Food and Agriculture Organization of the United Nations

ISSN 2709-006X [Print]
ISSN 2709-0078 [Online]

FAOSTAT ANALYTICAL BRIEF 72

# Food balance sheets

# 2010–2021

## Global, regional and country trends

>> FAO Statistics Division

## HIGHLIGHTS

→ **Global food supply, measured by the per capita dietary energy supply, increased by 5 percent between 2010 and 2021, to 2 978 kcal/cap/day.**

→ **Northern America and Europe presented the largest DES levels in 2021, reaching 3 878 kcal/cap/day and 3 458 kcal/cap day, respectively. Asia had the fastest growth in DES in both absolute and relative terms since 2010, reaching 2 931 kcal/cap/day in 2021. Africa had the lowest DES level in 2021: 2 573 kcal/cap/day.**

→ **At the country level, no clear effect of the COVID-19 pandemic on the average food availability can be seen in the observed changes between 2018–2019 and 2020–2021.**

→ **Cereals play a crucial role in meeting the daily caloric needs of the world's population. Wheat is a leading source of sustenance, contributing 538 kcal per capita per day in 2021, followed by rice (520 kcal per capita per day), reaffirming their significance in global diets.**

# 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 187 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 2021 FBS data comprises recompiled time series from 2010 to 2021, using new conversion factors and population estimates. The new conversion factors, used to compute kilocalories (kcal), proteins and fats per capita, are the result of a joint project with FAO's Food and Nutrition Division, which updated food composition tables for all items. The population data come from the latest World Population Prospects published by the United Nations Population Division in 2022. Because of these updates, some series have been significantly revised, either in terms of the historical trend or absolute levels.

An additional update concerns the revision of extraction rates[2] for cereals and fruit juices. The new data have been obtained through memoranda of understanding with specialized organizations: the International Association for Cereal Science and Technology (ICC) and the International Fruit and Vegetable Juice Association (IFU).

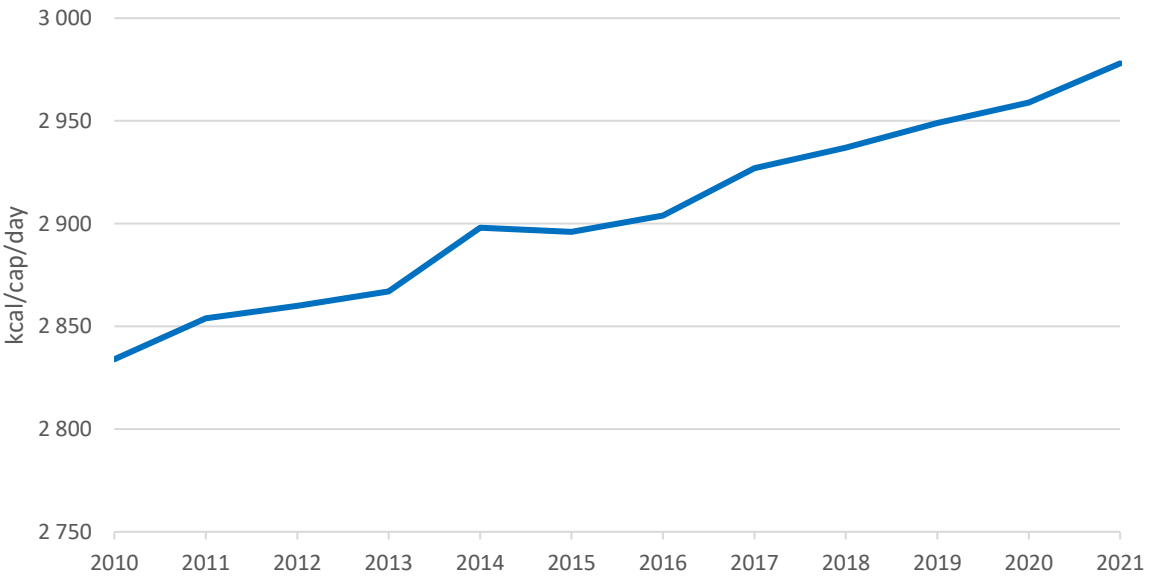
[1] More information is available at https://fenixservices.fao.org/faostat/static/documents/FBS/New%20FBS%20methodology.pdf
[2] Extraction rates (expressed as a percentage) are calculated as the weight of derived product that is produced from a given weight of input.

## GLOBAL AND REGIONAL HIGHLIGHTS

Global food supply, measured by the per capita dietary energy supply (DES), increased by 5 percent between 2010 and 2021, from 2 834 kcal/cap/day to 2 978 kcal/cap/day(Figure 1). Over the same period, population went up 14 percent, to 7.86 billion people in 2021.

The COVID-19 pandemic had little impact on the global DES, which grew by 0.34 percent between 2019 to 2020, while it increased by 0.64 percent from 2020 to 2021 (and by 0.98 percent between 2019 and 2021). However, the increasing food supply per person is not a straightforward indicator of an improving food security situation: the pandemic had a devastating impact on individuals and their livelihoods, resulting in a worldwide economic downturn that reversed three decades of global progress in poverty alleviation. As stated in *The State of Food Security and Nutrition in the World 2023*, this crisis led to an estimated increase of nearly 90 million people experiencing hunger from 2019 to 2020. Low- and lower-middle-income countries and disadvantaged segments of the population worldwide were particularly affected, not because of a real unavailability of food, but because of income losses incurred during the peak of the pandemic.

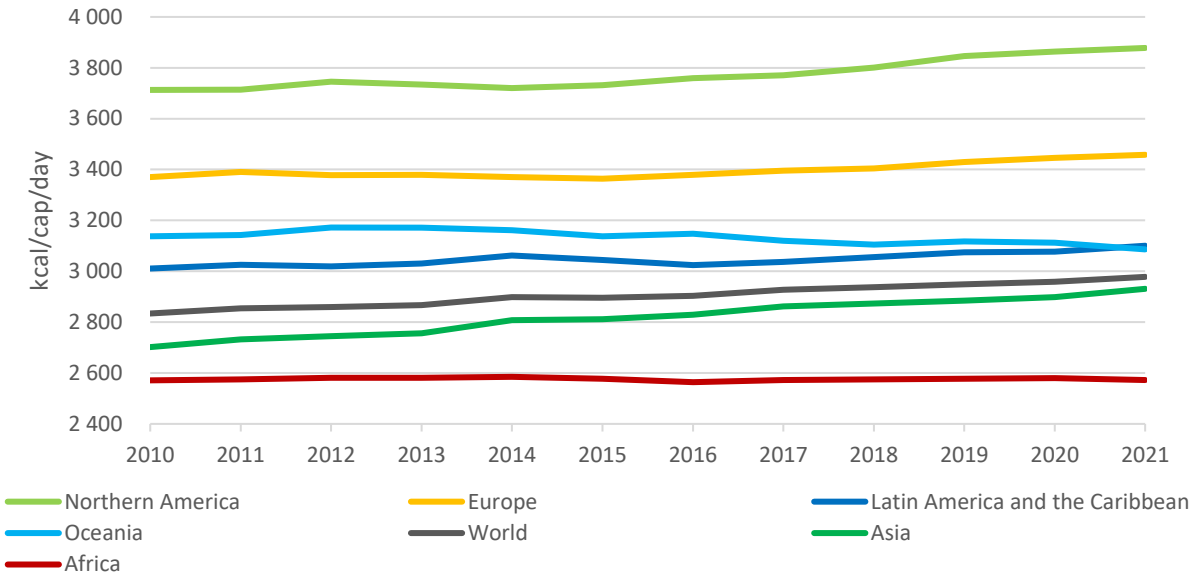
**Figure 1: Global food supply per capita**




**Source:** FAO. 2023. Food Balances (2010-). In: *FAOSTAT*. Rome. [Cited September 2023]. https://www.fao.org/faostat/en/#data/FBS

Northern America is the region with the largest DES levels, reaching 3 878 kcal/cap/day in 2021, up 4 percent since 2010. The gap between Europe, which has the second largest DES (3 458 kcal/cap/day in 2021), and Northern America on the one hand, and Latin America and the Caribbean and Oceania (3 100 kcal/cap/day and 3 086 kcal/cap/day in 2021, respectively) is significant. Asia exhibits the fastest growth in DES in both absolute and relative terms between 2010 and 2021: +229 kcal/cap/day (or 8 percent), from 2 702 kcal/cap/day in 2010 to 2 931 kcal/cap/day in 2021. Africa has the lowest DES throughout the period (2 573 kcal/cap/day in 2021) and more worryingly shows only a marginal increase compared with 2010, while Oceania shows a slightly decreasing trend (−2 percent between 2010 and 2021).

**Figure 2: Dietary energy supply by region**

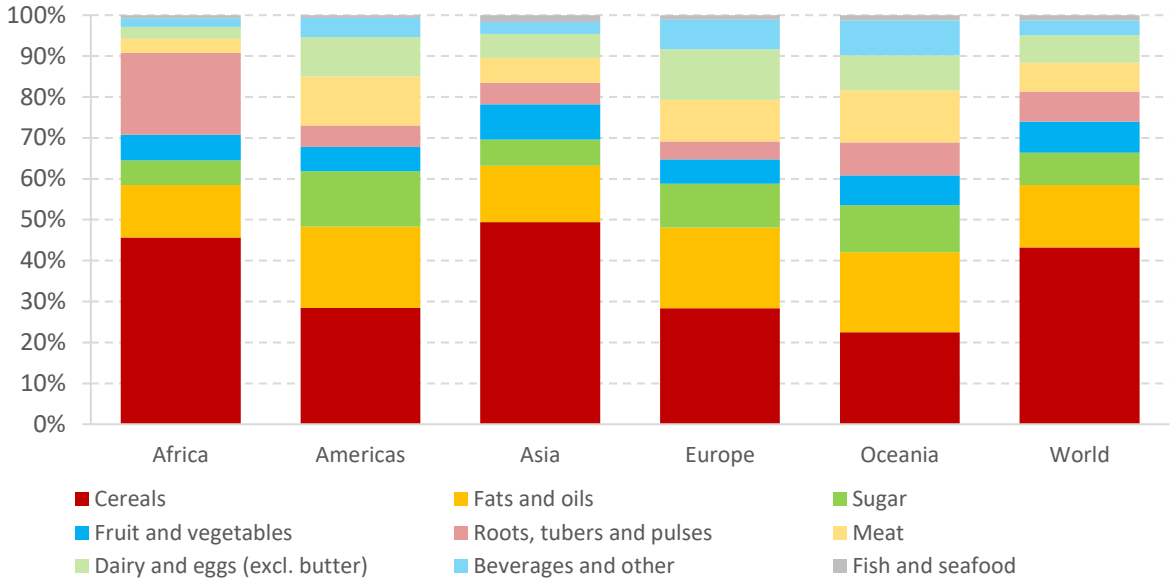



**Note:** Northern America shows a small break in series in 2018 due to new detailed data on the consumption of pigmeat in the United States of America.

**Source:** FAO. 2023. Food Balances (2010-). In: *FAOSTAT*. Rome. [Cited September 2023]. https://www.fao.org/faostat/en/#data/FBS

Figure 3 shows that the composition of the food supply per capita shows large variations among regions. Cereals are the main food group in terms of dietary energy content in all regions, and account for a substantial part (46–49 percent) of the diet in Asia and Africa, with an average supply of 1 447 and 1 175 kcal/cap/day, respectively. Europe and the Americas consume the highest amount of fats and oils (682 and 673 kcal/cap/day), with Oceania just behind (604 kcal/cap/day); in these three regions, fats and oils account for 20 percent of the total dietary energy supply. Notable regional particularities include the high share of roots, tubers and pulses in Africa (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, of fruit and vegetables in Asia, of dairy and eggs in Europe and of meat in Oceania. These consumption patterns provide valuable insights into regional dietary preferences and can inform strategies for addressing nutritional needs and promoting balanced diets.

**Figure 3: Food supply composition by region and commodity group**




**Note:** Beverages and other include alcoholic beverages, spices, stimulants, treenuts and miscellaneous; dairy and eggs (excl. butter) include eggs and milk - excluding butter; fats and oils include animal fats, oilcrops and vegetable oils; fish and seafood include fish, seafood and aquatic products, other; meat includes meat and offals; roots, tubers and pulses include pulses and starchy roots; sugar includes sugar & sweeteners and sugar crops.

**Source:** FAO. 2023. Food Balances (2010-). In: *FAOSTAT*. Rome. [Cited September 2023]. https://www.fao.org/faostat/en/#data/FBS

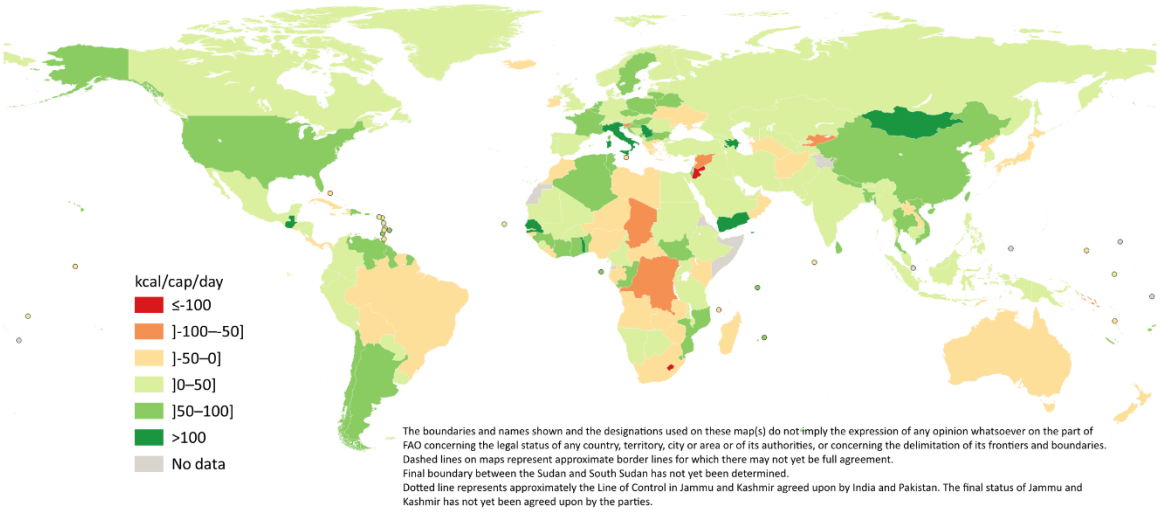
## COUNTRY-LEVEL HIGHLIGHTS

Analysing the change in DES between the average for 2018–2019 and the one for 2020–2021 suggests that the COVID-19 pandemic had no clear effect on the average food availability at the country level. Most countries showed an absolute DES change within a +/-100 kcal range, although for those exceeding this mark, the reason may sometimes be linked to data availability.

**Azerbaijan** has exhibited the largest positive change between 2018–2019 and 2020–2021 due to newly available official data showing an upward trend in the production of wheat and potatoes in the country. Conversely, the increase in **Mongolia** comes from a shift in trade data sources as mirror trade statistics were replaced with officially submitted data, resulting in fluctuations in its food supply data. The remarkable increase observed for **Yemen** (140 kcal/cap/day) results from higher imports of staple commodities and the incorporation of new stock data for 2020–2021.

Fewer countries have seen significant declines in their per capita dietary energy supply. In the case of **Jordan,** this can be attributed to a change in population figures and a decrease in the supply of wheat, a primary staple food. Conversely, **Lesotho** and **Chad** were affected by food shortages of essential cereals, stemming from climate-related events such as floods and erratic rainy seasons from 2019 to 2021.

**Figure 4: Change in dietary energy supply between 2020–2021 and 2018–2019**

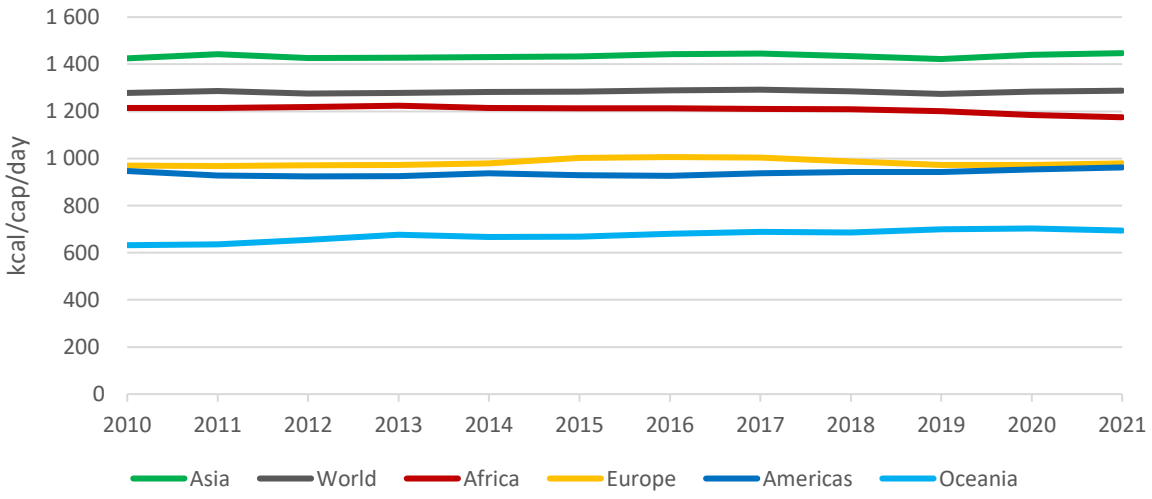



**Source:** FAO. 2023. Food Balances (2010-). In: *FAOSTAT*. Rome. [Cited September 2023]. https://www.fao.org/faostat/en/#data/FBS based on UN Geospatial. 2020. Map geodata [shapefiles]. New York, USA, UN.

## FOCUS ON CEREALS AND MILLETS

The trends in the cereal food supply show significant regional variations. Asia had the highest cereal food supply with a stable trend from 2010 to 2021. Africa had the second highest cereals food supply but experienced a slight decline over the past two years, dropping from 1 201 kcal/cap/day in 2019 to 1 175 kcal/cap/day in 2021. Meanwhile, Europe and the Americas exhibited relatively stable patterns, maintaining an average of around 950 kcal/cap/day. Oceania, though starting from the lowest level, has shown the strongest growth, from 632 kcal/cap/day in 2010 to 694 kcal/cap/day in 2021.

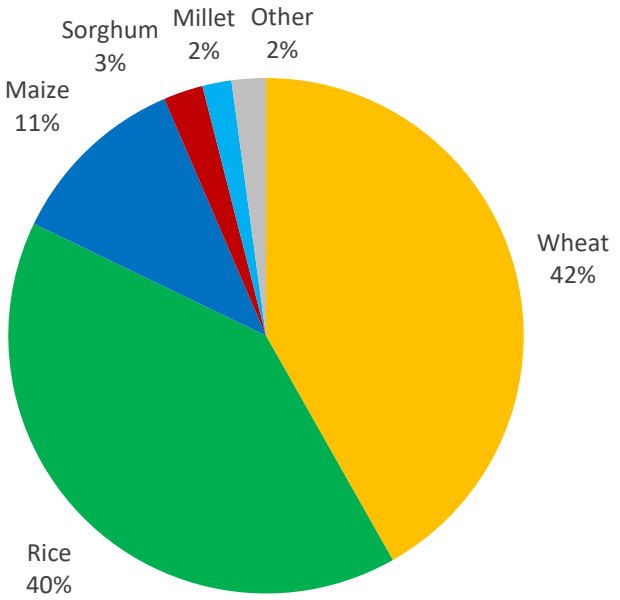
**Figure 5: Cereals food supply by region**




**Source:** FAO. 2023. Food Balances (2010-). In: *FAOSTAT*. Rome. [Cited September 2023]. https://www.fao.org/faostat/en/#data/FBS

As mentioned earlier, cereals play a crucial role in meeting the daily caloric needs of the world's population, accounting for 1 288 kcal/cap/day, or 43 percent of total DES. Wheat and rice are the two main sources of sustenance, contributing 42 and 40 percent, respectively, of the cereals food supply. The third most important cereal is maize (corn), which accounted for 11 percent of the cereals food supply and serving as a valuable cereal staple. Although they represent only 2–3 percent of cereals food supply, sorghum and millet are important in African countries such as Mali and the Sudan.

**Figure 6: Cereals food supply composition, main products (kcal/cap/day, 2021)**

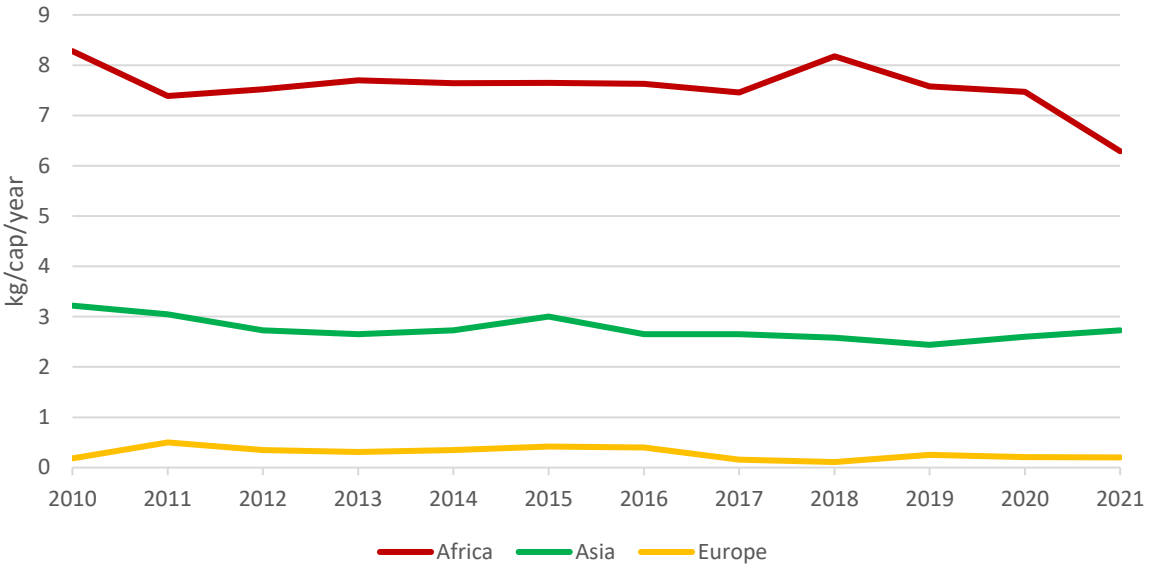



**Source:** FAO. 2023. Food Balances (2010-). In: *FAOSTAT*. Rome. [Cited September 2023]. https://www.fao.org/faostat/en/#data/FBS

Millets encompass a diverse group of small-grained, dryland cereals including foxtail, barnyard and fonio. They are a good source of essential nutrients and were among the first plants to be domesticated, still serving as a traditional staple crop in parts of sub-Saharan Africa and Asia. Their capacity to thrive in various climates and adaptability present opportunities to enhance food security and support economic development. In celebration of the **International Year of Millets** in 2023, FAO has worked in partnership with various stakeholders to unleash the considerable potential of millets as cost-effective food options that can play a role in promoting healthy diets and a sustainable development.

Data from food balances show that millets are primarily used for human consumption in three regions as of 2021. Africa has the greatest availability of millets, averaging 6–8 kg per capita annually. However, the yearly average availability of millets has decreased since 2018, dropping from 8.2 kg/cap in 2018 to 6.3 kg/cap in 2021. In Asia, the average millet food supply accounted for 2.7 kg/cap in 2021, a level around which has been fluctuating since 2010, while Europe had a rather lower supply throughout the period of 0.1–0.5 kg/cap.

**Figure 7: Millet food supply by region**




**Source:** FAO. 2023. Food Balances (2010-). In: *FAOSTAT*. Rome. [Cited September 2023]. https://www.fao.org/faostat/en/#data/FBS

Nine out of ten of the countries with the highest millet food supply are in Africa, and the largest consumers in 2021 were Mali (62 kg/cap) and the Niger (60 kg/cap), where the average supply is close to double the supply in the third largest user (Chad, with 32 kg/cap).

**Table 1: Millet food supply, top countries (2021)**

| Country | Food supply (kg/cap/year) |
|---|---|
| Mali | 62 |
| Niger | 60 |
| Chad | 32 |
| Burkina Faso | 27 |
| Senegal | 23 |
| Sudan | 19 |
| Namibia | 15 |
| Gambia | 10 |
| Nepal | 10 |
| Guinea-Bissau | 9 |

**Source:** FAO. 2023. Food Balances (2010-). In: *FAOSTAT*. Rome. [Cited September 2023]. https://www.fao.org/faostat/en/#data/FBS

## EXPLANATORY NOTES

The FAOSTAT Food Balances domain disseminates statistics on food balance sheets compiled using the new FAO methodology from 2010 to 2021. The historic time series back to 1961 consist of data derived from the old FBS methodology.

187 countries have been compiled using the new FBS methodology, of which 185 are published on FAOSTAT.

Breaks in time series between 2009 and 2010 are mainly given 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 and Salar Tayyib.**

**Required citation: FAO. 2023. *Food balance sheets 2010–2021. Global, regional and country trends*. FAOSTAT Analytical Brief Series No. 72. Rome. https://doi.org/10.4060/cc8088en**

**Cover photo: ©FAO/Marco Salustro**

**CONTACTS**

Statistics – Economic and Social Development
statistics@fao.org
www.fao.org/food-agriculture-statistics/en/
**Food and Agriculture Organization of the United Nations**
Rome, Italy



CC8088EN/1/10.23