70 762**	**71 664**	**72 350**	**73 128**
OECD[1]	kt	12 733	11 491	11 720	11 594	11 436	11 389	11 280	11 219	11 138	11 095	11 022
Developing countries	kt	50 331	53 033	54 256	55 931	57 078	57 961	58 781	59 683	60 647	61 357	62 186
Least Developed Countries	kt	9 705	8 873	9 606	10 179	10 700	11 047	11 357	11 733	12 128	12 447	12 746
Beef[2]												
World Trade	**kt cwe**	**11 620**	**11 835**	**11 946**	**12 002**	**12 143**	**12 296**	**12 429**	**12 561**	**12 695**	**12 833**	**12 975**
OECD[1]	kt cwe	4 627	4 668	4 654	4 572	4 546	4 538	4 534	4 530	4 525	4 522	4 520
Developing countries	kt cwe	7 581	7 775	7 925	8 072	8 239	8 402	8 542	8 685	8 829	8 974	9 122
Least Developed Countries	kt cwe	131	153	152	139	147	160	176	196	220	246	273
Pig meat[2]												
World Trade	**kt cwe**	**10 994**	**10 040**	**10 087**	**10 075**	**10 104**	**10 129**	**10 151**	**10 179**	**10 226**	**10 263**	**10 314**
OECD[1]	kt cwe	5 617	5 735	5 741	5 749	5 755	5 767	5 785	5 806	5 828	5 846	5 856
Developing countries	kt cwe	7 219	6 260	6 318	6 316	6 349	6 369	6 378	6 391	6 423	6 446	6 482
Least Developed Countries	kt cwe	197	213	232	253	276	299	323	347	372	397	424
Poultry meat												
World Trade	**kt rtc**	**15 060**	**15 287**	**15 474**	**15 643**	**15 798**	**15 959**	**16 127**	**16 320**	**16 502**	**16 672**	**16 863**
OECD[1]	kt rtc	4 241	4 411	4 364	4 348	4 364	4 372	4 382	4 393	4 403	4 405	4 409
Developing countries	kt rtc	10 794	10 896	11 093	11 272	11 446	11 631	11 807	12 007	12 204	12 398	12 611
Least Developed Countries	kt rtc	1 154	1 208	1 360	1 467	1 558	1 646	1 720	1 800	1 883	1 963	2 048
Sheep meat[2]												
World Trade	**kt cwe**	**1 140**	**1 193**	**1 176**	**1 177**	**1 177**	**1 177**	**1 177**	**1 175**	**1 175**	**1 175**	**1 175**
OECD[1]	kt cwe	449	456	453	451	448	445	442	438	435	431	428
Developing countries	kt cwe	700	742	729	732	734	737	740	742	745	748	751
Least Developed Countries	kt cwe	2	2	2	2	2	2	2	2	2	2	2

Table C.12.1 World trade projections, imports *(cont.)*

		Average 2021-23est	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Butter												
World Trade	**kt**	**1 024**	**1 058**	**1 068**	**1 068**	**1 075**	**1 086**	**1 093**	**1 105**	**1 114**	**1 125**	**1 138**
OECD[1]	kt	306	341	330	326	329	329	329	331	332	333	335
Developing countries	kt	603	614	629	639	649	656	659	665	670	677	685
Least Developed Countries	kt	12	18	21	23	24	25	25	26	27	28	30
Cheese												
World Trade	**kt**	**3 505**	**3 525**	**3 594**	**3 622**	**3 665**	**3 727**	**3 789**	**3 849**	**3 912**	**3 968**	**4 025**
OECD[1]	kt	1 652	1 579	1 596	1 614	1 638	1 658	1 682	1 703	1 726	1 744	1 757
Developing countries	kt	1 749	1 826	1 871	1 896	1 924	1 965	2 004	2 040	2 078	2 115	2 154
Least Developed Countries	kt	28	40	56	54	54	59	64	68	72	77	83
Whole milk powder												
World Trade	**kt**	**2 791**	**2 551**	**2 562**	**2 552**	**2 566**	**2 581**	**2 595**	**2 609**	**2 620**	**2 633**	**2 645**
OECD[1]	kt	151	130	137	138	139	140	139	139	139	139	139
Developing countries	kt	2 666	2 443	2 445	2 429	2 443	2 458	2 471	2 485	2 496	2 508	2 521
Least Developed Countries	kt	281	255	266	275	283	290	297	304	312	319	327
Skim milk powder												
World Trade	**kt**	**2 554**	**2 620**	**2 697**	**2 771**	**2 830**	**2 891**	**2 947**	**3 003**	**3 059**	**3 115**	**3 172**
OECD[1]	kt	500	500	511	522	527	532	536	541	547	552	558
Developing countries	kt	2 323	2 378	2 445	2 508	2 566	2 625	2 680	2 734	2 789	2 844	2 900
Least Developed Countries	kt	104	105	110	116	121	126	132	137	142	147	153
Fish												
World Trade	**kt**	**44 852**	**44 066**	**44 372**	**44 515**	**44 660**	**44 497**	**44 923**	**45 247**	**45 436**	**45 361**	**45 890**
OECD[1]	kt	23 412	22 350	23 307	23 295	23 328	22 976	23 307	23 490	23 545	23 371	23 686
Developing countries	kt	22 171	22 481	21 899	21 953	22 059	22 324	22 465	22 556	22 703	22 882	23 140
Least Developed Countries	kt	1 429	1 723	1 839	1 797	1 833	1 971	1 932	1 968	2 006	2 235	2 225
Fishmeal[3]												
World Trade	**kt**	**3 727**	**3 245**	**3 524**	**3 587**	**3 621**	**3 339**	**3 582**	**3 676**	**3 686**	**3 404**	**3 570**
OECD[1]	kt	1 201	1 069	1 165	1 151	1 132	1 006	1 089	1 101	1 107	998	1 051
Developing countries	kt	2 752	2 404	2 590	2 680	2 743	2 591	2 735	2 831	2 844	2 681	2 776
Least Developed Countries	kt	84	76	83	97	102	92	106	113	117	105	114
Fish oil[3]												
World Trade	**kt**	**936**	**984**	**1 021**	**1 030**	**1 043**	**1 023**	**1 061**	**1 080**	**1 097**	**1 068**	**1 096**
OECD[1]	kt	758	823	844	856	866	859	872	897	914	898	903
Developing countries	kt	343	347	367	375	383	372	387	392	396	383	395
Least Developed Countries	kt	5	5	5	5	5	5	5	5	5	5	5
Ethanol												
World Trade	**kt**	**10 835**	**10 755**	**10 941**	**11 113**	**11 273**	**11 453**	**11 667**	**11 890**	**12 136**	**12 389**	**12 422**
OECD[1]	kt	7 774	8 158	8 335	8 524	8 684	8 871	9 058	9 251	9 456	9 672	9 692
Developing countries	kt	3 990	3 505	3 493	3 472	3 448	3 429	3 446	3 470	3 508	3 543	3 554
Least Developed Countries	kt	117	130	130	130	130	130	130	130	130	130	130
Biodiesel												
World Trade	**kt**	**8 026**	**8 223**	**8 214**	**8 207**	**8 207**	**8 205**	**8 208**	**8 208**	**8 208**	**8 212**	**8 202**
OECD[1]	kt	7 477	7 528	7 513	7 502	7 494	7 485	7 482	7 479	7 478	7 479	7 472
Developing countries	kt	549	695	701	705	713	719	726	729	730	733	730
Least Developed Countries	kt	0	0	0	0	0	0	0	0	0	0	0
Cotton												
World Trade	**kt**	**8 992**	**10 183**	**10 521**	**10 824**	**11 028**	**11 244**	**11 454**	**11 679**	**11 898**	**12 124**	**12 352**
OECD[1]	kt	1 689	1 976	2 117	2 115	2 083	2 067	2 091	2 126	2 150	2 186	2 221
Developing countries	kt	8 636	9 813	10 151	10 458	10 663	10 876	11 086	11 310	11 528	11 754	11 982
Least Developed Countries	kt	1 546	1 683	1 694	1 773	1 847	1 917	1 983	2 047	2 110	2 174	2 237
Roots and tubers												
World Trade	**kt**	**27 516**	**27 855**	**28 114**	**28 287**	**28 564**	**28 830**	**29 078**	**29 369**	**29 665**	**29 984**	**30 302**
OECD[1]	kt	3 170	3 359	3 494	3 605	3 634	3 661	3 681	3 685	3 692	3 680	3 678
Developing countries	kt	24 163	24 303	24 473	24 538	24 786	25 025	25 252	25 546	25 844	26 185	26 516
Least Developed Countries	kt	695	736	719	709	711	726	736	735	731	721	717
Pulses												
World Trade	**kt**	**19 791**	**20 160**	**20 495**	**21 024**	**21 356**	**21 748**	**22 062**	**22 400**	**22 637**	**22 866**	**23 037**
OECD[1]	kt	5 174	4 901	4 980	4 894	4 835	4 765	4 691	4 612	4 530	4 494	4 463
Developing countries	kt	15 928	16 621	16 872	17 482	17 874	18 339	18 725	19 141	19 460	19 725	19 927
Least Developed Countries	kt	2 396	2 560	2 542	2 550	2 593	2 651	2 686	2 727	2 773	2 819	2 866

Note : The values do not add up to world trade due to double counting of certains countries and statistical differences (i.e. LDC are already included in the Developing countries aggregate).
Average 2021-23est: Data for 2023 are estimated.

1. Excludes Iceland (except for fish products) and Costa Rica but includes all current European member countries.
2. Excludes trade of live animals.
3. Data are in product weight.

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

Table C.12.2 World trade projections, exports

		Average 2021-23est	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Wheat												
OECD[1]	kt	106 103	111 621	110 452	110 671	112 593	114 010	115 214	116 367	117 369	118 558	119 896
Developing countries	kt	26 729	23 580	23 569	24 037	24 408	24 926	25 420	25 824	26 360	26 824	27 276
Least Developed Countries	kt	143	123	121	119	115	112	109	106	104	101	99
Maize												
OECD[1]	kt	54 146	59 785	61 487	63 284	64 817	65 992	66 833	67 769	68 708	69 726	70 738
Developing countries	kt	95 537	92 640	93 127	94 329	95 646	98 074	100 273	102 417	104 432	106 560	108 808
Least Developed Countries	kt	2 744	3 492	3 177	3 116	3 152	3 079	3 108	3 112	3 124	3 041	2 902
Other coarse grains												
OECD[1]	kt	31 105	29 052	29 315	29 444	29 873	30 332	30 738	31 245	31 674	32 134	32 554
Developing countries	kt	5 230	6 107	6 229	6 160	6 037	5 838	5 741	5 692	5 649	5 629	5 613
Least Developed Countries	kt	390	865	1 030	1 005	917	737	635	571	516	471	435
Rice												
OECD[1]	kt	3 287	3 499	3 534	3 603	3 654	3 676	3 749	3 780	3 803	3 861	3 907
Developing countries	kt	50 407	48 074	49 960	51 079	52 276	53 595	54 905	56 207	57 529	58 750	60 010
Least Developed Countries	kt	4 852	4 919	5 214	6 053	6 443	7 214	7 932	8 462	9 064	9 819	10 662
Soybean												
OECD[1]	kt	55 954	51 997	52 624	52 808	53 112	53 505	53 834	54 162	54 511	54 896	55 282
Developing countries	kt	106 261	113 812	115 142	115 706	116 387	116 792	117 601	117 767	118 281	118 382	118 746
Least Developed Countries	kt	818	723	705	683	675	670	664	657	649	643	637
Other oilseeds												
OECD[1]	kt	14 239	14 118	13 824	13 762	13 828	13 888	13 921	13 953	14 002	14 052	14 082
Developing countries	kt	3 033	2 805	2 836	2 850	2 840	2 846	2 853	2 858	2 860	2 863	2 865
Least Developed Countries	kt	429	436	415	414	407	405	405	404	402	401	398
Protein meals												
OECD[1]	kt	22 025	21 984	21 994	22 474	22 936	23 373	23 845	24 266	24 682	25 022	25 442
Developing countries	kt	61 722	64 749	65 348	65 428	65 584	66 054	66 222	66 843	67 168	67 816	68 308
Least Developed Countries	kt	407	392	416	416	399	381	366	350	334	317	300
Vegetable oils												
OECD[1]	kt	8 298	8 825	8 760	8 838	8 800	8 828	8 860	8 814	8 939	9 010	8 976
Developing countries	kt	65 546	67 109	67 316	67 344	67 490	67 553	67 571	67 691	67 736	67 849	67 948
Least Developed Countries	kt	568	550	537	522	509	497	485	473	462	451	442
Sugar												
OECD[1]	kt	6 699	6 876	6 573	6 557	6 769	6 940	7 061	7 097	7 183	7 259	7 324
Developing countries	kt	60 237	61 160	62 690	64 276	65 211	65 862	66 564	67 419	68 244	68 788	69 388
Least Developed Countries	kt	2 615	1 827	1 972	2 171	2 365	2 345	2 242	2 201	2 181	2 141	2 088
Beef[2]												
OECD[1]	kt cwe	5 234	5 113	5 214	5 250	5 316	5 382	5 440	5 496	5 557	5 615	5 675
Developing countries	kt cwe	6 927	6 949	6 986	7 016	7 101	7 198	7 286	7 372	7 458	7 547	7 640
Least Developed Countries	kt cwe	10	10	9	8	8	8	8	8	8	7	7
Pig meat[2]												
OECD[1]	kt cwe	9 338	8 474	8 614	8 649	8 677	8 695	8 713	8 735	8 774	8 800	8 841
Developing countries	kt cwe	1 880	1 728	1 648	1 609	1 612	1 620	1 630	1 642	1 657	1 673	1 689
Least Developed Countries	kt cwe	2	2	2	2	2	2	2	2	2	2	2
Poultry meat												
OECD[1]	kt rtc	6 993	6 739	6 894	6 967	7 053	7 136	7 217	7 316	7 402	7 478	7 571
Developing countries	kt rtc	8 528	8 194	8 250	8 378	8 488	8 598	8 707	8 815	8 927	9 035	9 149
Least Developed Countries	kt rtc	46	46	45	44	44	44	43	43	43	43	42
Sheep meat												
OECD[1]	kt cwe	1 071	1 114	1 101	1 109	1 115	1 123	1 131	1 138	1 145	1 153	1 160
Developing countries	kt cwe	99	92	92	88	86	84	83	82	81	81	80
Least Developed Countries	kt cwe	11	9	8	8	7	6	5	4	3	3	2

Table C.12.2 World trade projections, exports *(cont.)*

		Average 2021-23est	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Butter												
OECD[1]	kt	801	834	849	845	848	858	865	877	885	893	903
Developing countries	kt	123	131	123	127	134	139	144	149	156	165	174
Least Developed Countries	kt	2	1	1	1	0	0	0	0	0	0	0
Cheese												
OECD[1]	kt	2 609	2 630	2 702	2 732	2 771	2 827	2 881	2 930	2 980	3 026	3 072
Developing countries	kt	575	590	587	579	573	569	568	566	567	568	566
Least Developed Countries	kt	0	0	0	0	0	0	0	0	0	0	0
Whole milk powder												
OECD[1]	kt	1 880	1 784	1 800	1 787	1 801	1 812	1 823	1 834	1 843	1 853	1 863
Developing countries	kt	730	716	711	714	714	717	719	721	723	725	727
Least Developed Countries	kt	7	7	7	7	7	7	6	6	6	6	6
Skim milk powder												
OECD[1]	kt	2 313	2 280	2 357	2 430	2 488	2 546	2 601	2 654	2 707	2 760	2 814
Developing countries	kt	272	218	219	221	223	224	224	226	228	229	231
Least Developed Countries	kt	13	11	11	11	10	10	10	10	9	9	9
Fish												
OECD[1]	kt	13 323	12 695	12 761	12 927	12 980	12 908	13 094	13 217	13 306	13 148	13 311
Developing countries	kt	29 328	28 642	29 150	29 311	29 503	29 272	29 697	30 042	30 260	30 213	30 860
Least Developed Countries	kt	1 964	2 029	1 936	1 853	1 847	1 898	1 849	1 835	1 831	1 900	1 848
Fishmeal[3]												
OECD[1]	kt	929	841	874	891	916	863	902	926	931	883	940
Developing countries	kt	2 633	2 284	2 585	2 629	2 639	2 324	2 602	2 675	2 674	2 349	2 539
Least Developed Countries	kt	168	163	160	163	164	162	165	167	167	166	167
Fish oil[3]												
OECD[1]	kt	516	508	524	514	524	531	545	544	556	555	572
Developing countries	kt	541	521	574	578	586	552	597	608	620	580	611
Least Developed Countries	kt	25	24	24	24	24	23	23	23	23	23	23
Ethanol												
OECD[1]	kt	5 794	6 427	6 626	6 664	6 718	6 783	6 899	7 070	7 262	7 509	7 633
Developing countries	kt	3 901	3 950	3 937	4 070	4 177	4 293	4 391	4 443	4 497	4 504	4 413
Least Developed Countries	kt	17	10	10	10	10	10	10	10	10	10	10
Biodiesel												
OECD[1]	kt	2 991	3 268	3 304	3 335	3 370	3 405	3 439	3 472	3 505	3 542	3 549
Developing countries	kt	5 095	5 225	5 182	5 143	5 109	5 072	5 041	5 008	4 976	4 944	4 927
Least Developed Countries	kt	0	0	0	0	0	0	0	0	0	0	0
Cotton												
OECD[1]	kt	4 545	5 099	5 120	5 324	5 409	5 467	5 517	5 572	5 628	5 686	5 743
Developing countries	kt	4 287	5 073	5 354	5 472	5 607	5 777	5 946	6 125	6 297	6 474	6 654
Least Developed Countries	kt	1 116	1 020	1 133	1 121	1 116	1 117	1 123	1 130	1 135	1 141	1 147
Roots and tubers												
OECD[1]	kt	1 994	2 016	2 051	2 064	2 069	2 098	2 124	2 155	2 187	2 221	2 254
Developing countries	kt	16 508	17 721	17 927	18 087	18 357	18 599	18 828	19 092	19 358	19 643	19 929
Least Developed Countries	kt	547	557	564	579	596	612	626	644	667	692	717
Pulses												
OECD[1]	kt	10 172	10 541	10 833	11 259	11 527	11 828	11 989	12 165	12 229	12 276	12 284
Developing countries	kt	7 495	7 427	7 439	7 500	7 518	7 561	7 664	7 771	7 888	8 011	8 134
Least Developed Countries	kt	3 275	3 236	3 257	3 356	3 393	3 446	3 545	3 650	3 759	3 872	3 985

Note : The values do not add up to world trade due to double counting of certains countries and statistical differences (i.e. LDC are already included in the Developing countries aggregate).
Average 2021-23est: Data for 2023 are estimated.

1. Excludes Iceland (except for fish products) and Costa Rica but includes all current European member countries.
2. Excludes trade of live animals.
3. Data are in product weight.

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

Table C.13.1 Wheat projections: Production and trade

Marketing year

	PRODUCTION (kt)		Growth (%)[4]		IMPORTS (kt)		Growth (%)[4]		EXPORTS (kt)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**788 257**	**871 744**	**0.82**	**1.02**	**192 800**	**220 185**	**1.96**	**1.39**	**193 894**	**220 185**	**2.15**	**1.39**
NORTH AMERICA	76 215	90 107	-1.30	0.61	3 266	3 873	-1.92	0.82	42 330	52 757	-0.30	0.97
Canada	29 569	38 248	0.56	1.27	117	123	2.44	0.46	21 477	28 872	0.10	1.55
United States	46 646	51 858	-2.41	0.15	3 149	3 750	-2.10	0.84	20 852	23 885	-0.79	0.31
LATIN AMERICA	33 129	40 192	2.17	1.73	20 307	23 636	-0.73	1.03	14 030	18 759	1.59	2.98
Argentina	17 067	22 564	1.88	2.37	3	3	0.00	0.04	11 650	16 103	3.62	3.24
Brazil	8 789	10 306	6.08	1.21	3 277	2 631	-7.39	-2.72	589	589	-0.76	0.00
Chile	1 182	1 077	-3.40	0.69	1 257	1 665	4.67	1.05	0	0	..	..
Colombia	5	5	-6.90	0.24	2 011	2 413	1.53	1.35	12	8	12.86	-1.33
Mexico	3 451	3 510	-1.15	0.54	5 171	5 900	1.68	1.43	692	1 336	-6.37	5.66
Paraguay	1 011	1 013	-0.73	0.91	1	1	-0.74	1.02	341	170	-8.46	-4.98
Peru	203	212	-0.60	0.73	1 995	2 485	1.24	2.01	5	4	-5.30	-0.84
EUROPE	273 492	287 329	0.92	0.92	12 473	8 128	0.81	-1.08	90 925	107 813	2.68	1.78
European Union[1]	135 087	136 930	-0.59	0.18	8 377	5 158	1.45	-1.17	32 218	35 540	0.48	1.10
United Kingdom	14 755	16 859	-1.63	1.01	1 612	529	-1.62	-3.66	801	1 321	-9.31	-0.85
Russia	90 236	103 288	4.75	1.99	190	376	-11.35	4.13	41 150	56 634	7.05	2.88
Ukraine	25 017	21 263	-0.87	0.56	15	15	-9.47	0.30	15 074	12 346	-0.60	-0.36
AFRICA	27 454	33 459	0.22	1.07	51 616	63 807	1.04	2.08	563	433	-7.21	-0.55
Egypt	9 467	10 645	0.33	1.56	11 592	14 585	0.07	1.46	73	97	-11.77	-0.20
Ethiopia	5 764	7 733	3.75	0.99	1 483	1 912	1.56	11.74	0	0	..	..
Nigeria	93	86	3.01	-0.26	5 167	6 941	2.42	2.47	1	1	-5.82	-0.41
South Africa	2 225	2 206	4.03	1.07	1 548	1 924	-1.13	1.15	150	62	-2.95	6.83
ASIA	344 779	388 797	0.95	1.14	104 156	119 530	3.35	1.32	21 577	18 106	3.64	-0.13
China[2]	137 086	136 213	0.57	0.12	9 855	10 635	21.55	0.05	293	220	4.65	0.96
India	110 024	136 492	2.56	2.24	36	319	-38.29	14.42	4 835	12	12.94	-32.67
Indonesia	0	0	..	..	10 370	11 500	1.88	1.01	78	66	-5.51	-1.00
Iran	12 198	13 611	0.73	0.61	4 844	4 138	10.31	0.41	50	48	0.57	-0.04
Japan	1 047	1 101	2.38	0.27	5 396	5 306	-1.09	0.01	0	0	..	..
Kazakhstan	13 139	16 610	-0.97	0.91	1 300	837	28.70	-0.20	8 931	9 647	3.59	0.20
Korea	41	49	3.47	0.18	4 862	4 862	1.95	0.18	54	56	0.95	0.65
Malaysia	0	0	..	..	1 730	1 898	1.63	0.93	180	157	6.53	-0.92
Pakistan	27 102	31 560	0.62	1.49	2 236	5 000	79.22	6.10	300	291	-15.37	-1.27
Philippines	0	0	..	..	6 184	8 675	2.15	2.68	63	35	105.84	-2.61
Saudi Arabia	583	638	41.50	0.63	3 878	3 897	1.53	1.20	0	0	..	..
Thailand	1	1	-0.63	1.18	2 725	3 421	-4.46	1.89	20	11	0.60	-1.86
Türkiye	19 317	23 734	-0.73	1.36	10 160	9 768	10.40	-0.28	5 413	6 442	3.85	0.28
Viet Nam	0	0	..	..	4 275	4 860	3.68	1.82	48	59	8.70	-1.79
OCEANIA	33 188	31 859	3.54	0.70	982	1 211	1.69	1.76	24 469	22 316	4.53	0.72
Australia	32 766	31 375	3.58	0.69	31	28	3.65	-0.05	24 468	22 316	4.53	0.72
New Zealand	422	485	0.39	1.33	561	612	1.92	1.24	0	0	..	..
DEVELOPED COUNTRIES	**410 239**	**442 507**	**0.56**	**0.86**	**34 082**	**31 784**	**0.92**	**0.42**	**167 166**	**192 908**	**2.07**	**1.34**
DEVELOPING COUNTRIES	**378 018**	**429 237**	**1.10**	**1.18**	**158 718**	**188 400**	**2.19**	**1.57**	**26 729**	**27 276**	**2.48**	**1.75**
LEAST DEVELOPED COUNTRIES	8 266	8 643	-1.27	0.22	19 121	26 410	2.25	2.55	143	99	-0.29	-2.51
OECD[3]	**285 153**	**306 123**	**-0.46**	**0.50**	**45 673**	**43 375**	**2.45**	**0.22**	**106 103**	**119 896**	**0.89**	**0.94**

.. Not available

Note : Marketing year: See Glossary of Terms for definitions. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.13.2 Wheat projections: Consumption, food

Marketing year

	CONSUMPTION (kt)		Growth (%)[4]		FOOD (kt)		Growth (%)[4]		FOOD (kg/cap)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**781 703**	**871 209**	**1.10**	**0.98**	**506 881**	**571 082**	**1.06**	**1.09**	**63.9**	**65.6**	**0.02**	**0.26**
NORTH AMERICA	39 958	40 745	-0.64	0.24	27 727	28 545	0.38	0.31	73.6	71.6	-0.26	-0.20
Canada	8 976	9 488	-0.03	0.58	2 856	2 912	1.97	0.57	74.3	69.5	0.91	-0.20
United States	30 981	31 256	-0.80	0.14	24 871	25 633	0.21	0.28	73.5	71.8	-0.39	-0.20
LATIN AMERICA	39 879	44 983	0.89	0.98	32 218	35 623	0.84	0.91	48.8	50.2	-0.03	0.26
Argentina	5 930	6 462	0.38	0.90	4 778	5 192	0.98	0.76	105.0	107.2	0.24	0.20
Brazil	11 600	12 336	1.13	0.53	9 902	10 450	0.80	0.51	46.0	46.2	0.10	0.07
Chile	2 490	2 740	0.29	0.90	1 981	2 156	1.06	0.83	101.2	106.9	-0.24	0.54
Colombia	2 038	2 405	2.44	1.39	1 598	1 830	1.77	1.31	30.8	33.3	0.41	0.76
Mexico	7 631	8 074	1.26	0.27	6 353	6 693	1.72	0.29	49.8	48.9	0.85	-0.33
Paraguay	563	798	1.67	2.36	362	459	1.27	2.18	53.4	60.1	-0.07	1.11
Peru	2 243	2 690	1.09	1.91	1 927	2 360	1.54	1.89	56.6	62.6	0.06	0.96
EUROPE	184 665	187 504	-0.21	0.17	77 135	78 804	-0.20	0.19	103.8	107.6	-0.23	0.32
European Union[1]	108 895	106 546	-0.70	-0.26	49 346	49 786	0.12	0.03	110.4	112.7	-0.02	0.17
United Kingdom	14 432	16 042	-0.57	0.60	5 249	5 616	-2.29	0.64	77.8	80.6	-2.77	0.36
Russia	45 341	46 970	2.32	0.67	13 866	13 686	0.06	-0.10	95.8	97.7	0.05	0.20
Ukraine	7 748	8 896	-4.55	1.50	4 071	4 764	-2.03	1.85	101.8	127.1	-0.28	2.15
AFRICA	79 489	96 595	1.40	1.78	68 830	84 061	2.36	1.79	48.7	46.5	-0.15	-0.43
Egypt	21 202	25 099	0.53	1.53	19 199	22 580	2.01	1.46	173.0	173.0	0.16	0.00
Ethiopia	7 447	9 636	4.15	2.43	6 366	8 531	5.56	2.48	51.6	53.6	2.80	0.18
Nigeria	5 459	7 014	2.76	2.47	5 096	6 544	3.29	2.46	23.3	23.4	0.78	0.21
South Africa	3 610	4 063	1.68	1.06	3 273	3 678	1.05	1.08	54.6	55.5	-0.02	0.15
ASIA	427 953	490 719	1.85	1.22	298 242	340 876	1.20	1.23	63.5	68.1	0.36	0.66
China[2]	143 580	147 279	2.38	0.11	86 351	85 412	0.54	-0.15	60.6	60.7	0.22	-0.01
India	107 392	137 090	2.01	2.25	82 350	106 248	1.15	2.41	58.1	68.6	0.15	1.61
Indonesia	10 343	11 422	2.13	1.04	7 528	8 273	2.65	0.92	27.3	27.8	1.74	0.23
Iran	16 433	17 640	1.80	0.56	13 932	14 843	1.40	0.52	157.3	157.7	0.23	0.00
Japan	6 413	6 406	-0.41	0.06	4 683	4 621	-0.71	-0.14	37.8	39.7	-0.33	0.45
Kazakhstan	6 357	7 771	-1.42	1.74	2 627	3 201	1.08	1.66	135.4	147.1	-0.13	0.62
Korea	4 748	4 855	1.90	0.18	2 303	2 280	0.11	-0.08	44.5	44.8	-0.13	0.10
Malaysia	1 483	1 734	0.77	1.20	1 107	1 288	2.67	1.15	32.6	34.3	1.38	0.25
Pakistan	28 604	36 247	1.93	2.11	25 384	31 895	1.66	2.08	107.6	110.5	0.05	0.25
Philippines	6 288	8 603	3.08	2.74	3 168	3 992	3.76	2.11	27.4	29.7	2.08	0.74
Saudi Arabia	3 900	4 483	1.62	1.24	3 304	3 781	1.55	1.24	90.7	90.3	0.00	0.00
Thailand	2 822	3 397	-2.60	1.72	1 037	1 178	-0.21	1.28	14.5	16.4	-0.50	1.27
Türkiye	24 373	26 989	1.70	1.00	17 472	18 971	1.57	0.87	204.8	210.2	0.57	0.37
Viet Nam	3 977	4 792	2.85	1.88	1 640	1 873	1.90	1.23	16.7	18.0	0.99	0.75
OCEANIA	9 759	10 664	1.49	0.94	2 729	3 173	1.30	1.41	61.9	63.9	-0.29	0.34
Australia	8 351	9 008	1.48	0.80	2 023	2 287	1.21	1.13	77.3	79.2	-0.15	0.25
New Zealand	982	1 097	1.06	1.28	376	444	1.48	1.50	72.7	79.3	-0.26	0.83
DEVELOPED COUNTRIES	**270 420**	**280 577**	**-0.17**	**0.36**	**129 558**	**134 942**	**0.12**	**0.37**	**90.1**	**92.2**	**-0.20**	**0.21**
DEVELOPING COUNTRIES	**511 283**	**590 632**	**1.83**	**1.29**	**377 323**	**436 140**	**1.39**	**1.33**	**58.1**	**60.2**	**0.19**	**0.35**
LEAST DEVELOPED COUNTRIES	28 532	34 887	2.13	1.96	24 132	30 132	2.89	1.97	25.5	25.1	0.45	-0.19
OECD[3]	**223 941**	**228 929**	**-0.19**	**0.17**	**121 276**	**125 649**	**0.38**	**0.33**	**86.2**	**87.3**	**-0.09**	**0.12**

.. Not available

Note : Marketing year: See Glossary of Terms for definitions. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.14.1 Maize projections: Production and trade

Marketing year

	PRODUCTION (kt)		Growth (%)[4]		IMPORTS (kt)		Growth (%)[4]		EXPORTS (kt)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**1 214 664**	**1 401 747**	**1.60**	**1.19**	**185 403**	**213 012**	**4.62**	**1.79**	**182 647**	**217 669**	**4.16**	**1.75**
NORTH AMERICA	387 872	434 781	0.37	0.64	4 741	4 207	6.39	1.27	48 056	65 200	-0.46	2.01
Canada	14 742	15 764	1.76	0.89	3 596	3 174	11.05	1.72	2 146	1 794	11.14	0.26
United States	373 130	419 018	0.32	0.63	1 145	1 033	-0.21	-0.01	45 910	63 406	-0.76	2.07
LATIN AMERICA	223 963	274 704	4.41	1.95	41 333	50 043	4.21	1.64	86 781	104 376	8.03	2.47
Argentina	53 333	67 176	4.50	1.15	5	4	-1.75	0.02	32 230	38 307	6.41	0.71
Brazil	125 721	156 108	6.25	2.55	2 032	1 585	10.73	-0.08	51 324	61 422	9.84	3.77
Chile	559	505	-11.06	0.80	2 523	2 900	7.27	1.36	23	20	1.11	-1.09
Colombia	1 518	1 752	-1.28	1.84	6 256	7 638	5.26	1.68	1	1	-11.90	-0.13
Mexico	26 953	29 144	0.98	0.87	17 584	21 667	5.42	1.50	288	709	-10.98	3.97
Paraguay	5 067	7 221	-1.02	2.43	35	40	20.17	1.17	2 885	3 891	1.59	1.70
Peru	1 655	1 681	0.49	0.75	3 602	5 167	2.61	3.00	11	11	2.73	-0.37
EUROPE	118 754	126 899	0.04	0.90	22 978	18 305	5.63	0.18	35 207	40 783	2.49	1.44
European Union[1]	62 124	63 271	-1.16	0.21	19 749	14 782	6.63	-0.14	5 164	4 349	3.97	-0.69
United Kingdom	0	0	..	..	2 296	2 790	1.91	1.67	0	0	..	..
Russia	13 625	17 097	0.84	2.20	51	131	0.98	6.84	3 817	6 086	-1.32	4.39
Ukraine	32 260	32 396	2.05	1.54	40	39	0.30	0.01	24 302	25 355	3.51	1.62
AFRICA	94 082	123 018	3.20	2.00	19 512	23 971	-1.31	3.60	5 276	4 611	6.76	-2.91
Egypt	7 408	7 989	-1.35	0.69	8 287	12 431	0.04	4.91	0	0	..	..
Ethiopia	10 646	12 496	4.77	1.65	0	0	..	..	933	213	2.48	-13.40
Nigeria	12 647	15 828	2.53	2.41	2	4	-46.70	8.80	1		0.42	-8.98
South Africa	16 932	18 820	6.45	0.54	0	0	..	..	3 648	2 742	18.42	-3.65
ASIA	389 372	441 725	1.57	1.17	96 746	116 397	6.04	1.81	7 201	2 628	9.61	-8.70
China[2]	279 532	312 992	1.11	1.00	23 212	26 864	31.61	1.36	15	66	1.60	14.93
India	34 881	41 864	5.11	1.85	18	13	-5.64	-3.89	3 479	398	22.64	-19.36
Indonesia	21 738	25 401	1.01	1.60	1 120	1 530	-2.80	2.11	80	79	9.58	-0.23
Iran	825	644	-6.70	-1.02	8 964	11 767	4.22	2.29	0	0	..	..
Japan	0	0	..	..	15 291	15 664	0.38	0.21	0	0	..	..
Kazakhstan	1 031	1 133	5.11	1.19	6	5	-10.70	1.95	71	64	15.19	-9.32
Korea	87	90	1.86	0.18	11 673	11 921	2.42	0.36	0	0	..	..
Malaysia	70	72	1.53	1.59	3 672	4 730	0.06	2.45	10	8	0.06	-2.39
Pakistan	9 969	12 196	9.34	2.11	25	174	15.58	22.89	508	25	34.82	-18.85
Philippines	8 267	10 127	1.21	1.57	861	2 059	4.67	10.92	0	0	..	..
Saudi Arabia	86	96	0.81	0.35	3 433	4 467	1.10	2.49	0	0	..	..
Thailand	4 823	5 468	0.32	1.18	1 341	1 917	42.08	4.74	58	18	-29.09	-0.93
Türkiye	7 183	8 305	1.97	1.18	2 972	3 343	5.48	2.62	449	348	-1.30	-2.49
Viet Nam	4 390	4 534	-2.49	1.15	9 369	13 428	4.74	2.94	253	187	13.64	-2.74
OCEANIA	621	620	-1.71	0.75	92	88	-8.28	0.57	126	71	9.51	-1.50
Australia	419	396	-1.39	0.60	3	4	15.26	0.00	124	68	10.82	-1.57
New Zealand	187	208	-2.59	0.97	88	81	-12.16	0.32	1	4	-17.65	0.00
DEVELOPED COUNTRIES	**527 324**	**584 559**	**0.47**	**0.70**	**44 917**	**40 490**	**2.84**	**0.45**	**87 109**	**108 861**	**1.17**	**1.59**
DEVELOPING COUNTRIES	**687 339**	**817 188**	**2.54**	**1.57**	**140 486**	**172 523**	**5.18**	**2.14**	**95 537**	**108 808**	**7.81**	**1.91**
LEAST DEVELOPED COUNTRIES	45 557	65 491	2.88	2.55	4 906	5 028	9.66	3.95	2 744	2 902	0.02	-1.20
OECD[3]	**487 108**	**538 688**	**0.19**	**0.61**	**85 183**	**87 184**	**4.04**	**0.85**	**54 146**	**70 738**	**-0.25**	**1.81**

.. Not available

Note : Marketing year: See Glossary of Terms for definitions. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.14.2 Maize projections: Consumption, feed, food

Marketing year

	CONSUMPTION (kt)		Growth (%)[4]		FEED (kt)		Growth (%)[4]		FOOD (kg/cap)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**1 219 199**	**1 393 345**	**2.09**	**1.17**	**678 106**	**777 098**	**2.33**	**1.22**	**17.9**	**19.6**	**0.44**	**0.86**
NORTH AMERICA	346 637	372 814	1.05	0.40	134 532	147 245	1.19	0.43	16.2	15.6	0.10	-0.09
Canada	16 248	17 130	2.70	1.12	9 750	10 205	3.88	1.30	36.3	31.1	0.53	-0.18
United States	330 389	355 684	0.98	0.37	124 781	137 040	1.01	0.37	14.0	13.7	-0.10	-0.10
LATIN AMERICA	180 220	219 791	3.20	1.67	113 953	133 548	2.53	1.41	48.0	49.8	0.10	0.38
Argentina	20 996	28 778	2.39	1.78	15 560	19 900	2.11	2.05	32.6	33.4	1.86	0.20
Brazil	76 976	95 908	4.20	1.86	50 300	57 022	1.62	1.05	22.2	22.4	-0.10	0.12
Chile	3 060	3 384	1.18	1.28	2 558	2 785	1.26	1.38	19.7	20.6	-0.25	0.50
Colombia	7 773	9 383	3.70	1.70	6 161	7 544	4.36	1.80	28.5	30.6	0.28	0.75
Mexico	44 648	50 057	3.27	1.07	22 516	25 512	5.88	1.13	132.6	137.9	0.31	0.44
Paraguay	2 792	3 329	4.29	3.33	598	766	-1.38	2.87	54.1	55.0	-1.14	0.49
Peru	5 298	6 834	2.15	2.40	4 604	6 025	2.62	2.52	14.4	15.2	0.42	0.50
EUROPE	103 508	104 192	0.52	0.61	75 386	75 842	0.13	0.39	8.6	9.3	0.42	0.58
European Union[1]	77 229	73 655	0.81	0.32	55 462	52 404	0.40	-0.04	10.4	11.0	0.11	0.51
United Kingdom	2 396	2 790	4.07	1.67	1 236	1 550	6.52	2.83	8.1	9.0	3.27	0.16
Russia	9 293	11 099	1.13	1.38	7 529	9 154	1.45	1.39	1.3	1.3	0.53	0.00
Ukraine	6 162	6 950	-3.75	1.39	4 438	4 854	-4.68	1.34	11.4	15.3	1.40	2.27
AFRICA	109 323	142 261	2.25	2.47	35 428	45 764	0.77	2.79	40.6	42.4	0.24	0.29
Egypt	15 911	20 420	-0.44	3.05	10 992	14 189	-1.00	3.34	36.9	40.5	-0.49	1.07
Ethiopia	9 612	12 284	5.18	2.29	1 800	2 209	4.93	2.40	49.3	51.4	2.48	0.31
Nigeria	12 745	15 831	2.63	2.41	2 750	3 697	5.44	3.00	33.3	31.5	-0.04	0.15
South Africa	13 224	16 019	1.99	1.47	5 548	7 120	0.56	2.42	86.6	86.6	0.01	0.01
ASIA	478 927	553 652	2.81	1.30	318 388	374 257	3.60	1.47	8.5	9.0	-0.37	0.73
China[2]	302 097	338 233	2.92	0.92	193 500	218 755	3.37	1.02	9.2	9.2	0.04	0.00
India	31 569	41 427	4.16	2.62	17 743	24 065	6.82	2.81	5.3	6.7	-1.94	2.71
Indonesia	22 824	26 828	0.43	1.62	12 484	15 651	5.35	2.09	26.0	26.7	-0.67	0.29
Iran	9 955	12 409	3.29	2.08	9 729	12 143	3.38	2.09	0.8	0.8	-1.15	0.56
Japan	15 227	15 675	0.51	0.08	11 706	11 721	0.60	0.13	1.0	1.0	2.59	0.59
Kazakhstan	815	1 053	2.84	2.50	654	861	3.36	2.80	0.5	0.5	-1.10	0.55
Korea	11 905	12 005	2.43	0.02	9 600	9 651	3.02	0.01	1.9	2.0	0.88	0.29
Malaysia	3 739	4 789	0.15	2.44	3 361	4 348	-0.27	2.55	5.7	6.2	7.90	0.73
Pakistan	9 570	12 312	8.56	2.39	6 283	8 309	14.54	2.46	8.4	8.6	2.08	1.05
Philippines	9 303	12 171	1.89	2.68	6 433	8 782	2.19	3.09	17.8	18.3	0.10	0.30
Saudi Arabia	3 520	4 553	1.17	2.41	3 314	4 303	1.25	2.45	0.2	0.2	-1.60	0.17
Thailand	6 139	7 365	5.71	2.00	5 754	7 007	6.26	2.08	1.1	1.1	-0.18	-0.10
Türkiye	9 639	11 301	3.31	1.73	7 426	9 066	4.79	2.08	14.6	13.9	0.44	0.02
Viet Nam	13 718	17 761	2.35	2.52	10 478	14 056	2.51	2.82	8.3	8.5	2.53	0.30
OCEANIA	584	635	-3.66	0.99	419	442	-3.67	1.43	2.0	1.8	-1.23	-1.12
Australia	298	332	-4.34	1.11	164	175	-4.39	2.43	2.8	2.4	-1.14	-1.34
New Zealand	274	285	-3.26	0.78	252	264	-3.23	0.83	1.3	1.2	-1.63	-0.66
DEVELOPED COUNTRIES	**483 749**	**514 838**	**0.94**	**0.48**	**231 511**	**247 124**	**0.78**	**0.49**	**12.6**	**13.1**	**0.42**	**0.43**
DEVELOPING COUNTRIES	**735 450**	**878 507**	**2.89**	**1.59**	**446 595**	**529 974**	**3.23**	**1.57**	**19.0**	**20.9**	**0.38**	**0.87**
LEAST DEVELOPED COUNTRIES	48 516	67 587	3.53	2.87	13 457	19 515	6.27	3.47	28.6	32.1	0.27	0.61
OECD[3]	**521 266**	**554 055**	**1.29**	**0.49**	**253 530**	**270 011**	**1.57**	**0.49**	**22.6**	**23.8**	**0.54**	**0.60**

.. Not available

Note : Marketing year: See Glossary of Terms for definitions. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.15.1 Other coarse grains projections: Production and trade

Marketing year

	PRODUCTION (kt)		Growth (%)[4]		IMPORTS (kt)		Growth (%)[4]		EXPORTS (kt)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**299 033**	**328 717**	**0.06**	**0.74**	**44 437**	**48 177**	**0.05**	**1.12**	**45 376**	**49 116**	**-1.02**	**1.10**
NORTH AMERICA	26 303	27 703	-0.95	0.35	1 940	1 957	-0.17	0.64	9 543	9 156	-3.78	0.82
Canada	12 812	13 639	2.02	0.71	136	58	-1.39	0.37	5 769	5 455	3.32	1.41
United States	13 491	14 065	-3.35	0.02	1 804	1 899	-0.38	0.65	3 774	3 701	-10.59	-0.01
LATIN AMERICA	22 320	25 896	0.86	1.07	2 061	2 091	1.59	1.44	4 130	4 865	2.23	0.43
Argentina	8 275	9 753	0.75	1.28	1	1	0.01	0.00	3 792	4 600	1.76	0.62
Brazil	4 986	6 698	8.37	1.45	591	614	-0.19	2.14	9	12	-11.81	-0.14
Chile	675	770	-1.37	0.95	76	98	-13.84	2.23	28	8	-14.05	-2.18
Colombia	16	16	-10.45	0.32	334	360	0.47	0.73	0	0	..	..
Mexico	5 606	5 881	-3.40	0.42	805	697	10.45	0.76	15	5	18.35	0.22
Paraguay	108	108	1.16	0.00	0	0	..	..	13	16	22.94	0.00
Peru	275	299	0.27	1.03	155	195	4.71	2.05	0	0	..	..
EUROPE	132 158	134 063	-0.45	0.20	3 143	2 426	3.47	-0.09	20 287	24 041	-1.40	1.82
European Union[1]	82 714	83 013	-0.21	-0.07	2 104	1 505	3.77	-0.46	10 543	12 414	-1.17	1.86
United Kingdom	8097	7463	0.72	-0.57	198	245	-1.49	0.18	1012	1116	-3.36	0.18
Russia	26 718	28 251	-0.15	0.84	135	128	1.50	-0.86	4 527	7 005	1.27	3.28
Ukraine	8 645	8 243	-3.50	0.99	17	17	1.70	0.04	3 951	3 032	-4.56	-0.02
AFRICA	52 360	67 302	-0.04	1.79	5 152	5 132	3.24	4.37	682	472	-7.65	-10.83
Egypt	970	1 081	0.25	0.59	22	120	-13.80	6.70	0	0	..	..
Ethiopia	12 158	15 176	-0.49	2.33	0	0	-70.25	..	257	8	-8.04	-30.94
Nigeria	8 747	10 011	0.18	1.63	10	359	0.00	49.37	6	0	0.00	..
South Africa	544	600	0.63	1.16	115	164	-4.19	-0.80	10	10	-11.58	0.25
ASIA	48 787	56 236	0.83	0.86	32 018	36 425	-0.79	0.83	981	868	-2.95	-1.96
China[2]	10 590	11 071	1.73	0.38	16 551	18 573	0.28	0.24	64	68	-1.01	1.03
India	17 674	20 245	0.33	1.14	69	139	15.14	0.55	149	72	-9.92	-0.81
Indonesia	0	0	..	..	73	91	-1.26	2.30	0	0	..	..
Iran	2 950	3 423	-0.78	0.94	2 821	3 703	6.15	1.95	0	0	..	..
Japan	261	244	3.48	-0.57	1 682	890	-3.42	-6.32	0	0	..	..
Kazakhstan	3 258	3 642	0.98	0.95	47	41	22.67	0.81	552	583	-2.62	-2.09
Korea	235	208	4.18	-0.01	123	113	0.68	-0.14	0	0	..	..
Malaysia	0	0	..	..	13	16	5.90	1.96	0	0	..	..
Pakistan	489	499	-0.85	0.64	142	318	4.20	7.67	0	0	..	..
Philippines	1	1	3.87	-0.13	41	56	3.51	3.28	0	0	..	..
Saudi Arabia	203	241	-0.89	0.74	4 776	5 673	-8.09	0.94	0	0	..	..
Thailand	163	184	-0.12	0.75	377	584	44.63	1.39	2	2	0.16	-0.27
Türkiye	8 441	10 156	1.99	0.65	2 051	2 262	23.15	6.64	206	137	31.14	-3.02
Viet Nam	3	3	5.44	0.00	100	100	1.87	0.01	0	0	..	..
OCEANIA	17 105	17 517	3.56	0.91	122	148	0.43	1.97	9 754	9 715	3.70	1.40
Australia	16 735	17 105	3.73	0.93	0	0	..	..	9 754	9 715	3.70	1.40
New Zealand	369	411	-1.97	0.30	37	35	2.74	-0.35	0	0	..	..
DEVELOPED COUNTRIES	**181 840**	**186 190**	**-0.16**	**0.32**	**7 692**	**6 425**	**0.56**	**-0.53**	**40 146**	**43 503**	**-1.11**	**1.44**
DEVELOPING COUNTRIES	**117 192**	**142 527**	**0.41**	**1.33**	**36 745**	**41 751**	**-0.10**	**1.40**	**5 230**	**5 613**	**-0.28**	**-1.26**
LEAST DEVELOPED COUNTRIES	24 895	33 519	0.14	1.69	1 530	1 164	9.26	13.90	390	435	-7.35	-9.55
OECD[3]	**150 620**	**154 153**	**0.02**	**0.16**	**10 239**	**9 121**	**2.49**	**0.63**	**31 105**	**32 554**	**-0.93**	**1.33**

.. Not available

Note : Marketing year: See Glossary of Terms for definitions. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.15.2 Other coarse grain projections: Consumption, feed, food

Marketing year

	CONSUMPTION (kt)		Growth (%)[4]		FEED (kt)		Growth (%)[4]		FOOD (kg/cap)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**298 820**	**327 405**	**0.14**	**0.82**	**166 420**	**175 481**	**-0.35**	**0.66**	**9.8**	**10.7**	**-0.17**	**0.83**
NORTH AMERICA	18 708	20 516	-0.21	0.27	10 649	12 185	0.15	0.22	7.2	7.4	0.47	0.01
Canada	7 235	8 237	0.70	0.47	6 367	7 115	0.71	0.41	9.1	11.3	-5.09	0.14
United States	11 474	12 279	-0.72	0.14	4 282	5 069	-0.50	-0.04	7.0	7.0	1.44	-0.03
LATIN AMERICA	20 217	23 110	0.47	1.23	13 639	15 597	-0.05	1.05	2.1	2.3	-1.21	0.72
Argentina	4 484	5 148	-0.41	1.91	2 472	2 604	-1.87	1.35	12.7	12.3	-1.08	-0.28
Brazil	5 517	7 298	7.04	1.44	3 972	5 437	9.04	1.31	1.7	2.3	1.65	2.13
Chile	724	860	-2.74	1.10	452	556	-4.57	1.36	3.6	3.7	0.07	0.49
Colombia	350	376	-0.51	0.72	9	11	-18.88	1.48	0.4	0.4	-12.93	0.80
Mexico	6 363	6 574	-2.58	0.49	5 283	5 463	-3.27	0.45	0.2	0.2	-0.85	-0.62
Paraguay	95	92	1.22	0.00	79	91	0.09	0.00	0.0	0.0	-2.28	0.00
Peru	430	494	1.64	1.41	30	44	20.68	2.23	5.7	6.1	-0.41	0.93
EUROPE	114 330	112 305	-0.41	0.03	82 912	79 906	-0.86	0.26	13.4	14.1	-0.25	0.40
European Union[1]	74 726	72 053	-0.18	-0.08	53 343	50 099	-0.88	0.25	10.2	10.6	0.25	0.53
United Kingdom	7 343	6 581	1.42	-0.65	4 120	3 164	2.87	-1.31	30.6	33.2	-1.24	0.15
Russia	21 147	21 419	-0.94	0.09	17 527	17 916	-1.03	0.19	13.4	12.4	-0.54	-0.79
Ukraine	4 757	5 165	-2.72	1.17	3 074	3 262	-3.40	1.15	17.7	23.0	0.00	2.22
AFRICA	57 007	71 898	0.62	2.21	7 489	8 706	-2.58	1.76	29.0	29.6	-0.75	0.33
Egypt	992	1 200	-0.34	1.06	637	763	-0.53	0.32	2.6	2.7	-1.78	1.23
Ethiopia	12 155	15 084	0.81	2.33	292	260	-9.58	1.83	80.3	81.8	-1.07	0.30
Nigeria	8 711	10 361	0.40	2.05	200	249	-11.78	3.01	36.2	33.5	-1.05	-0.22
South Africa	647	753	1.28	0.72	67	50	-8.57	1.82	2.5	2.5	-1.02	0.28
ASIA	81 023	91 631	0.31	0.87	46 445	53 474	0.39	1.12	4.8	4.8	-0.91	0.07
China[2]	27 173	29 623	1.13	0.29	15 476	16 866	1.44	0.69	3.2	3.1	0.97	-0.31
India	18 031	20 312	0.60	1.14	1 510	1 901	12.30	3.44	10.6	10.5	-1.37	-0.10
Indonesia	73	91	-1.26	2.30	0	0	0.00	0.00	0.3	0.3	-2.17	1.60
Iran	5 838	7 110	2.59	1.45	5 660	6 898	2.69	1.46	0.3	0.3	-1.15	0.55
Japan	1 945	1 143	-3.30	-5.47	1 331	845	-4.11	-4.62	1.7	1.7	-1.28	0.00
Kazakhstan	2 629	3 083	1.03	1.51	1 721	2 088	1.00	1.96	2.3	2.4	-1.24	0.58
Korea	358	321	2.97	-0.06	67	67	0.09	-0.12	5.2	4.6	3.63	0.14
Malaysia	13	16	5.79	2.06	12	15	5.23	2.07	0.0	0.0	126.76	0.73
Pakistan	631	817	-0.09	2.86	191	257	-0.33	2.63	1.6	1.7	-1.43	1.28
Philippines	42	57	3.52	3.22	30	41	3.55	3.36	0.0	0.0	0.96	2.03
Saudi Arabia	5 078	5 895	-7.87	0.97	4 882	5 676	-8.09	0.97	2.3	2.3	-1.60	0.17
Thailand	538	765	17.84	1.23	168	281	29.17	1.94	1.3	1.5	-0.12	1.25
Türkiye	10 189	12 187	3.06	1.62	9 145	10 995	3.55	1.66	3.3	3.1	-1.01	0.02
Viet Nam	103	103	1.95	0.01	0	0	0.00	0.00	0.0	0.0	-7.88	0.00
OCEANIA	7 534	7 945	3.96	0.42	5 286	5 613	4.02	0.53	6.1	6.1	-0.43	-0.25
Australia	7 041	7 387	4.44	0.40	4 922	5 204	4.60	0.54	7.5	7.3	0.09	-0.76
New Zealand	406	446	-1.70	0.25	345	386	-1.94	0.33	1.4	1.3	-1.63	-0.66
DEVELOPED COUNTRIES	**148 498**	**148 909**	**-0.16**	**0.09**	**104 354**	**103 504**	**-0.49**	**0.29**	**9.3**	**9.6**	**-0.27**	**0.17**
DEVELOPING COUNTRIES	**150 322**	**178 496**	**0.45**	**1.47**	**62 066**	**71 977**	**-0.08**	**1.22**	**9.9**	**10.9**	**-0.15**	**0.94**
LEAST DEVELOPED COUNTRIES	25 937	34 268	0.74	2.40	1 589	1 903	-3.33	1.52	20.9	22.3	-0.40	0.67
OECD[3]	**130 203**	**130 579**	**0.13**	**0.10**	**91 364**	**90 757**	**-0.20**	**0.33**	**7.5**	**7.8**	**-0.12**	**0.20**

.. Not available

Note : Marketing year: See Glossary of Terms for definitions. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.16.1 Rice projections: Production and trade

Marketing year

	PRODUCTION (kt)		Growth (%)[4]		IMPORTS (kt)		Growth (%)[4]		EXPORTS (kt)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33	Average 2021-	2033	2014-23	2024-33
WORLD	**526 414**	**586 606**	**0.93**	**0.93**	**54 085**	**65 682**	**2.18**	**2.31**	**53 891**	**64 225**	**2.11**	**2.37**
NORTH AMERICA	5 992	6 818	-1.04	0.47	1 716	2 225	5.91	2.14	2 450	2 862	-3.59	0.54
Canada			..	..	457	524	2.67	1.07			..	..
United States	5 992	6 818	-1.04	0.47	1 260	1 701	7.33	2.49	2 450	2 862	-3.59	0.54
LATIN AMERICA	18 571	19 412	-0.20	0.17	4 246	5 144	1.16	1.23	3 631	3 296	2.33	-0.98
Argentina	870	760	-2.79	-0.40	2	2	-14.83	0.01	383	241	-1.92	-2.75
Brazil	7 387	6 916	-1.57	-0.49	810	1 015	6.72	1.22	1 123	897	5.56	-2.03
Chile	80	78	-3.24	0.23	185	207	5.43	0.95	0	1	-28.89	-0.11
Colombia	1 956	2 319	4.31	0.80	122	225	-8.96	1.71	2	1	141.31	-0.14
Mexico	257	300	1.10	0.99	742	845	1.28	0.73	12	10	13.82	0.00
Paraguay	705	880	2.60	0.89	1	1	-4.42	0.29	702	818	7.49	0.83
Peru	2 358	2 735	1.80	0.94	153	347	-7.30	7.07	40	26	42.82	-5.27
EUROPE	2 611	2 711	-1.36	0.73	3 837	4 140	3.18	0.56	630	992	-0.80	4.23
European Union[1]	1 527	1 447	-2.00	0.01	2 623	2 872	4.80	0.68	448	705	-0.40	3.40
United Kingdom	0	0	..	..	623	662	0.27	0.34	0	0	..	..
Russia	1 059	1 245	0.03	1.65	264	237	0.54	-0.53	171	279	-2.24	6.89
Ukraine	12	4	-25.31	2.66	91	116	2.69	1.56	1		-3.95	..
AFRICA	25 163	33 512	1.80	1.82	17 277	26 956	1.98	4.49	609	172	-4.40	-3.52
Egypt	3 627	4 194	-3.64	0.37	437	752	28.35	15.58	2	1	-55.34	-1.07
Ethiopia	164	192	9.70	0.90	492	770	8.29	4.13	0	0	..	..
Nigeria	5 189	7 208	2.48	2.57	2330	4043	-2.68	6.15	0	0	..	..
South Africa	2	2	0.00	1.73	887	971	0.79	0.33	0	0	..	..
ASIA	473 696	523 738	0.98	0.91	26 233	26 253	2.10	0.93	46 357	56 748	2.65	2.69
China[2]	146 520	146 201	0.17	0.11	5 043	4 129	-3.40	0.03	2 070	1 456	24.82	-1.05
India	131 408	154 344	2.98	1.58	6	3	16.12	0.87	19 403	20 089	7.57	2.78
Indonesia	34659	39007	-1.19	0.68	1 458	487	-0.19	1.96	3	2	14.38	-0.17
Iran	2 146	2 243	4.88	-0.25	1 370	1 646	0.68	1.48	4	3	33.42	-0.12
Japan	7351	6759	-0.73	-0.40	767	739	-0.39	-0.20	82	110	-1.18	2.96
Kazakhstan	324	381	2.56	0.65	21	29	3.03	1.52	109	97	6.24	-1.49
Korea	3 777	3 496	-1.83	-0.69	407	428	0.86	-0.06	55	50	51.07	-0.39
Malaysia	1 692	1 790	-0.85	0.04	1 305	1 845	2.91	3.12	110	92	19.06	-2.97
Pakistan	8 428	9 650	2.67	0.42	11	5	-8.75	0.15	4 373	4 368	0.93	-1.48
Philippines	12 981	14 824	1.03	0.93	3 897	5 097	15.00	3.83	0	0	..	..
Saudi Arabia	0	0	..	..	1 228	1 486	-1.34	0.93	0	0	..	..
Thailand	22 228	24 835	1.23	0.83	147	163	-7.09	0.90	8 410	11 163	-4.26	1.36
Türkiye	562	552	0.78	-0.29	241	320	-2.54	1.70	23	12	-8.88	-1.35
Viet Nam	28 078	31 484	-0.43	1.09	1897	1724	15.81	-1.84	7 299	8 668	-0.24	1.87
OCEANIA	380	415	-6.53	2.05	775	964	2.75	1.98	215	155	-7.27	6.11
Australia	363	394	-7.29	2.15	211	160	2.98	-1.71	213	154	-7.38	6.24
New Zealand	0	0	..	..	53	63	2.51	1.50	0	0	..	..
DEVELOPED COUNTRIES	**17 038**	**17 544**	**-0.94**	**0.21**	**7 763**	**8 727**	**3.00**	**0.96**	**3 484**	**4 215**	**-3.01**	**1.47**
DEVELOPING COUNTRIES	**509 376**	**569 062**	**1.00**	**0.96**	**46 322**	**56 955**	**2.05**	**2.53**	**50 407**	**60 010**	**2.56**	**2.43**
LEAST DEVELOPED COUNTRIES	81 476	100 629	1.46	1.73	11 080	15 128	2.16	3.46	4 852	10 662	3.15	9.07
OECD[3]	**21 865**	**22 164**	**-0.75**	**0.03**	**7 949**	**9 050**	**2.74**	**0.92**	**3 287**	**3 907**	**-3.16**	**1.22**

.. Not available

Note : Marketing year: See Glossary of Terms for definitions. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.16.2 Rice projections: Consumption, food

Marketing year

	CONSUMPTION (kt)		Growth (%)[4]		FOOD (kg/cap)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**525 460**	**587 557**	**0.92**	**0.94**	**50.7**	**52.4**	**-0.17**	**0.11**
NORTH AMERICA	5 261	6 167	2.74	0.98	12.2	13.5	2.32	0.48
Canada	457	524	2.67	1.07	11.0	11.4	1.44	0.29
United States	4 804	5 643	2.75	0.98	12.3	13.7	2.42	0.50
LATIN AMERICA	19 279	21 231	-0.11	0.77	25.0	25.0	-0.66	-0.05
Argentina	507	521	-0.94	0.91	9.7	9.7	0.15	0.40
Brazil	7 107	7 036	-1.73	0.12	28.1	24.4	-2.00	-0.94
Chile	271	284	2.93	0.83	10.9	11.3	1.35	0.56
Colombia	2 103	2 533	3.45	1.20	35.2	40.2	2.08	0.65
Mexico	987	1 135	1.04	0.80	7.2	7.7	0.17	0.18
Paraguay	61	62	-2.93	1.71	4.5	4.3	-4.12	1.33
Peru	2 533	3 051	1.32	1.61	63.8	70.7	0.14	0.74
EUROPE	5 826	5 854	1.50	0.16	7.1	7.2	1.62	0.27
European Union[1]	3 711	3 613	2.34	0.00	7.6	7.5	2.38	0.12
United Kingdom	623	662	0.27	0.34	8.1	8.4	-0.24	0.07
Russia	1 155	1 200	0.42	0.30	7.3	7.8	0.42	0.56
Ukraine	101	120	-2.30	1.76	2.2	2.8	-1.57	2.17
AFRICA	42 369	60 101	2.15	2.96	25.1	28.5	-0.07	0.79
Egypt	4 152	4 936	-1.49	1.69	33.3	34.0	-2.34	0.24
Ethiopia	779	960	10.66	3.41	5.5	5.4	7.24	1.30
Nigeria	7 529	11 247	0.78	3.74	28.8	33.7	-1.57	1.47
South Africa	927	973	0.40	0.41	14.8	14.0	-0.42	-0.50
ASIA	451 775	492 982	0.83	0.73	72.2	74.9	-0.13	0.14
China[2]	150 459	149 555	0.55	0.13	70.1	69.9	-0.13	0.00
India	108 944	133 733	1.63	1.48	67.0	75.8	0.14	0.69
Indonesia	36 115	39 457	-0.98	0.70	110.6	111.7	-1.30	0.00
Iran	3 649	3 882	3.00	0.54	35.7	35.5	1.77	0.01
Japan	8 128	7 370	-0.92	-0.77	49.7	47.3	-0.98	-0.42
Kazakhstan	256	313	2.33	1.60	11.4	12.4	1.00	0.65
Korea	4 005	3 869	-1.83	-0.56	66.4	64.4	-1.04	-0.42
Malaysia	2 895	3 536	0.58	1.73	76.1	84.1	0.05	0.86
Pakistan	4 257	5 269	4.79	2.49	13.3	14.6	1.94	0.98
Philippines	16 903	19 863	3.27	1.60	117.1	121.5	0.91	0.25
Saudi Arabia	1 231	1 478	-1.42	1.24	31.2	32.7	-3.02	0.01
Thailand	13 898	13 674	0.14	0.12	98.7	98.6	0.35	-0.05
Türkiye	789	859	0.47	0.67	8.5	8.7	-0.35	0.15
Viet Nam	22 642	24 507	0.42	0.74	136.3	131.3	-1.41	-0.21
OCEANIA	951	1 222	3.11	2.01	19.0	21.5	2.49	1.11
Australia	358	400	1.47	0.41	11.6	11.1	2.35	-0.22
New Zealand	53	63	2.51	1.50	9.2	10.2	0.81	0.84
DEVELOPED COUNTRIES	**21 462**	**22 014**	**0.73**	**0.17**	**12.6**	**12.7**	**0.48**	**-0.01**
DEVELOPING COUNTRIES	**503 998**	**565 543**	**0.93**	**0.97**	**59.1**	**60.4**	**-0.33**	**0.00**
LEAST DEVELOPED COUNTRIES	87 820	104 870	1.54	1.34	71.0	69.1	-0.41	-0.65
OECD[3]	**26 548**	**27 253**	**0.55**	**0.11**	**15.9**	**15.9**	**0.32**	**-0.12**

.. Not available

Note : Marketing year: See Glossary of Terms for definitions. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.17. Main policy assumptions for cereal markets

Marketing year

		Average 2021-23est	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
ARGENTINA												
Crops export tax	%	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Rice export tax	%	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
CANADA												
Tariff-quotas[1]												
Wheat	kt	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0
In-quota tariff	%	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Out-of-quota tariff	%	61.7	61.7	61.7	61.7	61.7	61.7	61.7	61.7	61.7	61.7	61.7
Barley	kt	399.0	399.0	399.0	399.0	399.0	399.0	399.0	399.0	399.0	399.0	399.0
In-quota tariff	%	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Out-of--quota tariff	%	58.0	58.0	58.0	58.0	58.0	58.0	58.0	58.0	58.0	58.0	58.0
EUROPEAN UNION[2,3]												
Voluntary coupled support												
Wheat[4]	mln EUR	99.8	113.5	113.5	113.5	117.3	117.3	117.3	117.3	117.3	117.3	117.3
Rice[5]	mln EUR	83.1	115.7	115.7	115.8	117.1	117.1	117.1	117.1	117.1	117.1	117.1
Cereal reference price[6]	EUR/t	101.3	101.3	101.3	101.3	101.3	101.3	101.3	101.3	101.3	101.3	101.3
Direct payments ceilings[7]	bln EUR	42.3	42.3	42.3	42.3	42.3	42.3	42.3	42.3	42.3	42.3	42.3
Rice reference price[8]	EUR/t	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0
Wheat tariff-quota[1]	kt	3 447.2	3 447.2	3 447.2	3 447.2	3 447.2	3 447.2	3 447.2	3 447.2	3 447.2	3 447.2	3 447.2
Coarse grain tariff-quota[1]	kt	4 434.3	4 436.3	4 437.3	4 438.3	4 439.3	4 440.3	4 441.3	4 442.3	4 443.3	4 444.3	4 445.3
JAPAN												
Wheat tariff-quota	kt	5740.0	5740.0	5740.0	5740.0	5740.0	5740.0	5740.0	5740.0	5740.0	5740.0	5740.0
In-quota tariff	'000 JPY/t	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Out-of-quota tariff	'000 JPY/t	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0
Barley tariff-quota	kt	1 369.0	1 369.0	1 369.0	1 369.0	1 369.0	1 369.0	1 369.0	1 369.0	1 369.0	1 369.0	1 369.0
In-quota tariff	'000 JPY/t	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Out-of-quota tariff	'000 JPY/t	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0
Rice tariff-quota	kt	682.2	682.2	682.2	682.2	682.2	682.2	682.2	682.2	682.2	682.2	682.2
In-quota tariff	'000 JPY/t	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Out-of-quota tariff	'000 JPY/t	341.0	341.0	341.0	341.0	341.0	341.0	341.0	341.0	341.0	341.0	341.0
KOREA												
Wheat tariff	%	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Maize tariff-quota	kt	10 000.0	10 000.0	10 000.0	10 000.0	10 000.0	10 000.0	10 000.0	10 000.0	10 000.0	10 000.0	10 000.0
In-quota tariff	%	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Out-of-quota tariff	%	328.0	328.0	328.0	328.0	328.0	328.0	328.0	328.0	328.0	328.0	328.0
Barley tariff-quota	kt	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6
In-quota tariff	%	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Out-of-quota tariff	%	271.4	271.4	271.4	271.4	271.4	271.4	271.4	271.4	271.4	271.4	271.4
Rice quota[9]	kt	408.7	408.7	408.7	408.7	408.7	408.7	408.7	408.7	408.7	408.7	408.7
In-quota tariff	%	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Out-of-quota tariff	%	513.0	513.0	513.0	513.0	513.0	513.0	513.0	513.0	513.0	513.0	514.0
MERCOSUR												
Wheat tariff	%	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Coarse grain tariff[10]	%	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Rice tariff	%	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
UNITED STATES												
ARC participation rate												
Wheat	%	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Coarse grains	%	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Wheat loan rate	USD/t	124.2	124.2	124.2	124.2	124.2	124.2	124.2	124.2	124.2	126.2	127.2
Maize loan rate	USD/t	86.6	86.6	86.6	86.6	86.6	86.6	86.6	86.6	86.6	86.6	86.6
CHINA												
Wheat tariff-quota	kt	9 636	9 636	9 636	9 636	9 636	9 636	9 636	9 636	9 636	9 636	9 636
In-quota tariff	%	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Out-of-quota tariff	%	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0
Coarse grains tariff	%	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Maize tariff-quota	kt	7 200	7 200	7 200	7 200	7 200	7 200	7 200	7 200	7 200	7 200	7 200
In-quota tariff	%	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Out-of-quota tariff	%	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0
Rice tariff-quota	kt	5 320	5 320	5 320	5 320	5 320	5 320	5 320	5 320	5 320	5 320	5 320
In-quota tariff	%	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Out-of-quota tariff	%	51.7	51.7	51.7	51.7	51.7	51.7	51.7	51.7	51.7	51.7	51.7

Table C.17. Main policy assumptions for cereal markets *(cont.)*

Marketing year

		Average 2021-23-est	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
INDIA												
Minimum support price												
Rice	INR/t	20 007	21 628	21 628	21 975	25 842	22 756	23 312	23 816	24 309	24 807	25 315
Wheat	INR/t	21 994	22 744	22 744	23 163	29 564	24 599	25 443	26 262	27 095	27 918	28 740
Wheat tariff	%	69.5	69.5	69.5	69.5	69.5	69.5	69.5	69.5	69.5	69.5	69.5
Rice tariff	%	72.4	72.4	72.4	72.4	72.4	72.4	72.4	72.4	72.4	72.4	72.4
RUSSIA												
Wheat export tax	%	31.2	18.0	15.5	15.9	16.7	17.7	18.6	19.3	19.9	20.7	21.2
Maize export tax	%	20.9	6.5	4.1	4.6	5.6	6.6	7.5	8.3	9.1	10.0	10.6
Other coarse grains export tax	%	23.6	12.2	11.2	11.7	12.6	13.6	14.8	15.7	16.5	17.3	18.0

Note : Marketing year: See Glossary of Terms for definitions. Average 2021-23est: Data for 2023 are estimated.The sources for tariffs and Tariff Rate Quotas are the national questionnaire reply, UNCTAD and WTO.

1. Year beginning 1 July.
2. Since 2015 the Basic payment scheme (BPS) holds, which shall account for 68% maximum of the national direct payment envelopes. On top of this, compulsory policy instruments have been introduced: the Green Payment (30%) and young farmer scheme (2%).
3. Refers to all current European Union member countries.
4. Mainly for durum wheat. Implemented in 6 Member States.
5. Implemented in 6 Member States.
6. Buying-in at the fixed reference price is operable automatically only for common wheat up to a maximum quantity of 3 million tons per marketing year. Above that ceiling and for durum wheat, maize and barley intervention can take place only via tender.
7. Estimated net amounts for all direct payments based on Annex II of EU Regulation No 1307/2013, accounting for the transfers between direct aids and rural development envelopes.
8. Intervention is set at zero tonnes per marketing year. However, the Commission may initiate intervention if market requires.
9. Milled rice basis.
10. Applied by Brazil only.

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

Table C.18.1 Soybean projections: Production and trade

Marketing year

	PRODUCTION (kt)		Growth (%)[4]		IMPORTS (kt)		Growth (%)[4]		EXPORTS (kt)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**379 866**	**429 919**	**2.05**	**0.82**	**162 204**	**179 310**	**3.33**	**0.52**	**165 989**	**179 310**	**2.98**	**0.52**
NORTH AMERICA	123 449	127 721	0.54	0.64	1 132	973	-0.55	1.36	55 687	54 982	0.05	0.65
Canada	6 429	8 605	-0.12	2.58	487	563	2.37	2.49	4 425	5 785	0.81	2.01
United States	117 020	119 116	0.58	0.51	644	410	-2.04	-0.02	51 262	49 197	-0.02	0.50
LATIN AMERICA	201 504	236 383	2.21	0.82	13 939	12 276	10.39	-1.12	105 074	117 776	4.67	0.46
Argentina	40 567	49 126	-4.60	0.98	5 334	3 407	492.27	-4.43	8 494	6 378	-5.45	-4.24
Brazil	146 778	168 561	5.44	0.74	410	410	1.62	-0.03	89 330	101 296	7.04	0.80
Chile	0	0	..	..	203	231	-1.75	0.48	2	2	0.00	-0.48
Colombia	75	84	1.00	1.08	583	775	-2.85	0.99	0	0	-53.36	..
Mexico	221	354	-8.96	3.54	6036	5973	6.11	0.61	3	1	41.55	0.00
Paraguay	8 304	11 422	-1.25	1.16	33	0	-40.52	..	4933	7017	-0.40	1.11
Peru	5	5	0.00	-0.17	433	614	1.86	1.37	0	0	..	..
EUROPE	13 692	17 313	4.94	1.41	17 173	15 116	0.42	-1.51	3 797	5 162	3.17	0.85
European Union[1]	2 648	3 552	2.76	2.09	14 110	12 569	1.00	-1.46	246	288	3.46	1.66
United Kingdom	0	0	..	..	762	788	-0.29	0.32	0	0	..	..
Russia	5 921	7 557	10.26	1.76	1 635	1 037	-3.72	-4.15	1 076	1 663	26.70	1.28
Ukraine	4 285	5 324	0.51	0.66	6	6	6.60	-0.03	2 468	3 202	-1.37	0.56
AFRICA	5 840	6 843	10.37	1.02	4 743	6 000	6.98	1.39	1 177	1 135	36.51	-0.56
Egypt	43	49	-0.06	1.02	3 333	4 120	8.40	1.53	0	0	-59.48	..
Ethiopia	123	143	6.05	1.34	17	83	27.31	2.49	68	47	6.40	-2.43
Nigeria	1 172	1 316	7.52	1.07	0	0	-77.92	..	9	1	-4.96	-12.44
South Africa	2 294	2 817	12.20	1.03	9	4	-28.50	-0.02	233	415	55.21	1.27
ASIA	35 330	41 579	4.68	1.14	125 213	144 943	3.08	0.87	245	250	-12.00	-0.24
China[2]	19 173	22 734	6.08	0.88	95 670	110 037	2.82	0.84	100	100	-6.03	0.00
India	13 821	16 351	4.00	1.58	585	423	54.26	-2.70	46	51	-21.63	0.33
Indonesia	683	752	-2.23	0.78	2 610	3 156	2.13	1.29	5	5	14.26	-0.17
Iran	220	220	2.25	-0.23	2 307	2 959	3.27	0.90	37	42	-14.18	-0.89
Japan	246	254	0.23	0.26	3 476	3 083	1.47	-0.55	0	0	..	..
Kazakhstan	270	294	2.67	0.96	40	44	23.35	-0.02	0	0	4.70	..
Korea	110	112	0.55	0.23	1 309	1 332	0.30	0.00	0	0	..	..
Malaysia	0	0	..	..	917	1 108	4.22	0.92	10	9	-14.14	-0.91
Pakistan	2	2	-11.06	0.14	1 793	3 047	9.49	2.28	0	0	..	..
Philippines	1	1	0.00	-0.71	227	292	13.08	1.51	0	0	..	..
Saudi Arabia	0	0	..	..	788	875	6.56	0.77	0	0	..	..
Thailand	43	45	-2.79	0.54	3 416	4 697	4.83	1.86	3	2	-17.22	-1.74
Türkiye	138	139	-1.64	0.71	3 017	3 558	4.13	0.66	5	5	-27.03	-0.46
Viet Nam	58	59	-12.21	0.50	1944	2205	3.05	1.21	3	3	46.59	-1.09
OCEANIA	53	80	2.72	0.75	3	2	5.16	-0.01	10	4	12.98	0.00
Australia	53	80	2.72	0.75	2	1	7.93	-0.06	10	4	12.98	0.00
New Zealand	0	0	..	..	1	1	-0.01	0.02	0	0	..	..
DEVELOPED COUNTRIES	**140 018**	**148 498**	**1.06**	**0.74**	**22 521**	**19 991**	**0.55**	**-1.15**	**59 727**	**60 564**	**0.32**	**0.67**
DEVELOPING COUNTRIES	**239 848**	**281 422**	**2.63**	**0.87**	**139 683**	**159 319**	**3.84**	**0.75**	**106 261**	**118 746**	**4.69**	**0.44**
LEAST DEVELOPED COUNTRIES	2 068	2 379	9.06	1.04	2 418	3 048	12.36	1.83	818	637	59.42	-1.28
OECD[3]	**126 945**	**132 302**	**0.56**	**0.68**	**31 706**	**30 475**	**1.92**	**-0.40**	**55 954**	**55 282**	**0.04**	**0.65**

.. Not available

Note : Marketing year: See Glossary of Terms for definitions. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.18.2 Soybean projections: Consumption, domestic crush

Marketing year

	CONSUMPTION (kt)		Growth (%)[4]		DOMESTIC CRUSH (kt)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**375 695**	**429 477**	**2.26**	**0.85**	**335 814**	**385 267**	**2.30**	**0.88**
NORTH AMERICA	67 523	73 575	1.77	0.68	62 316	67 797	2.17	0.70
Canada	2 482	3 382	-0.65	3.60	1 842	2 798	-0.42	3.96
United States	65 041	70 193	1.87	0.55	60 474	64 999	2.26	0.58
LATIN AMERICA	111 678	130 817	0.84	0.99	101 914	119 143	0.67	0.96
Argentina	36 907	46 155	-2.75	1.49	35 564	44 680	-3.00	1.53
Brazil	59 658	67 623	3.46	0.69	52 030	58 347	3.63	0.56
Chile	201	229	-1.47	0.49	201	229	-1.49	0.49
Colombia	645	859	-1.98	1.04	639	851	-1.98	1.04
Mexico	6 280	6 321	5.83	0.73	5 988	5 970	6.20	0.74
Paraguay	3 437	4 399	-2.44	1.24	3 323	4 260	-2.37	1.26
Peru	433	619	1.56	1.39	433	619	1.58	1.39
EUROPE	26 750	27 262	2.28	-0.20	23 923	24 104	2.22	-0.23
European Union[1]	16 578	15 833	1.66	-0.81	14 801	13 818	1.72	-0.92
United Kingdom	762	788	-0.29	0.32	696	694	0.00	0.03
Russia	6 243	6 931	3.92	0.72	5 830	6 458	3.65	0.72
Ukraine	1 676	2 123	2.18	1.01	1 509	1 940	2.16	1.14
AFRICA	9 256	11 701	7.52	1.39	8 129	10 238	8.38	1.28
Egypt	3 370	4 169	8.91	1.54	3 360	4 165	8.87	1.54
Ethiopia	71	179	10.18	3.34	44	151	12.56	3.57
Nigeria	1 167	1 314	7.18	1.10	1 021	1 157	14.61	0.89
South Africa	1 932	2 402	8.69	1.02	1 739	2 171	8.50	1.03
ASIA	160 442	186 044	3.35	0.96	139 490	163 915	3.44	1.04
China[2]	114 877	132 461	3.14	0.88	97 309	113 393	2.98	0.97
India	14 461	16 720	4.78	1.45	12 825	15 058	6.02	1.52
Indonesia	3 212	3 901	0.73	1.20	2 670	3 328	1.95	1.32
Iran	2 453	3 136	4.20	0.86	2 439	3 116	4.14	0.87
Japan	3 654	3 336	1.29	-0.49	3 089	3 101	2.72	-0.32
Kazakhstan	307	338	3.37	0.81	173	187	4.73	0.67
Korea	1 424	1 444	-0.07	0.02	1 382	1 403	0.04	0.02
Malaysia	910	1 099	4.90	0.97	909	1 099	4.89	0.97
Pakistan	1 829	3 048	10.07	2.33	1 824	3 048	10.05	2.33
Philippines	226	292	12.63	1.54	223	292	13.13	1.55
Saudi Arabia	788	875	6.59	0.77	783	870	6.49	0.77
Thailand	3 522	4 739	5.10	1.85	3 469	4 729	5.07	1.86
Türkiye	3 143	3 689	4.55	0.80	3 080	3 650	4.47	0.80
Viet Nam	1 997	2 257	2.86	1.20	1 965	2 223	3.03	1.21
OCEANIA	47	78	2.40	0.77	41	70	2.40	0.78
Australia	45	77	2.47	0.78	41	70	2.40	0.78
New Zealand	1	1	-0.01	0.02	0	0	..	..
DEVELOPED COUNTRIES	**100 920**	**107 778**	**2.00**	**0.42**	**91 984**	**98 210**	**2.31**	**0.44**
DEVELOPING COUNTRIES	**274 775**	**321 699**	**2.36**	**1.00**	**243 830**	**287 057**	**2.30**	**1.03**
LEAST DEVELOPED COUNTRIES	3 669	4 789	8.20	1.91	2 962	3 827	9.33	1.80
OECD[3]	**101 338**	**107 351**	**1.94**	**0.40**	**93 307**	**98 774**	**2.29**	**0.42**

.. Not available

Note : Marketing year: See Glossary of Terms for definitions. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.19.1 Other oilseed projections: Production and trade

Marketing year

	PRODUCTION (kt)		Growth (%)[4]		IMPORTS (kt)		Growth (%)[4]		EXPORTS (kt)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**180 927**	**199 704**	**2.88**	**0.78**	**23 374**	**25 010**	**2.45**	**0.43**	**24 571**	**25 010**	**3.15**	**0.43**
NORTH AMERICA	21 401	25 640	-0.42	0.99	1 025	1 007	-0.10	-0.04	7 352	8 813	-4.45	1.28
Canada	16 854	20 515	-0.75	1.07	245	227	0.43	-0.35	6 754	8 148	-4.70	1.27
United States	4 546	5 125	0.91	0.68	780	781	-0.23	0.05	599	666	-1.09	1.46
LATIN AMERICA	7 422	7 584	4.05	0.63	1 518	1 561	-1.76	0.57	1 015	1 218	2.66	1.17
Argentina	5 421	5 333	4.18	0.40	1	1	0.00	0.00	466	551	-3.85	0.98
Brazil	624	702	4.25	1.77	4	2	-6.07	0.00	186	216	11.92	1.18
Chile	200	209	-0.71	0.81	34	31	11.66	-1.85	9	10	-0.85	1.60
Colombia	2	2	0.01	1.04	7	8	0.02	0.31	0	0	..	..
Mexico	98	98	-2.29	0.78	1444	1495	-1.98	0.66	3	3	-0.14	0.00
Paraguay	144	167	-5.79	0.89	0	0	..	..	27	33	-0.92	1.37
Peru	6	7	0.00	0.46	1	1	0.00	2.79	0	0	..	..
EUROPE	70 979	78 283	2.58	0.66	9 623	8 309	9.96	-0.68	8 038	8 653	11.30	0.97
European Union[1]	28 714	30 374	-0.28	0.18	8 021	6 510	9.11	-1.23	1 005	812	-0.40	0.28
United Kingdom	1243	1414	-8.60	0.14	952	1 193	22.46	3.19	87	104	-17.83	-5.28
Russia	20 053	23 455	8.46	1.12	250	247	2.40	-0.87	1 721	1 912	35.98	0.31
Ukraine	18 623	20 480	3.58	0.90	32	34	0.24	-0.08	4 718	5 304	15.30	1.46
AFRICA	9 841	11 153	1.00	1.24	385	477	-2.43	1.63	529	473	9.92	-1.08
Egypt	127	138	1.65	1.02	52	62	-4.14	0.44	22	17	3.89	-0.44
Ethiopia	124	138	3.20	0.99	0	0	..	..	32	38	85.50	0.75
Nigeria	2 357	2 797	0.87	1.47	0	0	..	..	14		-10.11	-55.29
South Africa	1 005	1 044	1.11	0.83	10	8	-22.04	-1.30	10	12	4.87	1.59
ASIA	64 111	71 280	4.14	0.98	10 798	13 629	-0.88	1.17	1893	1534	0.95	-0.25
China[2]	36 718	40 571	3.41	0.82	4 172	6 453	-2.23	2.26	649	631	1.02	0.00
India	19 505	22 300	6.52	1.34	193	180	-7.90	-0.56	712	435	5.79	-0.57
Indonesia	462	516	-5.97	1.11	269	274	3.35	-0.15	1	1	-0.17	0.01
Iran	399	411	5.70	0.28	153	140	-0.48	0.13	1	1	0.03	-0.01
Japan	23	25	0.19	0.66	2 121	2 067	-2.01	-0.47	0	0	..	..
Kazakhstan	1 260	1 409	6.54	0.59	10	7	2.79	-0.11	365	323	6.17	-0.27
Korea	14	14	-3.56	-0.23	30	31	2.83	0.11	0	0	..	..
Malaysia	5	5	0.00	-0.05	44	46	0.00	0.55	3	3	0.02	-0.54
Pakistan	987	1 075	4.36	0.78	881	1 248	-2.81	1.19	0	0	..	..
Philippines	20	21	0.00	0.90	97	106	5.86	1.02	0	0	..	..
Saudi Arabia	3	3	0.00	0.29	4	4	0.02	0.92	0	0	..	..
Thailand	90	88	-0.05	0.09	58	65	2.85	0.76	4	3	0.31	-0.54
Türkiye	1 933	1 927	2.05	0.95	881	883	1.05	-0.19	24	7	-10.51	0.04
Viet Nam	309	337	-1.14	0.93	189	200	1.93	0.57	35	33	-1.42	-0.57
OCEANIA	7 173	5 765	10.01	-1.26	26	26	-0.57	0.02	5 743	4 318	11.95	-1.76
Australia	7 160	5 752	10.03	-1.27	22	22	-0.68	0.00	5 743	4 318	11.95	-1.76
New Zealand	10	10	0.00	-0.03	4	4	0.01	0.07	0	0	..	..
DEVELOPED COUNTRIES	**102 007**	**112 321**	**2.27**	**0.63**	**13 067**	**11 727**	**5.79**	**-0.56**	**21 538**	**22 145**	**3.29**	**0.47**
DEVELOPING COUNTRIES	**78 920**	**87 384**	**3.71**	**0.99**	**10 308**	**13 283**	**-0.81**	**1.40**	**3 033**	**2 865**	**2.19**	**0.18**
LEAST DEVELOPED COUNTRIES	6 863	7 777	1.41	1.24	256	278	4.60	1.12	429	398	12.31	-0.75
OECD[3]	**60 962**	**65 633**	**0.29**	**0.37**	**14 682**	**13 400**	**4.45**	**-0.40**	**14 239**	**14 082**	**-0.13**	**0.13**

.. Not available

Note : Marketing year: See Glossary of Terms for definitions. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.19.2 Other oilseed projections:Consumption, domestic crush

Marketing year

	CONSUMPTION (kt)		Growth (%)[4]		DOMESTIC CRUSH (kt)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**179 423**	**199 683**	**2.80**	**0.80**	**151 444**	**169 646**	**2.78**	**0.84**
NORTH AMERICA	15 233	17 837	2.41	0.90	12 877	15 344	2.49	1.00
Canada	10 456	12 597	2.93	1.08	10 068	12 225	3.14	1.11
United States	4 777	5 240	1.31	0.49	2 809	3 119	0.37	0.60
LATIN AMERICA	7 845	7 926	3.12	0.53	7 334	7 329	3.25	0.47
Argentina	4 877	4 783	5.90	0.34	4 682	4 548	5.87	0.30
Brazil	440	488	2.13	2.03	358	378	1.95	1.78
Chile	225	231	0.55	0.37	206	211	0.67	0.38
Colombia	9	10	0.02	0.48	8	8	0.02	0.47
Mexico	1 539	1 590	-1.97	0.67	1 452	1 502	-1.65	0.66
Paraguay	118	135	-6.65	0.77	92	105	-7.38	0.70
Peru	7	7	0.00	0.68	3	3	0.00	0.41
EUROPE	72 151	77 930	2.68	0.49	67 757	73 383	2.89	0.51
European Union[1]	35 588	36 072	1.42	-0.06	33 086	33 537	1.47	-0.05
United Kingdom	2 108	2 503	-1.19	1.84	2 023	2 410	-1.23	1.88
Russia	18 282	21 781	6.96	1.17	17 327	20 646	7.16	1.15
Ukraine	13 981	15 209	1.56	0.71	13 405	14 709	2.25	0.74
AFRICA	9 661	11 153	0.55	1.36	5 747	6 172	0.48	0.71
Egypt	157	184	-0.61	0.95	105	123	-0.87	0.78
Ethiopia	93	100	-0.45	1.09	60	58	-0.28	0.39
Nigeria	2 315	2 794	0.84	1.52	810	856	0.84	0.19
South Africa	1 008	1 041	0.74	0.75	903	924	0.66	0.73
ASIA	73 143	83 364	3.27	1.03	56 462	66 071	2.88	1.25
China[2]	40 154	46 393	2.67	1.02	27 663	33 633	1.52	1.42
India	19 140	22 037	6.26	1.36	16 835	19 561	6.59	1.43
Indonesia	732	788	-3.46	0.64	301	333	1.86	0.78
Iran	547	551	4.01	0.22	506	508	3.87	0.20
Japan	2 183	2 092	-1.74	-0.46	2 165	2 074	-1.76	-0.46
Kazakhstan	877	1 091	6.85	0.81	687	861	6.78	0.78
Korea	44	44	0.52	0.01	40	40	0.53	0.01
Malaysia	46	49	0.00	0.55	45	47	0.00	0.54
Pakistan	1 871	2 322	0.21	1.02	1 716	2 141	0.01	0.96
Philippines	116	127	4.72	1.00	103	113	5.49	0.96
Saudi Arabia	7	7	0.00	0.67	5	5	0.00	0.46
Thailand	144	150	0.97	0.38	88	94	1.71	0.61
Türkiye	2 814	2 803	2.00	0.59	2 599	2 580	2.05	0.60
Viet Nam	463	504	0.27	0.88	354	390	0.58	1.02
OCEANIA	1 389	1 473	4.06	0.38	1 268	1 346	4.31	0.40
Australia	1 373	1 456	4.12	0.38	1 256	1 334	4.36	0.41
New Zealand	14	14	-0.01	0.00	11	11	-0.01	0.00
DEVELOPED COUNTRIES	**93 230**	**101 895**	**2.53**	**0.55**	**86 002**	**94 316**	**2.70**	**0.57**
DEVELOPING COUNTRIES	**86 193**	**97 788**	**3.08**	**1.07**	**65 442**	**75 330**	**2.89**	**1.19**
LEAST DEVELOPED COUNTRIES	6 697	7 656	1.07	1.35	4 613	5 050	1.10	0.94
OECD[3]	**61 415**	**64 954**	**1.40**	**0.31**	**55 987**	**59 331**	**1.42**	**0.33**

.. Not available

Note : Marketing year: See Glossary of Terms for definitions. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.20.1 Protein meal projections: Production and trade

Marketing year

	PRODUCTION (kt)		Growth (%)[4]		IMPORTS (kt)		Growth (%)[4]		EXPORTS (kt)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**369 633**	**420 258**	**2.13**	**0.85**	**92 695**	**102 417**	**1.29**	**0.85**	**91 718**	**102 417**	**0.19**	**0.85**
NORTH AMERICA	58 178	64 746	1.80	0.79	4 981	4 962	1.10	-0.49	18 425	21 913	2.25	1.83
Canada	7 161	9 137	2.46	1.72	1 190	1 046	4.72	-1.09	5 377	6 492	3.52	1.22
United States	51 018	55 609	1.71	0.64	3 791	3 916	0.17	-0.32	13 048	15 421	1.79	2.10
LATIN AMERICA	85 730	99 649	0.73	0.97	10 714	12 700	1.87	1.65	47 478	55 457	-1.72	1.03
Argentina	29 962	37 012	-2.71	1.46	0	0	..	..	25 651	32 059	-3.47	1.52
Brazil	42 537	47 913	3.59	0.65	5	5	8.03	0.00	17 976	19 528	1.35	0.53
Chile	276	301	-0.82	0.45	1 191	1 394	0.94	1.55	1	1	0.00	-0.15
Colombia	689	871	-0.85	0.93	1 905	2 146	5.81	1.51	193	188	6.28	-1.49
Mexico	5 792	5 791	4.39	0.66	1825	2289	-2.26	1.61	22	22	0.50	0.00
Paraguay	2 630	3 355	-2.70	1.25	6	5	-0.70	0.06	1533	1877	-6.55	1.11
Peru	364	511	1.29	1.35	1550	2002	3.97	2.51	5	5	0.00	-0.56
EUROPE	50 943	53 348	2.35	0.19	26 899	25 402	-0.87	-0.87	11 238	11 892	4.03	0.80
European Union[1]	29 684	29 170	1.35	-0.38	21 948	20 411	-0.79	-1.11	2 482	2 293	3.33	1.67
United Kingdom	1685	1840	0.10	1.37	2 731	2 636	-1.79	-0.11	533	688	16.81	2.75
Russia	10 538	12 200	5.68	0.97	307	219	-2.82	-3.02	3 358	3 896	7.77	0.56
Ukraine	7 171	8 111	2.27	0.82	25	25	-4.01	-0.05	4 354	4 530	1.04	0.53
AFRICA	11 395	13 560	5.12	1.11	3 445	3 953	-6.69	2.60	879	511	5.42	-5.50
Egypt	2 773	3 422	8.35	1.49	375	181	-16.78	4.17	5	5	2.98	-0.35
Ethiopia	126	221	4.95	2.52	20	2	19.29	6.59	0	0	..	..
Nigeria	1 694	1 907	8.00	0.84	30	68	-29.28	13.41	301	67	7.77	-14.18
South Africa	1 818	2 173	6.21	0.97	528	610	-4.98	3.62	62	48	13.17	-2.43
ASIA	162 145	187 619	2.80	0.99	43 445	52 174	3.81	1.68	13615	12559	1.84	-1.01
China[2]	94 693	108 911	2.58	0.88	5 651	6 594	27.37	0.07	717	818	-10.00	0.56
India	24 333	29 033	4.19	1.64	633	553	7.39	1.65	2935	2414	9.54	-1.62
Indonesia	8504	9674	3.26	0.83	5 669	6 322	4.49	0.85	5703	5423	3.76	-0.85
Iran	2 283	2 815	4.25	0.77	1 845	1 942	1.46	1.50	5	5	-26.86	-0.13
Japan	3709	3679	1.08	-0.37	1 828	1 696	-0.28	-0.97	4	1	-20.48	0.00
Kazakhstan	515	611	5.89	0.78	83	89	45.79	1.18	234	225	13.74	-1.17
Korea	1 194	1 210	-0.02	0.02	3 288	3 409	-0.53	0.17	20	30	-22.42	0.00
Malaysia	3 245	3 567	0.39	0.72	1 505	1 712	1.27	0.88	2247	2098	-1.61	-0.87
Pakistan	3 469	4 818	-0.13	1.57	501	916	-6.57	7.47	68	56	-9.50	-2.55
Philippines	1 199	1 365	3.90	0.83	3 236	4 416	2.68	3.45	416	303	2.64	-3.33
Saudi Arabia	621	689	6.47	0.77	1 445	1 788	2.88	2.56	20	22	12.66	-1.63
Thailand	3 284	4 309	5.24	1.67	3 822	4 854	2.35	2.10	12	12	7.07	-0.21
Türkiye	4 544	5 023	2.99	0.75	2 382	3 354	3.64	2.92	214	177	10.33	-2.54
Viet Nam	1 793	2 020	2.90	1.16	5967	8150	1.97	3.13	53	51	-2.57	-1.82
OCEANIA	1 242	1 336	2.17	0.34	3210	3225	1.02	-0.08	82	85	-1.28	0.03
Australia	1 106	1 188	2.35	0.30	964	1158	3.10	1.25	25	25	-4.64	0.00
New Zealand	8	8	-0.11	0.00	2236	2057	0.20	-0.76	0	0	..	..
DEVELOPED COUNTRIES	**117 971**	**127 613**	**2.04**	**0.50**	**38 508**	**37 291**	**-0.36**	**-0.58**	**29 997**	**34 110**	**2.93**	**1.43**
DEVELOPING COUNTRIES	**251 662**	**292 646**	**2.17**	**1.01**	**54 187**	**65 126**	**2.63**	**1.77**	**61 722**	**68 308**	**-0.96**	**0.57**
LEAST DEVELOPED COUNTRIES	5 788	6 747	4.12	1.35	1 586	1 862	10.11	3.05	407	300	4.18	-3.47
OECD[3]	**107 864**	**114 926**	**1.74**	**0.43**	**46 980**	**47 466**	**-0.02**	**-0.19**	**22 025**	**25 442**	**2.55**	**1.76**

.. Not available

Note : Marketing year: See Glossary of Terms for definitions. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.20.2 Protein meal projections: Consumption

Marketing year

	CONSUMPTION (kt)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33
WORLD	**370 038**	**420 077**	**2.43**	**0.86**
NORTH AMERICA	44 731	47 795	1.56	0.22
Canada	2 961	3 691	1.53	1.71
United States	41 770	44 104	1.56	0.10
LATIN AMERICA	49 022	56 828	3.89	1.08
Argentina	4 279	4 952	1.76	1.25
Brazil	24 550	28 339	5.55	0.72
Chile	1 462	1 693	0.27	1.36
Colombia	2 393	2 826	3.56	1.59
Mexico	7 593	8 058	2.41	0.92
Paraguay	1 180	1 482	7.87	1.45
Peru	1 898	2 505	3.62	2.28
EUROPE	66 549	66 850	0.71	-0.33
European Union[1]	49 231	47 288	0.30	-0.79
United Kingdom	3 884	3 788	-2.39	0.10
Russia	7 404	8 523	4.04	1.04
Ukraine	2 789	3 598	4.31	1.27
AFRICA	13 931	16 993	0.91	1.75
Egypt	3 135	3 593	0.39	1.63
Ethiopia	146	223	6.10	2.51
Nigeria	1 417	1 906	3.62	2.50
South Africa	2 271	2 733	2.60	1.59
ASIA	191 460	227 135	3.08	1.28
China[2]	99 195	114 660	3.43	0.83
India	21 943	27 150	3.97	2.00
Indonesia	8 525	10 567	3.45	1.84
Iran	4 152	4 751	2.74	1.06
Japan	5 574	5 374	0.74	-0.56
Kazakhstan	364	474	5.11	1.96
Korea	4 455	4 589	-0.22	0.13
Malaysia	2 487	3 179	3.03	2.04
Pakistan	3 893	5 673	-0.88	2.41
Philippines	4 005	5 470	2.94	3.26
Saudi Arabia	2 044	2 455	4.21	2.07
Thailand	7 074	9 146	3.53	1.91
Türkiye	6 701	8 193	2.97	1.74
Viet Nam	7 667	10 112	2.11	2.75
OCEANIA	4 346	4 477	1.34	0.04
Australia	2 021	2 322	2.97	0.77
New Zealand	2244	2064	0.05	-0.75
DEVELOPED COUNTRIES	**126 429**	**130 782**	**1.07**	**-0.04**
DEVELOPING COUNTRIES	**243 609**	**289 295**	**3.19**	**1.29**
LEAST DEVELOPED COUNTRIES	6 960	8 304	5.27	1.94
OECD[3]	**132 886**	**136 939**	**0.98**	**-0.01**

Note : Marketing year: See Glossary of Terms for definitions. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.21.1 Vegetable oil projections: Production and trade

Marketing year

	PRODUCTION (kt)		Growth (%)[4]		IMPORTS (kt)		Growth (%)[4]		EXPORTS (kt)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**224 710**	**250 594**	**2.61**	**0.77**	**84 848**	**88 572**	**1.43**	**0.27**	**83 684**	**88 572**	**1.12**	**0.27**
NORTH AMERICA	18 754	21 097	2.22	0.84	6 153	6 959	4.96	0.07	3 594	4 278	-1.55	1.57
Canada	4 667	5 767	2.58	1.33	451	371	7.95	-2.68	3 013	3 859	1.16	1.32
United States	14 087	15 330	2.10	0.66	5 702	6 588	4.76	0.25	581	419	-12.18	4.24
LATIN AMERICA	28 895	33 157	1.64	1.00	4 916	5 263	1.11	0.70	10 655	12 143	-0.33	0.65
Argentina	8 512	10 054	-1.42	1.29	17	17	0.00	0.01	5 775	7 264	-0.38	1.29
Brazil	11 338	12 983	3.92	0.86	702	822	5.73	0.73	1 274	1 140	-3.38	-1.10
Chile	115	122	-0.07	0.42	531	556	3.92	0.68	1	1	0.00	-0.10
Colombia	2 097	2 328	4.03	0.64	602	660	-1.58	1.51	615	541	1.07	-1.49
Mexico	2 174	2 257	2.97	0.86	1010	1058	1.30	0.64	72	63	1.60	0.00
Paraguay	642	816	-2.66	1.22	13	12	0.00	-0.78	452	528	-4.84	0.79
Peru	301	346	2.93	0.80	603	735	3.52	2.02	1	0	0.08	-0.17
EUROPE	32 712	34 958	2.92	0.37	13 560	10 948	0.45	-1.99	14 193	16 020	5.18	0.61
European Union[1]	16 827	16 817	1.65	-0.20	10 228	7 561	0.36	-2.84	2 483	2 466	0.96	-1.47
United Kingdom	1018	1238	0.81	1.68	998	1 036	-0.39	0.13	213	303	-3.39	4.46
Russia	7 617	8 923	7.06	1.00	1 057	1 038	0.36	0.17	5 467	6 666	12.92	1.27
Ukraine	6 265	6 908	2.18	0.76	276	257	0.27	-0.71	5 467	6 006	2.08	0.72
AFRICA	9 520	10 663	3.43	0.91	11 125	13 398	0.39	1.86	1 532	1 289	1.93	-1.66
Egypt	687	840	7.36	1.41	1 765	1 848	-1.11	1.10	117	117	-6.62	-1.09
Ethiopia	63	88	3.28	1.95	643	798	3.42	2.01	0	0	..	..
Nigeria	2 484	2 812	6.03	0.95	1083	1621	-3.79	3.64	32	32	-8.82	-0.78
South Africa	656	719	3.70	0.90	830	938	0.14	0.91	22	26	-8.64	-0.60
ASIA	133 192	148 937	2.74	0.80	48 735	51 623	1.59	0.41	52 642	53 706	0.64	0.05
China[2]	29 191	33 547	2.34	0.86	8 999	7 091	1.76	-2.50	220	236	-4.54	0.00
India	11 879	14 114	3.80	1.60	15 717	17 520	0.58	1.04	218	215	17.72	-0.33
Indonesia	54159	59883	4.32	0.66	126	131	4.32	0.01	30 116	30 546	0.76	0.04
Iran	674	794	4.12	0.64	1 456	1 533	2.57	0.83	18	11	-19.85	-0.43
Japan	1461	1395	-0.67	-0.41	810	794	0.26	-0.49	6	2	10.86	0.00
Kazakhstan	369	447	6.48	0.79	108	121	3.29	1.35	101	86	12.10	-1.33
Korea	296	299	-0.02	0.02	1 294	1 258	4.57	-0.46	3	3	2.37	0.00
Malaysia	20 771	22 329	-0.44	0.65	1 877	1 686	3.57	-0.44	17 004	18 006	-0.85	0.44
Pakistan	1 554	2 020	-1.97	1.25	3 331	4 010	1.68	1.21	17	19	-20.36	-0.22
Philippines	2 006	2 229	2.82	0.70	1 245	1 347	2.80	1.39	1 118	964	3.20	-1.37
Saudi Arabia	143	159	6.35	0.77	901	1 037	4.92	1.29	36	32	-5.45	-1.27
Thailand	4 365	4 809	5.72	0.80	320	527	3.98	3.12	1 145	759	23.32	-3.03
Türkiye	2 058	2 168	2.38	0.70	2 068	2 257	4.10	0.43	981	999	7.54	-0.43
Viet Nam	720	802	2.76	1.01	1223	1473	4.48	1.39	137	113	0.33	-1.37
OCEANIA	1 638	1 783	3.95	0.53	359	382	1.59	0.50	1 068	1 136	3.60	0.32
Australia	617	657	3.14	0.34	246	270	2.24	0.75	198	191	2.39	0.00
New Zealand	5	5	-0.30	0.00	85	85	0.80	0.00	0	0	..	..
DEVELOPED COUNTRIES	**55 357**	**60 136**	**2.52**	**0.53**	**22 339**	**20 820**	**1.69**	**-0.98**	**18 139**	**20 624**	**3.46**	**0.78**
DEVELOPING COUNTRIES	**169 354**	**190 458**	**2.64**	**0.85**	**62 509**	**67 752**	**1.33**	**0.69**	**65 546**	**67 948**	**0.54**	**0.12**
LEAST DEVELOPED COUNTRIES	4 176	4 618	1.97	0.99	6 921	8 444	0.48	2.03	568	442	4.32	-2.42
OECD[3]	**45 721**	**48 708**	**1.96**	**0.42**	**24 899**	**23 464**	**2.07**	**-0.85**	**8 298**	**8 976**	**0.24**	**0.25**

.. Not available

Note : Marketing year: See Glossary of Terms for definitions. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.21.2 Vegetable oil projections: Consumption, food

Marketing year

	CONSUMPTION (kt)		Growth (%)[4]		FOOD (kg/cap)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**224 950**	**250 525**	**2.69**	**0.76**	**15.9**	**15.8**	**0.76**	**-0.21**
NORTH AMERICA	21 337	23 753	3.97	0.43	40.9	36.4	1.37	-0.70
Canada	2 044	2 281	6.91	0.61	45.6	42.9	6.37	-0.89
United States	19 294	21 472	3.70	0.41	40.3	35.6	0.87	-0.68
LATIN AMERICA	23 184	26 272	2.53	1.10	19.4	19.8	1.49	0.06
Argentina	2 756	2 807	-3.55	1.28	19.4	21.6	1.05	0.89
Brazil	10 750	12 665	5.23	1.05	27.7	28.2	2.63	-0.24
Chile	662	677	3.35	0.62	8.3	8.5	0.42	0.46
Colombia	2 088	2 445	3.18	1.41	14.6	15.9	1.31	0.60
Mexico	3 112	3 252	2.55	0.81	23.0	22.5	1.66	0.19
Paraguay	206	299	3.70	1.90	26.8	33.8	3.96	0.95
Peru	910	1 081	3.38	1.61	9.5	10.2	1.15	0.73
EUROPE	31 655	29 920	0.83	-0.68	21.5	21.3	0.66	-0.66
European Union[1]	24 187	21 949	0.92	-1.06	22.8	21.5	1.07	-1.31
United Kingdom	1 804	1 971	0.72	0.49	25.7	27.2	0.26	0.20
Russia	3 212	3 291	-1.18	0.23	20.7	21.7	-1.49	0.48
Ukraine	1 036	1 159	3.29	0.58	11.0	13.5	5.34	1.01
AFRICA	19 084	22 766	1.57	1.63	7.7	7.5	-1.40	-0.12
Egypt	2 306	2 570	0.66	1.30	5.3	5.3	-2.19	0.41
Ethiopia	705	886	3.40	2.00	3.4	3.5	1.07	0.31
Nigeria	3 521	4 399	2.17	1.88	10.2	10.5	-0.58	0.05
South Africa	1 461	1 631	1.92	0.93	15.9	16.4	-1.58	0.24
ASIA	128 769	146 786	3.19	0.94	15.0	15.8	1.20	0.26
China[2]	38 016	40 377	2.02	0.19	25.2	27.1	1.79	0.33
India	27 105	31 405	1.75	1.27	10.0	11.3	0.80	1.00
Indonesia	23 996	29 462	11.07	1.36	10.7	11.6	6.14	0.41
Iran	2 190	2 316	4.11	0.75	12.5	12.8	4.06	0.45
Japan	2 226	2 188	-0.27	-0.44	17.3	18.1	0.08	0.14
Kazakhstan	378	483	4.29	1.34	16.0	18.3	3.85	0.46
Korea	1 595	1 554	3.72	-0.34	17.4	17.2	4.26	-0.05
Malaysia	5 548	5 999	2.48	0.78	9.3	10.0	1.89	0.68
Pakistan	4 884	6 009	0.64	1.24	6.7	7.2	-2.43	0.31
Philippines	2 141	2 609	2.40	1.95	12.4	12.7	1.83	0.71
Saudi Arabia	1 008	1 163	6.04	1.27	20.8	21.4	4.61	0.21
Thailand	3 574	4 575	3.43	1.87	10.2	10.9	2.11	0.61
Türkiye	3 113	3 424	2.02	0.93	14.3	14.4	-1.53	0.33
Viet Nam	1 803	2 161	4.26	1.39	4.8	5.4	3.70	0.90
OCEANIA	920	1 028	3.09	0.61	18.2	18.2	0.80	-0.48
Australia	658	737	2.87	0.44	25.1	25.5	1.50	-0.44
New Zealand	90	90	0.74	0.00	16.3	15.0	-0.98	-0.69
DEVELOPED COUNTRIES	**59 113**	**60 341**	**1.91**	**-0.12**	**25.3**	**24.4**	**0.91**	**-0.51**
DEVELOPING COUNTRIES	**165 836**	**190 184**	**2.98**	**1.05**	**13.8**	**14.1**	**0.84**	**0.01**
LEAST DEVELOPED COUNTRIES	10 513	12 617	0.88	1.81	6.6	6.5	-1.77	0.07
OECD[3]	**61 908**	**63 206**	**2.23**	**-0.07**	**26.2**	**24.9**	**1.18**	**-0.55**

Note : Marketing year: See Glossary of Terms for definitions. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.22. Main policy assumptions for oilseed markets

Marketing year

		Average 2021-23est	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
ARGENTINA												
Export tax												
Soybean	%	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Other oilseeds	%	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Soybean meal	%	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Soybean oil	%	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
CANADA												
Tariffs												
Palm oil	%	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
EUROPEAN UNION[1,2]												
Voluntary coupled support												
Soybean	mln EUR	47.6	58.0	58.5	59.5	61.4	61.4	61.4	61.4	61.4	61.4	61.4
Tariffs												
Soybean oil	%	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4
Rapeseed oil	%	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4
KOREA												
Soybean tariff-quota	kt	1 200	1 200	1 200	1 200	1 200	1 200	1 200	1 200	1 200	1 200	1 200
In-quota tariff	%	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Out-of-quota tariff	%	487.0	487.0	487.0	487.0	487.0	487.0	487.0	487.0	487.0	487.0	487.0
Soybean (for food) mark up	'000 KRW/t	131.0	131.0	131.0	131.0	131.0	131.0	131.0	131.0	131.0	131.0	131.0
MEXICO												
Tariffs												
Soybean	%	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
Soybean meal	%	23.8	23.8	23.8	23.8	23.8	23.8	23.8	23.8	23.8	23.8	23.8
Soybean oil	%	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
UNITED STATES												
ARC participation rate												
Soybean	%	50.8	50.5	50.8	52.3	52.5	52.2	50.7	50.5	50.5	50.5	50.5
Soybean loan rate	USD/t	227.8	227.8	227.8	227.8	227.8	227.8	227.8	227.8	227.8	227.8	227.8
Tariffs												
Rapeseed	%	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Soybean meal	%	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Soybean oil	%	19.1	19.1	19.1	19.1	19.1	19.1	19.1	19.1	19.1	19.1	19.1
Rapeseed oil	%	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
CHINA												
Tariffs												
Soybean	%	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
Soybean meal	%	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Soybean oil in-quota tariff	%	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Vegetable oil tariff-quota	kt	7 998	7 998	7 998	7 998	7 998	7 998	7 998	7 998	7 998	7 998	7 998
INDIA												
Soybean tariff	%	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
Rapeseed tariff	%	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Soybean meal tariff	%	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Soybean oil tariff	%	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9
INDONESIA												
Protein meal tariff	%	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
PAKISTAN												
Protein meal tariff	%	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
VIET NAM												
Protein meal tariff	%	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Note : Marketing year: See Glossary of Terms for definitions. Average 2021-23est: Data for 2023 are estimated.The sources for tariffs and Tariff Rate Quotas are the national questionnaire reply, UNCTAD and WTO.

1. Since 2015 the Basic payment scheme (BPS) holds, which shall account for 68% maximum of the national direct payment envelopes. On top of this, compulsory policy instruments have been introduced: the Green Payment (30%) and young farmer scheme (2%).
2. Refers to all current European Union member countries.

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

Table C.23.1 Sugar projections: Production and trade

Marketing year

	PRODUCTION (kt)		Growth (%)[4]		IMPORTS (kt)		Growth (%)[4]		EXPORTS (kt)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**177 728**	**202 099**	**0.69**	**1.07**	**62 923**	**73 128**	**0.86**	**1.39**	**66 549**	**76 688**	**0.64**	**1.32**
NORTH AMERICA	7 871	8 595	0.65	0.70	4 351	3 974	0.36	0.08	204	204	7.35	0.00
Canada	110	114	1.73	0.30	1 280	1 207	1.18	1.17	124	71	18.06	0.00
United States	7 760	8 482	0.63	0.71	3 071	2 767	0.05	-0.35	80	133	-1.08	0.00
LATIN AMERICA	58 635	66 688	0.69	0.98	2 503	2 528	1.74	0.44	35 864	42 746	1.16	1.24
Argentina	1 640	1 856	-2.17	1.66	8	0	96.09	..	202	454	-3.06	8.90
Brazil	39 994	46 498	1.95	0.98	1	0	-61.45	..	29 727	36 237	2.31	1.21
Chile	108	135	-9.84	1.23	620	615	3.54	-0.74	0	0	..	..
Colombia	2 113	2 322	-1.02	0.83	235	172	10.15	-1.68	616	619	-1.32	1.71
Mexico	5 445	6 051	-1.81	1.72	225	108	26.71	-0.63	1403	1633	-2.57	5.36
Paraguay	151	124	-0.62	-4.55	88	102	100.14	5.10	89	69	1.91	-4.85
Peru	1 196	1 242	1.21	-0.02	262	396	-2.64	3.51	99	84	0.05	-3.39
EUROPE	25 241	26 215	0.15	0.01	3 625	2 131	-7.19	-2.72	2 136	2 912	-7.18	3.67
European Union[1]	15 340	15 320	0.11	-0.35	2 089	1 085	-7.25	-3.98	857	985	-13.20	1.69
United Kingdom	898	904	-3.21	-0.02	688	554	-4.55	-0.37	52	39	-21.15	-3.21
Russia	6 309	6 426	2.41	0.21	176	30	-21.23	-0.25	579	865	46.51	5.04
Ukraine	1 514	2 163	-2.76	1.39	2	0	-55.57	..	331	609	-1.46	7.47
AFRICA	10 823	13 597	1.02	1.16	15 270	19 929	2.02	3.00	5 205	4 684	1.85	-0.56
Egypt	2 507	3 588	1.46	1.29	1 014	914	-4.46	3.07	231	199	4.59	-2.98
Ethiopia	367	319	-0.50	-0.78	431	826	21.33	5.21	35	48	144.06	0.08
Nigeria	31	19	11.80	-0.88	1750	2861	2.96	4.31	0	0	..	..
South Africa	2 022	2 127	3.30	0.73	348	346	-5.25	-1.05	564	698	13.28	1.06
ASIA	70 667	82 446	1.05	1.59	36 844	44 210	1.64	1.15	19920	22748	1.18	1.95
China[2]	9 361	10 660	-0.72	1.40	6 013	7 379	2.56	1.09	106	90	-1.06	0.00
India	33 342	38 156	3.40	1.89	1 203	1 230	-6.81	-3.20	7925	7319	15.10	3.30
Indonesia	2258	2324	-0.41	0.90	5 569	7 270	4.57	1.69	150	0	-4.99	..
Iran	1 356	1 475	-1.97	0.16	1 035	1 168	12.08	1.41	6	0	-71.25	..
Japan	658	591	-1.62	0.08	1 251	1 204	0.13	-0.88	4	4	15.48	0.00
Kazakhstan	33	0	20.48	..	493	677	0.58	1.51	0	0	-51.28	..
Korea	0	0	..	..	1 954	1 966	0.68	-0.01	295	355	-0.44	0.46
Malaysia	0	0	-62.47	..	2 088	2 423	0.92	0.83	212	160	0.00	-0.82
Pakistan	7 126	7 596	2.87	1.30	309	755	44.33	2.42	852	940	3.77	-2.37
Philippines	1 836	1 831	-2.78	1.12	275	541	623.51	2.28	0	0	-81.04	..
Saudi Arabia	0	0	..	..	1 814	2 032	4.36	0.70	577	469	12.98	-0.69
Thailand	9 971	14 389	-2.50	1.87	0	0	..	..	7010	11464	-2.80	2.30
Türkiye	2 758	3 453	3.44	0.85	323	297	4.20	-0.31	166	181	43.84	0.29
Viet Nam	804	814	-8.29	0.38	1568	2228	25.64	2.05	132	158	9.02	-2.01
OCEANIA	4 492	4 559	-1.54	0.10	330	356	-1.10	0.25	3 220	3 393	-3.04	-0.51
Australia	4 299	4 347	-1.50	0.07	19	20	-16.62	0.00	3 074	3 277	-2.97	-0.49
New Zealand	0	0	..	..	237	232	-0.20	-0.15	20	20	-0.72	0.00
DEVELOPED COUNTRIES	**40 255**	**42 060**	**0.17**	**0.20**	**12 591**	**10 942**	**-2.58**	**-0.41**	**6 311**	**7 300**	**-3.82**	**1.13**
DEVELOPING COUNTRIES	**137 473**	**160 039**	**0.85**	**1.31**	**50 331**	**62 186**	**1.90**	**1.74**	**60 237**	**69 388**	**1.25**	**1.34**
LEAST DEVELOPED COUNTRIES	3 927	5 138	1.03	1.80	9 705	12 746	-0.18	3.86	2 615	2 088	-8.00	0.93
OECD[3]	**39 700**	**41 971**	**-0.30**	**0.38**	**12 733**	**11 022**	**-1.40**	**-0.62**	**6 699**	**7 324**	**-4.35**	**1.15**

.. Not available

Note : Marketing year: See Glossary of Terms for definitions. Average 2021-23est: Data for 2023 are estimated. Sugar data are expressed on a tel quel basis.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.23.2 Sugar projections: Consumption, food

Marketing year

	CONSUMPTION (kt)		Growth (%)[4]		FOOD (kg/cap)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**174 327**	**198 285**	**0.71**	**1.21**	**20.7**	**21.5**	**-0.35**	**0.38**
NORTH AMERICA	11 966	12 357	0.56	0.41	30.4	29.7	-0.01	-0.10
Canada	1 217	1 248	0.46	0.19	29.0	27.7	0.06	-0.58
United States	10 749	11 109	0.57	0.44	30.6	30.0	-0.01	-0.05
LATIN AMERICA	24 954	26 542	-0.68	0.56	34.9	34.3	-1.63	-0.09
Argentina	1 401	1 413	-1.92	0.07	29.0	27.4	-2.78	-0.51
Brazil	9 961	10 391	-1.28	0.28	41.1	40.1	-2.25	-0.21
Chile	748	751	-0.36	0.09	36.7	35.8	-1.54	-0.18
Colombia	1 771	1 874	0.38	0.44	32.8	32.7	-0.94	-0.12
Mexico	4 241	4 515	-0.64	0.45	31.5	31.2	-1.52	-0.19
Paraguay	143	158	1.20	0.84	20.0	19.6	-0.12	-0.13
Peru	1 380	1 545	1.38	1.19	38.8	39.3	-0.05	0.28
EUROPE	26 522	25 476	-0.49	-0.36	34.2	33.3	-0.58	-0.24
European Union[1]	16 449	15 453	-0.44	-0.52	35.2	33.5	-0.66	-0.39
United Kingdom	1 484	1 419	-1.70	-0.06	21.1	19.5	-2.11	-0.34
Russia	5 813	5 599	0.46	-0.38	38.6	38.3	0.40	-0.10
Ukraine	1 278	1 551	-3.55	0.52	30.5	39.3	-1.81	0.78
AFRICA	21 099	28 715	1.70	2.99	14.1	15.1	-0.82	0.78
Egypt	3 370	4 244	-0.12	2.30	28.9	30.9	-1.99	0.84
Ethiopia	715	1 075	5.79	3.84	5.4	6.3	2.99	1.50
Nigeria	1 761	2 871	2.93	4.72	7.6	9.6	0.34	2.44
South Africa	1 689	1 754	-1.71	0.43	26.4	24.7	-2.92	-0.47
ASIA	88 315	103 677	1.32	1.46	17.7	19.5	0.47	0.90
China[2]	15 680	17 961	0.08	1.31	10.0	11.6	-0.22	1.49
India	27 561	32 018	1.29	1.35	18.5	19.7	0.21	0.55
Indonesia	7 712	9 590	2.61	1.84	26.7	30.8	1.64	1.16
Iran	2 430	2 639	-0.26	0.91	26.4	26.9	-1.41	0.39
Japan	1 909	1 791	-1.47	-0.57	14.9	14.9	-1.11	0.00
Kazakhstan	526	672	1.15	1.99	26.0	29.6	-0.06	0.95
Korea	1 627	1 618	0.73	-0.09	29.8	30.2	0.47	0.10
Malaysia	1 936	2 249	1.61	1.13	54.5	57.3	0.36	0.25
Pakistan	6 000	7 417	2.72	1.98	24.3	24.6	1.03	0.18
Philippines	2 025	2 362	-0.89	1.52	16.7	16.7	-2.63	0.17
Saudi Arabia	1 274	1 553	1.10	1.72	33.2	35.4	-0.49	0.50
Thailand	2 747	2 920	-0.66	0.35	33.1	34.0	-1.05	0.18
Türkiye	3 071	3 539	4.46	1.39	34.0	37.0	3.35	0.88
Viet Nam	2 311	2 877	6.27	1.98	22.3	26.2	5.29	1.50
OCEANIA	1 472	1 517	0.69	0.49	29.9	27.8	-0.71	-0.54
Australia	1 119	1 093	0.68	0.10	37.6	33.9	-0.41	-0.75
New Zealand	215	212	-0.35	-0.16	40.0	36.5	-2.06	-0.80
DEVELOPED COUNTRIES	**45 989**	**45 711**	**-0.20**	**-0.01**	**30.6**	**29.8**	**-0.53**	**-0.18**
DEVELOPING COUNTRIES	**128 338**	**152 574**	**1.05**	**1.61**	**18.5**	**19.8**	**-0.17**	**0.65**
LEAST DEVELOPED COUNTRIES	10 996	15 738	2.85	3.60	11.1	12.5	0.47	1.43
OECD[3]	**45 533**	**45 662**	**0.07**	**0.09**	**30.9**	**30.3**	**-0.42**	**-0.12**

.. Not available

Note : Marketing year: See Glossary of Terms for definitions. Average 2021-23est: Data for 2023 are estimated. Sugar data are expressed on a tel quel basis.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.24 Main policy assumptions for sugar markets

Marketing year

		Average 2021-23-est	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
ARGENTINA												
Tariff, sugar	ARS/t	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
BRAZIL												
Tariff, raw sugar	%	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
Tariff, white sugar	%	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
CANADA												
Tariff, raw sugar	CAD/t	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7
Tariff, white sugar	CAD/t	30.9	30.9	30.9	30.9	30.9	30.9	30.9	30.9	30.9	30.9	30.9
CHINA[1]												
TRQ sugar	kt	1954.0	1954.0	1954.0	1954.0	1954.0	1954.0	1954.0	1954.0	1954.0	1954.0	1954.0
In-quota tariff, raw sugar	%	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Tariff, over-quota	%	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
EUROPEAN UNION[2]												
Voluntary coupled support												
Sugarbeet[3]	mln EUR	172.7	170.4	170.5	170.2	164.8	164.8	164.8	164.8	164.8	164.8	164.8
Tariff, raw sugar	EUR/t	339.0	339.0	339.0	339.0	339.0	339.0	339.0	339.0	339.0	339.0	339.0
Tariff, white sugar	EUR/t	419.0	419.0	419.0	419.0	419.0	419.0	419.0	419.0	419.0	420.0	421.0
INDIA												
Tariff, sugar	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
INDONESIA												
Tariff, sugar	%	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6
JAPAN												
Minimum stabilisation price, raw sugar	JPY/kg	153.2	153.2	153.2	153.2	153.2	153.2	153.2	153.2	153.2	153.2	153.2
Tariff, raw sugar	JPY/kg	71.8	71.8	71.8	71.8	71.8	71.8	71.8	71.8	71.8	71.8	71.8
Tariff, white sugar	JPY/kg	103.1	103.1	103.1	103.1	103.1	103.1	103.1	103.1	103.1	103.1	103.1
KOREA												
Tariff, raw sugar	%	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Tariff, white sugar	%	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
RUSSIA												
Minimum tariff, raw sugar	USD/t	140.0	140.0	140.0	171.0	171.0	171.0	171.0	171.0	171.0	171.0	171.0
Minimum tariff, white sugar	USD/t	340.0	340.0	340.0	340.0	340.0	340.0	340.0	340.0	340.0	340.0	340.0
UNITED STATES												
Loan rate, raw sugar	USD/t	435.4	435.4	435.4	435.4	435.4	435.4	435.4	435.4	435.4	435.4	435.4
Loan rate, white sugar	USD/t	531.1	531.1	531.1	531.1	531.1	531.1	531.1	531.1	531.1	531.1	531.1
TRQ, raw sugar	kt rse	1521.1	1504.4	1507.8	1511.2	1514.6	1518.0	1521.4	1524.8	1528.2	1531.5	1534.9
Raw sugar 2nd tier WTO tariff	USD/t	338.6	338.6	338.6	338.6	338.6	338.6	338.6	338.6	338.6	338.6	338.6
White sugar 2nd tier WTO tariff	USD/t	357.4	357.4	357.4	357.4	357.4	357.4	357.4	357.4	357.4	357.4	357.4
VIET NAM												
Tariff, sugar	%	83.4	83.4	83.4	83.4	83.4	83.4	83.4	83.4	83.4	83.4	83.4

Note : Marketing year: See Glossary of Terms for definitions. Average 2021-23est: Data for 2023 are estimated. The sources for tariffs and Tariff Rate Quotas are the national questionnaire reply, UNCTAD and WTO.

1. Refers to mainland only.
2. Refers to all current European Union member countries.
3. Implemented in 11 Member States.

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

Table C.25.1 Meat projections: Production and trade

Calendar year

	PRODUCTION (kt cwe)[4]		Growth (%)[5]		IMPORTS (kt cwe)[6]		Growth (%)[5]		EXPORTS (kt cwe)[6]		Growth (%)[5]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**350 754**	**391 467**	**1.40**	**1.03**	**41 008**	**43 588**	**3.20**	**0.80**	**42 172**	**43 588**	**2.47**	**0.80**
NORTH AMERICA	52 949	56 424	1.80	0.82	3 690	3 758	1.00	-0.24	10 783	11 137	2.44	0.80
Canada	5 329	5 638	1.88	0.56	692	768	0.18	0.57	2 679	2 642	2.32	0.23
United States	47 620	50 786	1.79	0.85	2 998	2 991	1.19	-0.44	8 104	8 495	2.48	0.99
LATIN AMERICA	57 394	65 501	1.81	1.25	5 638	5 994	3.77	0.64	12 187	13 066	4.54	1.22
Argentina	6 206	6 794	2.40	0.83	49	43	2.90	0.11	1 014	1 299	13.52	1.86
Brazil	29 189	31 759	1.65	0.82	106	118	2.16	-0.01	8 433	8 821	3.85	1.16
Chile	1 542	1 849	0.94	1.95	702	628	7.26	-0.11	462	525	6.18	1.51
Colombia	3 082	3 876	2.59	1.91	251	243	7.72	1.51	118	143	19.52	1.10
Mexico	7 603	8 860	2.86	1.36	2569	2705	4.21	0.41	797	876	4.18	1.17
Paraguay	683	882	2.64	3.10	32	33	11.01	-1.16	437	564	2.44	3.05
Peru	2 190	2 837	2.93	2.46	123	171	11.54	1.76	1	1	-24.58	-0.12
EUROPE	63 429	63 393	0.84	0.08	4 620	4 295	-3.06	-0.68	9 315	8 856	2.69	0.43
European Union[1]	43 128	41 466	0.31	-0.22	1 383	1 490	-1.59	-0.12	6 886	6 456	1.94	0.37
United Kingdom	4144	4382	1.32	0.59	1 569	1 480	-1.53	-0.37	697	629	-1.22	0.66
Russia	11 105	11 868	3.06	0.43	610	341	-11.65	-4.48	605	615	20.52	0.00
Ukraine	2 157	2 407	-0.41	1.23	259	219	1.03	-0.52	491	492	10.13	0.59
AFRICA	19 437	24 011	1.93	2.36	3 498	5 373	1.41	4.47	610	511	-0.96	-1.36
Egypt	2 565	3 070	2.85	3.59	304	377	-5.14	4.55	7	7	0.20	-0.72
Ethiopia	796	952	2.59	2.34	1	1	-5.46	..	19	21	-11.49	2.39
Nigeria	1 246	1 675	0.73	3.00	51	116	0.50	9.75	0	0	..	..
South Africa	3 341	4 122	0.96	2.14	563	486	-1.14	-1.56	170	201	-1.50	2.21
ASIA	151 014	174 709	1.33	1.22	23 033	23 490	5.64	0.58	6006	6367	1.38	0.78
China[2]	92 114	98 545	0.87	0.44	7 938	6 583	19.74	-0.59	1085	840	-1.41	-0.69
India	9 241	12 381	1.28	2.62	2	2	5.30	0.28	1382	1343	-3.91	-0.58
Indonesia	4770	6308	6.58	2.30	491	539	8.47	1.44	21	16	-2.55	-3.15
Iran	2 598	3 104	-1.42	1.71	129	67	-1.71	-4.21	56	64	-14.95	1.53
Japan	3487	3467	0.91	0.03	3 149	3 096	1.88	-0.20	18	20	5.47	0.10
Kazakhstan	1 066	1 351	4.03	2.03	328	338	2.94	1.01	55	59	22.73	-1.05
Korea	2 746	2 840	2.13	0.24	1 524	1 631	4.49	0.23	74	51	13.60	-2.28
Malaysia	1 990	2 625	0.21	2.45	521	690	5.24	1.08	242	251	6.13	-0.20
Pakistan	5 103	6 760	6.13	2.53	5	5	-1.40	0.54	92	67	7.02	-1.91
Philippines	2 872	4 151	-1.70	3.43	1 079	1 441	12.08	2.87	9	7	-6.74	-0.75
Saudi Arabia	1 033	1 336	8.35	2.44	976	1 102	-3.70	0.78	78	80	1.06	-0.49
Thailand	3 036	3 897	0.62	2.23	39	35	-4.87	-1.09	1551	2034	6.18	2.16
Türkiye	4 451	5 561	4.88	2.02	187	137	2.01	-3.56	797	1063	5.54	3.63
Viet Nam	5 266	8 069	4.80	3.55	781	969	-5.07	3.20	27	28	-7.10	-0.38
OCEANIA	6 531	7 429	-0.02	0.75	529	678	0.67	1.65	3 272	3 651	-1.62	0.61
Australia	4 910	5 770	-0.30	0.83	301	385	-1.31	1.02	2 110	2 525	-2.96	0.80
New Zealand	1 474	1 480	0.87	0.32	88	98	2.69	1.25	1159	1124	1.35	0.22
DEVELOPED COUNTRIES	**133 956**	**140 154**	**1.22**	**0.54**	**13 466**	**13 350**	**-0.28**	**-0.22**	**23 690**	**23 998**	**1.90**	**0.63**
DEVELOPING COUNTRIES	**216 797**	**251 313**	**1.50**	**1.31**	**27 542**	**30 239**	**5.31**	**1.29**	**18 482**	**19 591**	**3.23**	**1.01**
LEAST DEVELOPED	10 464	13 520	0.25	2.53	1 596	2 879	2.54	5.86	288	183	1.70	-4.12
OECD[3]	**131 118**	**137 774**	**1.31**	**0.57**	**15 785**	**16 065**	**1.73**	**0.00**	**23 927**	**24 572**	**1.80**	**0.78**

.. Not available

Note : Calendar year; except year ending 30 June for New Zealand. Average 2021-23est: Data for 2023 are estimated

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Gross indigenous production.
5. Least-squares growth rate (see glossary).
6. Excludes trade of live animals

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

Table C.25.2 Meat projections: Consumption, food

Calendar year

	CONSUMPTION (kt cwe)		Growth (%)[4]		FOOD (kg rwe/cap)[5]		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**349 561**	**391 455**	**1.47**	**1.03**	**28.1**	**28.6**	**0.33**	**0.15**
NORTH AMERICA	45 862	49 033	1.61	0.74	78.5	79.2	0.94	0.21
Canada	3 337	3 761	1.21	0.79	55.7	57.4	0.07	-0.04
United States	42 525	45 271	1.64	0.74	81.0	81.7	1.02	0.24
LATIN AMERICA	50 846	58 429	1.43	1.19	48.5	51.8	0.56	0.53
Argentina	5 241	5 538	0.98	0.60	73.5	73.0	0.27	0.03
Brazil	20 863	23 056	0.87	0.68	61.4	64.6	0.17	0.24
Chile	1 781	1 952	1.72	1.36	59.0	62.7	0.47	1.07
Colombia	3 215	3 977	2.56	1.91	39.0	45.5	1.24	1.36
Mexico	9 375	10 689	3.10	1.12	46.4	49.2	2.26	0.49
Paraguay	278	352	3.72	2.69	26.8	30.1	2.61	1.62
Peru	2 312	3 007	3.29	2.42	40.9	48.0	1.77	1.46
EUROPE	58 744	58 833	0.21	-0.03	51.4	52.1	0.13	0.09
European Union[1]	37 634	36 501	-0.04	-0.32	54.7	53.5	-0.27	-0.20
United Kingdom	5 016	5 232	0.71	0.30	47.9	48.2	0.17	-0.03
Russia	11 110	11 595	1.05	0.27	50.2	54.2	1.11	0.57
Ukraine	1 926	2 134	-1.94	1.20	31.2	36.8	-0.13	1.49
AFRICA	22 325	28 873	1.93	2.80	9.7	9.8	-0.65	0.53
Egypt	2 863	3 440	1.65	3.70	14.7	15.0	-0.56	2.18
Ethiopia	778	931	3.35	2.34	3.6	3.3	0.22	0.03
Nigeria	1 297	1 791	0.72	3.32	3.5	3.7	-1.92	1.05
South Africa	3 734	4 408	0.72	1.66	38.8	41.4	-0.33	0.72
ASIA	167 980	191 832	1.84	1.15	22.9	24.4	0.83	0.52
China[2]	98 967	104 288	1.77	0.38	45.8	49.0	1.24	0.52
India	7 861	11 040	2.46	3.09	2.7	3.5	1.16	2.23
Indonesia	5 241	6 831	6.80	2.25	10.3	12.5	6.04	1.55
Iran	2 672	3 107	-0.86	1.54	17.9	19.6	-2.06	1.01
Japan	6 588	6 549	1.34	-0.09	35.0	37.1	1.71	0.50
Kazakhstan	1 339	1 630	3.35	1.94	44.3	48.1	2.02	0.89
Korea	4 190	4 420	2.70	0.25	54.1	58.0	2.43	0.41
Malaysia	2 270	3 064	0.72	2.37	40.9	49.9	-0.52	1.45
Pakistan	5 016	6 698	6.11	2.58	13.0	14.2	4.52	0.74
Philippines	3 924	5 581	0.75	3.30	21.7	26.5	-1.20	1.90
Saudi Arabia	1 930	2 358	1.11	1.73	31.5	33.5	-0.48	0.49
Thailand	1 516	1 895	-3.55	2.28	13.7	17.2	-3.78	2.29
Türkiye	3 840	4 635	4.52	1.47	27.0	30.8	3.63	0.96
Viet Nam	6 020	9 010	3.12	3.53	40.5	57.3	1.88	3.05
OCEANIA	3 804	4 456	1.63	0.99	55.6	57.7	-0.01	-0.11
Australia	3 101	3 630	1.72	0.87	76.5	81.0	0.32	-0.05
New Zealand	420	455	0.37	0.78	52.0	51.9	-1.39	0.10
DEVELOPED COUNTRIES	**123 736**	**129 500**	**0.92**	**0.44**	**55.7**	**57.1**	**0.57**	**0.26**
DEVELOPING COUNTRIES	**225 825**	**261 955**	**1.77**	**1.33**	**22.0**	**22.9**	**0.44**	**0.30**
LEAST DEVELOPED COUNTRIES	11 771	16 216	0.49	3.16	7.9	8.5	-1.89	0.95
OECD[3]	**122 972**	**129 262**	**1.27**	**0.46**	**56.4**	**57.7**	**0.75**	**0.23**

.. Not available

Note : Calendar year; except year ending 30 June for New Zealand. Average 2021-23est: Data for 2023 are estimated

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).
5. Per capita consumption is expressed in edible retail weight equivalent basis. Carcass weight equivalent to edible retail weight conversion factor is 0.67 for beef and veal, 0.73 for pigmeat, 0.6 for poultry meat and 0.66 for sheepmeat.

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

Table C.26.1 Beef and veal projections: Production and trade

Calendar year

	PRODUCTION (kt cwe)		Growth (%)[5]		IMPORTS (kt cwe)[6]		Growth (%)[5]		EXPORTS (kt cwe)[6]		Growth (%)[5]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**73 562**	**81 224**	**1.03**	**1.11**	**13 177**	**14 553**	**2.83**	**0.94**	**13 484**	**14 553**	**2.14**	**0.94**
NORTH AMERICA	13 856	14 378	2.00	1.43	2 238	2 158	0.49	-0.96	2 338	2 445	3.44	1.39
Canada	1 592	1 672	2.20	0.43	242	259	-0.32	0.45	835	843	3.14	0.22
United States	12 264	12 706	1.97	1.57	1 996	1 899	0.60	-1.14	1 503	1 602	3.62	2.07
LATIN AMERICA	18 058	19 638	0.41	0.87	952	905	1.46	0.40	5 526	6 324	6.64	1.56
Argentina	3 119	3 247	2.24	0.45	7	7	0.00	-0.23	790	1 035	21.13	1.85
Brazil	8 698	9 241	-0.54	0.54	79	85	1.50	0.00	2 788	3 191	6.03	1.73
Chile	200	235	-1.39	1.91	372	366	5.92	0.92	30	30	16.81	-0.76
Colombia	793	931	-0.92	1.52	9	14	10.71	6.47	112	137	21.05	1.15
Mexico	2 175	2 390	2.32	0.92	180	120	4.49	-0.68	567	648	3.15	1.34
Paraguay	552	713	2.20	3.28	10	11	18.06	-3.18	422	550	2.09	3.30
Peru	192	234	-0.20	1.87	9	10	5.63	2.80	0	0	..	..
EUROPE	10 466	9 948	-0.16	-0.29	1 129	1 046	-4.14	-0.19	1 264	1 199	1.65	0.04
European Union[1]	6 954	6 445	-0.09	-0.57	328	379	-0.50	0.64	735	687	0.70	-0.33
United Kingdom	912	914	0.43	0.14	300	286	-1.76	-0.62	137	110	0.36	-1.27
Russia	1 625	1 610	0.02	0.03	315	207	-10.06	-0.67	103	97	27.73	0.00
Ukraine	276	218	-5.20	-0.52	9	10	16.48	-1.14	37	28	-1.87	1.23
AFRICA	6 715	8 017	0.34	1.99	749	1 043	-2.75	4.15	291	246	-0.96	-1.22
Egypt	468	606	-6.77	2.76	258	261	-3.93	3.63	5	5	38.44	-0.09
Ethiopia	434	483	0.84	1.91	0	0	..	..	3	3	-22.57	-1.03
Nigeria	293	370	-0.67	2.30	43	79	-0.87	7.30	0	0	..	..
South Africa	909	1 033	-1.25	1.95	121	108	4.55	-1.85	68	80	-0.36	3.25
ASIA	21 413	25 862	2.26	1.58	8 066	9 354	6.12	1.30	1837	1815	-2.21	-0.36
China[2]	7 197	8 150	2.25	0.90	3 293	4 004	29.46	1.30	65	68	-2.01	0.05
India	4 327	5 160	0.65	1.43	0	0	..	..	1363	1326	-3.83	-0.57
Indonesia	308	446	-3.31	3.52	482	524	8.97	1.40	1	1	5.96	-0.16
Iran	357	450	0.13	1.76	51	38	-11.72	-2.75	6	5	-5.52	0.76
Japan	510	492	0.81	-0.17	831	770	1.79	-0.50	12	13	32.59	0.00
Kazakhstan	556	699	4.20	1.96	60	54	1.31	-0.16	24	28	28.92	0.06
Korea	332	370	0.84	0.26	595	657	6.09	0.82	5	4	-2.75	0.00
Malaysia	29	36	7.13	2.54	261	335	1.51	1.54	19	21	5.10	-1.56
Pakistan	2 453	3 292	4.76	2.49	2	2	8.37	0.06	72	53	7.53	-1.81
Philippines	180	216	-6.50	2.03	212	261	4.56	2.95	4	4	2.19	-1.29
Saudi Arabia	21	29	-6.42	2.97	217	266	3.66	1.40	13	12	-4.11	-1.40
Thailand	187	223	-0.26	2.06	33	27	-3.51	-1.61	82	94	-0.02	1.32
Türkiye	1 465	1 811	8.59	1.69	101	61	8.97	-5.17	38	71	12.13	6.08
Viet Nam	262	366	4.40	3.33	353	569	-14.29	4.54	1	1	-1.86	-0.40
OCEANIA	3 053	3 381	-1.51	0.21	43	47	1.98	0.75	2 228	2 524	-2.47	0.66
Australia	2 276	2 622	-2.51	0.15	22	22	7.05	0.00	1 507	1 836	-4.39	0.75
New Zealand	765	744	2.17	0.36	8	8	-4.95	-0.02	718	686	3.17	0.43
DEVELOPED COUNTRIES	**30 979**	**31 955**	**0.75**	**0.77**	**4 739**	**4 593**	**-0.15**	**-0.41**	**5 942**	**6 298**	**0.51**	**0.84**
DEVELOPING COUNTRIES	**42 583**	**49 270**	**1.23**	**1.34**	**8 438**	**9 960**	**4.89**	**1.62**	**7 542**	**8 255**	**3.59**	**1.01**
LEAST DEVELOPED COUNTRIES	4 027	5 014	2.72	2.16	195	338	-3.44	5.51	148	92	4.71	-4.48
OECD[3]	**30 558**	**31 673**	**1.15**	**0.76**	**5 256**	**5 150**	**1.74**	**-0.30**	**6 203**	**6 671**	**0.76**	**0.89**

.. Not available

Note : Calendar year; except year ending 30 June for New Zealand. Average 2021-23est: Data for 2023 are estimated

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Gross indigenous production.
5. Least-squares growth rate (see glossary).
6. Excludes trade of live animals

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

Table C.26.2 Beef and veal projections: Consumption, food

Calendar year

	CONSUMPTION (kt cwe)		Growth (%)[4]		FOOD (kg rwe/cap)[5]		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**73 270**	**81 231**	**1.13**	**1.11**	**5.9**	**6.0**	**0.06**	**0.26**
NORTH AMERICA	13 769	14 091	1.55	1.04	24.2	23.4	0.90	0.52
Canada	998	1 087	0.88	0.61	17.1	17.1	-0.18	-0.17
United States	12 771	13 004	1.60	1.07	25.0	24.2	1.00	0.59
LATIN AMERICA	13 484	14 219	-1.43	0.55	13.4	13.1	-2.27	-0.10
Argentina	2 336	2 219	-0.93	-0.15	33.8	30.1	-1.65	-0.70
Brazil	5 989	6 135	-2.74	-0.04	18.3	17.8	-3.40	-0.48
Chile	543	571	2.29	1.41	18.3	18.7	1.00	1.13
Colombia	691	808	-2.43	1.65	8.8	9.7	-3.72	1.10
Mexico	1 788	1 862	2.28	0.67	9.1	8.8	1.43	0.05
Paraguay	140	173	3.32	2.68	13.6	14.8	2.02	1.60
Peru	201	244	0.03	1.91	3.9	4.2	-1.41	0.97
EUROPE	10 334	9 794	-0.87	-0.31	9.0	8.7	-0.91	-0.18
European Union[1]	6 549	6 138	-0.18	-0.51	9.4	8.9	-0.32	-0.38
United Kingdom	1 075	1 090	-0.21	0.09	10.5	10.3	-0.68	-0.19
Russia	1 837	1 720	-3.05	-0.05	8.4	8.1	-3.06	0.25
Ukraine	248	200	-5.20	-0.77	4.1	3.5	-3.48	-0.47
AFRICA	7 173	8 815	0.02	2.33	3.2	3.1	-2.44	0.09
Egypt	721	861	-5.94	3.03	4.0	4.1	-7.69	1.55
Ethiopia	432	480	1.69	1.93	2.0	1.7	-1.40	-0.36
Nigeria	336	450	-0.70	3.03	0.9	0.9	-3.32	0.77
South Africa	962	1 061	-0.74	1.41	10.6	10.6	-1.78	0.48
ASIA	27 627	33 409	3.65	1.61	3.7	4.2	2.77	1.02
China[2]	10 426	12 085	6.68	1.03	4.7	5.5	6.31	1.18
India	2 963	3 834	3.48	2.22	1.1	1.3	2.18	1.42
Indonesia	789	969	2.80	2.32	1.7	1.9	2.31	1.62
Iran	402	483	-2.24	1.33	2.9	3.3	-3.37	0.80
Japan	1 314	1 257	1.15	-0.41	7.0	7.2	1.55	0.17
Kazakhstan	593	726	3.41	1.86	20.2	22.0	2.18	0.82
Korea	922	1 023	3.46	0.62	11.7	13.3	3.23	0.80
Malaysia	271	349	1.57	1.86	5.2	6.1	0.29	0.96
Pakistan	2 382	3 241	4.69	2.58	6.5	7.2	3.19	0.74
Philippines	388	474	-1.88	2.55	2.2	2.3	-3.54	1.19
Saudi Arabia	226	284	3.07	1.68	4.0	4.4	1.44	0.44
Thailand	138	156	-1.29	1.76	1.2	1.4	-1.68	1.75
Türkiye	1 528	1 802	7.92	1.23	11.3	12.6	6.82	0.73
Viet Nam	613	934	-9.40	4.05	4.1	5.9	-10.21	3.55
OCEANIA	883	904	1.26	-0.91	13.3	12.1	-0.32	-1.95
Australia	791	807	1.84	-1.08	20.0	18.5	0.49	-1.94
New Zealand	70	66	-3.91	-0.29	8.9	7.8	-5.56	-0.95
DEVELOPED COUNTRIES	**29 791**	**30 257**	**0.65**	**0.58**	**13.6**	**13.6**	**0.34**	**0.42**
DEVELOPING COUNTRIES	**43 479**	**50 974**	**1.46**	**1.45**	**4.3**	**4.5**	**0.21**	**0.45**
LEAST DEVELOPED COUNTRIES	4 074	5 259	2.27	2.51	2.8	2.8	-0.16	0.34
OECD[3]	**29 625**	**30 159**	**1.32**	**0.54**	**13.8**	**13.7**	**0.86**	**0.34**

.. Not available

Note : Calendar year; except year ending 30 June for New Zealand. Average 2021-23est: Data for 2023 are estimated

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).
5. Per capita consumption is expressed in edible retail weight equivalent basis. Carcass weight equivalent to edible retail weight conversion factors is 0.67 for beef and veal.

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

Table C.27.1 Pig meat projections: Production and trade

Calendar year

	PRODUCTION (kt cwe)[4]		Growth (%)[5]		IMPORTS (kt cwe)[6]		Growth (%)[5]		EXPORTS (kt cwe)[6]		Growth (%)[5]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**121 830**	**131 058**	**0.26**	**0.52**	**11 360**	**10 702**	**4.66**	**0.29**	**11 429**	**10 702**	**3.56**	**0.29**
NORTH AMERICA	14 338	15 182	1.81	0.36	1 000	1 100	1.78	1.03	4 756	4 833	3.66	0.58
Canada	2 226	2 189	1.60	-0.02	252	280	2.39	0.49	1 708	1 641	2.58	0.10
United States	12 112	12 993	1.85	0.42	748	820	1.52	1.23	3 049	3 192	4.30	0.84
LATIN AMERICA	9 598	11 244	3.90	1.35	2 158	2 359	7.35	0.61	1 627	1 422	8.27	-0.19
Argentina	730	904	6.23	1.27	33	30	9.01	0.37	18	9	8.99	-0.37
Brazil	5 128	5 550	5.13	0.71	19	24	5.68	-0.05	1 103	821	9.26	-1.26
Chile	582	750	1.77	2.48	163	130	16.25	-2.18	255	339	7.19	2.23
Colombia	506	695	7.76	2.47	153	147	10.69	0.81	0	0	..	..
Mexico	1 531	1 816	2.32	1.38	1299	1445	6.34	0.74	226	227	7.35	0.72
Paraguay	68	95	9.45	2.89	6	6	9.95	-0.64	5	8	7.88	0.65
Peru	181	228	3.43	2.15	12	20	3.07	3.32	0	0	..	..
EUROPE	29 545	28 428	0.54	-0.12	1 130	961	-4.61	-1.15	4 450	3 795	3.04	-0.07
European Union[1]	22 277	20 497	-0.21	-0.40	106	84	-4.10	-1.15	4 062	3 447	3.28	-0.17
United Kingdom	950	985	1.37	0.87	662	545	-1.82	-1.88	198	159	-1.36	2.36
Russia	4 489	4 873	5.31	0.38	46	42	-28.26	0.70	107	107	16.16	0.00
Ukraine	679	811	-1.45	1.55	49	25	17.03	-2.26	7	5	-10.68	0.12
AFRICA	2 024	2 539	3.23	2.16	321	622	1.09	7.32	31	39	-0.03	1.87
Egypt	1	1	8.97	0.99	2	3	27.80	4.41	0	0	..	..
Ethiopia	2	3	1.51	2.89	0	0	..	..	0	0	..	..
Nigeria	307	414	2.02	3.05	6	30	32.28	20.38	0	0	..	..
South Africa	346	446	5.57	1.79	29	16	-2.31	-2.48	25	34	-0.54	2.48
ASIA	65 726	72 983	-0.77	0.64	6 386	5 191	7.55	-0.40	531	571	-2.95	1.50
China[2]	55 452	59 523	-0.74	0.27	2 854	1 596	15.70	-1.92	271	268	-7.98	-0.08
India	317	335	-1.86	0.61	1	1	7.02	0.00	1	1	20.36	0.00
Indonesia	280	356	-2.62	2.30	6	9	4.62	4.31	17	13	-2.70	-3.73
Iran	0	0	..	..	0	0	..	..	0	0	-21.27	..
Japan	1299	1286	0.33	-0.08	1 362	1 380	1.85	0.06	2	4	11.39	0.51
Kazakhstan	84	105	-1.93	1.95	48	58	4.60	2.06	0	0	-21.67	..
Korea	1 408	1 371	2.01	-0.21	670	728	2.27	0.23	10	3	18.81	-7.15
Malaysia	228	293	0.90	2.61	47	80	9.42	1.04	14	14	16.38	-0.03
Pakistan	0	0	..	..	0	0	..	..	0	0	..	..
Philippines	1 217	1 859	-4.56	4.03	419	393	18.07	-0.22	2	2	-2.23	0.02
Saudi Arabia	0	3	..	24.96	21	24	9.93	0.00	3	3	2.46	0.00
Thailand	904	1 193	-1.02	3.04	1	1	-17.07	0.46	117	171	8.04	7.72
Türkiye	0	0	..	..	27	26	12.34	0.00	27	26	12.34	0.00
Viet Nam	2 835	4 453	1.22	3.66	159	85	52.28	2.85	21	23	-7.76	-0.41
OCEANIA	597	681	2.17	1.04	364	468	-0.62	1.37	33	41	1.56	0.70
Australia	452	523	2.70	1.13	279	363	-1.78	1.09	32	40	1.11	0.76
New Zealand	45	44	-0.44	-0.22	75	85	4.30	1.46	1	1	16.96	-0.04
DEVELOPED COUNTRIES	**46 171**	**46 099**	**0.95**	**0.08**	**3 983**	**4 043**	**-0.57**	**0.17**	**9 273**	**8 712**	**3.37**	**0.30**
DEVELOPING COUNTRIES	**75 659**	**84 959**	**-0.19**	**0.77**	**7 377**	**6 659**	**8.71**	**0.36**	**2 155**	**1 989**	**4.37**	**0.27**
LEAST DEVELOPED COUNTRIES	1 766	2 323	-2.32	2.81	231	477	3.33	7.53	17	18	42.35	-0.06
OECD[3]	**43 765**	**43 501**	**0.76**	**0.08**	**5 818**	**6 058**	**2.37**	**0.24**	**9 577**	**9 085**	**3.57**	**0.37**

.. Not available

Note : Calendar year; except year ending 30 June for New Zealand. Average 2021-23est: Data for 2023 are estimated

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Gross indigenous production.
5. Least-squares growth rate (see glossary).
6. Excludes trade of live animals

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

Table C.27.2 Pig meat projections: Consumption, food

Calendar year

	CONSUMPTION (kt cwe)		Growth (%)[4]		FOOD (kg rwe/cap)[5]		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**121 717**	**131 045**	**0.33**	**0.52**	**10.8**	**10.6**	**-0.70**	**-0.31**
NORTH AMERICA	10 577	11 441	1.05	0.33	20.3	20.7	0.41	-0.19
Canada	767	827	-0.08	-0.11	14.3	14.2	-1.13	-0.88
United States	9 810	10 613	1.14	0.36	21.0	21.5	0.55	-0.12
LATIN AMERICA	10 130	12 181	3.92	1.39	10.9	12.2	3.05	0.74
Argentina	745	924	6.18	1.26	11.7	13.7	5.41	0.69
Brazil	4 044	4 753	4.21	1.09	13.5	15.0	3.50	0.65
Chile	490	540	2.12	1.29	18.0	19.3	0.83	1.01
Colombia	659	843	8.36	2.16	9.1	11.0	6.92	1.60
Mexico	2 605	3 034	3.72	1.12	14.5	15.7	2.86	0.49
Paraguay	69	93	9.52	2.84	7.2	8.6	8.15	1.76
Peru	193	248	3.42	2.24	4.0	4.7	1.94	1.30
EUROPE	26 226	25 594	-0.12	-0.17	24.9	24.7	-0.14	-0.03
European Union[1]	18 321	17 135	-0.90	-0.45	28.7	27.2	-1.05	-0.32
United Kingdom	1 415	1 371	0.14	-0.46	15.1	14.1	-0.34	-0.73
Russia	4 429	4 808	3.23	0.39	22.0	24.7	3.23	0.69
Ukraine	721	831	-0.75	1.42	13.0	15.9	1.05	1.73
AFRICA	2 314	3 122	2.97	3.01	1.1	1.2	0.43	0.75
Egypt	3	4	21.76	3.48	0.0	0.0	19.50	1.99
Ethiopia	2	3	-0.09	3.11	0.0	0.0	-3.13	0.79
Nigeria	314	445	2.26	3.62	0.9	1.0	-0.44	1.34
South Africa	350	429	5.25	1.54	4.2	4.6	4.15	0.62
ASIA	71 542	77 598	-0.15	0.56	10.7	10.9	-0.98	-0.01
China[2]	58 035	60 852	-0.15	0.20	28.6	30.4	-0.50	0.35
India	317	336	-1.88	0.61	0.1	0.1	-3.11	0.00
Indonesia	269	353	-2.52	2.64	0.6	0.8	-2.99	1.94
Iran	0	0	..	..	0.0	0.0	21.45	0.00
Japan	2 643	2 661	1.03	-0.01	15.4	16.5	1.43	0.57
Kazakhstan	131	163	0.17	1.99	4.9	5.4	-1.02	0.95
Korea	2 061	2 096	2.06	-0.09	28.6	29.6	1.83	0.09
Malaysia	260	359	1.65	2.35	5.5	6.8	0.37	1.44
Pakistan	0	0	..	..	0.0	0.0	12.02	0.00
Philippines	1 617	2 246	-1.74	3.16	9.9	11.8	-3.40	1.79
Saudi Arabia	18	24	11.36	1.20	0.4	0.4	9.61	0.00
Thailand	788	1 023	-2.12	2.43	7.7	10.0	-2.51	2.42
Türkiye	0	0	..	..	0.0	0.0	-0.99	0.00
Viet Nam	2 973	4 515	2.15	3.67	21.7	31.2	1.24	3.17
OCEANIA	928	1 108	1.03	1.19	15.2	16.1	-0.55	0.12
Australia	699	847	0.82	1.13	19.3	21.2	-0.53	0.25
New Zealand	119	128	2.24	0.86	16.5	16.4	0.48	0.20
DEVELOPED COUNTRIES	**40 860**	**41 420**	**0.30**	**0.04**	**20.2**	**20.1**	**0.00**	**-0.12**
DEVELOPING COUNTRIES	**80 857**	**89 625**	**0.33**	**0.75**	**8.8**	**8.7**	**-0.86**	**-0.22**
LEAST DEVELOPED COUNTRIES	1 980	2 783	-1.91	3.51	1.5	1.6	-4.23	1.31
OECD[3]	**39 979**	**40 466**	**0.37**	**0.03**	**20.2**	**20.0**	**-0.08**	**-0.17**

.. Not available

Note : Calendar year; except year ending 30 June for New Zealand. Average 2021-23est: Data for 2023 are estimated

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).
5. Per capita consumption is expressed in edible retail weight equivalent basis. Carcass weight equivalent to edible retail weight conversion factors is 0.73 for pig meat.

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

Table C.28.1 Poultry meat projections: Production and trade

Calendar year

	PRODUCTION (kt rtc)		Growth (%)[4]		IMPORTS (kt rtc)		Growth (%)[4]		EXPORTS (kt rtc)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**138 748**	**159 932**	**2.62**	**1.38**	**15 060**	**16 863**	**2.82**	**1.08**	**15 826**	**16 863**	**2.27**	**1.08**
NORTH AMERICA	24 670	26 780	1.70	0.77	262	313	-0.73	0.63	3 679	3 849	0.51	0.73
Canada	1 494	1 761	2.03	1.45	173	200	-2.15	0.88	135	157	-3.80	1.74
United States	23 176	25 019	1.68	0.73	89	113	2.57	0.19	3 544	3 692	0.71	0.69
LATIN AMERICA	29 261	34 088	2.10	1.44	2 512	2 711	2.38	0.75	5 002	5 289	1.66	1.24
Argentina	2 302	2 588	1.69	1.21	9	6	-5.26	-0.76	201	249	-0.18	2.03
Brazil	15 221	16 818	2.03	1.01	5	5	414.38	0.00	4 542	4 809	1.77	1.26
Chile	751	855	1.04	1.54	167	132	4.38	-0.55	172	151	3.79	0.56
Colombia	1 782	2 249	3.20	1.90	88	82	3.53	2.18	6	6	4.78	0.00
Mexico	3 789	4 544	3.46	1.61	1089	1139	2.20	0.13	4	2	-2.14	0.54
Paraguay	60	72	1.29	1.87	16	17	8.30	0.19	9	5	119.01	-7.92
Peru	1 779	2 334	3.36	2.58	102	140	13.83	1.50	1	0	-24.31	-0.12
EUROPE	22 172	23 746	1.82	0.47	2 138	2 085	-1.35	-0.64	3 400	3 638	2.72	1.08
European Union[1]	13 270	13 887	1.43	0.19	800	895	-1.64	-0.04	1 989	2 216	-0.06	1.50
United Kingdom	1985	2180	1.99	0.69	544	588	0.00	1.40	274	259	-1.89	0.50
Russia	4 780	5 177	2.44	0.63	249	92	-3.87	-10.60	393	408	21.06	0.00
Ukraine	1 195	1 372	1.79	1.35	201	184	-0.85	-0.24	447	459	12.87	0.56
AFRICA	7 268	9 048	3.42	2.65	2 385	3 660	3.54	4.22	164	148	3.35	-0.84
Egypt	2 028	2 377	7.69	3.89	41	110	-12.34	7.47	1	1	-19.90	-4.45
Ethiopia	69	89	-0.49	2.54	1	0	..	..	0	0	..	..
Nigeria	240	343	1.61	3.38	0	0	..	..	0	0	..	..
South Africa	1 931	2 450	1.64	2.26	400	350	-2.12	-1.46	70	75	-3.64	0.72
ASIA	53 705	64 231	3.62	1.79	7 670	7 970	4.32	0.46	3509	3862	4.97	1.32
China[2]	24 232	25 220	4.31	0.67	1 401	620	17.52	-6.14	748	502	2.42	-1.09
India	3 772	6 008	2.34	4.28			..	..	5	3	-3.42	-5.23
Indonesia	4065	5362	9.09	2.22	1	1	-20.82	0.01	2	2	-3.80	-0.70
Iran	1 931	2 278	-1.12	1.76	72	16	33.47	-9.13	26	36	-17.17	3.07
Japan	1677	1690	1.40	0.16	936	928	2.04	-0.30	4	3	-12.21	0.00
Kazakhstan	247	339	9.65	2.60	219	226	3.12	1.07	21	23	16.43	-1.05
Korea	1 004	1 096	2.76	0.82	242	228	7.43	-1.29	59	44	15.48	-1.96
Malaysia	1 731	2 295	0.05	2.43	176	226	14.96	0.24	208	216	5.70	-0.07
Pakistan	1 869	2 463	7.99	2.69	3	3	-5.40	0.70	16	14	14.18	-0.47
Philippines	1 443	2 028	2.60	3.05	447	785	12.17	4.82	2	2	-18.10	-0.37
Saudi Arabia	941	1 214	7.70	2.50	634	691	-4.65	0.38	60	62	3.01	-0.32
Thailand	1 943	2 479	1.52	1.88	4	4	-12.16	0.26	1352	1768	6.45	1.79
Türkiye	2 402	2 962	2.31	2.26	57	48	0.49	-2.93	721	956	4.87	3.64
Viet Nam	2 149	3 222	11.73	3.43	267	311	15.43	1.19	4	3	-8.01	-0.10
OCEANIA	1 671	2 041	2.30	1.87	92	124	6.94	3.23	71	75	2.88	1.06
Australia	1 410	1 733	2.39	1.93	0	0	..	..	57	60	4.88	1.08
New Zealand	227	259	1.88	1.24	1	1	6.91	0.00	14	14	-2.90	1.00
DEVELOPED COUNTRIES	**53 331**	**58 290**	**1.81**	**0.77**	**4 266**	**4 252**	**-0.18**	**-0.35**	**7 298**	**7 714**	**1.54**	**0.88**
DEVELOPING COUNTRIES	**85 417**	**101 642**	**3.15**	**1.75**	**10 794**	**12 611**	**4.23**	**1.62**	**8 528**	**9 149**	**2.92**	**1.26**
LEAST DEVELOPED COUNTRIES	2 518	3 460	-2.30	3.03	1 154	2 048	3.97	5.64	46	42	28.78	-0.75
OECD[3]	**53 815**	**59 268**	**1.85**	**0.85**	**4 241**	**4 409**	**1.06**	**0.09**	**6 993**	**7 571**	**0.76**	**1.24**

.. Not available

Note : Calendar year; except year ending 30 June for New Zealand. Average 2021-23est: Data for 2023 are estimated

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.28.2 Poultry meat projections: Consumption, food

Calendar year

	CONSUMPTION (kt rtc)		Growth (%)[4]		FOOD (kg rwe/cap)[5]		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**137 981**	**159 926**	**2.68**	**1.38**	**10.0**	**10.6**	**1.61**	**0.52**
NORTH AMERICA	21 253	23 238	1.92	0.78	33.5	34.6	1.27	0.26
Canada	1 530	1 802	2.15	1.37	23.5	25.4	1.08	0.58
United States	19 722	21 437	1.90	0.73	34.6	35.7	1.30	0.25
LATIN AMERICA	26 771	31 509	2.21	1.42	23.8	26.0	1.35	0.77
Argentina	2 110	2 345	1.87	1.12	27.3	28.5	1.13	0.56
Brazil	10 684	12 014	2.16	0.91	29.2	31.3	1.47	0.47
Chile	745	837	1.09	1.36	22.5	24.6	-0.19	1.08
Colombia	1 865	2 325	3.23	1.91	21.2	24.9	1.85	1.35
Mexico	4 873	5 681	3.17	1.30	22.2	24.2	2.32	0.67
Paraguay	67	83	0.77	2.63	5.8	6.4	-0.49	1.56
Peru	1 880	2 474	3.78	2.52	32.3	38.4	2.29	1.57
EUROPE	20 917	22 194	1.31	0.27	16.4	17.6	1.28	0.40
European Union[1]	12 088	12 568	1.47	-0.04	15.6	16.4	1.32	0.10
United Kingdom	2 255	2 510	2.01	0.88	19.7	21.3	1.52	0.59
Russia	4 635	4 860	1.14	0.28	18.9	20.5	1.13	0.57
Ukraine	949	1 098	-1.76	1.42	14.0	17.3	0.02	1.72
AFRICA	9 490	12 559	3.45	3.13	3.8	4.0	0.86	0.87
Egypt	2 068	2 486	6.88	4.02	10.3	10.5	4.90	2.52
Ethiopia	70	89	-0.46	2.54	0.3	0.3	-3.49	0.23
Nigeria	240	343	1.58	3.38	0.6	0.6	-1.10	1.11
South Africa	2 261	2 725	1.05	1.74	22.3	24.3	-0.01	0.82
ASIA	57 859	68 336	3.63	1.65	7.0	7.7	2.76	1.04
China[2]	24 885	25 338	4.86	0.48	10.1	10.4	4.50	0.63
India	3 766	6 005	2.36	4.29	1.2	1.8	1.07	3.47
Indonesia	4 064	5 360	9.07	2.22	7.8	9.5	8.54	1.53
Iran	1 977	2 258	-0.21	1.60	12.9	13.8	-1.36	1.08
Japan	2 611	2 613	1.77	0.00	12.5	13.3	2.17	0.59
Kazakhstan	445	542	5.92	2.11	13.6	14.7	4.66	1.06
Korea	1 187	1 280	3.19	0.52	13.5	14.9	2.96	0.70
Malaysia	1 699	2 304	0.45	2.45	29.4	36.1	-0.82	1.54
Pakistan	1 856	2 452	7.90	2.71	4.5	4.9	6.36	0.86
Philippines	1 888	2 812	4.36	3.52	9.5	12.2	2.60	2.14
Saudi Arabia	1 515	1 843	1.16	1.75	24.1	25.5	-0.44	0.51
Thailand	586	712	-5.58	2.20	4.7	5.7	-5.95	2.19
Türkiye	1 738	2 054	1.19	1.53	11.5	12.9	0.16	1.02
Viet Nam	2 411	3 530	12.21	3.22	14.5	20.0	11.21	2.72
OCEANIA	1 692	2 090	2.48	1.97	22.7	24.9	0.88	0.90
Australia	1 352	1 673	2.30	1.96	30.7	34.4	0.94	1.07
New Zealand	215	246	2.28	1.25	24.5	26.0	0.53	0.59
DEVELOPED COUNTRIES	**50 307**	**54 824**	**1.69**	**0.66**	**20.6**	**22.0**	**1.37**	**0.50**
DEVELOPING COUNTRIES	**87 674**	**105 103**	**3.29**	**1.78**	**7.7**	**8.3**	**2.05**	**0.77**
LEAST DEVELOPED COUNTRIES	3 626	5 466	-0.83	3.97	2.2	2.6	-3.18	1.77
OECD[3]	**51 071**	**56 101**	**1.96**	**0.73**	**21.3**	**22.9**	**1.49**	**0.53**

.. Not available

Note : Calendar year; except year ending 30 June for New Zealand. Average 2021-23est: Data for 2023 are estimated

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).
5. Per capita consumption is expressed in edible retail weight equivalent basis. Carcass weight equivalent to edible retail weight conversion factors is 0.6 for poultry meat.

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

Table C.29.1 Sheep meat projections: Production and trade

Calendar year

	PRODUCTION (kt cwe)		Growth (%)[5]		IMPORTS (kt cwe)[6]		Growth (%)[5]		EXPORTS (kt cwe)[6]		Growth (%)[5]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**16 614**	**19 253**	**1.87**	**1.32**	**1 140**	**1 175**	**0.85**	**-0.10**	**1 181**	**1 259**	**0.67**	**0.43**
NORTH AMERICA	84	84	-1.60	-0.04	190	188	6.92	-0.07	2	2	-7.75	0.06
Canada	17	17	0.18	-0.41	26	29	2.45	0.18			..	..
United States	67	67	-2.02	0.05	164	159	7.78	-0.11	1	1	-7.72	0.07
LATIN AMERICA	476	531	2.06	0.87	15	17	-8.91	0.20	31	30	6.26	-0.21
Argentina	54	55	-0.66	0.03	0	0	..	..	5	5	11.61	0.63
Brazil	142	151	2.50	0.60	3	4	-12.05	0.00			..	..
Chile	8	9	-1.41	0.48	0	0	..	..	6	5	0.53	-0.31
Colombia	1	1	-1.00	0.50	0	0	..	..	0	0	..	..
Mexico	108	111	1.30	0.17	1	1	-32.99	-1.35	1	0	..	..
Paraguay	3	3	-4.44	1.04	0	0	..	..	0	0	..	..
Peru	38	41	-0.59	0.74	0	0	..	..	0	0	..	..
EUROPE	1 245	1 272	-0.02	0.32	216	197	-4.41	-1.35	141	163	-0.22	1.23
European Union[1]	627	636	0.36	0.29	145	128	-2.07	-1.86	45	51	2.35	1.43
United Kingdom	297	303	-0.32	0.29	62	60	-8.06	-0.34	88	101	-1.47	0.93
Russia	211	209	0.24	-0.11			-54.32	..	1	1	48.72	0.00
Ukraine	8	5	-9.99	1.71	1	1	..	1.88			..	..
AFRICA	3 430	4 407	1.55	2.55	11	13	-14.04	-1.90	49	39	5.27	-1.39
Egypt	69	86	-8.03	1.98	1	1	-14.15	7.10	0	0	..	..
Ethiopia	291	378	6.84	2.85	0	0	..	..	14	16	-3.34	3.53
Nigeria	406	547	0.50	3.21	0	1	..	..	0	0	..	..
South Africa	155	193	-1.48	2.44	2	2	-20.11	-3.13	4	9	17.02	7.89
ASIA	10 170	11 633	2.48	1.14	679	722	2.57	0.21	32	27	-4.57	-2.45
China[2]	5 234	5 652	2.39	0.63	390	363	6.83	-0.79	2	2	-12.70	0.65
India	826	878	1.06	0.60	0	0	..	..	9	10	-12.03	0.00
Indonesia	116	144	0.61	1.65	3	5	2.01	2.03	0	0	..	..
Iran	310	376	-4.90	1.33	6	13	8.22	0.54	0	0	..	..
Japan	0	0	..	..	20	18	0.37	-1.72	0	0	..	..
Kazakhstan	179	208	1.11	1.44	0	0	..	..	8	6	107.06	-5.09
Korea	2	3	5.76	-0.01	17	18	10.90	0.27	0	0	..	..
Malaysia	2	2	155.19	2.88	37	49	1.59	2.29	0	0	..	..
Pakistan	781	1005	6.55	2.26	0	0	..	..	4	0	-8.68	-20.83
Philippines	31	47	-7.26	4.40	1	2	-2.09	9.99	0	0	..	..
Saudi Arabia	72	90	549.48	1.17	27	38	-10.28	3.39	0	0	-20.82	..
Thailand	2	2	0.37	0.61	1	2	-3.09	3.39	0	0	..	..
Türkiye	584	788	8.95	1.88	0	0	..	..	3	2	42.25	-0.61
Viet Nam	21	27	8.13	2.57	1	3	-9.60	12.83	0	0	..	..
OCEANIA	1 209	1 326	0.23	0.39	29	39	0.20	1.59	927	999	0.70	0.49
Australia	772	892	1.21	0.70	0	0	..	..	501	576	2.41	0.97
New Zealand	437	434	-1.40	-0.21	4	4	-2.17	0.07	426	423	-1.08	-0.14
DEVELOPED COUNTRIES	**3 475**	**3 811**	**0.13**	**0.76**	**440**	**423**	**-0.39**	**-0.69**	**1 082**	**1 179**	**0.67**	**0.59**
DEVELOPING COUNTRIES	**13 139**	**15 442**	**2.38**	**1.46**	**700**	**751**	**1.69**	**0.26**	**99**	**80**	**0.60**	**-1.67**
LEAST DEVELOPED COUNTRIES (LDC)	2 152	2 723	1.74	2.36	2	2	-7.74	-1.42	11	2	9.59	-15.18
OECD[3]	**2 980**	**3 332**	**1.47**	**0.70**	**449**	**428**	**-0.21**	**-0.71**	**1 071**	**1 160**	**0.58**	**0.56**

.. Not available

Note : Calendar year; except year ending 30 June for New Zealand. Average 2021-23est: Data for 2023 are estimated

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Gross indigenous production.
5. Least-squares growth rate (see glossary).
6. Excludes trade of live animals

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

Table C.29.2 Sheep meat projections: Consumption, food

Calendar year

	CONSUMPTION (kt cwe)		Growth (%)[4]		FOOD (kg rwe/cap)[5]		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**16 593**	**19 253**	**1.89**	**1.32**	**1.3**	**1.4**	**0.82**	**0.48**
NORTH AMERICA	264	262	3.89	-0.06	0.5	0.4	3.23	-0.57
Canada	41	45	1.18	-0.04	0.7	0.7	0.12	-0.81
United States	223	218	4.46	-0.07	0.4	0.4	3.85	-0.55
LATIN AMERICA	461	519	1.31	0.91	0.4	0.5	0.44	0.26
Argentina	50	50	-1.36	-0.03	0.7	0.7	-2.08	-0.58
Brazil	145	155	1.91	0.58	0.4	0.4	1.22	0.14
Chile	3	4	-4.40	1.65	0.1	0.1	-5.61	1.36
Colombia	1	1	-1.39	0.54	0.0	0.0	-2.70	0.00
Mexico	108	112	-0.22	0.15	0.5	0.5	-1.04	-0.47
Paraguay	3	3	-4.52	1.04	0.2	0.2	-5.71	0.00
Peru	38	41	-0.59	0.74	0.7	0.7	-2.01	-0.19
EUROPE	1 267	1 251	-0.99	-0.06	1.1	1.1	-1.02	0.07
European Union[1]	676	661	-0.51	-0.22	1.0	0.9	-0.65	-0.09
United Kingdom	271	261	-2.25	-0.09	2.6	2.4	-2.71	-0.37
Russia	209	207	-0.18	-0.12	0.9	1.0	-0.18	0.18
Ukraine	7	5	-10.46	1.96	0.1	0.1	-8.84	2.26
AFRICA	3 348	4 378	1.65	2.68	1.5	1.5	-0.92	0.43
Egypt	72	90	-7.85	1.98	0.4	0.4	-9.56	0.51
Ethiopia	274	359	8.00	2.84	1.3	1.3	4.71	0.53
Nigeria	408	554	0.50	3.28	1.1	1.1	-2.15	1.01
South Africa	161	194	-2.55	2.07	1.7	1.9	-3.57	1.14
ASIA	10 952	12 490	2.39	1.10	1.5	1.6	1.54	0.55
China[2]	5 621	6 013	2.66	0.54	2.5	2.7	2.30	0.69
India	814	865	1.36	0.61	0.3	0.3	0.08	0.00
Indonesia	119	149	0.66	1.66	0.3	0.3	0.18	0.97
Iran	293	367	-3.47	1.42	2.1	2.5	-4.58	0.89
Japan	20	18	0.37	-1.72	0.1	0.1	0.77	-1.15
Kazakhstan	169	200	0.31	1.75	5.7	6.0	-0.88	0.71
Korea	20	21	10.02	0.23	0.2	0.3	9.78	0.41
Malaysia	40	52	0.83	2.25	0.8	0.9	-0.44	1.34
Pakistan	778	1 005	6.74	2.30	2.1	2.2	5.22	0.46
Philippines	32	49	-7.15	4.60	0.2	0.2	-8.72	3.20
Saudi Arabia	172	208	-2.01	1.68	3.0	3.2	-3.56	0.44
Thailand	3	5	-0.08	1.83	0.0	0.0	-0.48	1.82
Türkiye	574	779	8.63	1.90	4.2	5.4	7.53	1.39
Viet Nam	22	31	7.47	3.09	0.1	0.2	6.51	2.59
OCEANIA	301	353	0.13	0.28	4.4	4.6	-1.43	-0.78
Australia	258	303	0.92	0.25	6.4	6.9	-0.43	-0.62
New Zealand	17	15	-8.75	-2.04	2.1	1.7	-10.31	-2.68
DEVELOPED COUNTRIES	**2 778**	**2 999**	**-0.07**	**0.64**	**1.2**	**1.3**	**-0.38**	**0.47**
DEVELOPING COUNTRIES	**13 816**	**16 254**	**2.33**	**1.45**	**1.3**	**1.4**	**1.09**	**0.48**
LEAST DEVELOPED COUNTRIES	2 091	2 708	2.22	2.55	1.4	1.4	-0.21	0.38
OECD[3]	**2 296**	**2 535**	**1.72**	**0.53**	**1.0**	**1.1**	**1.21**	**0.31**

.. Not available

Note : Calendar year; except year ending 30 June for New Zealand. Average 2021-23est: Data for 2023 are estimated

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).
5. Per capita consumption is expressed in edible retail weight equivalent basis. Carcass weight equivalent to edible retail weight conversion factors is 0.66 for sheep meat.

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

Table C.30 Main policy assumptions for meat markets

Calendar year

		Average 2021-23-est	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
ARGENTINA												
Beef export tax[2]	%	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
CANADA												
Beef tariff-quota	kt pw	129.2	129.2	129.2	129.2	129.2	129.2	129.2	129.2	129.2	129.2	129.2
In-quota tariff	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Out-of-quota tariff	%	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
Poultry meat tariff-quota	kt pw	106.5	110.9	112.8	114.7	116.3	118.1	120.0	121.7	123.4	125.0	126.4
In-quota tariff	%	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Out-of-quota tariff	%	249.0	249.0	249.0	249.0	249.0	249.0	249.0	249.0	249.0	249.0	249.0
EUROPEAN UNION[3,4]												
Voluntary coupled support												
Beef and veal[5]	mln EUR	1606.2	1780.9	1760.2	1741.1	1720.5	1729.3	1729.3	1729.3	1729.3	1729.3	1729.3
Sheep and goat meat[6]	mln EUR	509.6	482.2	478.4	474.3	478.1	478.1	478.1	478.1	478.1	478.1	478.1
Beef basic price[1]	EUR/kg dwt	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	3.2	4.2
Beef tariff-quota	kt cwe	321.4	327.1	328.7	329.2	329.7	330.2	330.7	331.2	331.2	331.2	331.2
Pig tariff-quota	kt cwe	212.1	213.9	214.8	215.7	216.6	217.5	218.4	219.3	220.2	220.2	221.1
Poultry tariff-quota	kt rtc	905.0	909.1	911.2	913.3	915.3	917.4	919.4	921.5	922.6	923.6	924.7
Sheep meat tariff-quota	kt cwe	163.1	163.5	163.7	163.9	164.1	164.3	164.5	164.7	164.9	164.9	164.9
JAPAN[7]												
Beef stabilisation prices												
Upper price	JPY/kg dwt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lower price	JPY/kg dwt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Beef tariff	%	24.1	22.7	21.8	21.0	20.2	18.6	16.8	15.0	13.1	11.3	9.5
Pig meat stabilisation prices												
Upper price	JPY/kg dwt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lower price	JPY/kg dwt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pig meat import system												
Tariff	%	1.2	0.7	0.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standard import price	JPY/kg dwt	416.0	424.8	415.3	407.4	401.5	391.7	383.3	376.5	368.4	361.9	353.7
Poultry meat tariff	%	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9
KOREA												
Beef tariff	%	10.6	5.3	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pig meat tariff	%	10.6	5.3	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Poultry meat tariff	%	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6
MEXICO[8]												
Beef and veal tariff-quota	kt pw	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
In-quota tariff	%	2.1	2.1	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Out-of-quota tariff[9]	%	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
Poultry meat tariff-quota	kt pw	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
In-quota tariff	%	2.1	2.1	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Out-of-quota tariff	%	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
RUSSIA												
Beef tariff-quota	kt pw	570.0	570.0	570.0	570.0	570.0	570.0	570.0	570.0	570.0	570.0	570.0
In-quota tariff	%	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Out-of-quota tariff	%	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Pig meat tariff-quota[10]	kt pw	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
In-quota tariff	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Out-of-quota tariff	%	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Poultry tariff-quota	kt pw	364.0	364.0	364.0	364.0	364.0	364.0	364.0	364.0	364.0	364.0	364.0
In-quota tariff	%	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Out-of-quota tariff	%	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0
UNITED STATES												
Beef tariff-quota	kt pw	676.8	676.8	676.8	676.8	676.8	676.8	676.8	676.8	676.8	676.8	676.8
In-quota tariff	%	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
Out-of-quota tariff	%	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4

Table C.30 Main policy assumptions for meat markets *(cont.)*

Calendar year

		Average 2021-23-est	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
CHINA												
Beef tariff	%	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Pig meat tariff	%	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Sheep meat tariff	%	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Poultry meat tariff	%	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
INDIA												
Beef tariff	%	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5
Pig meat tariff	%	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Sheep meat tariff	%	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Poultry meat tariff	%	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
SOUTH AFRICA												
Beef tariff	%	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
Pig meat tariff	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sheep meat tariff	%	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
Poultry meat tariff	%	40.2	40.2	40.2	40.2	40.2	40.2	40.2	40.2	40.2	40.2	40.2

Note : Average 2021-23est: Data for 2023 are estimated.

1. Price for R3 grade male cattle.
2. In Argentina, a temporary export tax is applied on all goods from September 4th 2018 until December 31st 2020.
3. Since 2015 the Basic payment scheme (BPS) holds, which shall account for the maximum of the national direct payment envelopes. On top of this, compulsory policy instruments have been introduced: the Green Payment and young farmer scheme.More details can be found in here: https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/key_policies/documents/voluntary-coupled-support-note-revised- aug2018_en.pdf
4. Refers to all current European Union member countries.
5. Implemented in 24 Member States.
6. Implemented in 22 Member States.
7. Year beginning 1 April.
8. Intended for countries which whom Mexico has no free trade agreements.
9. 25% for frozen beef.
10. Eliminated in 2020 and replaced by import tariff

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

Table C.31.1 Butter projections: Production and trade

Calendar year

	PRODUCTION (kt)		Growth (%)[4]		IMPORTS (kt)		Growth (%)[4]		EXPORTS (kt)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**13 054**	**15 717**	**2.20**	**1.73**	**1 024**	**1 138**	**0.68**	**0.80**	**1 034**	**1 138**	**-0.31**	**0.80**
NORTH AMERICA	1 058	1 204	2.00	0.99	76	77	14.54	-1.41	49	24	5.95	-6.65
Canada	116	146	3.94	2.23	28	36	11.72	0.40			..	..
United States	942	1 058	1.79	0.83	49	41	16.45	-2.79	49	24	6.19	-6.65
LATIN AMERICA	464	512	0.95	0.99	54	76	-2.35	1.67	43	38	-1.36	-0.11
Argentina	31	35	-3.34	1.10	0	0	..	..	21	20	9.46	0.15
Brazil	113	111	2.05	0.10	3	10	9.98	6.63	1	1	-5.56	-7.78
Chile	29	32	3.80	0.79	5	3	-2.77	1.16	1	1	-12.05	-0.86
Colombia	22	24	0.43	1.19	0	0	..	..	0	0	..	..
Mexico	211	246	1.03	1.21	24	37	-4.64	1.19	2	3	-13.20	0.00
Paraguay	1	1	5.35	2.67	0	0	..	..	1	1	17.86	2.42
Peru	7	7	7.92	0.26	6	8	-1.69	3.24	0	0	..	..
EUROPE	3 082	3 117	1.10	0.08	250	257	-0.36	0.40	406	444	0.54	1.09
European Union[1]	2 334	2 343	1.19	-0.01	52	45	5.49	-2.44	251	285	1.09	1.11
United Kingdom	207	203	5.11	-0.03	58	68	-6.94	2.14	49	45	-1.17	0.87
Russia	302	316	2.35	0.26	120	124	0.62	0.89	4	4	-2.97	0.00
Ukraine	43	32	-12.28	1.09	4	3	-0.90	2.07	11	2	-3.13	-2.03
AFRICA	320	368	-0.07	1.66	64	62	-9.79	2.24	10	13	-3.11	-0.05
Egypt	90	90	-4.09	0.33	19	14	-14.85	3.56	4	6	11.35	-2.51
Ethiopia	19	25	3.22	3.08	0	0	..	..	0	2	..	24.98
Nigeria	12	14	-0.23	1.88	2	3	-10.66	7.84	0	0	..	..
South Africa	16	16	1.64	1.12	3	2	-4.67	0.42	3	2	-5.50	-0.41
ASIA	7 600	9 953	3.30	2.55	539	625	2.12	1.09	84	135	8.54	4.78
China[2]	99	111	0.70	1.01	135	138	7.58	0.33	2	2	1.10	1.00
India	5 194	6 889	3.68	2.83	0	1	-26.43	..	26	1	16.45	-27.33
Indonesia	0	0	..	..	23	23	-0.22	0.57	0	0	..	..
Iran	197	230	0.66	1.77	1	0	-50.37	..	10	35	36.72	12.07
Japan	75	73	2.54	-0.45	12	15	0.88	0.10	0	0	..	..
Kazakhstan	28	29	7.02	1.73	7	11	-3.23	0.76	4	2	34.75	-0.75
Korea	55	51	-3.45	-0.48	28	36	22.32	1.47	0	0	..	..
Malaysia	0	0	..	..	22	23	2.00	0.53	6	8	-0.87	0.00
Pakistan	1 286	1 697	3.12	2.07	0	1	-0.98	11.03	0	0	..	..
Philippines	0	0	..	..	30	30	3.66	1.17	1	1	..	0.00
Saudi Arabia	8	10	2.16	3.09	54	64	-0.53	0.83	12	12	16.13	-0.83
Thailand	3	4	4.19	1.63	13	12	-0.22	0.02	1	1	-2.42	5.42
Türkiye	270	407	3.13	2.97	3	2	-23.95	-2.09	6	59	0.49	16.52
Viet Nam	0	0	..	..	12	11	-0.53	0.43	0	0	..	..
OCEANIA	530	563	-2.34	0.24	40	40	4.94	0.34	443	484	-2.30	0.35
Australia	70	59	-6.29	-1.04	35	35	5.77	0.00	17	7	-10.92	-1.07
New Zealand	459	503	-1.56	0.40	1	1	0.26	1.00	425	477	-1.89	0.37
DEVELOPED COUNTRIES	**4 933**	**5 161**	**1.00**	**0.33**	**421**	**452**	**2.29**	**0.36**	**911**	**964**	**-0.69**	**0.37**
DEVELOPING COUNTRIES	**8 121**	**10 556**	**2.98**	**2.49**	**603**	**685**	**-0.36**	**1.11**	**123**	**174**	**2.93**	**3.68**
LEAST DEVELOPED COUNTRIES	305	359	2.40	1.94	12	30	-7.33	4.85	2	0	-18.68	..
OECD[3]	**4 851**	**5 208**	**1.08**	**0.50**	**306**	**335**	**1.85**	**0.02**	**801**	**903**	**-1.06**	**0.86**

.. Not available

Note : Calendar year; except year ending 30 June for New Zealand and Australia. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.31.2 Butter projections: Consumption, food

Calendar year

	CONSUMPTION (kt)		Growth (%)[4]		FOOD (kg/cap)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**13 048**	**15 716**	**2.33**	**1.74**	**1.6**	**1.7**	**1.40**	**0.91**
NORTH AMERICA	1 091	1 255	2.57	1.10	2.7	3.0	3.23	0.60
Canada	142	182	5.31	2.13	3.5	4.0	4.23	1.34
United States	948	1 073	2.21	0.93	2.7	2.8	3.08	0.47
LATIN AMERICA	475	551	0.65	1.16	0.7	0.7	-0.19	0.52
Argentina	10	15	-13.90	2.53	0.2	0.3	-14.55	2.29
Brazil	115	120	2.42	0.54	0.5	0.5	1.73	0.11
Chile	32	34	4.20	0.88	1.5	1.6	2.90	0.60
Colombia	22	24	0.27	1.22	0.4	0.4	-1.10	0.68
Mexico	233	281	0.57	1.22	1.7	1.9	-0.38	0.60
Paraguay	0	0	..	..	0.0	0.0	..	..
Peru	13	15	2.58	1.74	0.4	0.4	1.13	0.81
EUROPE	2 927	2 931	1.09	-0.04	3.7	3.7	0.98	0.09
European Union[1]	2 135	2 102	1.37	-0.22	4.4	4.4	1.12	-0.09
United Kingdom	216	226	1.88	0.39	3.0	3.1	1.41	0.11
Russia	418	437	1.80	0.44	2.7	3.0	1.79	0.73
Ukraine	36	33	-13.56	1.30	0.8	0.8	-12.11	1.62
AFRICA	374	417	-2.23	1.80	0.2	0.2	-4.72	-0.41
Egypt	105	97	-6.99	0.94	0.9	0.7	-8.82	-0.50
Ethiopia	19	23	3.27	2.11	0.1	0.1	0.52	0.00
Nigeria	14	18	-2.44	2.77	0.1	0.1	-5.17	0.52
South Africa	16	16	2.65	1.31	0.2	0.2	1.53	0.41
ASIA	8 057	10 444	3.18	2.43	1.6	2.0	2.36	1.87
China[2]	232	246	4.19	0.62	0.1	0.2	3.98	0.77
India	5 168	6 888	3.63	2.87	3.5	4.3	2.62	2.06
Indonesia	23	23	-0.29	0.57	0.1	0.1	-0.95	0.00
Iran	188	195	-2.92	0.64	2.0	1.9	-4.06	0.06
Japan	89	88	2.69	-0.36	0.7	0.7	3.03	0.24
Kazakhstan	31	38	3.43	1.57	1.5	1.6	2.22	0.54
Korea	83	88	0.93	0.29	1.5	1.6	0.72	0.47
Malaysia	16	15	3.03	0.82	0.4	0.4	1.80	0.00
Pakistan	1 286	1 698	3.11	2.08	5.2	5.6	1.51	0.24
Philippines	29	29	3.45	1.20	0.2	0.2	2.11	0.00
Saudi Arabia	50	62	-2.19	1.51	1.3	1.4	-3.71	0.30
Thailand	16	14	0.68	0.01	0.2	0.2	0.43	0.00
Türkiye	267	350	1.95	1.71	3.0	3.6	0.97	1.14
Viet Nam	12	11	-0.55	0.43	0.1	0.1	-1.19	0.00
OCEANIA	124	119	1.39	-0.16	2.4	2.0	0.06	-1.27
Australia	86	86	-0.19	-0.63	3.0	2.7	-1.66	-1.53
New Zealand	34	27	9.12	0.97	4.5	2.8	20.00	0.79
DEVELOPED COUNTRIES	**4 447**	**4 649**	**1.63**	**0.33**	**2.9**	**3.0**	**1.57**	**0.18**
DEVELOPING COUNTRIES	**8 601**	**11 067**	**2.71**	**2.38**	**1.3**	**1.5**	**1.53**	**1.41**
LEAST DEVELOPED COUNTRIES	315	389	2.11	2.14	0.3	0.3	-0.29	-0.02
OECD[3]	**4 361**	**4 640**	**1.72**	**0.41**	**2.9**	**3.0**	**1.51**	**0.20**

.. Not available

Note : Calendar year; except year ending 30 June for New Zealand and Australia. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.32.1 Cheese projections: Production and trade

Calendar year

	PRODUCTION (kt)		Growth (%)[4]		IMPORTS (kt)		Growth (%)[4]		EXPORTS (kt)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**25 640**	**28 803**	**1.55**	**1.09**	**3 505**	**4 025**	**2.68**	**1.49**	**3 502**	**4 025**	**2.21**	**1.49**
NORTH AMERICA	6 843	8 083	2.32	1.60	190	193	1.14	-0.39	436	532	3.21	1.83
Canada	496	603	2.06	2.09	49	58	8.91	1.01	9	9	-4.76	0.44
United States	6 347	7 480	2.35	1.56	141	135	-0.74	-0.94	428	523	3.45	1.85
LATIN AMERICA	2 349	2 740	0.60	1.57	457	546	5.49	1.65	183	166	2.12	-0.40
Argentina	459	547	0.26	1.60	3	1	2.65	0.00	67	70	3.13	0.13
Brazil	768	935	0.43	2.04	35	30	4.68	-0.49	4	6	4.31	1.58
Chile	107	114	2.92	0.33	63	74	11.05	2.79	7	6	1.47	-2.65
Colombia	63	59	0.43	0.89	7	21	11.91	5.26	1	1	20.17	-2.79
Mexico	332	400	-0.72	1.30	147	172	3.73	2.30	12	9	13.41	0.00
Paraguay	0	0	..	..	4	4	5.63	0.91	0	0	..	..
Peru	28	31	2.32	1.20	10	17	13.86	5.04	0	0	..	..
EUROPE	12 667	13 619	1.43	0.63	1 101	1 124	0.99	1.05	1 965	2 380	2.67	2.14
European Union[1]	10 814	11 445	1.41	0.48	186	181	0.22	0.78	1 359	1 697	2.07	2.27
United Kingdom	521	581	2.80	0.41	404	383	-2.25	0.89	160	122	1.35	-0.45
Russia	551	669	1.36	1.53	321	344	3.64	1.53	37	23	5.51	-2.96
Ukraine	82	62	-10.21	2.85	41	62	25.65	1.51	8	5	-5.91	-1.49
AFRICA	939	1 068	-0.58	1.36	148	214	-0.42	4.16	51	25	-14.58	-6.47
Egypt	547	592	-1.54	0.84	17	24	-11.48	10.03	33	10	-16.99	-11.28
Ethiopia	7	10	5.73	3.08	0	0	..	..	0	1	..	25.03
Nigeria	10	7	-0.42	-3.69	1	10	6.33	21.55	0	0	..	..
South Africa	59	61	1.49	0.95	8	11	-6.08	2.40	9	6	0.49	-2.34
ASIA	2 009	2 384	1.59	1.60	1 497	1 826	4.02	1.72	361	388	6.21	0.01
China[2]	208	248	1.02	1.74	164	189	10.65	1.02	0	0	..	..
India	6	9	8.01	3.16	2	2	4.96	0.00	9	12	8.19	2.42
Indonesia	0	0	..	..	30	33	4.31	1.40	3	2	15.56	-1.38
Iran	331	370	1.80	1.12	0	0	..	..	99	107	13.83	1.16
Japan	166	191	2.42	1.11	273	297	1.47	1.47	1	0	11.71	..
Kazakhstan	38	38	6.04	1.56	34	52	7.00	2.30	3	2	14.05	-2.19
Korea	43	44	1.45	0.31	152	173	5.10	1.76	1	1	21.64	0.00
Malaysia	0	0	..	..	34	38	7.33	2.05	3	3	34.21	-2.01
Pakistan	0	0	..	..	1	2	-13.85	2.89	0	0	..	..
Philippines	0	0	..	..	50	83	10.13	4.90	1	1	19.98	-4.67
Saudi Arabia	127	160	-1.15	2.63	208	233	3.35	0.47	81	77	-2.49	-0.47
Thailand	2	2	-9.66	1.63	19	20	6.52	0.01	1	1	18.48	2.97
Türkiye	231	325	1.15	1.95	9	5	-3.81	-1.34	46	85	0.45	1.36
Viet Nam	0	0	..	..	16	17	17.63	0.40	1	1	..	0.00
OCEANIA	833	908	2.76	0.71	113	122	1.40	0.60	506	535	1.04	0.73
Australia	439	453	3.25	0.34	98	103	0.64	0.38	150	125	-1.47	-0.43
New Zealand	394	455	2.26	1.09	13	16	8.70	2.00	356	410	2.29	1.11
DEVELOPED COUNTRIES	**21 098**	**23 481**	**1.81**	**0.99**	**1 756**	**1 871**	**1.27**	**1.10**	**2 928**	**3 459**	**2.44**	**1.84**
DEVELOPING COUNTRIES	**4 542**	**5 322**	**0.44**	**1.57**	**1 749**	**2 154**	**4.30**	**1.84**	**575**	**566**	**1.18**	**-0.45**
LEAST DEVELOPED COUNTRIES	439	526	1.17	2.15	28	83	2.58	6.89	0	0	..	..
OECD[3]	**20 374**	**22 597**	**1.75**	**0.92**	**1 652**	**1 757**	**1.13**	**1.25**	**2 609**	**3 072**	**1.95**	**1.72**

.. Not available

Note : Calendar year; except year ending 30 June for New Zealand and Australia. Average 2021-23est: Data for 2023 are estimated

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.32.2 Cheese projections: Consumption, food

Calendar year

	CONSUMPTION (kt)		Growth (%)[4]		FOOD (kg/cap)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**25 656**	**28 792**	**1.63**	**1.09**	**3.0**	**3.1**	**0.57**	**0.26**
NORTH AMERICA	6 586	7 733	2.30	1.53	16.8	18.7	1.65	1.01
Canada	537	652	2.89	2.02	13.3	14.8	1.87	1.24
United States	6 048	7 081	2.25	1.49	17.2	19.1	1.64	1.00
LATIN AMERICA	2 623	3 120	1.21	1.70	3.7	4.1	0.34	1.06
Argentina	395	478	-0.13	1.83	8.2	9.3	-0.86	1.28
Brazil	800	959	0.55	1.93	3.5	4.0	-0.12	1.49
Chile	163	182	5.54	1.37	7.9	8.5	4.23	1.09
Colombia	68	80	1.00	1.85	1.2	1.4	-0.37	1.30
Mexico	467	563	0.28	1.61	3.4	3.9	-0.57	0.99
Paraguay	4	4	7.04	0.97	0.5	0.4	5.56	0.00
Peru	38	47	4.26	2.41	1.0	1.1	2.80	1.47
EUROPE	11 827	12 363	1.22	0.40	14.8	15.7	1.11	0.53
European Union[1]	9 666	9 929	1.33	0.21	20.1	20.8	1.09	0.33
United Kingdom	764	842	0.12	0.76	10.8	11.6	-0.37	0.49
Russia	834	990	1.92	1.66	5.5	6.8	1.92	1.97
Ukraine	115	120	-5.64	2.21	2.7	3.0	-4.00	2.53
AFRICA	1 036	1 258	0.83	2.03	0.7	0.6	-1.72	-0.19
Egypt	530	606	0.03	1.49	4.4	4.3	-1.89	0.04
Ethiopia	8	9	5.43	2.10	0.1	0.1	2.62	0.00
Nigeria	11	16	0.21	4.45	0.0	0.0	-2.58	2.18
South Africa	58	66	0.30	1.54	0.9	0.9	-0.81	0.64
ASIA	3 145	3 822	2.21	1.83	0.6	0.7	1.38	1.27
China[2]	372	437	4.31	1.43	0.2	0.3	4.09	1.57
India	0	0	..	..	0.0	0.0	-54.93	0.00
Indonesia	27	31	3.71	1.64	0.1	0.1	3.05	0.97
Iran	232	263	-1.11	1.11	2.4	2.6	-2.26	0.58
Japan	438	489	1.76	1.33	3.3	4.0	2.17	1.92
Kazakhstan	69	88	6.22	2.08	3.3	3.8	5.00	1.05
Korea	194	215	4.12	1.46	3.5	3.9	3.94	1.65
Malaysia	31	35	6.32	2.44	0.8	0.9	5.07	1.55
Pakistan	1	2	-13.89	2.90	0.0	0.0	-15.27	1.24
Philippines	49	82	10.04	5.03	0.4	0.5	8.66	3.64
Saudi Arabia	253	316	3.03	1.78	6.6	7.1	1.47	0.56
Thailand	20	21	3.32	0.01	0.3	0.3	3.08	0.00
Türkiye	194	246	1.03	2.07	2.1	2.6	0.06	1.57
Viet Nam	15	16	17.19	0.43	0.1	0.1	16.54	0.00
OCEANIA	441	495	4.28	0.66	9.4	9.4	2.74	-0.39
Australia	387	432	4.41	0.58	14.1	14.2	3.08	-0.29
New Zealand	51	61	3.40	1.18	8.2	9.2	1.84	0.57
DEVELOPED COUNTRIES	**19 940**	**21 882**	**1.70**	**0.87**	**13.1**	**14.1**	**1.34**	**0.71**
DEVELOPING COUNTRIES	**5 716**	**6 910**	**1.41**	**1.84**	**0.8**	**0.9**	**0.20**	**0.86**
LEAST DEVELOPED COUNTRIES	467	608	1.25	2.67	0.5	0.5	-1.14	0.49
OECD[3]	**19 430**	**21 272**	**1.70**	**0.84**	**13.0**	**13.9**	**1.19**	**0.64**

.. Not available

Note : Calendar year; except year ending 30 June for New Zealand and Australia. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.33.1 Skim milk powder projections: Production and trade

Calendar year

	PRODUCTION (kt)		Growth (%)[4]		IMPORTS (kt)		Growth (%)[4]		EXPORTS (kt)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**4 640**	**5 399**	**0.58**	**1.83**	**2 554**	**3 172**	**1.45**	**2.10**	**2 691**	**3 172**	**1.89**	**2.10**
NORTH AMERICA	1 272	1 754	1.46	3.87	5	8	-0.47	3.56	947	1 468	7.11	4.24
Canada	84	115	-1.69	3.69	3	6	-6.02	5.53	26	30	7.25	0.88
United States	1 188	1 639	1.73	3.88	2	2	11.40	0.00	921	1 438	7.13	4.32
LATIN AMERICA	294	333	-0.12	1.50	490	574	3.87	1.33	58	52	-2.69	0.62
Argentina	40	44	1.51	1.51	0	0	..	..	24	27	-0.15	2.90
Brazil	161	205	0.59	2.08	21	20	-5.36	0.00	0	0	..	..
Chile	14	12	-8.87	-1.44	8	9	-1.35	4.35	2	2	4.98	-4.16
Colombia	0	0	..	..	29	31	23.01	0.51	0	0	..	..
Mexico	46	48	0.84	0.79	341	391	3.95	1.10	11	11	-3.63	0.00
Paraguay	0	0	..	..	1	1	..	0.00	1	1	..	0.00
Peru	0	0	..	..	22	24	-0.92	2.45	0	0	..	..
EUROPE	1 821	1 852	-0.07	0.29	129	144	-6.60	0.38	960	983	1.09	0.66
European Union[1]	1 457	1 491	0.67	0.22	35	37	-4.29	0.10	752	765	1.79	0.56
United Kingdom	55	67	-6.49	1.86	24	24	-6.32	-0.32	55	67	-3.77	1.71
Russia	90	75	3.32	-1.36	57	73	-9.35	0.96	2	2	-0.03	0.00
Ukraine	52	51	-10.91	2.95	2	1	16.04	-3.14	19	21	-6.81	3.24
AFRICA	14	14	5.36	0.72	422	585	1.99	2.72	23	17	4.86	-1.88
Egypt	0	0	..	..	63	77	-2.40	3.76	0	0	..	..
Ethiopia	0	0	..	..	4	3	45.85	2.09	0	0	..	..
Nigeria	0	0	..	..	52	60	6.44	4.33	0	0	..	..
South Africa	3	3	-0.77	-1.47	13	18	8.95	0.86	9	8	4.78	-0.85
ASIA	725	942	5.69	2.74	1 483	1 838	1.49	2.31	205	173	1.53	0.79
China[2]	26	39	-7.59	3.54	368	391	7.33	1.26	2	3	2.70	0.00
India	364	573	6.99	4.37	1	1	2.17	-0.37	25	0	-16.43	..
Indonesia	0	0	..	..	204	265	4.78	2.97	1	1	-7.48	-2.88
Iran	77	112	23.56	1.39	6	10	-3.57	0.00	83	121	25.36	1.27
Japan	153	147	2.45	-0.14	15	11	-14.59	-0.20	0	0	..	..
Kazakhstan	1	1	5.10	-0.35	22	26	-0.55	1.82	2	2	23.06	-1.79
Korea	31	22	-3.36	-3.16	13	20	-6.77	6.16	0	0	..	..
Malaysia	0	0	..	..	118	133	-2.50	2.23	3	4	-29.05	-2.18
Pakistan	0	0	..	..	22	40	-6.93	3.21	0	0	..	..
Philippines	0	0	..	..	170	248	4.24	4.90	1	0	..	..
Saudi Arabia	0	0	..	..	21	31	-16.44	0.91	9	9	-5.97	-0.90
Thailand	0	0	..	..	65	67	-0.49	0.02	5	4	10.67	0.27
Türkiye	61	38	16.36	1.89	4	3	28.94	0.00	37	11	0.98	6.01
Viet Nam	0	0	..	..	108	107	4.09	0.43	1	1	-7.78	0.00
OCEANIA	515	504	-3.78	0.21	24	22	10.17	0.83	497	480	-2.92	0.29
Australia	147	124	-6.60	-0.98	16	13	12.44	0.00	135	107	-4.21	-0.80
New Zealand	367	380	-2.41	0.62	3	3	6.54	0.00	362	372	-2.41	0.62
DEVELOPED COUNTRIES	**3 778**	**4 271**	**-0.06**	**1.59**	**230**	**272**	**-4.34**	**1.08**	**2 419**	**2 941**	**2.05**	**2.22**
DEVELOPING COUNTRIES	**863**	**1 128**	**3.94**	**2.80**	**2 323**	**2 900**	**2.22**	**2.20**	**272**	**231**	**0.28**	**0.63**
LEAST DEVELOPED COUNTRIES	6	7	23.17	1.48	104	153	-2.28	4.23	13	9	8.51	-2.61
OECD[3]	**3 648**	**4 122**	**0.10**	**1.61**	**500**	**558**	**1.50**	**1.12**	**2 313**	**2 814**	**2.09**	**2.30**

.. Not available

Note : Calendar year; except year ending 30 June for New Zealand and Australia. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.33.2 Skim milk powder projections: Consumption, food

Calendar year

	CONSUMPTION (kt)		Growth (%)[4]		FOOD (kg/cap)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**4 508**	**5 399**	**0.79**	**1.83**	**0.5**	**0.5**	**-0.40**	**1.10**
NORTH AMERICA	331	294	-7.59	2.22	0.7	0.6	-9.30	1.84
Canada	62	91	-2.46	5.03	0.8	1.4	-1.83	7.84
United States	269	203	-8.57	1.17	0.7	0.5	-10.01	0.26
LATIN AMERICA	726	855	2.67	1.44	0.8	0.9	2.52	0.60
Argentina	16	18	7.97	-0.28	0.3	0.3	7.62	-1.02
Brazil	182	224	-0.28	1.88	0.1	0.1	-4.82	-0.44
Chile	20	19	-7.65	1.23	0.9	0.9	-8.88	0.98
Colombia	29	31	23.21	0.51	0.5	0.5	21.68	0.00
Mexico	376	428	4.12	1.10	2.7	2.9	3.31	0.48
Paraguay	0	0	..	..	0.0	0.0	-51.50	0.00
Peru	22	24	-0.92	2.45	0.6	0.6	-2.35	1.52
EUROPE	989	1 014	-0.46	-0.06	1.0	1.1	-0.90	0.34
European Union[1]	740	763	1.60	-0.12	1.2	1.3	1.35	0.38
United Kingdom	24	24	-11.31	0.02	0.3	0.3	-12.29	-0.37
Russia	145	146	-3.07	-0.31	0.9	1.0	-3.08	-0.01
Ukraine	35	31	-13.04	2.64	0.8	0.8	-11.58	2.93
AFRICA	413	582	1.95	2.84	0.3	0.3	-0.66	0.58
Egypt	63	77	-2.28	3.76	0.5	0.5	-4.17	2.27
Ethiopia	4	3	45.85	2.09	0.0	0.0	41.99	0.00
Nigeria	52	60	6.45	4.34	0.2	0.2	3.54	2.05
South Africa	7	13	7.27	1.47	0.1	0.2	6.10	0.61
ASIA	2 009	2 607	2.92	2.57	0.4	0.5	1.96	2.06
China[2]	392	428	5.61	1.45	0.2	0.3	5.41	1.60
India	340	574	8.90	4.38	0.2	0.4	7.89	3.56
Indonesia	203	265	4.88	2.99	0.6	0.8	4.23	2.29
Iran	0	0	-78.07	..	0.0	0.0	-79.59	0.00
Japan	174	158	0.25	-0.15	1.0	1.0	-1.83	0.49
Kazakhstan	21	25	-1.01	2.03	1.0	1.1	-2.20	1.01
Korea	44	41	-4.44	0.24	0.8	0.7	-4.72	0.42
Malaysia	114	129	1.39	2.41	3.1	3.2	0.17	1.51
Pakistan	21	40	-6.83	3.27	0.1	0.1	-8.35	1.42
Philippines	169	248	4.20	4.90	1.3	1.6	2.85	3.50
Saudi Arabia	12	22	-21.40	1.77	0.3	0.5	-22.73	0.58
Thailand	60	63	-0.63	0.01	0.8	0.8	-0.89	0.00
Türkiye	28	30	172.75	0.47	0.3	0.3	224.92	0.00
Viet Nam	107	106	4.29	0.44	1.0	0.9	3.66	0.00
OCEANIA	40	47	-9.08	-0.29	0.8	0.8	-11.12	-1.35
Australia	27	30	-12.26	-1.18	0.9	0.9	-14.78	-2.12
New Zealand	9	11	-0.76	0.66	1.7	1.9	-2.55	0.00
DEVELOPED COUNTRIES	**1 594**	**1 602**	**-2.29**	**0.44**	**0.9**	**0.9**	**-3.43**	**0.48**
DEVELOPING COUNTRIES	**2 914**	**3 797**	**2.86**	**2.48**	**0.4**	**0.5**	**1.84**	**1.52**
LEAST DEVELOPED COUNTRIES	97	151	-2.52	4.65	0.1	0.1	-4.81	2.47
OECD[3]	**1 840**	**1 866**	**-0.78**	**0.52**	**1.1**	**1.1**	**-1.77**	**0.50**

.. Not available

Note : Calendar year; except year ending 30 June for New Zealand and Australia. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.34.1 Whole milk powder projections: Production and trade

Calendar year

	PRODUCTION (kt)		Growth (%)[4]		IMPORTS (kt)		Growth (%)[4]		EXPORTS (kt)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**5 011**	**5 788**	**-0.72**	**1.56**	**2 791**	**2 645**	**0.57**	**0.43**	**2 653**	**2 645**	**0.43**	**0.43**
NORTH AMERICA	73	88	15.90	1.44	14	14	-2.21	0.00	50	81	21.06	3.84
Canada	8	7	-1.53	-1.66	3	3	1.80	0.00	1	1	3.90	1.29
United States	65	81	21.50	1.74	11	11	-2.93	0.00	49	80	21.59	3.87
LATIN AMERICA	1 362	1 636	0.51	1.59	297	269	-4.14	-1.41	337	368	1.82	1.04
Argentina	188	211	-1.28	0.88	0	0	..	..	138	152	1.51	1.78
Brazil	590	748	-0.17	2.21	96	51	8.29	-6.87	6	16	-21.25	6.74
Chile	67	71	-4.26	0.58	4	4	-6.65	5.63	6	3	-10.47	-5.33
Colombia	44	45	0.43	0.01	20	28	7.04	2.93	2	2	14.05	-2.39
Mexico	232	276	1.27	1.25	31	34	-3.79	-0.75	16	10	6.42	0.00
Paraguay	11	16	422.84	2.67	0	0	-31.66	..	10	17	35.56	2.64
Peru	0	0	..	..	34	45	9.30	2.10	0	0	..	..
EUROPE	756	682	-2.14	-0.97	48	59	-9.66	1.76	338	285	-4.58	-1.23
European Union[1]	603	520	-1.94	-1.40	14	12	-11.02	0.00	256	202	-5.57	-1.90
United Kingdom	32	35	-8.65	1.02	8	5	-15.84	0.31	19	17	-12.94	0.62
Russia	57	59	-0.58	0.06	22	37	-7.74	3.08	21	21	56.83	0.00
Ukraine	7	5	-6.15	2.18	1		..	-0.79	3	2	5.39	0.80
AFRICA	23	24	-0.65	0.22	580	681	-0.42	2.23	17	15	-3.95	-2.20
Egypt	0	0	..	..	36	33	-9.16	2.65	3	4	-1.55	-2.58
Ethiopia	0	0	..	..	2	2	12.98	2.07	0	0	..	..
Nigeria	0	0	..	..	54	48	-5.98	2.22			..	..
South Africa	7	6	-0.82	-0.30	4	6	5.03	1.30	6	4	-4.24	-1.29
ASIA	1 246	1 807	-3.03	3.58	1 801	1 590	2.21	0.04	381	348	2.72	-0.50
China[2]	1 078	1 653	-3.56	3.77	671	361	3.91	-2.32	4	8	-1.88	-0.09
India	5	7	5.33	3.16	0	0	..	..	2	4	-0.10	6.71
Indonesia	72	77	-0.85	2.35	83	99	7.58	0.75	1	0	-21.21	..
Iran	1	1	0.38	1.39	6	8	8.42	0.00	7	9	10.69	0.14
Japan	40	13	0.59	0.00	3	4	74.41	0.00	0	0	..	..
Kazakhstan	32	37	5.57	1.64	3	8	-3.13	3.86	1	1	..	-0.89
Korea	4	4	-2.47	0.00	5	6	11.40	1.04	0	0	..	..
Malaysia	0	0	..	..	47	57	3.12	1.08	23	19	2.10	-1.07
Pakistan	0	0	..	..	0	0	-25.92	..	0	0	-28.70	..
Philippines	0	0	..	..	14	12	-7.52	2.36	5	1	-15.80	-2.31
Saudi Arabia	0	0	..	..	111	134	-0.25	1.47	12	10	-5.26	-1.44
Thailand	0	0	..	..	69	69	6.03	0.02	3	1	-2.29	0.89
Türkiye	2	2	279.95	1.89	0	0	-23.82	..	1	1	-0.84	..
Viet Nam	0	0	..	..	64	59	4.89	0.31	17	17	7.94	0.00
OCEANIA	1 551	1 551	0.72	0.71	51	34	13.36	0.29	1 529	1 548	0.73	0.71
Australia	38	34	-9.52	-1.24	42	22	19.73	-0.50	38	31	-6.84	-1.23
New Zealand	1 513	1 517	1.15	0.76	3	3	3.16	0.00	1490	1517	1.00	0.76
DEVELOPED COUNTRIES	**2 459**	**2 378**	**0.05**	**0.23**	**125**	**125**	**-1.70**	**1.12**	**1 923**	**1 919**	**-0.17**	**0.51**
DEVELOPING COUNTRIES	**2 552**	**3 410**	**-1.41**	**2.60**	**2 666**	**2 521**	**0.70**	**0.40**	**730**	**727**	**2.15**	**0.22**
LEAST DEVELOPED COUNTRIES	8	9	-0.90	0.45	281	327	3.60	2.68	7	6	-5.42	-2.49
OECD[3]	**2 664**	**2 620**	**0.02**	**0.31**	**151**	**139**	**-0.33**	**0.47**	**1 880**	**1 863**	**-0.36**	**0.49**

.. Not available

Note : Calendar year; except year ending 30 June for New Zealand and Australia. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.34.2 Whole milk powder projections: Consumption, food

Calendar year

	CONSUMPTION (kt)		Growth (%)[4]		FOOD (kg/cap)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**5 149**	**5 787**	**-0.62**	**1.56**	**0.6**	**0.6**	**-1.62**	**0.71**
NORTH AMERICA	37	21	3.88	-5.56	0.1	0.0	2.44	-7.37
Canada	10	9	-1.11	-1.41	0.2	0.2	-2.42	-2.19
United States	27	12	6.65	-7.90	0.1	0.0	5.03	-11.07
LATIN AMERICA	1 323	1 537	-0.99	1.12	1.9	2.0	-1.88	0.47
Argentina	50	59	-6.89	-1.14	1.0	1.1	-8.09	-1.91
Brazil	680	783	1.25	1.18	3.0	3.3	0.57	0.73
Chile	65	72	-3.89	1.19	3.1	3.4	-5.15	0.92
Colombia	62	71	2.25	1.12	1.1	1.2	0.87	0.58
Mexico	246	300	0.23	1.04	1.8	2.0	-0.71	0.42
Paraguay	1	0	7.74	..	0.1	0.0	3.11	0.00
Peru	34	45	9.30	2.10	0.9	1.1	7.81	1.16
EUROPE	466	456	-1.32	-0.49	0.6	0.6	-1.44	-0.33
European Union[1]	361	330	0.67	-1.03	0.7	0.7	0.56	-0.87
United Kingdom	21	24	-8.24	1.13	0.3	0.3	-9.24	0.87
Russia	58	75	-7.22	1.42	0.4	0.5	-7.61	1.75
Ukraine	4	4	-10.37	2.48	0.1	0.1	-8.81	2.86
AFRICA	586	690	-0.31	2.27	0.4	0.3	-2.72	0.04
Egypt	33	29	-11.65	3.63	0.3	0.2	-13.48	2.21
Ethiopia	2	2	13.15	2.09	0.0	0.0	10.12	0.00
Nigeria	54	48	-5.98	2.23	0.2	0.1	-8.64	-0.02
South Africa	6	8	21.82	1.49	0.1	0.1	30.80	0.64
ASIA	2 665	3 048	-0.60	2.07	0.5	0.5	-1.34	1.50
China[2]	1 745	2 006	-1.33	2.39	1.1	1.3	-1.54	2.53
India	4	4	12.72	0.73	0.0	0.0	11.93	0.00
Indonesia	155	176	3.71	1.42	0.5	0.5	3.06	0.73
Iran	0	0	..	..	0.0	0.0	-72.19	0.00
Japan	42	17	1.58	0.00	0.3	0.1	1.99	0.59
Kazakhstan	35	44	4.43	2.02	1.7	1.9	3.22	0.98
Korea	9	9	3.62	0.37	0.2	0.1	3.80	0.06
Malaysia	24	37	3.79	2.40	0.6	0.9	2.50	1.57
Pakistan			-15.24	..	0.0	0.0	-15.18	0.00
Philippines	9	11	5.41	3.10	0.1	0.1	4.46	1.80
Saudi Arabia	99	124	0.51	1.73	2.6	2.8	-1.03	0.50
Thailand	66	67	6.39	0.01	0.9	0.9	6.17	0.00
Türkiye	1	1	..	0.46	0.0	0.0	152.82	0.00
Viet Nam	47	42	3.89	0.43	0.4	0.4	3.26	0.00
OCEANIA	72	36	7.77	0.33	1.6	0.7	6.16	-0.77
Australia	41	24	6.91	-0.59	1.6	0.8	5.48	-1.45
New Zealand	25	3	10.05	1.65	4.7	0.6	8.16	0.99
DEVELOPED COUNTRIES	**661**	**584**	**0.28**	**-0.46**	**0.4**	**0.4**	**-0.08**	**-0.62**
DEVELOPING COUNTRIES	**4 488**	**5 203**	**-0.75**	**1.81**	**0.6**	**0.7**	**-1.89**	**0.82**
LEAST DEVELOPED COUNTRIES	282	329	3.75	2.73	0.3	0.3	1.38	0.56
OECD[3]	**935**	**896**	**0.67**	**-0.04**	**0.6**	**0.6**	**0.17**	**-0.24**

.. Not available

Note : Calendar year; except year ending 30 June for New Zealand and Australia. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.35 Whey powder projections: Production and trade

Calendar year

	PRODUCTION (kt)		Growth (%)[4]		IMPORTS (kt)		Growth (%)[4]		EXPORTS (kt)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**3 493**	**3 817**	**2.23**	**0.72**	**1 717**	**1 962**	**2.91**	**1.59**	**2 012**	**2 256**	**1.01**	**1.37**
NORTH AMERICA	488	532	-1.09	0.86	7	7	1.47	0.87	231	257	-2.04	1.06
Canada	40	48	0.89	2.09	7	7	1.47	0.87	43	43	2.21	0.00
United States	448	484	-1.26	0.75			..	..	188	214	-2.84	1.28
LATIN AMERICA	164	193	1.03	1.38	97	143	-2.63	2.21	150	206	-2.70	2.02
Argentina	76	90	1.86	1.60	1	1	-9.64	0.00	52	62	-2.69	1.61
Brazil	0	0	..	..	14	14	-5.01	0.01	1	1	..	0.00
Chile	11	12	3.38	0.33	10	19	17.90	5.74	15	23	3.18	3.80
Colombia	0	0	..	..	8		-2.97	-48.77	8	0	-2.97	-50.63
Mexico	59	72	1.00	1.30	31	66	-7.61	3.28	31	66	-7.61	3.28
Paraguay	0	0	..	..	1	1	11.66	0.00	0	0	..	..
Peru	0	0	..	..	11	14	3.03	2.07	11	14	3.04	2.07
EUROPE	2 470	2 654	2.67	0.59	142	157	-4.86	0.89	939	997	1.23	0.69
European Union[1]	2 192	2 327	2.73	0.48	44	52	-5.81	1.27	691	702	3.01	0.35
United Kingdom	77	84	1.37	0.73	45	37	3.51	-1.94	45	41	-0.93	-1.22
Russia	1	1	0.60	0.00	30	29	-12.64	0.00	30	29	-12.64	0.00
Ukraine	23	25	-1.80	0.86	5	12	25.10	7.84	28	37	2.24	2.64
AFRICA	3	3	3.76	0.95	95	167	10.52	5.46	65	131	9.55	6.67
Egypt	0	0	..	..	26	53	7.27	6.62	26	53	7.27	6.62
Ethiopia	0	0	..	..	1	1	22.06	0.00	0	0	..	..
Nigeria	0	0	..	..	10	21	8.54	6.77	10	21	8.54	6.77
South Africa	3	3	3.77	0.95	17	21	11.13	1.90	1	0	-15.41	..
ASIA	211	268	7.23	1.42	1 349	1 459	4.29	1.28	583	620	2.62	1.60
China[2]	92	109	2.44	1.12	740	845	7.32	1.30	1	1	1.72	0.00
India	2	2	9.74	0.00	13	13	7.15	0.00	0	0	..	..
Indonesia	0	0	..	..	136	163	3.04	1.49	136	163	3.04	1.49
Iran	13	14	7.85	1.12	4	8	6.63	6.30	6	10	0.55	4.34
Japan	19	19	369.78	0.00	56	58	0.19	0.00	0	0	..	..
Kazakhstan	0	0	..	..	12	21	7.36	5.14	12	21	7.36	5.14
Korea	0	0	..	..	38	39	1.75	0.00	0	0	..	..
Malaysia	0	0	..	..	95	133	3.64	3.04	95	133	3.64	3.04
Pakistan	0	0	..	..	20	8	-2.70	-8.75	20	8	-2.70	-8.75
Philippines	0	0	..	..	59	59	7.32	-0.31	59	59	7.32	-0.31
Saudi Arabia	0	0	..	..	7	8	5.87	1.67	7	8	5.88	1.67
Thailand	0	0	..	..	3	0	-30.87	..	3	0	-30.88	..
Türkiye	85	123	11.15	2.00	3	8	20.28	8.89	88	132	14.62	2.33
Viet Nam	0	0	..	..	76	0	7.92	..	76	0	7.92	..
OCEANIA	157	166	3.03	0.50	28	27	1.78	-0.14	44	45	0.56	0.46
Australia	125	129	3.25	0.34	9	9	-2.67	0.00	30	29	-1.67	0.14
New Zealand	33	38	2.26	1.09	18	18	4.62	-0.22	14	16	9.31	1.10
DEVELOPED COUNTRIES	**3 138**	**3 375**	**2.10**	**0.63**	**273**	**319**	**-1.75**	**1.41**	**1 238**	**1 348**	**0.65**	**0.92**
DEVELOPING COUNTRIES	**355**	**442**	**3.45**	**1.47**	**1 444**	**1 643**	**4.04**	**1.62**	**773**	**908**	**1.62**	**2.06**
LEAST DEVELOPED COUNTRIES	0	0	..	..	23	30	5.44	2.29	14	17	4.67	1.83
OECD[3]	**3 112**	**3 360**	**2.20**	**0.61**	**277**	**324**	**-1.20**	**0.77**	**1 160**	**1 273**	**1.32**	**0.75**

.. Not available

Note : Calendar year; except year ending 30 June for New Zealand and Australia. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.36. Fresh dairy products projections: Production and food consumption

Calendar year

	PRODUCTION (kt)		Growth (%)[4]		FOOD CONSUMPTION		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**481 947**	**586 595**	**2.26**	**1.78**	**58.1**	**64.7**	**1.21**	**0.98**
NORTH AMERICA	24 834	23 773	-1.13	-0.37	64.0	57.9	-1.73	-0.89
Canada	2 690	2 653	-1.06	-0.02	68.3	61.8	-1.96	-0.79
United States	22 144	21 120	-1.13	-0.42	63.5	57.4	-1.71	-0.90
LATIN AMERICA	50 006	52 866	1.04	0.45	72.4	71.2	0.18	-0.18
Argentina	1 624	1 698	0.80	0.38	27.5	27.1	0.39	-0.11
Brazil	28 975	29 489	1.62	0.07	130.5	126.4	0.93	-0.35
Chile	517	602	3.23	1.28	25.1	28.3	1.93	0.99
Colombia	5 880	6 575	0.44	1.02	109.0	115.0	-0.94	0.46
Mexico	3 436	3 258	-0.11	-0.46	25.7	22.8	-1.12	-1.07
Paraguay	454	570	-1.31	2.67	62.9	70.1	-2.71	1.60
Peru	1 936	2 511	2.01	2.50	53.9	63.2	0.56	1.56
EUROPE	85 743	81 935	-0.22	-0.44	108.5	105.6	-0.42	-0.27
European Union[1]	40 958	39 188	0.61	-0.43	82.3	80.3	0.11	-0.24
United Kingdom	6 215	6 417	-1.13	-0.12	92.2	92.6	-1.37	-0.31
Russia	24 650	22 179	-0.51	-0.92	167.7	156.0	-0.53	-0.62
Ukraine	6 462	6 994	-1.78	0.78	156.5	180.4	-0.03	1.08
AFRICA	36 720	46 388	1.41	2.24	24.4	24.1	-1.09	0.00
Egypt	1 258	1 704	-1.07	3.29	10.6	12.2	-2.97	1.80
Ethiopia	3 962	5 467	3.45	3.07	30.2	32.4	0.68	0.75
Nigeria	226	296	0.09	2.81	0.9	0.9	-2.70	0.55
South Africa	3 060	3 425	1.39	1.10	48.5	49.0	0.27	0.18
ASIA	280 933	378 345	3.89	2.69	57.7	73.0	3.09	2.13
China[2]	31 544	34 672	6.02	0.27	20.8	23.3	6.07	0.53
India	144 500	207 245	4.99	3.35	99.1	130.3	3.95	2.54
Indonesia	1 156	1 417	1.87	1.42	3.6	4.1	1.22	0.73
Iran	1932	2106	0.24	0.89	20.5	21.0	-0.91	0.37
Japan	4 595	4 419	-0.88	-0.53	35.7	36.5	-0.50	0.05
Kazakhstan	5 361	6 915	2.42	2.20	267.3	307.5	1.21	1.15
Korea	499	457	5.67	-1.75	9.3	8.4	5.84	-1.84
Malaysia	48	56	-5.05	2.10	1.3	1.4	-6.24	1.19
Pakistan	45 907	65 748	2.55	3.21	189.7	222.1	0.94	1.36
Philippines	16	20	-3.92	3.20	0.1	0.1	-5.22	1.83
Saudi Arabia	1 998	2 460	5.80	1.80	52.4	56.2	4.21	0.56
Thailand	1 073	1 222	-0.07	1.63	14.0	15.9	-0.32	1.62
Türkiye	15 222	17 421	2.16	1.39	172.6	186.7	1.18	0.89
Viet Nam	1 150	1 733	7.26	4.19	10.7	15.2	6.62	3.69
OCEANIA	3 710	3 289	1.43	-1.40	65.3	60.0	-1.16	-0.84
Australia	3 120	2 678	1.18	-1.75	101.5	95.4	-0.63	-0.64
New Zealand	581	598	2.96	0.19	40.9	37.8	-4.28	-0.90
DEVELOPED COUNTRIES	**142 578**	**142 513**	**-0.05**	**-0.03**	**93.6**	**92.4**	**-0.49**	**-0.13**
DEVELOPING COUNTRIES	**339 369**	**444 082**	**3.37**	**2.44**	**50.2**	**59.1**	**2.19**	**1.47**
LEAST DEVELOPED COUNTRIES	21 580	28 613	1.06	2.72	21.4	22.4	-1.33	0.54
OECD[3]	**107 835**	**107 475**	**0.23**	**-0.06**	**71.8**	**70.5**	**-0.39**	**-0.18**

.. Not available

Note : Calendar year; except year ending 30 June for New Zealand and Australia. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.37. Cow milk projections: Production, inventories, yield

Calendar year

	PRODUCTION (kt)		Growth (%)[4]		INVENTORIES ('000 hd)		Growth (%)[4]		YIELD (t/head)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**884 199**	**1 049 667**	**1.97**	**1.60**	**340 584**	**388 820**	**0.73**	**1.34**	**2.60**	**2.70**	**1.23**	**0.25**
NORTH AMERICA	114 071	128 508	1.31	1.15	10 389	10 521	0.18	0.20	10.98	12.21	1.13	0.96
Canada	11 098	13 326	2.70	1.73	971	965	0.35	-0.05	11.42	13.81	2.34	1.79
United States	102 973	115 182	1.17	1.09	9 418	9 556	0.16	0.22	10.94	12.07	0.98	0.89
LATIN AMERICA	86 672	94 711	1.07	0.93	34 924	35 402	-1.91	0.24	2.48	2.68	3.03	0.69
Argentina	11 401	12 241	0.37	1.08	1 713	1 695	-0.48	-0.10	6.65	7.22	0.91	1.18
Brazil	36 808	40 095	1.13	0.80	15 976	15 625	-3.80	-0.19	2.30	2.56	5.56	0.99
Chile	2 251	2 464	1.31	0.73	623	597	-2.48	-0.19	3.67	4.12	4.41	1.04
Colombia	7 034	7 751	0.43	0.98	3 577	3 467	-2.59	0.01	1.97	2.23	4.94	1.03
Mexico	13 155	13 611	1.91	0.45	2 675	2 706	1.21	0.25	4.95	5.04	0.71	0.31
Paraguay	547	705	1.06	2.67	217	265	-0.27	2.23	2.53	2.68	1.50	0.50
Peru	2 238	2 823	2.37	2.30	953	1 063	1.06	1.38	2.38	2.67	1.36	1.02
EUROPE	224 238	225 751	0.51	0.02	32 748	29 819	-1.56	-0.81	6.85	7.57	2.10	0.84
European Union[1]	151 301	150 778	0.73	-0.09	19 801	17 701	-1.06	-1.08	7.61	8.47	1.76	1.00
United Kingdom	15 625	16 219	0.53	0.04	1 854	1 708	-0.21	-0.82	8.43	9.49	0.61	0.90
Russia	32 686	32 873	1.16	0.00	6 204	5 730	-2.44	-0.48	5.20	5.72	3.68	0.49
Ukraine	7 750	7 908	-4.27	0.91	1 603	1 484	-4.80	-0.03	4.73	5.31	0.61	0.97
AFRICA	38 813	47 759	1.20	2.01	62 546	74 492	-0.26	1.66	0.62	0.64	1.46	0.34
Egypt	5 131	5 788	-0.22	1.39	2 398	2 401	-4.91	0.33	2.14	2.41	4.85	1.08
Ethiopia	4 023	5 582	3.59	3.14	9 063	10 921	-3.66	2.22	0.46	0.52	7.74	1.04
Nigeria	533	631	-0.12	1.77	2 294	2 716	0.39	1.90	0.23	0.23	-0.19	-0.03
South Africa	3 810	4 197	1.37	1.07	1 014	1 041	0.70	0.57	3.77	4.04	0.76	0.58
ASIA	389 945	522 603	3.66	2.68	193 743	232 727	2.21	1.83	2.01	2.25	1.42	0.83
China[2]	39 373	47 096	3.31	1.14	14 047	14 595	1.06	0.34	2.81	3.23	2.74	0.80
India	207 759	291 804	4.83	3.23	105 147	129 933	2.52	2.16	1.99	2.27	2.20	1.07
Indonesia	1 060	1 321	1.62	2.23	717	790	1.33	1.27	1.49	1.68	-0.02	1.04
Iran	7 169	8 170	0.78	1.41	1 962	2 034	0.92	0.46	3.61	4.03	0.21	0.94
Japan	7 633	7 248	0.52	-0.25	837	772	-0.51	-0.50	9.06	9.36	1.03	0.25
Kazakhstan	6 340	7 963	3.00	2.14	2 672	2 951	2.55	1.15	2.40	2.71	0.43	1.00
Korea	1 945	1 839	-1.47	-0.53	239	217	-1.00	-0.88	8.10	8.42	-0.47	0.35
Malaysia	48	56	-5.05	2.10	42	43	-6.07	1.00	1.14	1.30	1.57	1.10
Pakistan	60 189	84 522	2.72	2.93	31 971	40 176	3.29	2.04	1.91	2.12	-0.57	0.87
Philippines	16	20	-3.92	3.20	6	6	-0.49	2.08	2.80	3.23	-3.54	1.25
Saudi Arabia	2 628	3 351	3.28	2.36	212	245	-2.38	1.43	12.33	13.78	5.98	0.96
Thailand	1 147	1 309	-0.03	1.63	222	223	-0.13	0.63	5.19	5.87	0.32	1.12
Türkiye	20 404	25 746	2.56	1.92	6 681	7 536	2.46	0.91	3.09	3.43	0.18	1.01
Viet Nam	1 150	1 733	7.26	4.19	350	467	2.94	3.07	3.29	3.76	3.43	1.13
OCEANIA	30 461	30 334	-0.50	0.16	6 234	5 859	-1.11	-0.27	4.89	5.18	0.63	0.43
Australia	8 606	8 031	-1.86	-0.65	1 301	1 123	-2.98	-0.94	6.51	7.15	1.08	0.46
New Zealand	21 834	22 282	0.11	0.46	4 883	4 677	-0.56	-0.13	4.46	4.76	0.62	0.68
DEVELOPED COUNTRIES	**407 721**	429 497	**0.79**	**0.49**	**63 261**	**61 030**	**-0.77**	**-0.23**	**6.45**	**7.04**	**1.57**	**0.73**
DEVELOPING COUNTRIES	**476 479**	620 170	**3.07**	**2.44**	**277 324**	**327 790**	**1.10**	**1.66**	**1.72**	**1.89**	**1.95**	**0.76**
LEAST DEVELOPED COUNTRIES	20 570	26 873	1.51	2.72	52 023	63 920	1.21	1.98	0.40	0.42	0.30	0.72
OECD[3]	**370 706**	**391 446**	**0.88**	**0.50**	**53 728**	**51 851**	**-0.48**	**-0.29**	**6.90**	**7.55**	**1.38**	**0.79**

.. Not available

Note : Calendar year; except year ending 30 June for New Zealand and Australia. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.38. Main policy assumptions for dairy markets

Calendar year

		Average 2021-23est	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
CANADA												
Milk target price[2]	CADc/litre	84.5	95.0	97.1	99.1	101.3	103.5	105.7	108.1	110.4	112.7	115.2
Butter support price	CAD/t	9 379.8	10 423.4	10 752.8	11 091.2	11 440.3	11 782.1	12 128.7	12 503.7	12 874.2	13 260.2	13 650.2
Cheese tariff-quota	kt pw	50.4	57.1	58.4	59.1	59.7	60.4	61.0	61.7	62.1	62.5	62.6
In-quota tariff	%	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Out-of-quota tariff	%	245.6	245.6	245.6	245.6	245.6	245.6	245.6	245.6	245.6	245.6	245.6
EUROPEAN UNION												
Voluntary coupled support												
Milk and milk products[3]	mln EUR	752.9	829.8	835.0	838.4	824.3	824.3	824.3	824.3	824.3	824.3	824.3
Butter reference price[4]	EUR/t	2 217.5	2 217.5	2 217.5	2 217.5	2 217.5	2 217.5	2 217.5	2 217.5	2 217.5	2 217.5	2 217.5
SMP reference price	EUR/t	1 400.0	1 400.0	1 400.0	1 400.0	1 400.0	1 400.0	1 400.0	1 400.0	1 400.0	1 400.0	1 400.0
Butter tariff-quotas	kt pw	63.6	63.7	63.7	63.8	63.8	63.9	63.9	64.0	64.0	64.1	64.1
Cheese tariff-quotas	kt pw	104.3	105.0	105.3	105.6	106.0	106.3	106.6	106.9	107.0	107.1	107.2
JAPAN												
Direct payments[5]	JPY/kg	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6
Cheese tariff[6]	%	29.8	29.8	29.8	29.8	29.8	29.8	29.8	29.8	29.8	29.8	29.8
Tariff-quotas												
Butter	kt pw	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
In-quota tariff	%	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Out-of-quota tariff	%	205.6	189.6	186.2	192.6	196.0	199.0	201.1	205.0	209.2	213.2	217.8
SMP	kt pw	82.2	82.2	82.2	82.2	82.2	82.2	82.2	82.2	82.2	82.2	82.2
In-quota tariff	%	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
Out-of-quota tariff	%	210.0	210.0	210.0	210.0	210.0	210.0	210.0	210.0	210.0	210.0	210.0
MEXICO												
Butter tariff	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tariff-quotas												
Cheese	kt pw	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4
In-quota tariff	%	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Out-of-quota tariff	%	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
SMP	kt pw	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0
In-quota tariff	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Out-of-quota tariff	%	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
Liconsa social program	mln MXN	1 271.6	1 287.0	1 287.0	1 287.0	1 287.0	1 287.0	1 287.0	1 287.0	1 287.0	1 287.0	1 287.0
RUSSIA												
Butter tariff	%	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Cheese tariff	%	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
UNITED STATES[7]												
Butter tariff-quota	kt pw	8.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
In-quota tariff	%	2.4	2.6	2.6	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.3
Out-of-quota tariff	%	29.5	32.5	32.2	31.9	31.6	31.3	30.9	30.5	30.1	29.7	29.3
Cheese tariff-quota	kt pw	110.0	110.0	110.0	110.0	110.0	110.0	110.0	110.0	110.0	110.0	110.0
In-quota tariff	%	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1
Out-of-quota tariff	%	31.8	34.2	34.0	33.8	33.4	32.9	32.4	31.9	31.4	31.0	30.5
INDIA												
Butter tariff	%	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
Cheese tariff	%	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Skim milk powder tariff	%	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
Whole milk powder tariff	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOUTH AFRICA												
Butter tariff	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cheese tariff	%	23.9	23.9	23.9	23.9	23.9	23.9	23.9	23.9	23.9	23.9	23.9
Skim milk powder tariff	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Whole milk powder tariff	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Note : Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. For manufacturing milk.
3. Implemented in 19 Member States. The maximum quantity limit is 11.695 million dairy cow heads.
4. Buying-in when market prices go below the reference price for SMP and 90% of the reference price for butter is operable automatically for a maximum quantity of 109 000 tonnes for SMP and 50 000 tonnes for butter.
5. In April 2017, in addition to skim milk powder, butter and cheese, milk used for fresh cream, concentrated skim mik and concentrated whole milk production became covered by the direct payments.
6. Excludes processed cheese.
7. A milk margin (all-milk price minus the average feed margin) protection program applies, which has been updated February 2018, and provides a dairy safety net to farmers. Farmers have to decide on enrolment and coverage levels.

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

Table C.39.1 Fish and seafood projections: Production

Calendar year

	TOTAL (kt)		Growth (%)[4]		AQUACULTURE (kt)		Growth (%)[4]		CAPTURE (kt)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**184 623**	**206 225**	**1.64**	**1.10**	**93 985**	**112 430**	**3.59**	**1.80**	**90 638**	**93 795**	**-0.12**	**0.31**
NORTH AMERICA	5 650	5 955	-1.82	0.24	642	675	0.85	1.23	5 008	5 280	-2.12	0.12
Canada	902	1 029	-1.99	1.15	179	218	0.48	1.90	723	811	-2.50	0.96
United States	4 749	4 927	-1.78	0.05	463	457	1.03	0.92	4 286	4 469	-2.05	-0.03
LATIN AMERICA	16 993	18 687	2.91	0.61	4 229	4 896	6.53	1.17	12 764	13 791	1.85	0.41
Argentina	855	906	0.69	0.44	5	6	3.28	0.00	850	900	0.67	0.44
Brazil	1 471	1 614	1.76	1.01	711	829	3.38	1.72	761	785	0.39	0.31
Chile	3 674	3 753	2.92	0.77	1 505	1 653	4.50	0.97	2 169	2 100	1.91	0.58
Colombia	323	352	8.47	0.18	202	217	10.98	0.25	120	135	5.04	0.07
Mexico	1 948	1 892	1.77	0.03	274	284	4.69	0.24	1 674	1 608	1.32	0.00
Paraguay	36	44	5.11	1.22	18	26	11.90	2.18	18	18	0.48	0.00
Peru	5 368	6 183	2.83	0.30	145	176	5.16	1.95	5 223	6 007	2.77	0.25
EUROPE	17 352	18 175	0.00	0.79	3 519	3 880	2.36	1.59	13 834	14 296	-0.53	0.59
European Union[1]	4 741	5 208	-2.65	1.20	1 137	1 240	0.62	1.06	3 603	3 968	-3.52	1.24
United Kingdom	839	873	-1.78	0.52	217	236	-0.13	1.78	622	637	-2.30	0.08
Russia	5 346	5 596	1.98	0.67	315	347	9.93	1.00	5 031	5 249	1.61	0.65
Ukraine	49	77	-14.87	4.67	15	17	-6.32	3.47	35	60	-17.67	5.28
AFRICA	12 984	14 302	2.47	0.93	2 347	2 885	3.61	2.44	10 636	11 417	2.23	0.58
Egypt	2 003	2 380	3.61	2.13	1 582	1 956	3.82	2.58	420	424	2.89	0.25
Ethiopia	97	123	9.21	0.94	1	2	39.54	7.32	97	121	9.08	0.86
Nigeria	1 065	1 187	-0.14	0.82	262	289	-2.60	1.43	803	898	0.79	0.63
South Africa	509	550	-1.75	-0.28	8	14	5.34	4.49	501	537	-1.83	-0.38
ASIA	129 881	147 290	1.80	1.26	83 007	99 812	3.54	1.82	46 874	47 478	-0.78	0.16
China[2]	65 480	74 620	1.24	1.37	52 506	62 120	2.56	1.70	12 975	12 500	-3.02	-0.16
India	15 447	18 552	5.83	1.43	10 254	13 176	9.88	1.80	5 193	5 376	0.24	0.55
Indonesia	12 750	14 876	1.88	1.55	5 503	7 210	2.73	2.94	7 247	7 666	1.28	0.39
Iran	1 274	1 307	3.45	0.29	482	500	4.63	0.32	793	807	2.79	0.27
Japan	3 623	3 386	-1.79	-0.84	620	641	-1.12	-0.01	3 003	2 745	-1.93	-1.03
Kazakhstan	50	55	3.44	0.64	8	13	39.21	3.04	42	42	1.17	0.00
Korea	1 887	1 935	-1.38	0.07	586	635	2.42	0.95	1 302	1 300	-2.72	-0.33
Malaysia	1 577	1 610	-1.40	0.25	250	285	0.16	2.66	1 328	1 325	-1.66	-0.20
Pakistan	671	693	0.34	0.43	166	193	1.26	1.67	505	500	0.06	0.00
Philippines	2 650	3 057	-1.35	1.46	848	1 123	0.92	3.06	1 802	1 934	-2.27	0.65
Saudi Arabia	184	261	8.76	2.95	119	196	21.09	3.96	65	65	-1.23	0.38
Thailand	2 402	2 625	-0.36	0.76	1 002	1 175	1.36	1.65	1 400	1 450	-1.45	0.09
Türkiye	846	1 049	5.38	2.39	512	661	11.21	3.06	334	388	-0.24	1.33
Viet Nam	8 601	8 956	4.41	0.48	5 025	5 096	5.48	0.23	3 576	3 860	3.03	0.81
OCEANIA	1 763	1 816	1.81	0.58	241	281	3.38	1.86	1 522	1 534	1.58	0.36
Australia	289	317	2.89	1.04	126	147	6.18	1.92	163	170	0.86	0.33
New Zealand	455	520	-2.33	1.49	111	130	0.97	1.85	344	390	-3.22	1.37
DEVELOPED COUNTRIES	**28 392**	**29 523**	**-0.52**	**0.50**	**5 222**	**5 767**	**2.04**	**1.49**	**23 170**	**23 756**	**-1.02**	**0.27**
DEVELOPING COUNTRIES	**156 231**	**176 702**	**2.07**	**1.20**	**88 763**	**106 662**	**3.69**	**1.81**	**67 468**	**70 040**	**0.20**	**0.32**
LEAST DEVELOPED COUNTRIES	14 518	16 940	2.73	1.57	4 776	6 352	4.38	3.26	9 743	10 588	2.00	0.68
OECD[3]	**28 334**	**29 412**	**-0.44**	**0.48**	**7 576**	**8 307**	**2.70**	**1.26**	**20 758**	**21 105**	**-1.41**	**0.19**

.. Not available

Note : Fish: The term "fish" indicates fish, crustaceans, molluscs and other aquatic animals, but excludes aquatic mammals, crocodiles, caimans, alligators and aquatic plants.
All data are in live weight equivalent. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Costa Rica.
4. Least-squares growth rate (see glossary).

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

Table C.39.2 Fish and seafood projections: Trade

Calendar year

	IMPORTS (kt)		Growth (%)[4]		EXPORTS (kt)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**44 852**	**45 890**	**1.28**	**0.41**	**43 443**	**45 190**	**0.96**	**0.65**
NORTH AMERICA	6 815	7 434	2.09	1.04	2 426	2 520	-2.69	0.27
Canada	702	711	0.74	0.08	755	797	-1.29	0.46
United States	6 113	6 723	2.26	1.15	1 670	1 723	-3.26	0.18
LATIN AMERICA	2 314	2 498	-1.05	0.95	5 766	6 634	4.12	0.74
Argentina	63	50	-0.57	0.00	576	586	-0.66	0.05
Brazil	471	597	-6.34	1.24	70	125	7.29	5.95
Chile	193	164	6.86	-1.19	1 884	2 055	4.12	1.32
Colombia	248	247	0.38	0.43	56	54	-2.57	-0.15
Mexico	522	730	0.61	3.33	261	215	4.17	-0.47
Paraguay	4	6	-0.33	3.87	0	0	..	..
Peru	144	71	-0.10	-1.05	733	959	2.53	-1.42
EUROPE	11 363	10 513	0.00	-0.40	10 280	10 420	0.36	0.64
European Union[1]	7 983	7 506	0.08	-0.47	2 438	2 438	-0.74	0.58
United Kingdom	1 114	1 102	-1.33	0.49	723	668	-3.06	-0.69
Russia	785	600	-2.34	-0.61	2 267	2 617	1.63	1.59
Ukraine	494	413	3.56	-1.53	20	13	-4.79	-1.10
AFRICA	4 603	6 374	-0.42	2.61	3 167	2 873	3.15	-0.74
Egypt	484	870	-3.53	4.42	27	23	-4.73	0.00
Ethiopia	6	10	13.01	2.28	0	0	-21.43	..
Nigeria	503	584	-7.08	1.51	4	4	-12.32	0.00
South Africa	280	275	0.83	2.35	155	154	-1.27	0.77
ASIA	19 103	18 401	2.70	-0.08	20 784	21 775	0.68	0.87
China[2]	6 090	5 216	6.97	-1.49	7 268	8 504	-1.21	2.12
India	77	100	11.67	3.55	1 507	1 862	4.98	0.27
Indonesia	237	202	4.11	0.09	1 328	1 153	1.20	-0.13
Iran	16	25	-21.40	0.00	144	149	6.90	0.41
Japan	3 303	3 568	-1.08	1.01	771	732	0.73	-0.29
Kazakhstan	69	75	1.59	0.70	40	38	0.76	-0.68
Korea	1 903	1 642	1.46	-0.40	841	772	3.58	0.99
Malaysia	813	1 110	4.73	3.55	397	454	4.50	3.32
Pakistan	7	6	-4.26	0.00	210	156	2.74	-2.84
Philippines	585	703	4.35	2.32	317	283	-2.28	-1.41
Saudi Arabia	320	309	0.02	0.14	50	50	-0.28	0.00
Thailand	2 159	1 936	2.77	-0.28	1 783	1 714	-2.17	0.39
Türkiye	137	112	3.26	-1.51	351	385	10.19	1.61
Viet Nam	617	606	8.01	0.50	3 438	3 426	3.19	0.33
OCEANIA	652	670	-1.01	-0.11	1 021	969	0.76	0.48
Australia	466	468	-0.40	-0.17	73	48	1.99	-2.44
New Zealand	59	54	2.09	-0.60	349	395	-2.76	1.88
DEVELOPED COUNTRIES	**22 681**	**22 750**	**0.47**	**0.33**	**14 116**	**14 330**	**-0.28**	**0.54**
DEVELOPING COUNTRIES	**22 171**	**23 140**	**2.14**	**0.49**	**29 328**	**30 860**	**1.60**	**0.70**
LEAST DEVELOPED COUNTRIES	1 429	2 225	0.72	2.71	1 964	1 848	6.18	-0.65
OECD[3]	**23 412**	**23 686**	**0.61**	**0.38**	**13 323**	**13 311**	**0.28**	**0.52**

.. Not available

Note : Fish: The term "fish" indicates fish, crustaceans, molluscs and other aquatic animals, but excludes aquatic mammals, crocodiles, caimans, alligators and aquatic plants. Imports and exports refer to trade of food fish i.e. for human.All data are in live weight equivalent. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Costa Rica.
4. Least-squares growth rate (see glossary).

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

Table C.39.3 Fish and seafood projections: Reduction, food consumption

Calendar year

	REDUCTION (kt)		Growth (%)[4]		FOOD (kt)		Growth (%)[4]		FOOD (kg/cap)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**16 804**	**17 497**	**1.96**	**0.36**	**165 418**	**186 333**	**1.72**	**1.15**	**20.8**	**21.4**	**0.68**	**0.32**
NORTH AMERICA	987	1 017	-0.05	0.10	8 719	9 552	1.41	0.87	23.1	23.9	0.76	0.36
Canada	14	14	-9.63	0.83	833	928	0.13	0.92	21.7	22.1	-0.91	0.14
United States	972	1 003	0.14	0.10	7 886	8 624	1.55	0.87	23.3	24.2	0.95	0.38
LATIN AMERICA	6 026	6 284	2.98	0.19	7 015	7 907	0.74	1.05	10.6	11.1	-0.13	0.41
Argentina	0	0	0.00	0.00	342	370	2.97	1.03	7.5	7.6	2.22	0.47
Brazil	98	100	3.72	1.31	1 775	1 985	-1.20	0.82	8.2	8.8	-1.89	0.38
Chile	1 439	1 359	1.75	-0.55	295	353	3.24	1.88	15.1	17.5	1.92	1.59
Colombia	0	0	0.00	0.00	516	545	5.44	0.33	10.0	9.9	4.03	-0.22
Mexico	328	272	10.61	-0.10	1881	2135	0.20	1.08	14.7	15.6	-0.65	0.45
Paraguay	0	0	0.00	0.00	40	50	4.42	1.52	6.0	6.5	3.03	0.45
Peru	3 883	4 245	2.77	0.37	895	1051	2.62	1.27	26.3	27.9	1.14	0.34
EUROPE	2 708	3 057	2.00	1.01	15 322	14 984	-0.48	0.03	20.6	20.5	-0.52	0.16
European Union[1]	529	631	-4.61	1.20	9 693	9 565	-0.73	0.04	21.7	21.7	-0.87	0.17
United Kingdom	0	0	0.00	0.00	1 229	1 306	-0.46	1.18	18.2	18.7	-0.95	0.90
Russia	700	760	9.81	0.68	3 098	2 804	-0.12	-0.39	21.4	20.0	-0.13	-0.10
Ukraine	0	0	0.00	0.00	523	478	0.67	-0.81	13.0	12.7	2.48	-0.51
AFRICA	587	634	-4.34	-0.19	13 536	16 876	1.52	1.93	9.6	9.3	-0.98	-0.29
Egypt	0	0	0.00	0.00	2 459	3 227	1.87	2.72	22.2	24.7	0.02	1.23
Ethiopia	0	0	0.00	0.00	103	133	9.88	1.04	0.8	0.8	7.01	-1.23
Nigeria	0	0	0.00	0.00	1563	1767	-3.02	1.04	7.2	6.3	-5.37	-1.18
South Africa	223	202	-3.92	-0.58	412	469	1.35	0.95	6.9	7.1	0.27	0.03
ASIA	6 434	6 418	2.25	0.36	119 817	135 868	2.15	1.22	25.5	27.1	1.31	0.65
China[2]	1 977	2 020	-1.13	0.33	61 578	68 511	2.21	1.08	43.2	48.7	1.88	1.22
India	796	732	12.09	1.43	12 881	15 815	5.73	1.67	9.1	10.2	4.69	0.87
Indonesia	90	100	14.06	0.00	11 570	13 825	1.95	1.70	42.0	46.5	1.05	1.00
Iran	121	126	-2.31	-0.30	1 025	1 058	2.54	0.34	11.6	11.2	1.36	-0.18
Japan	748	723	0.73	-0.02	5 342	5 424	-1.83	0.13	43.1	46.6	-1.46	0.71
Kazakhstan	0	0	0.00	0.00	80	91	3.19	1.30	4.1	4.2	1.96	0.26
Korea	53	54	-15.28	0.00	2 881	2 737	0.06	-0.45	55.6	53.8	-0.18	-0.27
Malaysia	100	64	-8.66	-3.61	1 873	2 187	0.84	1.32	55.2	58.2	-0.43	0.42
Pakistan	80	80	-4.21	0.00	389	463	0.29	1.88	1.6	1.6	-1.30	0.05
Philippines	0	0	0.00	0.00	2 918	3 476	-0.30	1.90	25.3	25.9	-1.92	0.54
Saudi Arabia	0	0	0.00	0.00	454	520	2.86	1.48	12.5	12.4	1.29	0.24
Thailand	437	382	0.55	-0.91	2 165	2 350	3.26	0.70	30.2	32.7	2.97	0.69
Türkiye	137	214	4.08	3.97	493	558	2.94	1.53	5.8	6.2	1.93	1.03
Viet Nam	1 342	1 418	6.29	0.71	4231	4618	4.55	0.97	43.1	44.4	3.61	0.48
OCEANIA	62	86	-11.20	0.47	1009	1146	0.47	0.90	22.9	23.1	-1.11	-0.16
Australia	27	28	-1.40	-0.06	655	709	0.89	0.53	25.0	24.5	-0.46	-0.34
New Zealand	31	41	-8.24	1.05	135	138	2.59	-0.24	26.0	24.7	0.83	-0.89
DEVELOPED COUNTRIES	**4 787**	**5 133**	**1.02**	**0.59**	**31 241**	**32 106**	**-0.06**	**0.37**	**21.7**	**21.9**	**-0.38**	**0.21**
DEVELOPING COUNTRIES	**12 017**	**12 364**	**2.37**	**0.27**	**134 177**	**154 226**	**2.17**	**1.32**	**20.7**	**21.3**	**0.96**	**0.34**
LEAST DEVELOPED COUNTRIES	273	291	-4.25	0.00	13 363	16 700	2.18	2.11	14.1	13.9	-0.24	-0.05
OECD[3]	**5 158**	**5 401**	**0.88**	**0.49**	**32 510**	**33 741**	**0.00**	**0.42**	**23.1**	**23.4**	**-0.47**	**0.21**

.. Not available

Note : Fish: The term "fish" indicates fish, crustaceans, molluscs and other aquatic animals, but excludes aquatic mammals, crocodiles, caimans, alligators and aquatic plants.
All data are in live weight equivalent. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Costa Rica.
4. Least-squares growth rate (see glossary).

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

Table C.40.1 Ethanol projections: Production and use

Calendar year

	PRODUCTION (mln L)		Growth (%)[4]	DOMESTIC USE (mln L)		Growth (%)[4]	FUEL USE (mln L)		Growth (%)[4]
	Average 2021-23est	2033	2024-33	Average 2021-23est	2033	2024-33	Average 2021-23est	2033	2024-33
WORLD	**127 242**	**154 660**	**1.47**	**127 814**	**154 268**	**1.45**	**104 240**	**127 479**	**1.56**
NORTH AMERICA	61 636	64 941	0.33	59 115	62 277	0.45	56 342	58 316	0.28
Canada	1 953	2 194	1.00	3 707	5 878	4.45	3 278	5 418	4.70
United States	59 683	62 748	0.30	55 408	56 399	0.11	53 064	52 898	-0.08
LATIN AMERICA	35 374	47 811	2.21	33 279	45 465	2.13	30 005	40 489	2.26
Argentina	1 270	1 522	0.99	1257	1517	1.00	1 082	1 321	0.73
Brazil	31 681	42 659	2.14	29 265	40 052	2.09	27 332	36 575	2.21
Chile	4	6	3.85	32	19	1.08	0	0	0.00
Colombia	376	797	5.66	525	901	3.43	462	865	3.60
Mexico	167	178	0.62	455	500	0.52	257	305	0.97
Paraguay	560	1 026	6.62	349	703	9.57	324	683	10.03
Peru	210	231	1.92	275	315	1.37	201	233	1.30
EUROPE	7 792	8 689	1.04	9 769	10 438	0.43	6 528	7 199	0.59
European Union[1]	6 261	7 001	1.12	7 443	7 827	0.42	5 279	5 663	0.59
United Kingdom	690	819	0.55	1 470	1 719	0.26	1164	1414	0.32
Russia	597	575	0.15	527	527	0.16	0	0	0.00
Ukraine	134	188	2.93	80	106	5.91	60	106	5.91
AFRICA	1 286	1 600	2.23	1 587	1 869	1.88	225	265	3.10
Egypt	10	15	3.02	15	22	1.89	0	0	0.00
Ethiopia	121	169	3.09	121	169	3.08	60	96	4.09
Nigeria	49	78	4.77	253	219	1.47	0	0	0.00
South Africa	412	434	0.33	195	186	0.80	5	5	-0.29
ASIA	20 819	31 288	3.12	23 786	33 989	2.91	10938	21020	4.82
China[2]	10 217	11 433	1.08	10 346	11 410	1.08	3311	4456	2.73
India	6 076	14 737	5.77	6 293	14 906	5.94	4359	12932	7.17
Indonesia	180	217	1.82	137	161	2.55	10	41	3.05
Iran	153	179	1.41	207	233	1.06	12	15	1.58
Japan	50	45	0.00	1 715	1 711	-0.09	925	938	-0.17
Kazakhstan	55	71	2.23	75	91	1.70	4	8	5.33
Korea	158	136	-1.82	579	478	-1.03	5	3	-4.91
Malaysia		3	25.43	15	17	1.90	0	0	0.00
Pakistan	578	485	-0.54	37	36	0.08	0	0	0.00
Philippines	405	641	4.59	908	1 138	2.33	641	866	2.18
Saudi Arabia		11	21.53	76	86	1.33	0	0	0.00
Thailand	1 570	1 587	0.66	1 588	1 611	0.58	1349	1385	0.66
Türkiye	151	160	-0.01	276	256	-0.01	100	85	-1.97
Viet Nam	281	364	1.94	295	360	1.61	176	235	2.50
OCEANIA	335	329	-0.64	277	231	-0.94	202	191	-1.19
Australia	328	320	-0.69	271	224	-1.02	202	191	-1.19
New Zealand	3	3	0.00	0	0	..	0	0	0.00
DEVELOPED COUNTRIES	**70 326**	**74 578**	**0.41**	**71 237**	**75 049**	**0.43**	**64 010**	**66 661**	**0.31**
DEVELOPING COUNTRIES	**56 916**	**80 082**	**2.57**	**56 577**	**79 220**	**2.51**	**40 229**	**60 818**	**3.13**
LEAST DEVELOPED COUNTRIES	677	928	3.06	777	1 048	2.66	57	86	4.14
OECD[3]	**69 825**	**74 408**	**0.44**	**72 058**	**76 080**	**0.44**	**64 761**	**67 795**	**0.33**

.. Not available

Note : Calendar year: See Glossary of Terms for definitions. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.40.2 Ethanol projections: Share in volume terms and trade

Calendar year

	SHARE IN GASOLINE TYPE FUEL USE (%)		IMPORTS (mln L)		Growth (%)[4]	EXPORTS (mln L)		Growth (%)[4]
	Average 2021-23est	2033	Average 2021-23est	2033	2024-33	Average 2021-23est	2033	2024-33
WORLD	**..**	**..**	**10 835**	**12 422**	**1.70**	**10 065**	**12 422**	**1.70**
NORTH AMERICA	..	..	2 369	4 109	5.66	5 027	6 765	1.89
Canada	7.1	12.4	1 843	3 774	6.88	90	90	0.00
United States	10.0	12.0	526	335	-2.98	4 937	6 675	1.92
LATIN AMERICA	..	..	1 260	1 300	-0.54	3 035	3 642	2.19
Argentina	10.9	12.0	4	10	-0.03	24	16	0.09
Brazil	47.7	52.5	384	401	-0.08	2 474	3 002	2.44
Chile	..	..	30	17	0.00	3	4	0.00
Colombia	..	..	156	116	-5.53	8	12	2.24
Mexico	0.6	0.8	289	323	0.46	1	1	0.01
Paraguay	..	..	0	0	..	211	322	2.12
Peru	..	..	233	245	0.00	168	162	0.00
EUROPE	..	..	2 696	3 011	0.27	810	884	1.45
European Union[1]	6.3	8.2	1 504	1 676	0.50	442	472	2.91
United Kingdom	7.3	11.6	1 002	1 155	0.00	195	255	0.00
Russia	0.0	0.0	1	2	-0.68	68	50	-0.02
Ukraine	..	..	1		..	55	81	0.00
AFRICA	..	..	571	549	0.00	270	281	0.00
Egypt	..	..	17	18	0.00	13	10	0.00
Ethiopia	..	..	1	0	..	0	0	..
Nigeria	..	..	205	141	0.00	0	0	..
South Africa	..	..	4	0	..	221	249	0.00
ASIA	..	..	3 924	3 447	0.36	824	746	-0.84
China[2]	1.6	2.3	279	2	-0.08	20	25	0.05
India	..	..	332	299	8.80	115	130	-2.89
Indonesia	..	..	30	4	0.00	73	61	0.00
Iran	..	..	62	63	0.00	8	8	0.00
Japan	2.2	2.6	1 690	1 669	-0.09	1	2	0.00
Kazakhstan	..	..	22	23	0.00	3	3	0.00
Korea	0.0	0.0	399	341	-0.69	0	0	..
Malaysia	..	..	15	14	0.00	0	0	..
Pakistan	..	..			..	541	449	-0.59
Philippines	..	..	503	497	0.00	0	0	..
Saudi Arabia	..	..	76	75	0.00	0	0	..
Thailand	..	..	25	30	-2.81	7	7	1.13
Türkiye	..	..	138	111	0.00	13	14	0.00
Viet Nam	..	..	30	12	-3.71	15	17	3.63
OCEANIA	..	..	16	6	-1.04	99	105	0.06
Australia	1.3	1.3	13	4	-1.62	95	100	0.06
New Zealand	0.0	0.0	2	2	0.00	4	4	0.00
DEVELOPED COUNTRIES	**..**	**..**	**6 845**	**8 868**	**2.37**	**6 163**	**8 009**	**1.75**
DEVELOPING COUNTRIES	**..**	**..**	**3 990**	**3 554**	**0.18**	**3 901**	**4 413**	**1.62**
LEAST DEVELOPED COUNTRIES	..	..	117	130	0.00	17	10	0.00
OECD[3]	**..**	**..**	**7 774**	**9 692**	**2.03**	**5 794**	**7 633**	**1.85**

.. Not available

Note : Calendar year: See Glossary of Terms for definitions. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.41.1 Biodiesel projections: Production and use

Calendar year

	PRODUCTION (mln L)		Growth (%)[4]	DOMESTIC USE (mln L)		Growth (%)[4]
	Average 2021-23est	2033	2024-33	Average 2021-23est	2033	2024-33
WORLD	**60 048**	**78 721**	**1.48**	**59 337**	**78 533**	**1.48**
NORTH AMERICA	11 947	20 846	2.38	13 152	22 453	2.04
Canada	408	915	6.58	451	1 015	6.94
United States	11 539	19 931	2.22	12 701	21 437	1.86
LATIN AMERICA	9 916	12 505	2.04	8 928	11 887	2.14
Argentina	1 877	1 708	1.16	684	924	2.22
Brazil	7 049	9 451	2.12	7 060	9 427	2.11
Chile	0	0	..	0	0	..
Colombia	760	1 019	2.57	760	1019	2.57
Mexico	0	0	..	0	0	..
Paraguay	12	23	6.02	12	23	6.02
Peru	219	304	2.78	413	494	1.62
EUROPE	19 432	18 800	0.08	22 036	21 216	0.02
European Union[1]	18 820	18 134	0.01	20 305	19 173	-0.16
United Kingdom	612	666	2.21	1 463	1 827	2.21
Russia	0	0	..	0	0	..
Ukraine	0	0	..	0	0	..
AFRICA	0	0	..	0	0	..
Egypt	0	0	..	0	0	..
Ethiopia	0	0	..	0	0	..
Nigeria	0	0	..	0	0	..
South Africa	0	0	..	0	0	..
ASIA	18 735	26 552	1.60	15 210	22 966	2.08
China[2]	2 522	2 719	-1.19	716	1031	1.96
India	184	201	0.30	181	201	0.48
Indonesia	11 340	17 756	2.05	10 893	17 001	2.06
Iran	0	0	..	0	0	..
Japan	23	24	-0.07	16	19	1.12
Kazakhstan	0	0	..	0	0	..
Korea	705	690	-0.50	681	665	-0.57
Malaysia	1 278	1 472	1.84	944	1279	2.28
Pakistan	0	0	..	0	0	..
Philippines	213	291	2.35	213	291	2.35
Saudi Arabia	0	0	..	0	0	..
Thailand	1 575	2 504	3.18	1566	2480	3.15
Türkiye	0	0	..	0	0	..
Viet Nam	0	0	..	0	0	..
OCEANIA	18	19	2.28	10	11	4.30
Australia	18	19	2.28	10	11	4.30
New Zealand	0	0	..	0	0	..
DEVELOPED COUNTRIES	**31 420**	**39 689**	**1.23**	**35 214**	**43 699**	**1.01**
DEVELOPING COUNTRIES	**28 628**	**39 033**	**1.74**	**24 123**	**34 834**	**2.10**
LEAST DEVELOPED COUNTRIES	0	0	..	0	0	..
OECD[3]	**32 885**	**41 398**	**1.23**	**36 655**	**45 382**	**1.02**

.. Not available

Note : Calendar year: See Glossary of Terms for definitions. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.41.2 Biodiesel projections: Share in volume terms and trade

Calendar year

	SHARE IN DIESEL TYPE FUEL USE (%)		IMPORTS (mln L)		Growth (%)[4]	EXPORTS (mln L)		Growth (%)[4]
	Average 2021-23est	2033	Average 2021-23est	2033	2024-33	Average 2021-23est	2033	2024-33
WORLD	**..**	**..**	**8 026**	**8 202**	**-0.01**	**8 062**	**8 451**	**-0.01**
NORTH AMERICA	..	..	2 648	3 060	-0.96	1 443	1 453	-0.20
Canada	2.5	6.1	362	505	3.49	319	404	2.21
United States	7.2	12.6	2 286	2 556	-1.65	1 124	1 049	-1.00
LATIN AMERICA	..	..	194	190	0.00	1 223	806	0.13
Argentina	6.2	6.7	0	0	..	1 208	782	0.02
Brazil	13.3	15.0	0	0	..	14	24	5.02
Chile	..	..	0	0	..	0	0	..
Colombia	..	..	0	0	..	0	0	..
Mexico	0.0	0.0	0	0	..	0	0	..
Paraguay	..	..	0	0	..	0	0	..
Peru	..	..	194	190	0.00	0	0	..
EUROPE	..	..	4 826	4 410	0.58	1 507	2 055	1.89
European Union[1]	10.1	11.7	3 333	2 735	-0.02	1 132	1 758	1.95
United Kingdom	5.4	9.9	1 226	1 460	2.07	375	298	1.50
Russia	0.0	0.0	0	0	..	0	0	..
Ukraine	..	..	0	0	..	0	0	..
AFRICA	..	..	0	0	..	0	0	..
Egypt	..	..	0	0	..	0	0	..
Ethiopia	..	..	0	0	..	0	0	..
Nigeria	..	..	0	0	..	0	0	..
South Africa	..	..	0	0	..	0	0	..
ASIA	..	..	356	541	0.84	3 881	4 127	-0.81
China[2]	0.7	1.2	354	539	0.83	2 160	2 227	-1.96
India	..	..	1	1	2.84	5	1	-12.97
Indonesia	..	..	0	0	..	446	755	1.99
Iran	..	..	0	0	..	0	0	..
Japan	0.1	0.1	1	1	-0.12	8	6	-3.15
Kazakhstan	..	..	0	0	..	0	0	..
Korea	0.0	0.0	0	0	..	24	26	1.53
Malaysia	..	..	0	0	..	333	192	-0.64
Pakistan	..	..	0	0	..	0	0	..
Philippines	..	..	0	0	..	0	0	..
Saudi Arabia	..	..	0	0	..	0	0	..
Thailand	..	..	0	0	..	9	24	6.51
Türkiye	..	..	0	0	..	0	0	..
Viet Nam	..	..	0	0	..	0	0	..
OCEANIA	..	..	1	1	-0.12	9	9	0.00
Australia	0.1	0.1	1	1	-0.12	9	9	0.00
New Zealand	0.0	0.0	0	0	..	0	0	..
DEVELOPED COUNTRIES	**..**	**..**	**7 477**	**7 472**	**-0.07**	**2 967**	**3 523**	**0.96**
DEVELOPING COUNTRIES	**..**	**..**	**549**	**730**	**0.61**	**5 095**	**4 927**	**-0.66**
LEAST DEVELOPED COUNTRIES	..	..	0	0	..	0	0	..
OECD[3]	**..**	**..**	**7 477**	**7 472**	**-0.07**	**2 991**	**3 549**	**0.96**

.. Not available

Note : Calendar year: See Glossary of Terms for definitions. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.42 Main policy assumptions for biofuel markets

Calendar year

		Average 2021-23-est	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
ARGENTINA												
Biodiesel												
Export tax	%	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
BRAZIL												
Ethanol												
Import tariff	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incorporation mandate[3]	%	27.0	30.0	31.0	32.0	33.0	34.0	35.0	36.0	37.0	38.0	40.0
Biodiesel												
Tax concessions[4]	BRL/hl	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Import tariff	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CANADA												
Ethanol												
Incorporation mandate[3]	%	5.0	5.6	5.9	6.3	6.6	6.9	7.2	7.5	7.8	8.2	8.3
Biodiesel												
Incorporation mandate[3]	%	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
COLOMBIA												
Ethanol												
Import tariff	%	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Blending target[2,5]	%	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Biodiesel												
Blending target[2]	%	11.3	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
EUROPEAN UNION												
Biofuel												
Energy share in fuel consumption[6]	%	10.3	10.5	10.7	11.0	11.3	11.5	11.8	12.1	12.4	12.7	13.0
Ethanol												
Tax concessions[4]	EUR/hl	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8
Import tariff	EUR/hl	19.2	19.2	19.2	19.2	19.2	19.2	19.2	19.2	19.2	20.2	21.2
Biodiesel												
Tax concessions[4]	EUR/hl	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9
Import tariff	%	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
INDIA												
Ethanol												
Import tariff	%	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Share of biofuel mandates in total fuel consumption	%	9.3	10.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Biodiesel												
Import tariff	%	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Share of biofuel mandates in total fuel consumption	%	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
INDONESIA												
Biodiesel												
Blending target[2]	%	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
MALAYSIA												
Biodiesel												
Blending target[2]	%	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
THAILAND												
Ethanol												
Blending target[2]	%	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5
Biodiesel												
Blending target[2]	%	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
UNITED STATES												
Renewable Fuel Standard[7]												
Total	mln L	78 006	82 652	83 521	84 390	85 260	86 129	86 998	88 460	89 027	89 664	90 314
advanced mandate	mln L	21 445	25 077	26 004	26 931	27 857	28 784	29 711	31 230	31 854	32 491	33 141
cellulosic ethanol	mln L	2 365	2 551	2 551	2 551	2 551	2 551	2 551	2 551	2 551	2 551	2 551
Ethanol												
Import tariff (undenatured)	%	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
Import tariff (denatured)	%	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Blender tax credit	USD/hl	26.4	26.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Biodiesel												
Import tariff	%	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Blender tax credit	USD/hl	0	0	0	0	0	0	0	0	0	0	0

Note : 2023est: Data for 2023 are estimated.For many countries, shares for ethanol and biodiesel are not individually specified in the legislation.Figures are based on a combination of the EU mandate in the context of the Renewable Energy Directive and the National Renewable Energy Action Plans (NREAP) in the EU member states.

1. Refers to all current European Union member countries.
2. Expressed in volume share.
3. Share in respective fuel type, in volume.
4. Difference between tax rates applying to fossil and biogen fuels.
5. Applies to cities with more than 500 000 inhabitants.
6. According to the current Renewable energy Directive 2009/28/EC, the energy content of biofuel other than first-generation biofuels counts twice towards meeting the target. It is assumed that other sources than biofuel will help filling the 10% transport energy target.
7. The total, advanced and cellulosic mandates are not at the levels defined in EISA. Details can be found in the policy assumptions section of the biofuel chapter.

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

Table C.43.1 Cotton projections projections: Production and trade

Marketing year

	PRODUCTION (kt)		Growth (%)[4]		IMPORTS (kt)		Growth (%)[4]		EXPORTS (kt)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**24 737**	**29 010**	**0.18**	**1.34**	**8 992**	**12 352**	**1.63**	**2.08**	**8 888**	**12 352**	**1.54**	**2.08**
NORTH AMERICA	3 167	4 303	-1.71	1.65	1	1	5.28	0.91	2 789	3 876	1.31	1.85
Canada	0	0	..	..	0	0	..	..			..	..
United States	3 167	4 303	-1.71	1.65	1	1	31.72	1.04	2 789	3 876	1.31	1.85
LATIN AMERICA	3 540	4 478	8.14	2.30	403	432	-0.72	0.74	2 004	3 501	12.61	3.51
Argentina	297	318	3.25	2.19	0	0	-76.94	..	128	132	9.61	10.20
Brazil	2 957	3 852	10.05	2.45	5	6	-14.47	-0.03	1 744	3 208	12.56	3.45
Chile	0	0	..	..	0	1	..	..	0	0	..	..
Colombia	16	16	1.71	0.00	12	11	-12.84	0.00	0	0	..	..
Mexico	233	256	-0.25	0.87	223	239	-0.45	-0.26	126	156	19.51	0.78
Paraguay	5	6	0.66	0.97	1	0	-55.84	..	5	5	5.94	0.65
Peru	19	19	-2.81	0.46	48	56	-1.18	2.75	0	0	-16.87	..
EUROPE	285	293	-0.90	0.15	293	317	-3.89	0.20	418	417	-0.98	-0.01
European Union[1]	283	291	-0.93	0.15	259	273	-2.32	0.15	415	414	-1.01	-0.01
United Kingdom	0	0	..	..	0	0	..	..	0	0	..	..
Russia	0	0	..	..	12	20	-19.82	0.00	1	1	4.87	0.00
Ukraine	0	0	..	..	1	0	-16.63	..	0	0	..	..
AFRICA	1 869	2 115	3.14	1.08	151	187	-3.05	1.37	1 610	1 711	3.28	0.55
Egypt	79	85	1.46	0.06	88	114	-0.19	2.65	53	39	4.30	-2.58
Ethiopia	63	75	4.64	1.92	1	1	-32.34	2.82	5	2	-6.20	-12.53
Nigeria	88	101	7.24	1.06	1	1	0.00	1.40	35	19	0.74	-5.96
South Africa	14	17	-1.82	1.63	11	11	-6.37	-0.12	14	8	4.50	0.13
ASIA	14 724	16 608	-1.36	1.11	8 142	11 414	2.11	2.20	1017	1638	-10.82	3.43
China[2]	5 770	5 730	0.15	-0.05	1 791	2 826	5.44	0.71	24	27	-0.83	0.27
India	5 466	7 071	-1.45	2.27	339	62	0.35	-5.60	440	1286	-14.00	6.02
Indonesia	2	2	-9.16	-0.24	474	537	-5.96	2.18	3	4	6.01	-2.14
Iran	80	76	5.88	-0.22	96	105	7.90	2.48	0	0	..	..
Japan	0	0	..	..	40	34	-6.53	-1.53	0	0	..	..
Kazakhstan	80	85	5.39	1.02			31.91	..	57	68	6.64	0.84
Korea	0	0	..	..	122	139	-9.77	-0.36	8	2	14.89	0.00
Malaysia	0	0	..	..	144	200	7.07	2.20	4	4	-19.02	-2.15
Pakistan	1 192	1 356	-6.82	0.78	888	1 424	14.03	4.35	9	8	-22.83	-0.61
Philippines	0	0	..	..	8	11	-6.55	3.59	0	0	..	..
Saudi Arabia	0	0	..	..			..	..	0	0	..	..
Thailand	2	2	3.83	1.13	163	194	-10.46	1.56	0	0	..	..
Türkiye	823	851	0.65	0.81	1 029	1 521	2.28	1.40	149	77	9.11	-1.38
Viet Nam	1	1	4.34	-0.08	1393	2024	4.21	3.25	0	0	..	..
OCEANIA	1 152	1 212	5.32	0.93	1	1	0.00	0.00	1 052	1 209	4.96	0.50
Australia	1 151	1 211	5.33	0.93	0	0	..	..	1 051	1 208	4.96	0.50
New Zealand	1	1	0.00	0.00	1	1	0.00	0.00	1	1	0.00	0.00
DEVELOPED COUNTRIES	**5 752**	**7 057**	**-0.85**	**1.36**	**355**	**370**	**-4.11**	**0.04**	**4 601**	**5 699**	**-0.07**	**1.17**
DEVELOPING COUNTRIES	**18 985**	**21 952**	**0.50**	**1.34**	**8 636**	**11 982**	**1.93**	**2.15**	**4 287**	**6 654**	**3.43**	**2.93**
LEAST DEVELOPED COUNTRIES	1 430	1 520	2.13	1.15	1 546	2 237	1.72	3.40	1 116	1 147	2.97	0.74
OECD[3]	**5 683**	**6 939**	**-0.13**	**1.31**	**1 689**	**2 221**	**-0.63**	**0.87**	**4 545**	**5 743**	**2.44**	**1.33**

.. Not available

Note : Marketing year: See Glossary of Terms for definitions. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.43.2. Cotton projections: Consumption

Marketing year

	CONSUMPTION (kt)[4]		Growth (%)[5]	
	Average 2021-23est	2033	2014-23	2024-33
WORLD	**24 447**	**28 736**	**-0.30**	**1.68**
NORTH AMERICA	470	405	-6.95	-0.01
Canada	0	0	..	..
United States	470	405	-6.94	-0.01
LATIN AMERICA	1 350	1 371	-1.42	-0.37
Argentina	142	121	0.21	-2.27
Brazil	699	680	-0.53	-1.00
Chile	0	1	..	..
Colombia	27	27	-7.85	0.00
Mexico	318	339	-3.65	0.43
Paraguay	1	1	-13.74	2.52
Peru	60	74	-2.18	2.06
EUROPE	170	193	-5.14	1.23
European Union[1]	132	151	-3.33	0.86
United Kingdom	0	0	..	..
Russia	17	19	-15.00	7.82
Ukraine	0	0	-18.83	..
AFRICA	386	549	0.07	3.05
Egypt	107	159	-1.91	2.93
Ethiopia	56	73	2.09	2.59
Nigeria	53	80	11.70	4.35
South Africa	17	20	-3.21	1.50
ASIA	22 068	26 216	0.0006	1.80
China[2]	7 772	8 460	-0.18	0.88
India	5 168	5 840	-0.39	1.52
Indonesia	462	532	-6.29	2.27
Iran	150	178	4.74	1.34
Japan	38	34	-7.27	-1.43
Kazakhstan	13	17	-0.08	2.07
Korea	139	138	-8.63	2.58
Malaysia	120	193	8.73	2.42
Pakistan	2 116	2 757	-1.51	2.72
Philippines	7	11	-7.95	3.88
Saudi Arabia	0	0	..	..
Thailand	159	195	-10.70	1.61
Türkiye	1 788	2 264	1.97	2.14
Viet Nam	1 393	2 016	4.49	3.28
OCEANIA	3	3	-15.26	0.00
Australia	2	2	-19.61	-0.01
New Zealand	1	1	0.00	0.00
DEVELOPED COUNTRIES	**1 537**	**1 695**	**-0.99**	**1.48**
DEVELOPING COUNTRIES	**22 910**	**27 040**	**-0.25**	**1.69**
LEAST DEVELOPED COUNTRIES	1 896	2 562	2.12	3.28
OECD[3]	**2 917**	**3 361**	**-1.75**	**1.55**

.. Not available

Note : Marketing year: See Glossary of Terms for definitions. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Consumption for cotton means mill consumption and not final consumer demand.
5. Least-squares growth rate (see glossary).

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

Table C.44. Main policy assumptions for cotton markets

Marketing year

		Average 2021-23est	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
ARGENTINA												
Export tax equivalent of export barriers	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tariff equivalent of import barriers	%	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
BRAZIL												
Producer Minimum Price, lint cotton	BRL/t	8 866	10 753	10 753	10 753	10 753	10 753	10 753	10 753	10 753	10 753	10 753
Tariff equivalent of import barriers	%	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
UNITED STATES												
Economic Adjustment Assistance payment	USD/t	66.1	66.1	66.1	66.1	66.1	66.1	66.1	66.1	66.1	66.1	66.1
TRQ	kt	73.2	73.2	73.2	73.2	73.2	73.2	73.2	73.2	73.2	73.2	73.2
In-quota tariff	USD/t	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0
Out-of-quota tariff	USD/t	314.0	314.0	314.0	314.0	314.0	314.0	314.0	314.0	314.0	314.0	314.0
CHINA												
TRQ	kt	894.0	894.0	894.0	894.0	894.0	894.0	894.0	894.0	894.0	894.0	894.0
In-quota tariff	%	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Out-of-quota tariff	%	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0

Note : Marketing year: See Glossary of Terms for definitions. Average 2021-23est: Data for 2023 are estimated.

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

Table C.45. Roots and tubers projections: Production and food consumption

Calendar year

	PRODUCTION (kt)		Growth (%)[4]		FOOD (kg/cap)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**250 187**	**305 906**	**2.40**	**1.65**	**17.4**	**19.3**	**1.45**	**0.82**
NORTH AMERICA	6 051	6 308	1.44	0.27	12.7	12.5	1.14	-0.22
Canada	1 148	1 237	2.37	0.38	15.5	14.8	0.23	-0.47
United States	4 903	5 072	1.22	0.24	12.4	12.2	1.25	-0.19
LATIN AMERICA	14 577	16 406	0.53	1.07	12.8	14.0	0.34	0.74
Argentina	714	806	2.77	0.91	10.6	10.3	1.33	-0.40
Brazil	5 798	5 343	-2.37	-0.53	13.1	12.1	-1.99	-0.62
Chile	221	228	-1.37	0.31	9.6	9.7	-1.11	0.56
Colombia	1 639	2 232	4.12	2.70	24.8	33.3	2.69	2.31
Mexico	394	438	-0.13	1.10	3.2	3.7	-0.32	1.04
Paraguay	1128	1480	3.19	2.26	56.7	64.7	2.12	0.94
Peru	1 861	2 342	3.08	1.91	29.0	33.4	0.72	1.13
EUROPE	27 680	29 520	0.80	0.43	15.4	16.1	-0.31	0.27
European Union[1]	10 948	11 549	-1.19	0.00	7.4	6.8	-5.54	-1.01
United Kingdom	1 142	1 309	-0.16	1.06	14.6	16.3	-4.29	0.94
Russia	8 159	8 235	3.03	0.45	35.5	38.7	4.55	0.50
Ukraine	6 047	6 943	3.16	1.02	35.6	43.1	6.15	2.01
AFRICA	89 571	121 734	2.66	2.66	35.1	38.6	0.10	0.78
Egypt	1 675	2 171	6.16	2.15	8.5	9.5	5.21	0.90
Ethiopia	2 591	3 306	1.62	2.08	13.6	13.5	-2.16	-0.14
Nigeria	35 876	48 006	3.08	2.61	81.6	90.0	0.32	0.92
South Africa	565	655	2.10	0.95	5.5	5.9	1.87	0.38
ASIA	111 702	131 222	2.95	1.20	13.4	14.1	2.39	0.28
China[2]	52 585	56 091	3.35	0.26	24.9	25.7	4.01	0.01
India	16 260	20 462	3.64	1.81	7.2	8.2	2.26	1.06
Indonesia	9 576	11 826	1.60	1.84	22.6	25.0	-1.00	0.92
Iran	543	587	-8.33	0.73	3.6	3.8	-10.53	0.63
Japan	674	648	-2.51	-0.19	6.0	6.0	-0.88	0.05
Kazakhstan	855	1 040	2.50	1.42	17.9	19.5	-0.22	0.64
Korea	288	315	2.21	0.35	6.2	7.4	2.30	1.18
Malaysia	46	65	3.98	3.17	9.7	15.0	8.85	3.62
Pakistan	1 410	1 889	5.60	2.39	3.5	3.9	3.91	0.90
Philippines	1 206	1 607	3.57	2.57	5.3	7.2	4.43	2.53
Saudi Arabia	64	94	-2.64	4.00	3.5	3.3	-5.50	0.19
Thailand	13 111	17 447	4.12	2.24	3.5	5.5	4.24	3.69
Türkiye	704	742	-1.41	0.28	5.3	5.0	-2.35	-0.23
Viet Nam	3 795	4 536	-0.04	1.47	3.7	5.3	1.34	3.07
OCEANIA	606	716	2.64	1.41	12.5	12.8	0.13	-0.07
Australia	296	331	1.90	0.90	13.0	12.5	0.96	-0.57
New Zealand	157	163	3.25	0.49	16.1	15.1	-3.00	-0.71
DEVELOPED COUNTRIES	**38 075**	**40 856**	**0.94**	**0.50**	**13.4**	**13.8**	**0.23**	**0.20**
DEVELOPING COUNTRIES	**212 113**	**265 049**	**2.68**	**1.84**	**18.2**	**20.4**	**1.63**	**0.87**
LEAST DEVELOPED COUNTRIES	39 423	55 952	2.82	3.01	25.4	28.9	0.56	1.00
OECD[3]	**22 781**	**24 553**	**-0.07**	**0.40**	**9.3**	**9.6**	**-1.53**	**0.16**

Note : Calendar year. Average 2021-23est: Data for 2023 are estimated. Production and consumption are expressed on dry weight basis.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.46. Pulses projections: Production and food consumption

Calendar year

	PRODUCTION (kt)		Growth (%)[4]		FOOD (kg/cap)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**93 927**	**118 849**	**1.86**	**2.18**	**7.3**	**8.6**	**0.52**	**1.68**
NORTH AMERICA	7 311	10 247	-2.63	2.99	3.3	4.3	-2.04	2.42
Canada	5 073	6 851	-3.03	2.31	4.3	4.7	3.00	1.01
United States	2 238	3 396	-1.77	4.51	3.2	4.2	-2.61	2.61
LATIN AMERICA	7 766	9 024	0.37	1.34	9.9	10.3	-0.61	0.42
Argentina	1 108	1 306	4.01	1.43	10.5	9.7	17.85	-0.90
Brazil	3 003	3 263	-0.50	0.67	12.0	12.7	-2.52	0.50
Chile	58	72	4.11	1.30	2.6	2.8	2.11	0.55
Colombia	159	203	-4.55	2.71	4.9	5.4	-3.16	0.82
Mexico	1 669	1 955	1.11	1.30	11.8	11.5	0.52	0.00
Paraguay	174	194	1.16	0.92	10.2	11.8	1.34	1.20
Peru	289	314	1.57	0.82	7.9	8.9	0.71	0.96
EUROPE	11 038	13 422	2.85	1.86	3.2	4.6	2.86	3.18
European Union[1]	4 498	6 123	2.28	3.18	3.4	5.1	3.35	3.82
United Kingdom	1 214	1 316	4.26	0.89	1.5	2.9	-9.53	5.36
Russia	3 991	4 500	4.69	0.94	3.0	3.5	3.01	1.29
Ukraine	707	782	0.47	0.55	3.5	4.6	11.03	2.15
AFRICA	23 042	31 669	2.38	3.02	10.5	11.5	-1.15	0.78
Egypt	320	435	1.26	2.79	3.4	3.7	-6.95	1.27
Ethiopia	3 154	4 140	0.62	2.62	22.1	22.4	-0.38	0.22
Nigeria	3 781	4 884	2.66	2.36	10.7	11.2	0.62	0.30
South Africa	88	115	0.02	2.21	1.3	1.4	-1.95	0.35
ASIA	40 838	50 305	2.41	1.93	6.8	8.2	1.07	1.95
China[2]	5 129	5 884	1.99	1.12	2.0	2.1	5.32	0.93
India	26 453	34 233	4.15	2.38	15.0	18.2	0.42	2.06
Indonesia	197	208	-4.72	0.84	0.8	0.9	-2.38	1.70
Iran	422	421	-5.12	-0.03	3.7	3.7	-5.85	-0.10
Japan	97	121	-4.10	1.26	1.1	1.2	-5.29	1.49
Kazakhstan	324	365	6.63	1.01	4.4	4.5	0.92	0.62
Korea	13	23	-5.03	5.06	1.6	1.6	1.98	0.18
Malaysia	0	0	..	..	2.0	2.0	-2.63	0.23
Pakistan	549	660	-0.66	1.43	4.8	5.5	5.10	1.41
Philippines	68	75	1.01	0.92	1.2	1.4	1.79	1.05
Saudi Arabia	15	17	-0.10	0.98	4.6	4.5	-2.68	0.18
Thailand	225	235	0.63	0.43	2.1	2.5	1.01	1.40
Türkiye	1 062	1 220	-1.05	1.36	9.4	9.4	-0.02	0.01
Viet Nam	291	322	-0.92	1.03	2.5	3.0	1.63	1.72
OCEANIA	3 932	4 182	5.42	0.23	6.3	6.0	25.39	-0.59
Australia	3 889	4 136	5.51	0.22	9.5	8.9	44.50	-0.67
New Zealand	28	30	-0.22	0.50	2.9	3.2	-3.33	1.14
DEVELOPED COUNTRIES	**23 279**	**29 023**	**1.08**	**1.96**	**3.1**	**4.1**	**1.37**	**2.57**
DEVELOPING COUNTRIES	**70 648**	**89 826**	**2.16**	**2.25**	**8.2**	**9.5**	**0.34**	**1.52**
LEAST DEVELOPED COUNTRIES	17 432	23 325	1.79	2.84	10.5	11.8	-0.37	1.09
OECD[3]	**20 067**	**25 519**	**0.36**	**2.18**	**4.3**	**5.3**	**0.64**	**1.90**

Note : Calendar year. Average 2021-23est: Data for 2023 are estimated. Production and consumption are expressed on dry weight basis.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.47. Egg: Production and food consumption

Calendar year

	PRODUCTION (kt)		Growth (%)[4]		FOOD (kg/cap)		Growth (%)[4]	
	Average 2021-23est	2033	2014-23	2024-33	Average 2021-23est	2033	2014-23	2024-33
WORLD	**94 051**	**106 105**	**2.84**	**1.05**	**10.7**	**11.0**	**1.73**	**0.23**
NORTH AMERICA	6 301	7 315	1.24	1.13	15.9	17.4	0.90	0.59
Canada	616	757	3.03	1.88	16.1	18.0	3.33	1.05
United States	5 686	6 559	1.06	1.04	15.9	17.4	0.66	0.53
LATIN AMERICA	10 977	12 376	3.43	0.99	14.9	15.6	2.61	0.37
Argentina	902	959	2.28	0.63	18.5	18.5	1.81	0.08
Brazil	3 595	3 998	5.21	0.78	15.8	16.7	4.58	0.35
Chile	236	264	0.81	0.90	10.1	11.0	0.05	0.68
Colombia	1 053	1 206	5.31	1.14	15.6	17.2	3.95	0.78
Mexico	3 129	3 502	2.46	0.91	22.5	23.4	1.73	0.27
Paraguay	131	162	1.20	1.95	18.9	20.6	-0.14	0.87
Peru	519	617	4.61	1.49	11.1	12.2	3.42	0.79
EUROPE	11 369	11 924	0.71	0.43	14.3	15.2	0.60	0.54
European Union[1]	6 422	6 524	0.95	0.25	13.1	13.5	0.87	0.40
United Kingdom	981	1 218	1.73	1.51	15.4	17.2	0.14	0.84
Russia	2 617	2 672	1.35	0.00	17.6	18.5	0.84	0.30
Ukraine	793	910	-3.10	1.40	17.9	22.1	-0.64	1.81
AFRICA	3 538	4 351	1.07	2.03	2.0	2.0	-1.51	-0.01
Egypt	406	488	0.51	2.08	2.8	2.9	-1.76	0.80
Ethiopia	53	66	0.84	2.22	0.3	0.3	-1.69	0.21
Nigeria	575	774	-1.78	3.24	2.3	2.5	-4.06	1.01
South Africa	556	610	2.51	0.85	7.0	7.0	1.96	0.10
ASIA	61 503	69 724	3.47	1.10	11.8	12.5	2.52	0.56
China[2]	34 761	36 497	2.16	0.37	22.8	24.2	1.83	0.51
India	6 916	9 773	7.08	3.23	4.1	5.4	6.32	2.56
Indonesia	5 686	6 941	17.13	1.83	17.2	20.1	17.49	1.38
Iran	760	820	-0.07	1.05	8.4	8.5	-0.45	0.51
Japan	2 596	2 525	0.44	-0.36	21.2	21.4	0.49	0.22
Kazakhstan	250	293	-0.41	1.23	8.0	8.8	-0.71	0.63
Korea	791	856	1.48	0.39	14.9	15.9	1.99	0.41
Malaysia	854	1 020	0.91	1.42	17.6	20.1	-0.49	0.96
Pakistan	1 053	1 371	5.23	2.13	3.6	3.9	3.65	0.47
Philippines	733	1 004	6.10	2.92	5.3	6.5	4.39	1.90
Saudi Arabia	361	427	4.30	1.39	9.2	9.4	7.10	0.18
Thailand	1 127	1 277	0.26	1.19	12.0	13.8	0.08	1.41
Türkiye	1 243	1 352	1.97	0.69	9.7	10.2	2.71	0.45
Viet Nam	410	543	0.05	2.83	3.5	4.5	-0.71	2.50
OCEANIA	362	415	2.22	1.15	7.9	8.1	0.65	0.08
Australia	273	308	2.08	1.05	10.3	10.5	0.67	0.16
New Zealand	72	86	2.94	1.34	13.4	14.7	1.56	0.65
DEVELOPED COUNTRIES	**22 381**	**24 234**	**1.03**	**0.64**	**14.5**	**15.3**	**0.61**	**0.46**
DEVELOPING COUNTRIES	**71 670**	**81 872**	**3.46**	**1.18**	**9.9**	**10.1**	**2.23**	**0.23**
LEAST DEVELOPED COUNTRIES	2 424	3 297	4.46	2.85	2.2	2.4	2.13	0.86
OECD[3]	**23 414**	**25 516**	**1.48**	**0.68**	**15.4**	**16.3**	**1.08**	**0.46**

.. Not available

Note : Marketing year: See Glossary of Terms for definitions. Average 2021-23est: Data for 2023 are estimated.

1. Refers to all current European Union member countries.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland and Costa Rica but includes all current European Union member countries.
4. Least-squares growth rate (see glossary).

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

Table C.48. Information on food price changes

	Total inflation % change (year-on-year)		Food inflation % change (year-on-year)[2]		Expenditure share of food		Food contribution to total change inflation[3]	
	2023	2024	2023	2024	2023	2024	2023	2024
OECD								
Australia[1]	7.0	..	9.6	..	12.8	12.8	1.2	..
Austria	11.2	4.5	17.0	5.4	12.0	12.0	2.0	0.7
Belgium	8.0	1.8	16.4	6.3	17.4	17.4	2.9	1.1
Canada	5.9	2.9	11.4	3.4	11.5	11.5	1.3	0.4
Chile	12.3	3.8	23.9	5.3	18.9	18.9	4.5	1.0
Colombia	13.3	8.3	26.2	3.0	34.7	34.7	9.1	1.0
Czechia	17.5	2.3	24.8	-3.9	17.0	17.0	4.2	-0.7
Denmark	7.7	1.2	14.5	2.2	11.5	11.5	1.7	0.2
Estonia	18.6	4.7	27.4	5.0	21.7	21.7	5.9	1.1
Finland	8.4	3.3	15.4	1.6	13.4	13.4	2.1	0.2
France	6.0	3.1	14.2	5.7	14.7	14.7	2.1	0.8
Germany	8.7	2.9	19.2	4.2	10.4	10.4	2.0	0.4
Greece	7.0	3.1	15.4	8.3	17.1	17.1	2.6	1.4
Hungary	25.7	3.8	46.9	1.0	19.6	19.6	9.2	0.2
Iceland	9.9	6.7	10.8	8.9	14.9	14.9	1.6	1.3
Ireland	7.8	4.1	12.8	4.6	11.7	11.7	1.5	0.5
Israel	5.4	2.6	4.9	5.9	14.3	14.3	0.7	0.8
Italy	4.3	2.2	7.5	5.7	19.0	19.0	1.4	1.1
Japan	4.3	2.2	7.5	5.7	19.0	19.0	1.4	1.1
Korea	5.0	2.8	5.8	5.9	14.4	14.4	0.8	0.9
Luxembourg	4.8	3.4	11.8	6.4	11.1	11.1	1.3	0.7
Mexico	7.9	4.9	12.8	7.3	18.9	18.9	2.4	1.4
Netherlands	7.6	3.2	17.3	2.5	11.3	11.3	2.0	0.3
New Zealand[1]	6.7	..	12.5	..	17.4	17.4	2.2	..
Norway	7.0	4.7	12.0	8.7	13.3	13.3	1.6	1.2
Poland	16.6	3.9	20.6	4.9	27.0	27.0	5.6	1.3
Portugal	8.4	2.3	20.6	2.7	18.1	18.1	3.7	0.5
Slovak Republic	15.2	3.9	27.5	4.9	18.4	18.4	5.1	0.9
Slovenia	7.0	6.9	13.7	10.8	26.0	26.0	3.6	2.8
Spain	5.9	3.4	15.4	7.4	18.2	18.2	2.8	1.4
Sweden	11.7	5.4	19.6	3.8	13.9	13.9	2.7	0.5
Switzerland	3.3	1.3	5.6	2.3	10.8	10.8	0.6	0.3
Türkiye	57.7	64.9	71.0	69.7	26.8	26.8	19.0	18.7
United Kingdom	8.8	4.2	16.8	7.0	11.8	11.8	2.0	0.8
United States	6.4	3.1	11.4	1.2	7.8	7.8	0.9	0.1
OECD Total	9.2	5.7	15.2	6.2	..	..	..	..
Enhanced Engagement								
Brazil	5.8	4.5	11.7	1.8	22.5	22.5	2.6	0.4
China	2.1	-0.8	6.2	-5.9	33.6	33.6	2.1	-2.0
India	5.3	2.6	5.9	8.3	35.4	35.4	2.1	2.9
Indonesia	6.2	4.6	3.5	5.8	19.6	19.6	0.7	1.1
Russia	11.8	7.4	10.2	8.5	32.8	32.8	3.3	2.8
South Africa	7.2	5.3	13.6	7.2	18.3	18.3	2.5	1.3

Table C.48. Information on food price changes *(cont.)*

	Total inflation % change (year-on-year)		Food inflation % change (year-on-year)[2]		Expenditure share of food		Food contribution to total change inflation[3]	
	2023	2024	2023	2024	2023	2024	2023	2024
NON OECD								
Algeria	9.3	6.3	13.7	7.2	43.1	43.1	5.9	3.1
Bangladesh	8.6	9.9	7.8	9.6	28.6	28.6	2.2	2.7
Bolivia	3.1	2.4	6.8	7.2	27.1	27.1	1.8	1.9
Botswana	9.3	3.9	7.1	5.9	13.6	13.6	1.0	0.8
Bulgaria	16.7	7.1	25.0	8.4	37.2	37.2	9.3	3.1
Costa Rica	7.7	-1.9	18.5	-4.8	21.4	21.4	4.0	-1.0
Dominican Republic	6.6	4.5	11.4	5.6	29.2	29.2	3.3	1.6
Ecuator	3.6	1.4	5.6	4.6	23.0	23.0	1.3	1.0
Egypt	25.8	29.8	48.0	47.9	32.7	32.7	15.7	15.7
El savador	7.0	6.9	13.7	10.8	26.0	26.0	3.6	2.8
Ethiopia	33.9	29.4	36.2	32.2	54.0	54.0	19.5	17.4
Ghana	53.6	23.5	47.9	27.1	56.9	56.9	27.3	15.4
Guatelama	3.2	3.8	13.3	7.3	28.6	28.6	3.8	2.1
Haiti	24.0	20.9	25.5	28.3	48.8	48.8	12.4	13.8
Honduras	8.9	5.0	16.1	6.1	31.8	31.8	5.1	1.9
Iraq	7.1	0.4	9.6	..	35.0	35.0	3.4	..
Jordan	3.7	2.0	-0.4	0.0	35.2	35.2	-0.1	0.0
Kenya	9.0	6.9	12.8	7.9	36.0	36.0	4.6	2.8
Madagascar	11.4	9.9	14.0	12.0	60.0	60.0	8.4	7.2
Malawi	25.4	35.0	31.3	44.9	50.0	50.0	15.7	22.5
Malaysia	3.7	1.5	6.7	2.0	56.3	56.3	3.8	1.1
Moldavia	27.3	7.1	28.6	7.6	37.0	37.0	10.6	2.8
Morocco	8.9	2.3	17.4	4.2	40.4	40.4	7.0	1.7
New Caledonia	4.3	0.0	9.4	-0.3	21.0	21.0	2.0	-0.1
Nicaragua	10.9	5.8	15.7	6.8	26.1	26.1	4.1	1.8
Niger	2.0	6.9	1.3	9.6	47.0	47.0	0.6	4.5
Nigeria	21.8	29.9	24.3	35.4	51.8	51.8	12.6	18.3
Pakistan	27.6	28.3	42.9	25.0	37.5	37.5	16.1	9.4
Panama	2.1	1.0	5.2	1.0	33.6	33.6	1.7	0.3
Paraguay	7.8	3.4	7.7	8.8	39.1	39.1	3.0	3.4
Peru	8.9	3.0	15.9	3.7	25.0	25.0	4.0	0.9
Philipinnes	8.6	2.8	12.1	3.5	39.0	39.0	4.7	1.3
Romania	15.1	7.4	22.5	5.6	37.4	37.4	8.4	2.1
Rwanda	31.1	5.0	57.3	7.4	39.0	39.0	22.3	2.9
Senegal	10.5	2.1	13.7	2.6	53.4	53.4	7.3	1.4
Singapore	6.6	2.9	8.1	3.3	21.7	21.7	1.8	0.7
Sri Lanka	53.2	6.4	53.6	3.3	41.0	41.0	22.0	1.4
Chinese Taipei	2.1	-0.8	6.2	-5.9	33.6	33.6	2.1	-2.0
Tanzania	4.9	1.5	5.9	3.0	28.2	28.2	1.7	0.8
Thailand	5.0	-1.1	7.7	-1.1	40.0	40.0	3.1	-0.4
Tunisia	10.4	7.8	15.6	12.1	28.7	28.7	4.5	3.5
Ugunda	10.4	2.8	22.7	-0.01	27.2	27.2	6.2	0.0
Zambia	9.4	13.2	11.6	13.7	52.5	52.5	6.1	7.2

.. Not available

1. No data available for January 2024 in Australia and New Zealand.
2 CPI food: definition based on national sources.
3. Contribution is food inflation multiplied by expenditure share, expressed in %.

Source : OECD and national sources.

OECD-FAO Agricultural Outlook 2024-2033

The *OECD-FAO Agricultural Outlook 2024-2033* provides a consensus assessment of the ten-year prospects for agricultural commodity and fish markets.

This *Outlook* edition reveals important trends. Emerging economies will be pivotal in shaping the global agricultural landscape, with India expected to overtake China as the leading player. Yet calorie intake growth in low-income countries is projected to be only 4%. Agriculture's global greenhouse gas intensity is projected to decline, although direct emissions from agriculture will likely increase by 5%. If food loss and waste could be halved, however, this would have the potential to reduce both global agricultural GHG emissions by 4% and the number of undernourished people by 153 million by 2030.

Well-functioning international agricultural commodity markets will remain vital for global food security and rural livelihoods. Expected developments should keep real international reference prices on a slightly declining trend over the next ten years, although environmental, social, geopolitical, and economic factors could significantly alter these projections.

More information can be found at www.agri-outlook.org.

PRINT ISBN 978-92-64-72259-0
PDF ISBN 978-92-64-59211-7

9 789264 722590