National energy available from non-staples

Overview

Energy available from non-staples is an indicator calculated at the national level that estimates the percentage of all calories that come from non-staple goods in the food supply (i.e. all food items, excluding tubers and grains). Staple foods are generally the least expensive food items available and are also the least nutrient-dense, and diets based predominantly on staple foods have been associated with micronutrient deficiencies and low dietary diversity (Arimond et al., 2010 [1]; Ruel, 2003 [2]). This indicator does not yield any information on the affordability, accessibility, or consumption of non-staple foods by different population groups within a given country, meaning that a sufficient national supply does not ensure sufficient consumption by nutritionally vulnerable groups. Additional indicators of that are covered in the Data4Diets platform and could be used as proxies for diet quality and rely on Food Balance Sheet [3] (FBS) data include national average supply of protein [4] and national fruit and vegetable availability in food supply [5].

Method of Construction

This indicator can be accessed through the FAOSTAT [6] website by selecting the 'Food Balance Sheets' option under the 'Data' tab. The Food and Agriculture Organization (FAO) calculates the national estimate of total food availability using data from a number of sources, including government agencies, marketing authorities, and industrial/manufacturing surveys, among others (FAO, 2001 [7]). This national estimate is calculated as the sum of the elements of supply (production quantity, import quantity, and stock variation [i.e. net increase or decrease]) minus the elements of utilization (export quantity, food manufacturing, feed, seed, waste, and other uses). Using food composition tables, FAOSTAT calculates the energy content (kcal) of the edible portion of each type of food available for human consumption. This value is then divided by the population size and by 365 days to calculate the per capita daily average supply of energy from each type of food (or from total food available if these food groups are added together).

To calculate this indicator, the food supply (kcal/capita/day) must first be calculated for non-staple goods. In the FAOSTAT [8] food balance sheets, the 'Food supply (kcal/capita/day)' option can be selected under the 'Elements' heading, and food groups can be selected under the 'Items Aggregated' heading to produce a total food supply (kcal) for non-staple goods. After calculating the food supply for non-staples, the food supply for all goods is calculated by selecting 'Grand Total + (Total)' under the 'Items Aggregated' heading. The indicator for energy available from non-staples (% kcals non-staples) can then be calculated using the following fraction:

$$\frac{Food\ supply\ of\ all\ non\text{-}staple\ foods\ (kcal/capita/day)}{Food\ supply\ of\ all\ foods\ (kcal/capita/day)} \times 100\ (to\ express\ as\ a\ percent)$$

For more information on the FAO food balance sheet methodology, see FAOSTAT [9]. For more detail on using FAO data to calculate available energy, refer to the Food Security Information [10] Network's [10] (FSIN) guide to food security indicators (Lele et al., 2016 [11])

Uses

This indicator can be used to gain an overview of the overall quality of the food supply by measuring the percentage of the food supply that is coming from non-staple foods. When the preferred data from individual or household surveys are unavailable, this indicator using FBS [3] data can serve as a proxy for relative diet quality trends based on food supply at the population level (FAO, 2016 [12]).

Because the data are available annually for nearly all countries (with a 2-3-year lag), this is a useful indicator for cross-country comparisons of food supply, as well as for analysis of trends over time within a country. Non-staple items are of particular interest because they tend to be more nutrient-dense than staple goods, and previous research has found an association between the diversity of the national-level food supply (of which this is an indicator) and health outcomes (Remans et al., 2014 [13]). This indicator has also been identified as one of a suite to be used in measuring the nutrient adequacy component of 'sustainable nutrition security' (Gustafson et al., 2016 [14]). The inverse of this indicator (energy available from staple foods) is part of the FAO Suite of Food Security Indicators [15].

Strengths and Weaknesses

Due to the availability and comprehensiveness of FBS [3] data, this indicator is easily calculated and compared across time and place (FAOSTAT [9]). Another strength of this indicator is that it is simple to interpret and lacks sampling and reporting biases associated with dietary recall data (Lele et al., 2016 [11]).

However, a downside of this indicator is that it does not reflect actual consumption of non-staple foods, but rather the availability of these foods in a given country. In addition, as a national-level estimate, it cannot be disaggregated by sex, age, or by any geographic scale smaller than the national level, nor can it detect disparities in consumption of non-staples across population groups or between seasons, as is possible with individual-level dietary data. Although the FBS accounts for food losses incurred at the distribution and processing levels, it does not account for plate waste at the household or individual level (Lele et al., 2016 [11]). It is also important to confirm the definition of non-staple goods, which may vary by context. For example, some have suggested excluding from the definition all foods eaten regularly (Gustafson et al., 2016 [14]).

Data Source

The main source of data for this indicator is the FAO FBS database [16], which disaggregates elements of utilization and supply, and estimates total food available for human consumption. FAO pairs this information with food composition data to produce information on the national supply of macronutrients (per capita/day). In addition, Household Consumption and Expenditure Surveys [17] (HCES) could be used to calculate a similar indicator, such as the household share of energy consumed from non-staples [18]. Alternatively, 24-hour Dietary Recall [19], a Food Frequency Questionnaire [20] (FFQ) or Weighed Food Records [21] could also be used to calculate an analogous indicator.

Links to guidelines

- Food and Agriculture Organization, (2001). "Food balance sheets: A handbook" [22]

Links to validation studies

- Del Gobbo et al., (2015). "Assessing global dietary habits: a comparison of national estimates from the FAO and the Global Dietary Database" [23]
- Serra-Majem et al., (2003). "Comparative analysis of nutrition data from national, household, and individual levels: results from a WHO-CINDI collaborative project in Canada, Finland, Poland, and Spain"

[24]

Links to illustrative analyses

- Arsenault et al., (2015). "Improving nutrition security through agriculture: an analytical framework based on national food balance sheets to estimate nutritional adequacy of food supplies" [25]
- Balanza et al., (2007). "Trends in food availability determined by the Food and Agriculture Organization?s food balance sheets in Mediterranean Europe in comparison with other European areas" [26]
- Remans et al., (2013). "Measuring nutritional diversity of national food supplies" [27]

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Food Security Dimensions

- Quality [29]

Data Collection Levels

- National [30]

Data Sources and Methods

- Food Balance Sheets (FBS)

Requires Food Composition Database

- No [31]