Food balance sheets

2010–2022

Global, regional and country trends
HIGHLIGHTS

→ Global food supply, measured by per capita dietary energy supply, increased by 5 percent between 2010 and 2022, to 2 985 kcal/cap/day.

→ The highest DES in 2022 was recorded in Europe and the Americas, with Oceania as the third highest. The fastest increase in the DES between 2010 and 2022 took place in Asia, while in Africa the DES remained the lowest throughout the period, with minor fluctuations.

→ Between 2021 and 2022, the most severe decreases in caloric availability at the country level were recorded in Haiti, Ukraine and Yemen.

→ Meat products represented 21 percent of total protein supply globally in 2022. Poultry is the largest protein source (41 percent of the total), followed by pigmeat (31 percent) and bovine meat (21 percent), while mutton, goat, and other types of meat (such as horse, rabbit, and camel meat) contribute 5 percent or less.

FAOSTAT FOOD BALANCE SHEETS

BACKGROUND

The Statistics Division of the Food and Agriculture Organization of the United Nations (FAO) compiles Food Balance Sheet (FBS) statistics for 189 countries, which 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 utilizations.¹

The new release of the 2022 FBS data comprises time series from 2010 to 2022, with the addition of three countries compiled from 2019 to 2022 (Marshall Islands, Tonga, Tuvalu).

GLOBAL AND REGIONAL HIGHLIGHTS

Global food supply, measured by the calories available for food consumption at the global level, increased by 21 percent between 2010 and 2022, outpacing the growth in population, which went up by 15 percent over the same period (Figure 1). This resulted in an overall increase of the global dietary energy supply (DES) per capita, which reached an average global level of 2 985 kcal/cap/day in 2022.

The long-term increase of global food availability reflects successful advancements in agricultural productivity, along with technological innovations in food production. However, the enhanced availability did not translate in improvements of global food security, which was impacted mostly by income distribution and socioeconomic shocks that shape people’s ability to access food. The continuous rise in population highlights the need for production growth to be based on sustainable practices, to ensure that food supply can keep up with demand without further affecting the environment and depleting natural resources.

The dietary energy supply, measured in calories per capita per day, shows different long-term trends across regions (Figure 2). The world average DES increased steadily between 2010 and 2022, growing by 5.4 percent over the period. The fastest increase took place in Asia (8.9 percent), followed by the Americas (3.7 percent) and Europe (3.0 percent). No significant growth occurred in Africa (0.3 percent), while Oceania exhibits a slight decline of 1.1 percent. The average DES went up faster in Eastern Asia (11.7 percent growth), Central Asia (10.6 percent) and South-eastern Asia (9.5 percent) than in Asia; the increase was slightly lower than the regional average in Southern Asia (8.0 percent) and much lower in Western Asia (1.5 percent). In the Americas, Central America and Northern America show increases of the DES that are larger than the regional average, of 5.5 percent and 4.5 percent, respectively, while the DES in South America went up by 2.3 percent.

The highest DES in 2022 was recorded in Europe (3 471 kcal/cap/day), closely followed by the Americas (3 392 kcal/cap/day). Oceania had the third highest DES in 2022 (3 101 kcal/cap/day). With 2 944 kcal/cap/day, the DES in Asia was just below the world average. At 2 567 kcal/cap/day, Africa’s DES was the lowest among regions. The disparities between regions are significant. Europe and the Americas consistently show the highest levels, reflecting better food availability and dietary diversity. In contrast, Africa’s relatively flat DES is consistent with persistent food security challenges and insufficient nutritional intake.

The DES composition varies significantly across regions, highlighting diverse dietary patterns and food groups availability (Figure 3). Food choices reflect cultural preferences and economic conditions, along with the relative availability of different foods.

Cereals constitute the main staple in all regions, providing a significant portion of the dietary energy supply. The highest consumption is recorded in Asia (1,433 kcal/capita/day, or 49 percent of total DES) and Africa (1,171 kcal/capita/day, or 46 percent of total DES), and the lowest in Oceania (703 kcal/capita/day, or 23 percent of total DES). Europe and the Americas consume the highest amount of fats and oils (692 and 675 kcal/cap/day), with Oceania just behind (640 kcal/cap/day); in these three regions, fats and oils account for 20–21 percent of the total dietary energy supply. Notable regional particularities include the high share of roots, tubers and pulses in Africa (with 520 kcal/cap/day, or 20 percent of total DES) combined with the lowest share of meat and dairy and eggs among all regions, the high share of sugar in the Americas (14 percent), of fruit and vegetables in Asia (9 percent), of dairy and eggs in Europe (12 percent) and of meat in Oceania (13 percent).

In general, the Americas and Europe show the relatively more diverse diets, with higher consumption of vegetable oils, sugar, meat, and dairy products, while the profiles for Asia and Africa are more dominated by cereals and starchy roots. Oceania appears to be characterized by high meat and dairy consumption.
The past few years have seen significant global instability due to the COVID-19 pandemic and conflicts, resulting in disruptions to food supply chains across various regions. The following analysis focuses on changes in DES by country between 2021 and 2022.

The largest decreases in caloric availability are recorded in Haiti, Ukraine, Yemen, Kenya and Indonesia. In Haiti, availability decreased from 2 075 kcal/cap/day in 2021 to 1 978 kcal/cap/day in 2022, representing a 4.7 percent decline. Chronic food insecurity was exacerbated by socioeconomic developments related to natural disasters, violence and related displacements. The DES in Ukraine decreased from 2 937 kcal/cap/day in 2021 to 2 851 kcal/cap/day in 2022 (~86 kcal/cap/day) as an outcome of the ongoing war and its impact on food production and supply. Official sources report a decrease in the production of several agricultural and food items, including wheat, barley, sugar and vegetable oils. Food availability in 2022 likely integrates transfers and humanitarian assistance. In Yemen, the DES decreased from 2 160 kcal/cap/day in 2021 to 2 083 kcal/cap/day in 2022 (~3.6 percent). This decline highlights the chronic food insecurity conditions related to conflicts and instability, which have also disrupted trade flows, resulting in reduced imports of several food items, including wheat, some cereal processed products and vegetable oils. In the case of Kenya, the reduction of 71 kcal/cap/day in 2022 was mainly due to a noticeable drop in the officially reported production of maize, which is one of the most important staple foods in the country. Similarly, Indonesia
shows a decrease of 70 kcal/cap/day in 2022, as a consequence of lower production of wheat flour, cassava and groundnuts.

The Niger shows the largest increase in DES, from 2 507 kcal/cap/day in 2021 to 2 631 kcal/cap/day in 2022, an increase of 124 kcal/cap/day in one year. This significant growth is evidence of a recovery from a significant and general decline in cereal production that took place in 2021.

**Figure 4: Change in dietary energy supply between 2021 and 2022**


**FOCUS ON ANIMAL PRODUCTS AND CAMELIDS**

As seen in Figure 5, trends in meat supply show significant regional differences in meat consumption patterns. Oceania and the Americas had the higher supply levels in 2022 (93.2 kg/cap/year), although Oceania’s supply exhibited a 7 percent decrease from 2010 while the Americas posted a 7 percent increase from 2010. Meat supply in Europe went up by just 1 percent between 2010 and 2022, to 77.7 kg/cap/year, which is still much higher than the world average of 44.5 kg/cap/year in 2022. Asia, on contrary, experienced steady growth in meat supply, rising from 30.6 kg/cap/year in 2010 to 36.3 kg/cap/year in 2022 – an increase of 9 percent that highlights changing dietary habits and enhanced meat availability in the region. Meat supply in Africa is the lowest among regions and shows a 2 percent increase from 17.3 kg/cap/year in 2010 to 17.7 kg/cap/year in 2022.
Meat products accounted for 21 percent of the global protein supply in 2022, providing on average 18.2 g/cap/day of protein. Among the different meat types, poultry is the largest protein source (7.7 g/cap/day, or 41 percent of the total), followed by pigmeat (5.9 g/cap/day, or 31 percent) and bovine meat (3.9 g/cap/day, or 21 percent), while mutton, goat, and other types of meat (such as horse, rabbit, and camel meat) contribute 5 percent or less.
The United Nations has declared 2024 the International Year of Camelids (IYC 2024) to highlight the crucial role camelids play in supporting the livelihoods of millions of people, particularly Indigenous Peoples and local communities in over 90 countries. Although small on the global scale, camelids play a key role in the food security, nutrition, economic growth and cultural heritage of these population groups. They contribute to the Sustainable Development Goals in this context, as they help escape food insecurity and poverty, empower women, and promote sustainable land use.

Available data from the FAO supply utilization accounts show that meat of camelids was predominantly consumed in Africa and Asia, with Northern Africa (driven by the Sudan), Eastern Africa (driven by Kenya and Somalia) and Western Asia (driven by Saudi Arabia) showing the highest supply levels – 180 thousand tonnes (kt), 137 kt and 133 kt in 2022, respectively (Figure 7). Many countries in these subregions rely substantially on camelids for their meat supply, reflecting the animals’ adaptability to harsh climates and their cultural importance.

Figure 7: Supply of camel meat (2022)


Somalia is the country with the highest contribution of camelids meat to the diet, accounting for 26 percent of the meat supply and 27 percent of the total protein supply from meat. Mauritania and the Sudan show similar shares of camelids in meat and meat protein supply of 16–19 percent. In the rest of the countries, these shares are below 10 percent. Notably, in Western Asia, the United Arab Emirates has the highest per capita consumption of camelids meat, although it accounts for around 5 percent of total meat and meat protein supply.
Camelids are important in the countries shown on Figure 7 for their meat and for several other products. Camelid milk is particularly rich in vitamins and minerals, and essential for the dietary requirements of several communities. Moreover, camelids are a source of fibres, used in the production of high-quality textiles, and of hides, which are particularly valuable for leather production. These products contribute to improve and diversify the livelihoods and economic stability of the communities that raise them, emphasizing their essential role in sustainable agricultural practices.

Camelid milk is an essential component of the dairy supply in several countries, particularly in Eastern Africa and Western Asia. In Somalia, camelid milk accounted for 43 percent of the total dairy supply, with 125 g/cap/day. In Djibouti, Mali and Kenya, the share of camelid milk in total milk supply was at least 20 percent.
Table 2: Milk of camelids food supply, top countries (2022)

<table>
<thead>
<tr>
<th></th>
<th>Total milk and products (excluding butter) supply quantity (g/cap/day)</th>
<th>Of which: camelids (g/cap/day)</th>
<th>Share of camelids (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Somalia</td>
<td>282.5</td>
<td>121.8</td>
<td>43.1</td>
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<tr>
<td>Djibouti</td>
<td>49.5</td>
<td>14.1</td>
<td>28.4</td>
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<tr>
<td>Mali</td>
<td>108.0</td>
<td>24.6</td>
<td>22.8</td>
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<tr>
<td>Kenya</td>
<td>236.2</td>
<td>47.2</td>
<td>20.0</td>
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<tr>
<td>Qatar</td>
<td>96.0</td>
<td>16.7</td>
<td>17.4</td>
</tr>
<tr>
<td>United Arab Emirates</td>
<td>90.4</td>
<td>11.3</td>
<td>12.5</td>
</tr>
<tr>
<td>Saudi Arabia</td>
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<tr>
<td>Niger</td>
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<td>Mauritania</td>
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<tr>
<td>Chad</td>
<td>63.1</td>
<td>3.8</td>
<td>6.1</td>
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**EXPLANATORY NOTES**

The FAOSTAT Food Balances domain disseminates statistics on food balance sheets compiled using the new FAO methodology from 2010 to 2022. 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 189 are published on FAOSTAT.

Breaks in time series between 2009 and 2010 are mainly caused by the change in methodology used, which can be summarised 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 (GDP) and changes in population. Commodity demand elasticities are used as parameters.

- **Stocks:** They are now imputed using a new module that monitors stock levels vis-a-vis the supply of that commodity – thus averting unrealistically high stock levels. Furthermore, an updated reference file has been created for potentially stockable commodities (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 new feed module now 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. More use is being made of feed and forage imports in assessing the availability of commodity specific amounts to be destined for animal feed. Feed-only commodities (e.g.
cereal cakes) are exhausted first to meet the calculated requirements before deducting further quantities from mixed food and feed commodities (e.g. maize).

- **Loss:** A new loss module imputes for 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 commodity 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. 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 over the time series of the share) 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, with input from Piero Conforti and Olivier Lavagne d’Ortigue.


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