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FAOSTAT ANALYTICAL BRIEF 112

Food balance sheets

2010–2023

>> FAO Statistics Division

HIGHLIGHTS

- → **In 2023, global food supply, measured in terms of average per capita dietary energy supply (DES), crossed the historic milestone of 3 000 kilocalories per capita per day.**
- → **Europe, the Americas and Oceania have consistently maintained a higher food supply than the world average. The fastest increase in the DES between 2010 and 2023 was in Asia, steadily closing the gap from the world average. Food supply in Africa remains low and stagnant.**
- → **Globally, cereals are the biggest component of food supply, with a 42 percent share in DES and 36 percent share in protein supply in 2023. Livestock products (meat, eggs and milk) accounted for 16 percent of DES and 36 percent of protein supply. Oils and oil crops accounted for 13 percent of DES while sugar and sweeteners accounted for about 8 percent.**
- → **Of the total supply, 45 percent of cereals and 42 percent of vegetable oils were used directly as food in 2023. On the other hand, almost all the meat produced, 88 percent of vegetables and 83 percent of fruits were used directly for human consumption.**
- → **Globally, about 35 percent of cereals and 24 percent of pulses were used as animal feed in 2023.**
- → **The use of agricultural products for other non-food purposes has been on the rise. In 2023, 45 percent of vegetable oils was used for non-food purposes. The use of sugar crops for other non-food purposes is much higher in the Americas (26 percent) than anywhere else in the world.**
- → **International trade has become increasingly important in global agrifood systems. In 2023, about 46 percent of the global production of vegetable oils, 34 percent of fish and seafood and 34 percent of sugars and sweeteners, 20 percent of cereals and 26 percent of pulses were exported.**

FAOSTAT FOOD BALANCE SHEETS

BACKGROUND

Supply utilization accounts and food balance sheets are important tools for the analysis and policy monitoring of national agrifood systems. They present a comprehensive picture of the agrifood situation of a country in a specified reference period, showing the pattern of a country's food supply and

utilization.[1] Food balance sheets can be used to examine changes in the level and composition of food supply, the availability of dietary energy and nutrients in different countries, and on the part played by international trade in global agrifood systems.

The Statistics Division of the Food and Agriculture Organization of the United Nations (FAO), in collaboration with the Fisheries and Aquaculture Division for aquatic products, compiles supply utilization accounts (SUAs) for 178 countries covering a total of 449 primary and derived products. The latest release of food balance sheets provides time-series data from 2010 to 2023.[2]

GLOBAL

Globally, dietary energy supply (DES) increased from 2 825 kcal/cap/day in 2010 to 3 016 kcal/cap/day in 2023, crossing the 3 000 kcal/cap/day milestone for the first time (Figure 1). The gain between 2010 and 2023 was nearly 200 kcal/cap/day, of which 64 kcal/cap/day was from oil crops and vegetable oils, 61 kcal/cap/day from Livestock products, 31 kcal/cap/day from fruits and vegetables, 10 kcal/cap/day from cereals, 9 kcal/cap/day from pulses and 3 kcal/cap/day from fish and seafood.

Africa has consistently remained below the world average, with DES fluctuating between 2 545 and 2 583 kcal/cap/day over the years. The trend is relatively flat, showing minimal growth from 2010 to 2023. In 2023, Africa's average DES was 2 556 kcal/cap/day, nearly 500 kcal/cap/day below the global average, pointing to persistent challenges in improving food availability and access. In Figure 2, sub-Saharan Africa stands out as the region with the lowest average energy availability, with many countries recording per capita dietary energy supply substantially below the global average DES.

The DES for Asia shows instead a clear upward trajectory, increasing from 2 694 kcal/cap/day in 2010 to 2 991 kcal/cap/day in 2023. While still slightly below the global average, Asia has made significant progress, narrowing the gap by nearly 100 kcal/cap/day over the period. This is driven by economic and agricultural growth, and improved trade performance.

The Americas has consistently reported above-average DES levels, growing steadily from 3 277 kcal/cap/day in 2010 to 3 438 kcal/cap/day in 2023. This growth, though moderate, keeps the region well above the global average, by more than 400 kcal/cap/day in 2023.

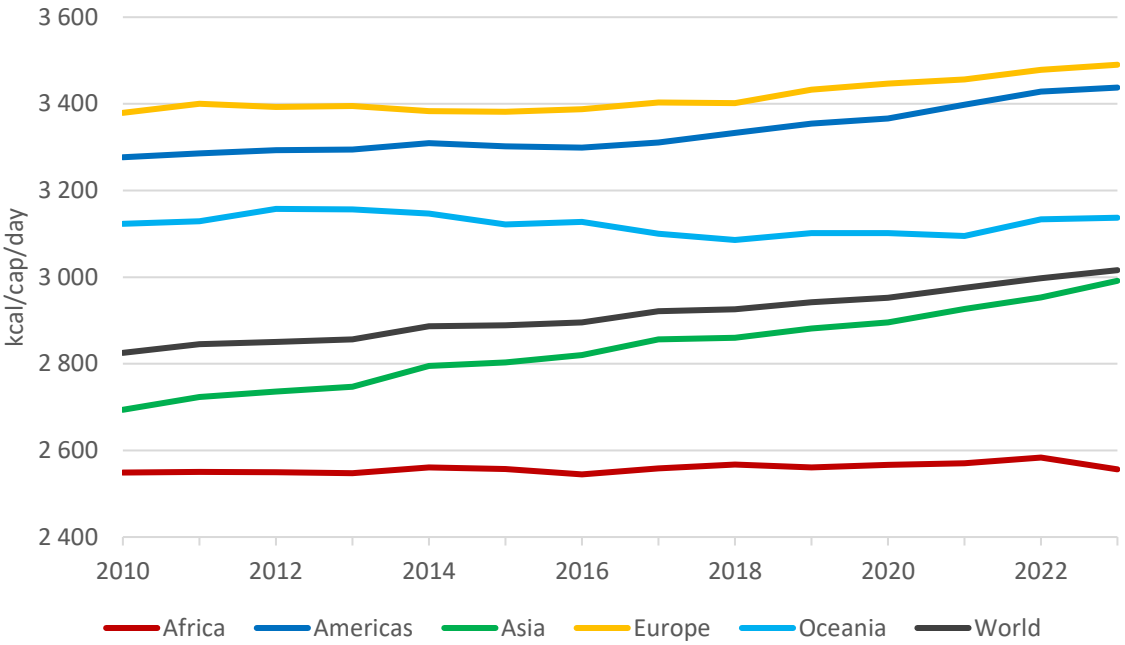
Europe has the highest average DES across all regions, with values above 3 370 kcal/cap/day since 2010. By 2023, the region reached 3 490 kcal/cap/day, marking an increase of 111 kcal/cap/day over 13 years. Europe's stable, high-level DES reflects mature agrifood systems, high purchasing power and diverse food access.

Oceania maintains DES levels above the world average, but unlike other high-DES regions, its trend is mostly stagnant, hovering around 3 086–3 157 kcal/cap/day. In 2023, the region stood at 3 137 kcal/cap/day, just slightly above the global average and showing limited growth since 2010. This overall trend reflects moderate global improvements in food availability.

[1] More information is available in FAO. 2025. *Food balance sheets and supply utilization accounts resource handbook 2025*. FAO Statistical Development Series, No. 20. Rome. https://doi.org/10.4060/cd4472en

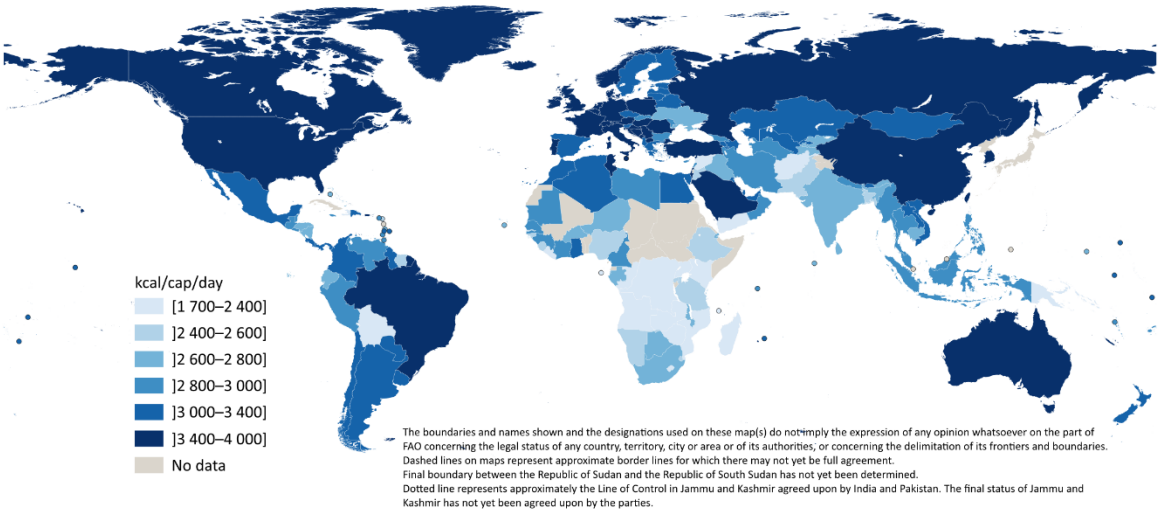
[2] Food balance sheets using the previous methodology are available on FAOSTAT for 1961–2013.

Figure 1: Dietary energy supply by region



Source: FAO. 2025. FAOSTAT: Food Balances (2010-). [Accessed October 2025]. https://www.fao.org/faostat/en/#data/FBS. Licence: CC-BY-4.0.

Figure 2: Dietary energy supply (2023)

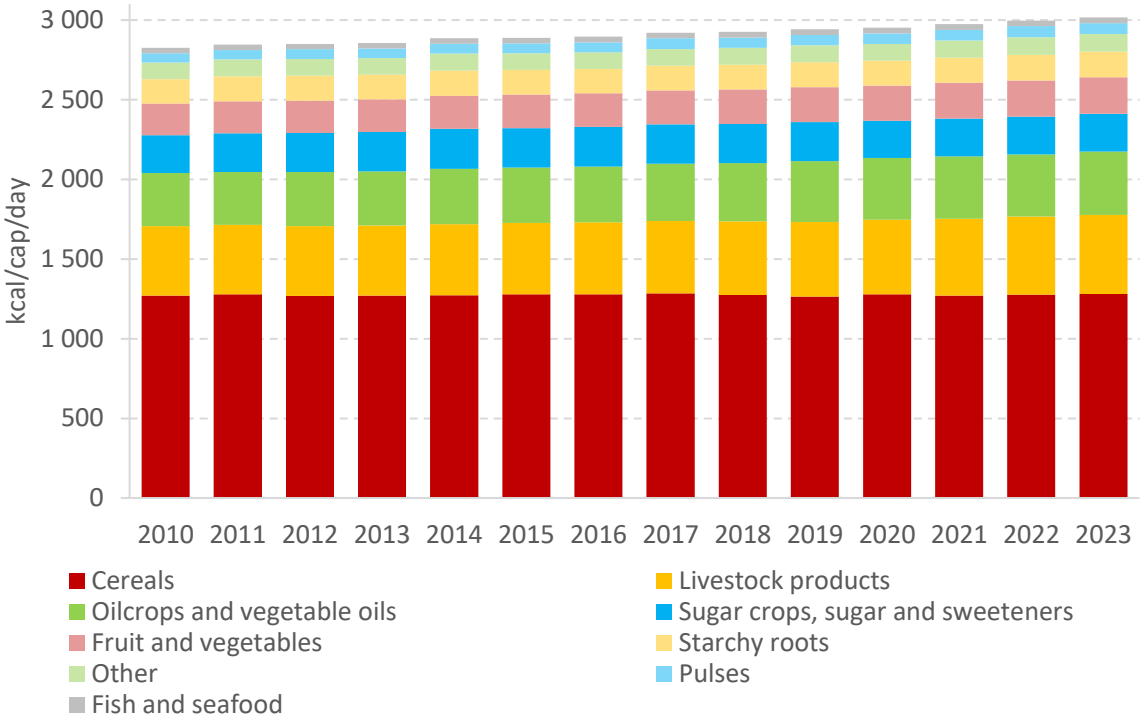


Source: FAO. 2025. FAOSTAT: Food Balances (2010-). [Accessed October 2025]. https://www.fao.org/faostat/en/#data/FBS. Licence: CC-BY-4.0.

Between 2010 and 2023, the share in total per capita dietary energy supply decreased for cereals (by 2.5 percentage points), sugar crops, sugar and sweeteners (by 0.6 percentage point) and starchy roots (by 0.1 percentage point) while the share in total per capita dietary energy supply increased for oilcrops

and vegetable oils (by 1.4 percentage points), livestock products (by 1.0 percentage point), fruit and vegetables (by 0.6 percentage point) and pulses (by 0.1 percentage point).

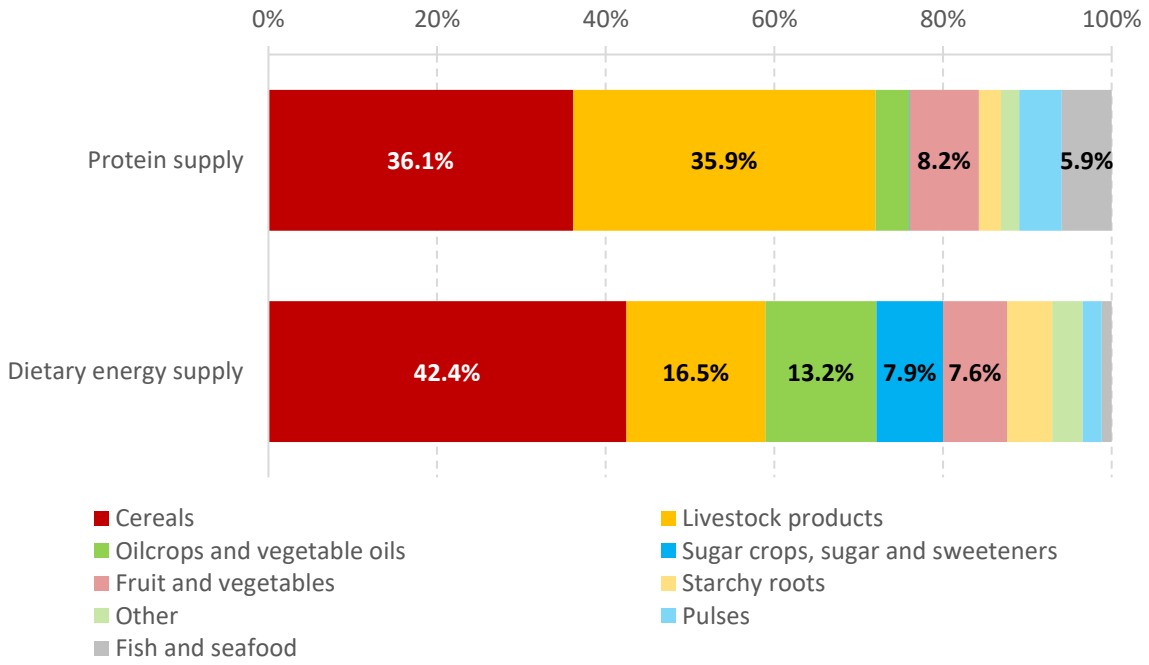
Figure 3: World dietary energy supply by food group



Note: Livestock products include animal fats, eggs, meat, milk - excluding butter, and offals; Other includes alcoholic beverages, miscellaneous, other aquatic products, spices, stimulants, and treenuts.
Source: FAO. 2025. FAOSTAT: Food Balances (2010-). [Accessed October 2025]. https://www.fao.org/faostat/en/#data/FBS. Licence: CC-BY-4.0.

The contribution of food groups to the overall supply of protein in food is very different from their contribution to overall dietary energy supply (Figure 4). In 2023, cereals were the most important source of both dietary energy supply (42.4 percent) and protein supply (36.1 percent). Livestock products accounted for 35.9 percent of the total supply of proteins though their contribution to dietary energy supply was only 16.5 percent. On the other hand, energy-dense foods such as vegetable oils and sugar contain marginal quantities of proteins: oilcrops and vegetable oils, together with sugar crops, sugar and sweeteners accounted for 4.1 percent of protein supply but 21.1 percent of dietary energy supply. In contrast, fish and seafood are nutritionally dense foods, with a 5.9 percent contribution to protein supply and only a 1.2 percent contribution to dietary energy supply. Fruits and vegetables also have a low average caloric density and are a rich source of many different nutrients. They contributed about 8 percent to both protein supply and dietary energy supply.

Figure 4: Protein and dietary energy supply by food group (2023)



Note: Livestock products include animal fats, eggs, meat, milk - excluding butter, and offals; Other includes alcoholic beverages, miscellaneous, other aquatic products, spices, stimulants, and treenuts.
Source: FAO. 2025. FAOSTAT: Food Balances (2010-). [Accessed October 2025]. https://www.fao.org/faostat/en/#data/FBS. Licence: CC-BY-4.0.

REGIONAL

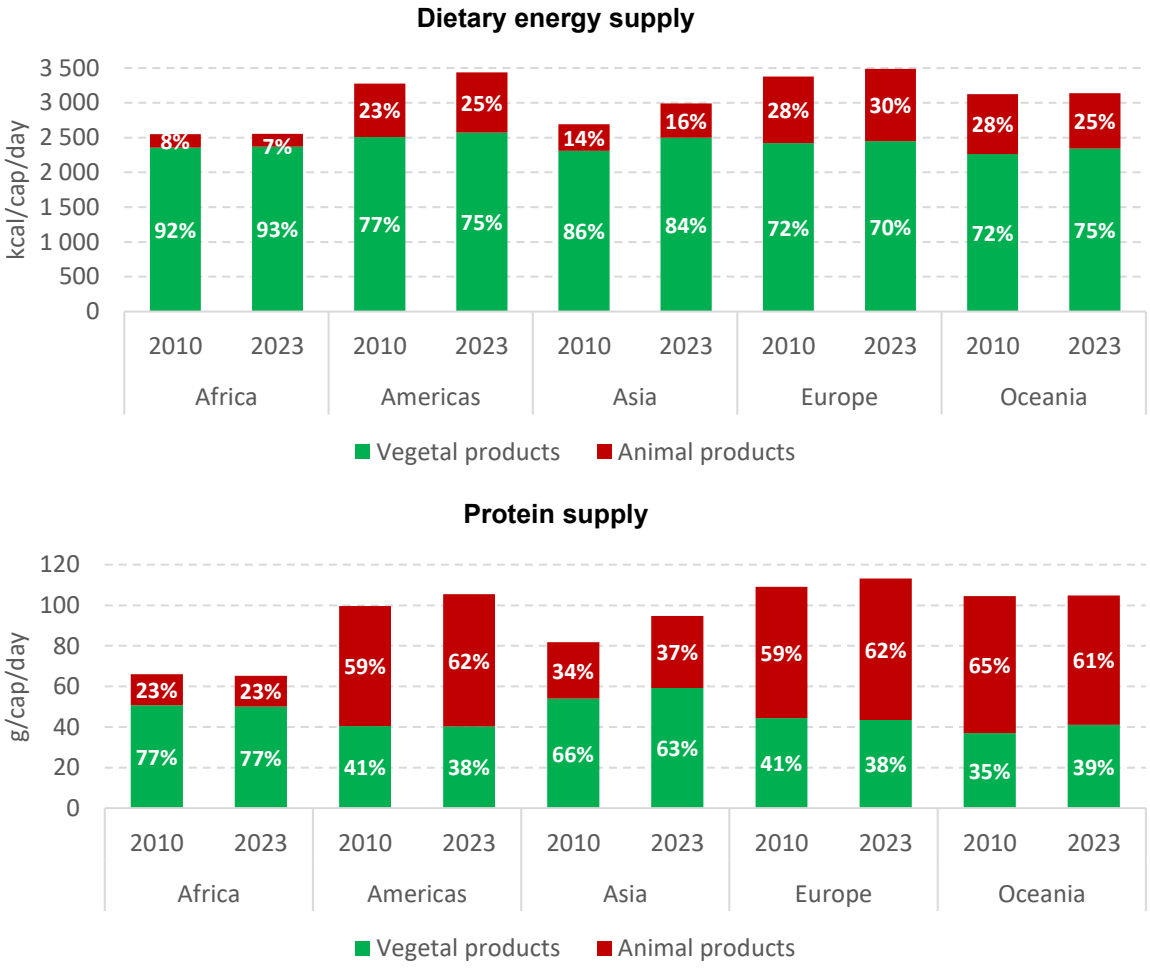
The 2023 data on daily energy supply by food groups show distinct variations in dietary patterns across regions shaped by differences in levels of economic and agricultural development, agroclimatic conditions and cultural preferences. In particular, the contributions of vegetal and animal products to total dietary energy supply and to protein supply differ across regions, with some notable shifts between 2010 and 2023.

In Africa, food supply remains heavily plant-based, with vegetal products consistently providing over 90 percent of energy and around 77 percent of protein supply in both years. There has been little change over time, suggesting a continued reliance on cereals and other staples, and limited growth in animal-source foods. Cereals contributed 1 167 kcal/day in 2023, or nearly half the region's average energy supply. This is complemented by a high availability of starchy roots (420 kcal/cap/day) – the highest among all regions – highlighting the continued importance of traditional staples such as cassava and yams. The availability of food sources from animals – meat, fish, eggs and dairy products – is low, contributing only 188 kcal in 2023, the lowest globally in absolute and relative terms, reflecting economic constraints and lower consumption of livestock products. Animal products contributed only 23 percent of protein in 2023, slightly down from 2010, and less than 8 percent of total energy, highlighting a persistently low animal protein supply.

In the Americas, livestock products contributed 843 kcal/cap/day in 2023, which is significantly higher than in Africa, Asia and Oceania, and nearly as much as cereals (976 kcal/cap/day). The share of animal products in total dietary energy supply rose from 23 percent to 25 percent over the period. Animal

products are the major source of protein supply in the region, and the share of protein from animal sources increased from 59 percent in 2010 to 62 percent in 2023. The region also showed the highest availability of sugar crops and sugar (452 kcal/cap/day) and oilcrops and vegetable oils (601 kcal/cap/day) in 2023, underscoring the sharp increase in the use of processed foods, energy-dense diets, and sweet non-alcoholic beverages.

Figure 5: Dietary energy and protein supply by origin and region



Source: FAO. 2025. FAOSTAT: Food Balances (2010-). [Accessed October 2025]. https://www.fao.org/faostat/en/#data/FBS. Licence: CC-BY-4.0.

In Asia, although vegetal products were still the largest source of both dietary energy supply (84 percent of DES) and proteins (63 percent of total supply) in 2023, the share of animal products in total protein supply rose significantly, from 34 percent in 2010 to 37 percent in 2023, reflecting rising incomes and changing consumption patterns in the region. Cereals continued to be the most important source of dietary energy, contributing 1 435 kcal/day in 2023, the highest of any region. Fish and seafood were notably more prominent in Asia's dietary energy supply (43 kcal/cap/day) compared with other regions.

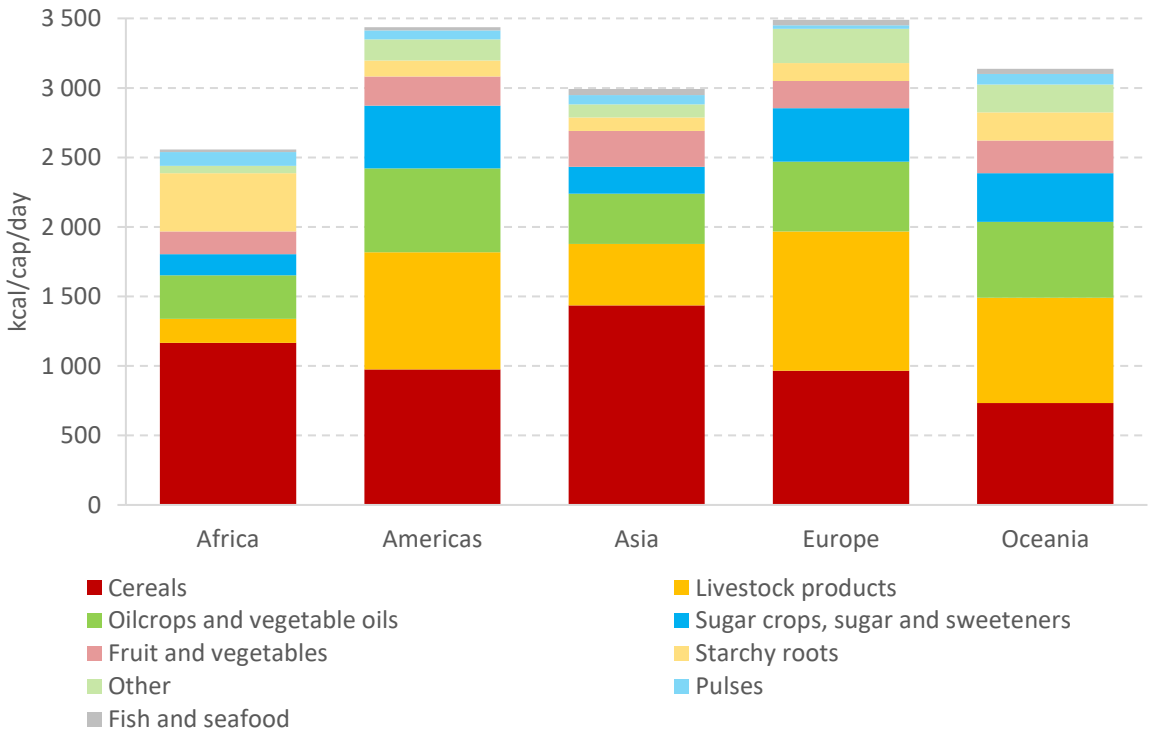
Europe stands out for its high reliance on livestock products (1 002 kcal/day in 2023), exceeding its cereal supply (966 kcal/cap/day) – it is the only region with Oceania where this is the case. The contribution of animal products to total protein supply increased from 59 percent in 2010 to 62 percent in 2023. Animal products also contributed over 30 percent of total energy, reflecting a diet richer in dairy,

meat and other animal-derived foods. Europe also shows high shares of vegetable oils and oilcrops (503 kcal/cap/day) and sugar crops, sugar and sweeteners (384 kcal/cap/day) in its energy supply.

Dietary energy supply in Oceania shows a large contribution of animal products (793 kcal/cap/day) and a lower dependence on cereals (734 kcal/cap/day) in 2023, combined with high levels of oilcrops and vegetable oils (546 kcal/cap/day) and sugar crops, sugar and sweeteners (349 kcal/cap/day) availability. Oceania had the highest share of animal-based protein in 2010, although it has declined slightly from 65 percent to 61 percent in 2023.

In summary, while plant-based foods remain the dominant source of dietary energy across all regions, their contribution to the supply of protein varies significantly. Africa and Asia have diets dominated by cereals and plant-based staples, and these continue to be the main source of not just dietary energy but also protein. In contrast, Europe, the Americas and Oceania have diets where animal products contribute most of the protein. These regional patterns highlight both nutritional transitions and persistent inequalities in global food access and dietary quality. The nutritional implications of high and rising share of sugars and oils in food supply in many regions and the environmental burden of the high share of animal products in food supply in Europe, Oceania and Americas are also causes of concern.

Figure 6: Dietary energy supply by food group and region (2023)



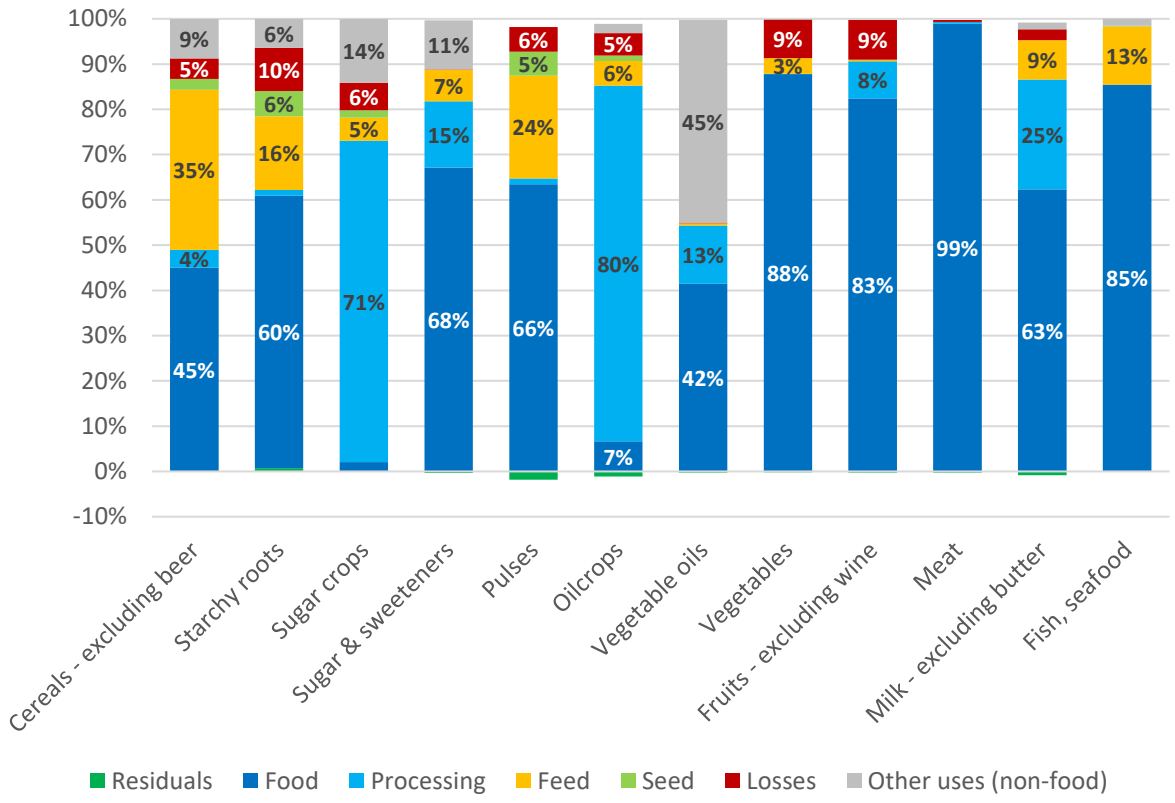
Note: Livestock products include animal fats, eggs, meat, milk - excluding butter, and offals; Other includes alcoholic beverages, miscellaneous, other aquatic products, spices, stimulants, and treenuts.
Source: FAO. 2025. FAOSTAT: Food Balances (2010-). [Accessed October 2025]. https://www.fao.org/faostat/en/#data/FBS. Licence: CC-BY-4.0.

PATTERNS OF UTILIZATION

Agricultural products can be used directly as food (either in their raw form or after processing into other derived food products), reused as inputs in the food system as seed or animal feed, or used for non-food purposes. The major food groups show significant variations in the share of the total supply that is used directly for food. In 2023, sugar crops (2 percent of total supply), oilcrops (7 percent), vegetable oils (42 percent) and cereals (45 percent) had the lowest shares of direct use as food. On the other hand, almost all the meat produced, 88 percent of vegetables and 83 percent of fruits were used directly for human consumption.

Feed requirements of animals are met through forage (grazing or stall feeding of grass, hay or silage) as well as primary and processed products that are covered in the SUA (which therefore account for only a part of the dietary energy and protein supply of animals). Globally, about 35 percent of cereals and 24 percent of pulses were used as animal feed in 2023.[3]

Figure 7: World supply of food groups by utilization (2023)



Note: Food includes tourist consumption.
Source: FAO. 2025. FAOSTAT: Food Balances (2010-). [Accessed October 2025]. https://www.fao.org/faostat/en/#data/FBS. Licence: CC-BY-4.0.

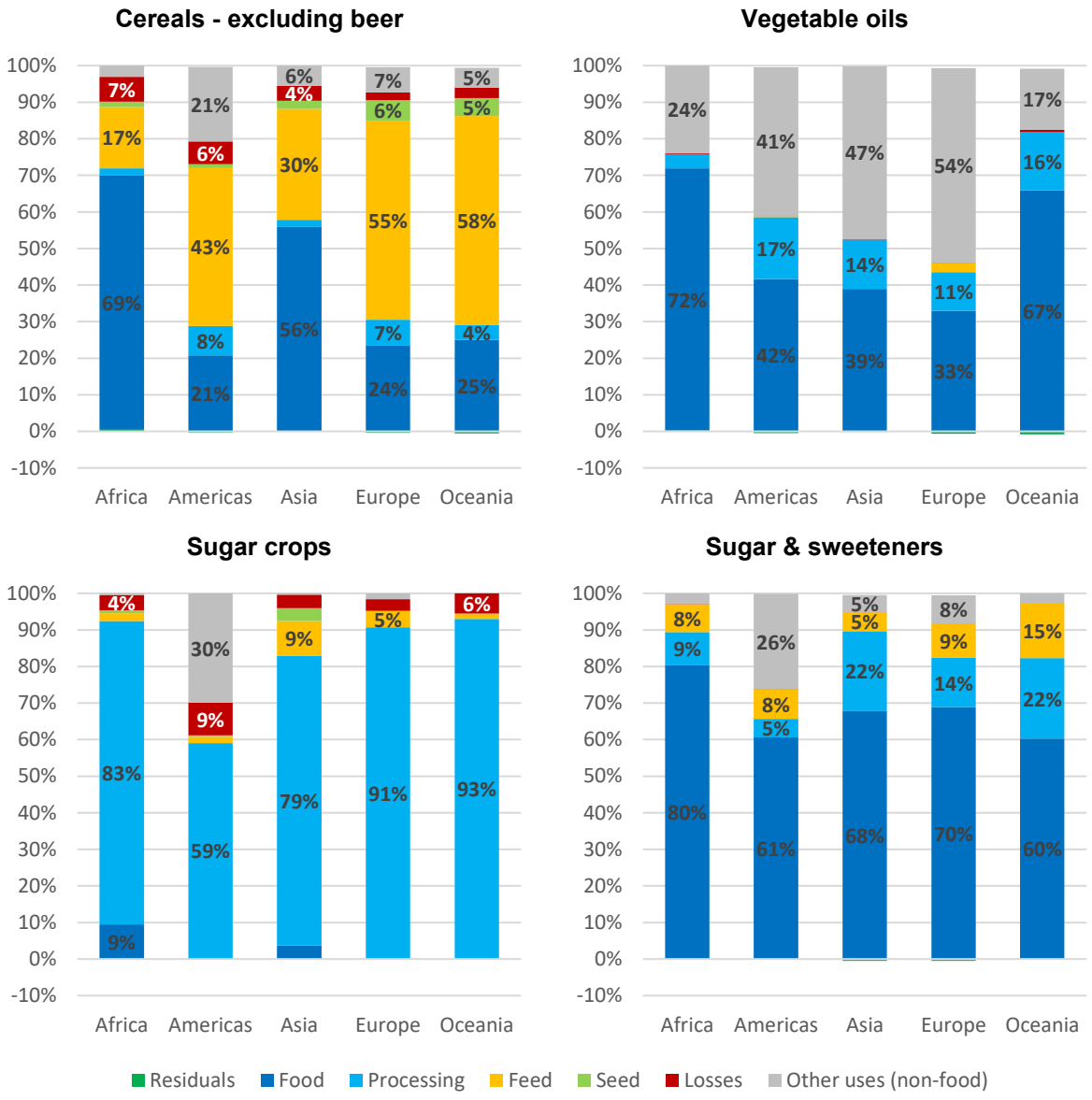
The use of products covered in the SUA for other non-food purposes has been on the rise. A significant factor contributing to this trend in many countries is the use of some of these products, especially

[3] Since food balance sheets are done in terms of equivalents of primary products, the co-products of processed products, some of which are used as animal feed (for example, bran and oil cakes), are included in the supply utilization accounts but are excluded from the food balance sheets.

vegetable oils and sugar crops, for the production of biofuels. In 2023, 45 percent of vegetable oils – up 4 percentage points since 2010 – were used for other non-food purposes (Figure 7). The use of vegetable oils for other non-food purposes was highest in Europe (54 percent) and Asia (47 percent), which is linked to the production of biodiesel. The use of sugar crops for other non-food purposes – related to the production of bioethanol – was highest in the Americas (26 percent) (Figure 8).

Distinct regional patterns of use emerge (Figure 8): while 69 percent of cereals in Africa and 56 percent in Asia were used directly as food in 2023, equal or less than a quarter was in Europe, Oceania and the Americas as the largest use of cereals in these regions is in the form of feed.

Figure 8: Supply of selected food groups by utilization and region (2023)

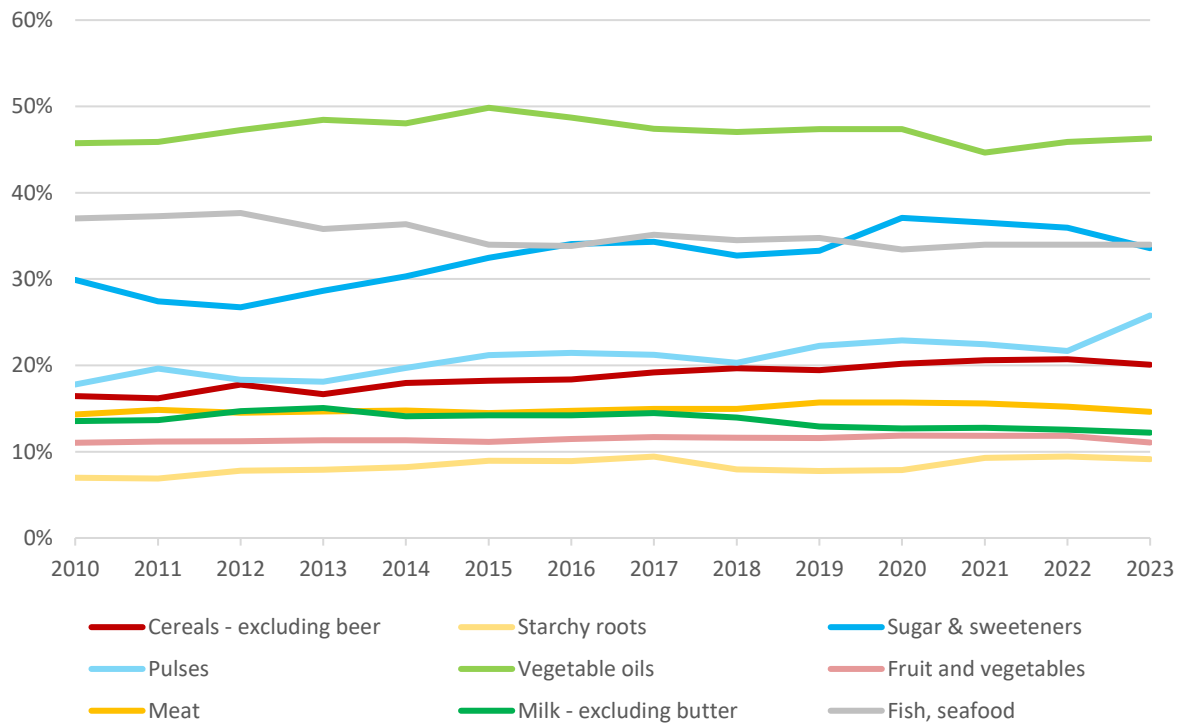


Note: Totals may not add up to 100 percent because of rounding and the existence of residuals.
Source: FAO. 2025. FAOSTAT: Food Balances (2010-). [Accessed October 2025]. https://www.fao.org/faostat/en/#data/FBS. Licence: CC-BY-4.0.

RISING IMPORTANCE OF TRADE

As a proportion of total production, vegetable oils, fish and seafood, and sugar are the most exported food products (Figure 9). Since 2010, the share of exports in vegetable oils production fluctuated between 45 and 50 percent, and reached 46 percent in 2023, the share of fish and seafood exports in total production oscillated between 33 and 38 percent, reaching 34 percent in 2023. After a period of overall growth, from 27 percent in 2012 to 37 percent in 2020, the share of exports in the total production of sugar (including sweeteners) fell to 34 percent in 2023. The share of production that is exported increased for cereals (20 percent in 2023 compared with 16 percent in 2010) and pulses (26 percent in 2023 vs 18 percent in 2010).

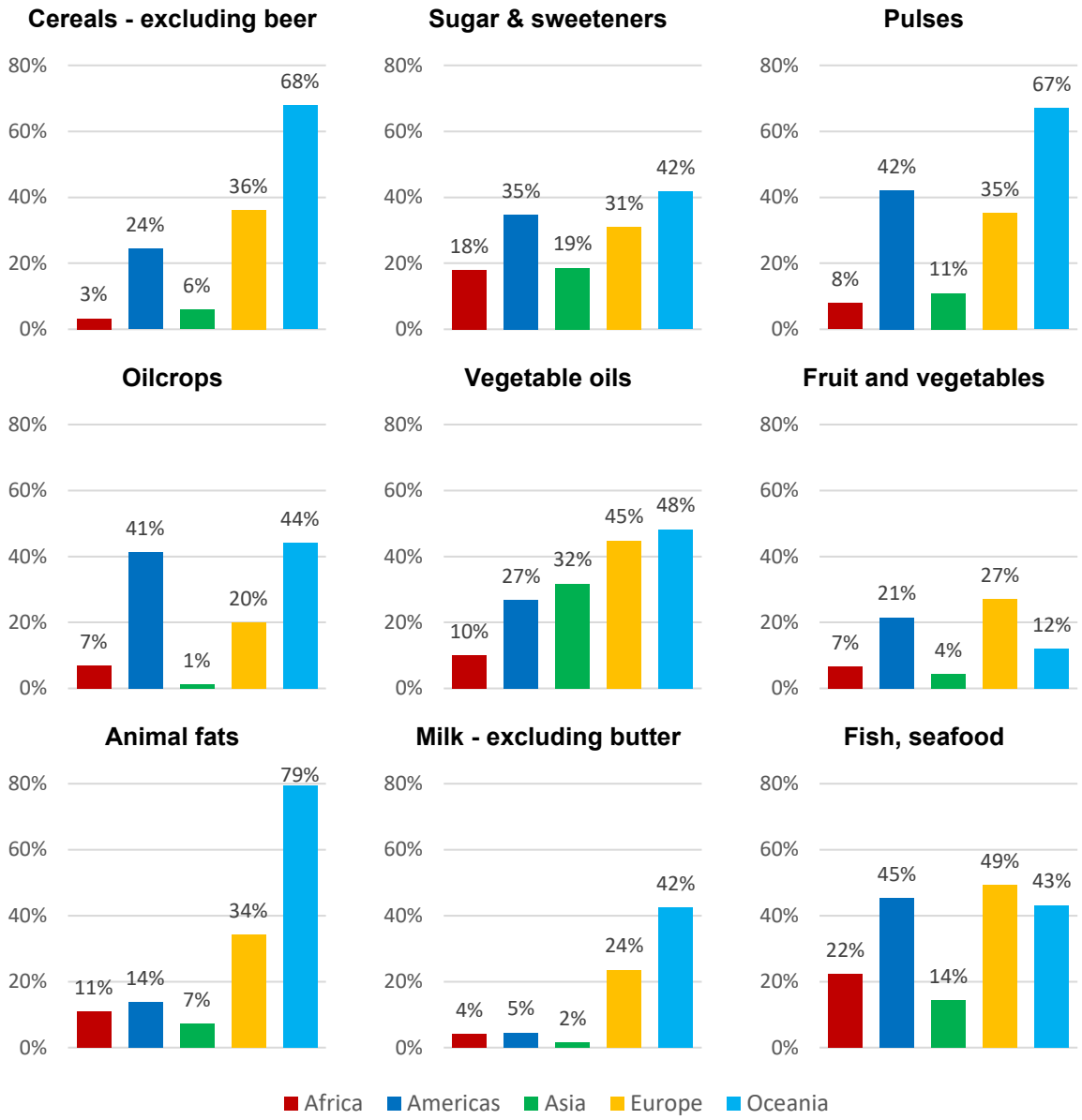
Figure 9: Share of exports in global production by food group



Note: Includes intraregional trade.
Source: FAO. 2025. FAOSTAT: Food Balances (2010-). [Accessed October 2025]. https://www.fao.org/faostat/en/#data/FBS. Licence: CC-BY-4.0.

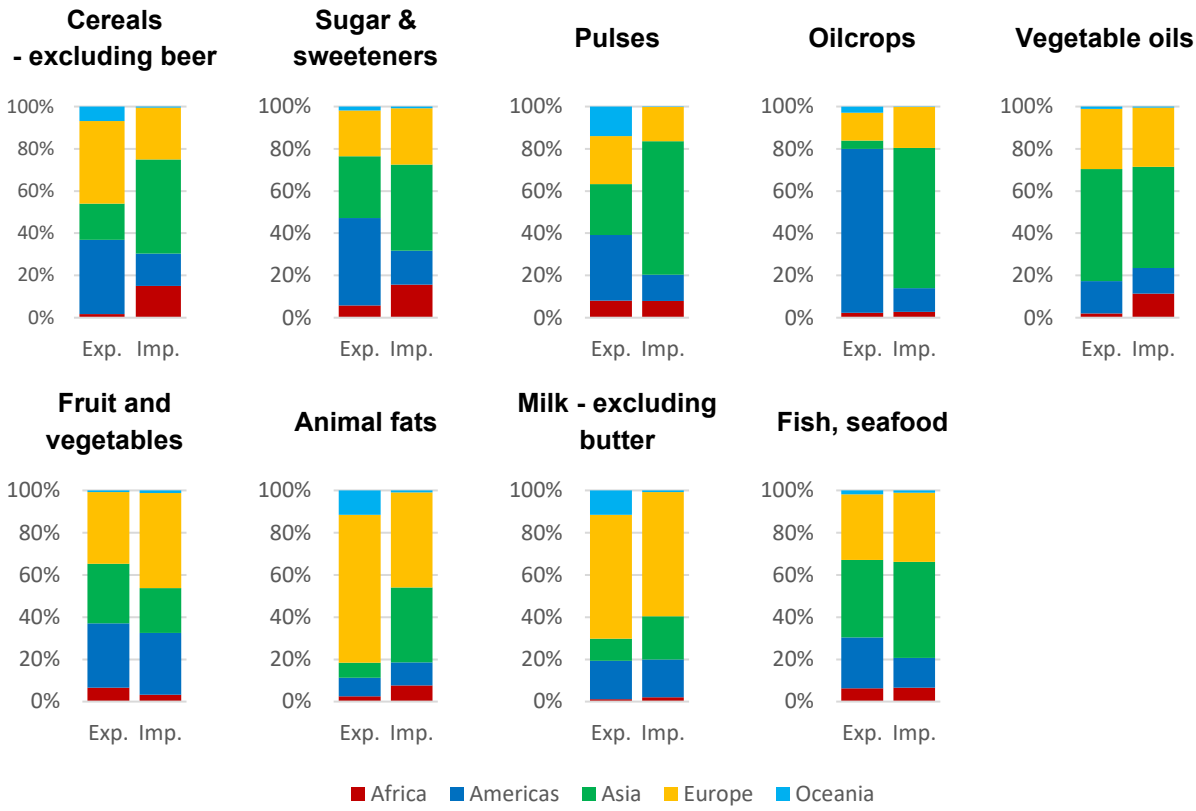
Oceania ranks at the top in terms of exports as a share of total supply (production + imports – stock variation) for several food groups (Figure 10). Europe and the Americas are major exporters of food: they have a high share in global exports (though this includes intra-regional trade, which is significant, especially within the European Union), and their share in global exports is higher than their share in global imports for the majority of food groups (Figure 11). Asia accounts for a very large share of global imports of cereals, pulses, oilcrops, fish and seafood, and milk. Africa's share in global imports is higher than its share in global exports for cereals, sugar, vegetable oils, and milk.

Figure 10: Share of exports in total supply by region and food group (2023)



Source: FAO. 2025. FAOSTAT: Food Balances (2010-). [Accessed October 2025]. https://www.fao.org/faostat/en/#data/FBS. Licence: CC-BY-4.0.

Figure 11: World import and export quantities by food group and region (2023)



Notes: Exp.: exports; Imp.: imports.
Source: FAO. 2025. FAOSTAT: Food Balances (2010-). [Accessed October 2025]. https://www.fao.org/faostat/en/#data/FBS. Licence: CC-BY-4.0.

SUMMING UP

The FAO food balance sheets are an essential tool to understand national and regional agrifood systems, levels and trends of food supply, as well as the pattern of uses for agricultural products beyond food for human consumption. They show the varying composition of food supply resulting from differences in levels of economic and agricultural development, agroclimatic conditions, and cultural preferences, as well as the food system shifts that have taken place since 2010. They also provide the basis for targeted interventions for development of agrifood systems, food security, and investment.

EXPLANATORY NOTES

The FAOSTAT Food Balances domain disseminates statistics on food balance sheets compiled using the new FAO methodology from 2010 to 2023. The historic time series back to 1961 consist of data derived from the old FBS methodology. 191 countries have been compiled using the new FBS methodology, of which 178 are published on FAOSTAT. Breaks in time series between 2009 and 2010 are mainly caused by the change in methodology used, which can be summarized as follows:

- **Food**: A new model estimates food in year t as a function of food in year t-1, changes in real gross domestic product per capita (GDP) and changes in population. Product demand elasticities are used as parameters.

- **Stocks**: They are estimated using a module that monitors stock levels vis-a-vis the supply of that product – thus averting unrealistically high stock levels. Furthermore, an updated reference file has been created for potentially stockable products (e.g. fresh meats can be expensively stocked only in certain rich countries). Lastly, much wider use is now made of United States Department of Agriculture (USDA) stock data, and from other specialized commodity institutions (such as OilWorld).

- **Feed**: A feed module generates feed requirements based on the actual animal numbers and species, and on the typology of livestock farming, such as intensive using concentrated feeds, or pasture grazing using grasses and forage. Data on feed and forage imports are used in assessing the availability of product-specific amounts to be destined for animal feed. Feed-only products (e.g. cereal cakes) are exhausted first to meet the calculated requirements before deducting further quantities from mixed food and feed products (e.g. maize).

- **Loss**: A loss module estimates losses across the whole value chain up to and excluding the retail level. The module uses a hierarchical linear model, where the hierarchy is based upon product and country groups. In addition, much more use is made of web scraping, text mining and academic/research articles and publications. Thus, the historical loss percentages in the food balances are consistently being revised based upon the new findings.

- **Balancing mechanism**: In the past, one of the components of the FBS was used as balancer. With the new methodology, the imputations for the FBS components are generated by dedicated modules, and a balancing mechanism will then proportionally spread the imbalances out among all the components for which official data are not available. The proportional balancing mechanism is based upon a 3-year moving average of the share of each variable in the total utilizations. A maximum of 10 iterations is performed, and the upper and lower boundaries for the different utilizations (based on the maximum/minimum share over supply over the time series) are established, which may cause a residual to remain unsolved.

- **Residual variable**: The quantity of unsolved imbalance is allocated to the 'residual' component and will indicate the amounts that could not be allocated within the established criteria.

Given this, the main reasons for residuals are:

1. Mismatch of official data declared by countries,

2. Incompatibility between official and unofficial data,

3. Over/under estimation of utilization variables by modules, and

4. Transparency approach: the new methodology reaffirms the necessity of transparency in treating data. For this reason, the residuals represent the extent to which data can be reliable, and the statistical discrepancy among different estimation methods and sources.

This analytical brief was prepared by Giulia Piva, Chiara Bordin, Cristina Valdivia, Tomasz Filipczuk (Crop, Livestock and Food Statistics team) under the supervision of Vikas Rawal. Other members of the team who participated in data compilation included Giorgia Amato, Andrii Besieda, Claudia De Vita, Birkan Durak, Gianluca Fiorentino, Sanghyun Jeon, Irina Kovrova, Livia Lombardi, Aydan Selek, Sumeda Siriwardena, Simona Sorrenti and Ankur Verma. The compilation of the food balance sheets for aquatic products was carried out by Gabriella Laurenti and Adrienne Egger of the Statistics Team of the Fisheries and Aquaculture Division. Support from Olivier Lavagne d'Ortigue in preparing the dataset for dissemination and this analytical brief is gratefully acknowledged.

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