FACT

FORTIFICATION ASSESSMENT COVERAGE TOOLKIT (FACT)

INDICATOR DEFINITIONS AND MEASUREMENT GUIDELINES

This document provides

- a list of the standard indicators assessed in a FACT survey mapped to the objectives and research questions they contribute to answering;
- definitions and measurement guidelines for the list of standard indicators assessed in a FACT survey;
- instructions for calculating indicators; and
- notes on how these indicators should be disaggregated.

This document does not provide

- the syntax for constructing each indicator, as that will depend on the format of the data and the software used for analysis; or
- guidelines on how to interpret each indicator, as that will depend on the results and context of the survey in the country of study.

This document should be read in conjunction with the following accompanying tools:

- "FACT Market Assessment Forms Template"
- "FACT Fieldwork Manual for the Market Assessment Template"
- "FACT Household Questionnaire Template"
- "FACT Fieldwork Manual for the Household Assessment Template"
- "FACT Household Questionnaire Customization Guidelines"
- "FACT Manual"

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FACT survey objectives, research questions, and indicators

Table 1: FACT survey objectives, research questions, and indicators lists the objectives and associated key research questions of a standard FACT survey (including both household and market assessments) as well as the indicators that contribute to answering these questions.

Table 1: FACT survey objectives, research questions, and indicators

Objective	Research question	Indicator
1. Assess the availability of brands for a food vehicle in the market	What brands of food vehicles are present in the market, and what are their characteristics?	• Total number of brands of a food vehicle • Proportion of food vehicle brands that are locally produced (or other characteristic)
2. Assess the fortification quality of brands available in the market	To what extent are the food vehicle brands that are available in the market fortified? How do they compare with national fortification standards?	• Nutrient content of a food vehicle brand • Proportion of food vehicle brands that are fortified (to any extent) • Proportion of food vehicle brands that are fortified below minimum standards • Proportion of food vehicle brands that are fortified according to standards • Proportion of food vehicle brands that are fortified above standards (if applicable)
3. Assess the fortification quality of food vehicle volume in the market (only applicable where complementary data on food vehicle volume are available from other sources)	What volume of the food vehicle available in the market is fortified? How does it compare with national fortification standards?	• Food vehicle supply volume • Proportion of food vehicle volume that is fortified (to any extent) • Proportion of food vehicle volume that is fortified below minimum standards • Proportion of food vehicle volume that is fortified according to standards • Proportion of food vehicle volume that is fortified above standards (if applicable)
4. Assess the coverage of food vehicles, fortifiable food vehicles, and fortified food vehicles among households	What proportion of households consume the food vehicle, the fortifiable food vehicle, and the fortified food vehicle?	• Proportion of households that consume a food vehicle • Proportion of households that consume a fortifiable food vehicle • Proportion of households that consume a fortified food vehicle
5. Estimate the consumption of fortifiable food vehicles among target populations	How much of the fortifiable food vehicle does the target population consume each day?	• Amount of fortifiable food vehicle consumed daily among target population groups (e.g., children 6–59 months of age or women of reproductive age)

6. Estimate the contribution of fortified food vehicles to the intake of select nutrients in the diet among target populations	What proportion of nutrient requirements are supplied by the fortified food among the target population?	• Actual percentage of daily nutrient requirements met from consumption of a fortified food vehicle among the target population groups • Modeled percentage of daily nutrient requirements met from consumption of a fortified food vehicle among the target population groups (assuming fortification quality standards are met)
7. Assess awareness of food fortification among households	Is the target population aware of fortification? Do they know what fortification means and/or what its benefits are?	• Proportion of households that have heard about fortified foods OR Proportion of households that have ever seen the fortification logo • Proportion of households that are aware of the benefits of fortified foods OR Proportion of households that report positive attributes of the fortification logo
8. Assess equity in coverage, consumption, and micronutrient contribution by identifying vulnerable population subgroups using risk factors that are often associated with poor micronutrient intakes and disaggregating the coverage, consumption, and micronutrient contribution results by them	Are there differences in coverage, consumption, and micronutrient contribution of fortified foods between vulnerable population subgroups that are at risk of poor micronutrient intakes compared with nonvulnerable groups?	Typical risk factors by which the coverage, consumption, and micronutrient contribution indicators are disaggregated: • households living in rural areas; • households at risk of acute poverty; • households with low socioeconomic status; • households at risk of food insecurity; • women of reproductive age not meeting minimum dietary diversity; and • households with poor infant and young child feeding practices.

1 Assess the availability of brands for each food vehicle

These indicators use data generated by the availability component of the market assessment (i.e., using data from the Brand Registration Form).

Indicator 1.1: Total number of brands of a food vehicle

Definition

Total number of brands of a food vehicle

Calculation

This indicator is a count of the unique brands of a food vehicle registered by their origin, food vehicle type, supplier in purposively selected markets, and retail outlets.

Disaggregation

It is recommended that this indicator be disaggregated and reported by other characteristics such as

- origin (locally produced, imported);
- food vehicle type (e.g., palm oil, sunflower oil);
- supplier type (producer, import/exporter, distributor, packer/repacker);
- retail outlet type (e.g., supermarket, wholesaler, retail shop); or
- market hub/geographic administrative area (depending on sample design).

Indicator 1.2: Proportion of food vehicle brands that are locally produced

Definition

$$\frac{\text{Number of food vehicle brands that are locally produced}}{\text{Number of all available food vehicle brands}}$$

Calculation

First create a dummy variable for each brand that takes the value

- 1 if brand has the characteristic of being locally produced, or
- 0 otherwise.

Then, divide the number of brands that have this characteristic (i.e., are locally produced) by the number of all available brands.

Disaggregation

It is recommended that this indicator be disaggregated and reported by other characteristics such as

- origin (locally produced, imported);
- food vehicle type (e.g., palm oil, sunflower oil);
- supplier type (producer, import/exporter, distributer, packer/repacker);
- retail outlet type (e.g., supermarket, wholesaler, retail shop); or
- market hub/geographic administrative area (depending on sample design).

2 Assess the fortification quality of food vehicle brands compared with national fortification standards

These indicators use data generated through laboratory analysis of collected food samples from the market assessment.

Indicator 2.1: Nutrient content of a food vehicle brand

Definition

Nutrient content of a food vehicle brand

Calculation

This indicator is the nutrient content of the composite sample that is made up of all the individual food samples collected for each food vehicle brand as measured by the laboratory quantitative analysis.

Notes

- This indicator is repeated for each food vehicle brand that was tested for its nutrient content by the laboratory.
- This indicator is repeated for each nutrient that was tested in a food vehicle. For example, if maize flour is fortified with iron and vitamin A and the scope of the market assessment includes testing maize flour brands for both their iron and vitamin A content, then two indicators are constructed: (1) vitamin A content of a maize flour brand; and (2) iron content of a maize flour brand.
- For all nutrients that were tested by the laboratory, this indicator will be provided directly to the analyst by the laboratory. In case of budgetary or laboratory capacity constraints, however, it might not be possible for the laboratory to assess the content of all fortificants in a food vehicle brand. In the example above, the scope of the FACT market assessment might cover only the assessment of the iron content in maize flour brands. For additional nutrients required for inclusion in the premix but not measured by the lab, the measured nutrient can be used as a proxy to estimate the additional nutrients based on the proportion added in the premix. First, however, it is critical to confirm from premix providers in the country of interest that the additional nutrients were in fact added to the premix in the prescribed proportions

Indicator 2.2: Proportion of food vehicle brands that are fortified (to any extent)

Definition

$$\frac{\text{Number of food vehicle brands confirmed to be fortified (to any extent)}}{\text{Number of all available food vehicle brands}}$$

Calculation

First, create a dummy variable for each brand and nutrient combination that takes the value

- 1 if the brand nutrient content is above the intrinsic amount or lowest amount of detection (as determined by the laboratory) based on the laboratory analysis, or
- 0 otherwise.

Then, divide the number of brands that are fortified by the number of all available brands.

Notes

- This indicator is repeated for each nutrient that was measured in the brands of a given food vehicle. For example, if maize flour is fortified with iron and vitamin A and the content of both nutrients was measured/deduced in maize flour brands, then two indicators are constructed: (1) the proportion of maize flour brands that are fortified with iron; and (2) the proportion of maize flour brands that are fortified with vitamin A.
- This indicator is repeated for each food vehicle of interest.

Disaggregation

It is recommended that this indicator be disaggregated and reported by other characteristics such as

- origin (locally produced, imported);
- food vehicle type (e.g., palm oil, sunflower oil);
- supplier (producer, import/exporter, distributer, packer/repacker);
- retail outlet type (e.g., supermarket, wholesaler, retail shop); or
- market hub/geographic administrative area (depending on sample design).

Indicator 2.3: Proportion of food vehicle brands that are fortified below minimum standard

Definition

$$\frac{\text{Number of food vehicle brands confirmed to be fortified below the minimum national standard}}{\text{Number of all available food vehicle brands}}$$

Calculation

First, create a dummy variable for each brand and nutrient combination that takes the value

- 1 if the brand nutrient content is above the intrinsic amount or lowest amount of detection (as determined by the laboratory) but below the minimum national standard based on the laboratory analysis, or
- 0 otherwise.

Then, divide the number of brands that are fortified below minimum standard by the number of all available brands.

Notes

- This indicator is repeated for each nutrient that was measured in the brands of a given food vehicle. For example, if maize flour is fortified with iron and vitamin A and the content of both nutrients was measured/deduced in maize flour brands, then two indicators are constructed: (1) proportion of maize flour brands that are fortified below standard with iron; and (2) proportion of maize flour brands that are fortified with vitamin A below standard.
- This indicator is repeated for each food vehicle of interest.

- The minimum national standard should be obtained in reference to the fortification standards in the country. The analysts need to obtain this information from stakeholders in the government or food fortification programs.
- Minimum and maximum values depend on the quantity of the food sample that is being analyzed (small amounts provide larger variation than large amounts), as well as the use of composite or single samples (variation is too high in single samples that usually makes the application of minimum and maximum content values impractical). If the standard specifies a method for sampling and nutrient analysis, it should be followed. Otherwise, preparation of composite samples mixing equal amounts of single samples, and putting into solution a sufficient quantity of the fortified food sample (e.g., 50 grams for the case of fortified salt) should be applied.

Disaggregation

It is recommended that this indicator be disaggregated and reported by other characteristics such as

- origin (locally produced, imported);
- food vehicle type (e.g., palm oil, sunflower oil);
- supplier (producer, import/exporter, distributer, packer/repacker);
- retail outlet type (e.g., supermarket, wholesaler, retail shop); or
- market hub/geographic administrative area (depending on sample design).

Indicator 2.4: Proportion of food vehicle brands that are fortified according to standard

Definition

$$\frac{\text{Number of food vehicle brands confirmed to be fortified according to the national standard}}{\text{Number of all available food vehicle brands}}$$

Calculation

First, create a dummy variable for each brand and nutrient combination that takes the value

- 1 if the brand nutrient content is in accordance with the national standard based on the laboratory analysis, or
- 0 otherwise.

Then, divide the number of brands that are fortified according to standard by the number of all available brands.

Notes

- This indicator is repeated for each nutrient that was measured in the brands of a given food vehicle. For example, if maize flour is fortified with iron and vitamin A and the content of both nutrients was measured/deduced in maize flour brands, then two indicators are constructed: (1) the proportion of maize flour brands that are fortified according to the standard with iron; and (2) the proportion of maize flour brands that are fortified according to the standard with vitamin A.
- This indicator is repeated for each food vehicle of interest.
- The national fortification standard may be defined as a range of values or simply as exceeding a minimum value, depending on the country of study. This standard is obtained from stakeholders in the government or food fortification programs.
- Minimum and maximum values depend on the quantity of the food sample that is being analyzed (small amounts provide larger variation than large amounts), as well as the use of composite or single samples (variation is too high in single samples that usually makes the application of minimum and maximum content values impractical). If the standard specifies a method for sampling and nutrient

analysis, it should be followed. Otherwise, preparation of composite samples mixing equal amounts of single samples, and putting into solution a sufficient quantity of the fortified food sample (e.g., 50 grams for the case of fortified salt) should be applied.

Disaggregation

It is recommended that this indicator be disaggregated and reported by other characteristics such as

- origin (locally produced, imported);
- food vehicle type (e.g., palm oil, sunflower oil);
- supplier (producer, import/exporter, distributer, packer/repacker);
- retail outlet type (e.g., supermarket, wholesaler, retail shop); or
- market hub/ geographic administrative area (depending on sample design).

Indicator 2.5: Proportion of food vehicle brands that are fortified above standard range (if applicable)

Definition

$$\frac{\text{Number of food vehicle brands confirmed to be fortified above the national standard range}}{\text{Number of all available food vehicle brands}}$$

Calculation

First, create a dummy variable for each brand and nutrient combination that takes the value

- 1 if the brand nutrient content is above the national standard range based on the laboratory analysis, or
- 0 otherwise.

Then, divide the number of brands that are fortified above the standard range by the number of all available brands.

Notes

- This indicator is repeated for each nutrient that was measured in the brands of a given food vehicle. For example, if maize flour is fortified with iron and vitamin A and the content of both nutrients was measured/deduced in maize flour brands, then two indicators are constructed: (1) the proportion of maize flour brands that are fortified above the standard with iron; and (2) the proportion of maize flour brands that are fortified above the standard with vitamin A.
- This indicator is repeated for each food vehicle of interest.
- This indicator is not calculated for nutrients that do not have a maximum limit defined in the national fortification standards in the country.
- The national standard should be obtained in reference to the fortification standards in the country. The analysts need to obtain this information from stakeholders in the government or food fortification programs.
- Minimum and maximum values depend on the quantity of the food sample that is being analyzed (small amounts provide larger variation than large amounts), as well as the use of composite or single samples (variation is too high in single samples that usually makes the application of minimum and maximum content values impractical). If the standard specifies a method for sampling and nutrient analysis, it should be followed. Otherwise, preparation of composite samples mixing equal amounts of single samples, and putting into solution a sufficient quantity of the fortified food sample (e.g., 50 grams for the case of fortified salt) should be applied.

Disaggregation

It is recommended that this indicator be disaggregated and reported by other characteristics such as

- origin (locally produced, imported);
- food vehicle type (e.g., palm oil, sunflower oil);
- supplier (producer, import/exporter, distributer, packer/repacker);
- retail outlet type (e.g., supermarket, wholesaler, retail shop); or
- market hub/ geographic administrative area (depending on sample design).

3 Assess the fortification quality of food vehicle volume compared with the national fortification standards

These indicators use data generated by the laboratory analysis of collected food samples from the market assessment and food vehicle supply volumes by brand or food vehicle type from supplementary data sources, if available.

Indicator 3.1: Food vehicle supply volume

Definition

The food vehicle supply volume of the respective food vehicle brand or food vehicle type in the market is collected from available sources.

Calculation

Sum the supply volumes reported for different brands to determine the total volume for the following characteristics, or collect this information directly if reported in available sources.

Notes

- This indicator is repeated for each food vehicle that was tested for its nutrient content by the laboratory.

Disaggregation

The volumes can be reported by

- origin (locally produced, imported);
- food vehicle type (e.g., palm oil, sunflower oil);
- supplier (producer, import/exporter, distributer, packer/repacker);
- retail outlet type (e.g., supermarket, wholesaler, retail shop); or
- market hub/geographic administrative area (depending on sample design)

Indicator 3.2: Proportion of food vehicle volume that is fortified (to any extent)

Definition

$$\frac{\text{Food vehicle volume confirmed to be fortified (to any extent)}}{\text{Total food vehicle volume}}$$

Calculation

First, sum the volumes of food vehicle brands that are fortified (i.e., the dummy variable for fortification quality indicator 2.2 is 1).

Then, divide by the respective total food vehicle volume.

Notes

- This indicator is repeated for each nutrient that was measured in the brands of a given food vehicle. For example, if maize flour is fortified with iron and vitamin A and the content of both nutrients was measured/deduced in maize flour brands, then two indicators are constructed: (1) the proportion of maize flour volume that is fortified with iron; and (2) the proportion of maize flour volume that is fortified with vitamin A.
- This indicator is repeated for each food vehicle of interest.

Disaggregation

It is recommended that this indicator be disaggregated and reported by other characteristics such as:

- origin (locally produced, imported);
- food vehicle type (e.g., palm oil, sunflower oil);
- supplier (producer, import/exporter, distributer, packer/repacker);
- retail outlet type (e.g., supermarket, wholesaler, retail shop); or
- market hub/geographic administrative area (depending on sample design)

Indicator 3.3: Proportion of food vehicle volume that is fortified below the standard

Definition

$$\frac{\text{Food vehicle volume confirmed to be fortified below the minimum national standard}}{\text{Total food vehicle volume}}$$

Calculation

First, sum the volumes of food vehicle brands that are fortified below the national standard (i.e., the dummy variable for fortification quality indicator 2.3 is 1).

Then, divide by the respective total food vehicle volume.

Notes

- This indicator is repeated for each nutrient that was measured in the brands of a given food vehicle. For example, if maize flour is fortified with iron and vitamin A and the content of both nutrients was measured/deduced in maize flour brands, then two indicators are constructed: (1) the proportion of maize flour volume that is fortified with iron; and (2) the proportion of maize flour volume that is fortified with vitamin A.
- This indicator is repeated for each food vehicle of interest.
- The minimum national standard should be obtained in reference to the fortification standards in the country. The analysts need to obtain this information from stakeholders in the government or food fortification programs.
- Minimum and maximum values depend on the quantity of the food sample that is being analyzed (small amounts provide larger variation than large amounts), as well as the use of composite or single samples (variation is too high in single samples that usually makes the application of minimum and maximum content values impractical). If the standard specifies a method for sampling and nutrient analysis, it should be followed. Otherwise, preparation of composite samples mixing equal amounts of single samples, and putting into solution a sufficient quantity of the fortified food sample (e.g., 50 grams for the case of fortified salt) should be applied.

Disaggregation

It is recommended that this indicator be disaggregated and reported by other characteristics such as

- origin (locally produced, imported);
- food vehicle type (e.g.. palm oil, sunflower oil);
- supplier (producer, import/exporter, distributer, packer/repacker);
- retail outlet type (e.g., supermarket, wholesaler, retail shop); or
- market hub/geographic administrative area (depending on sample design)

Indicator 3.4: Proportion of food vehicle volume that is fortified according to standard

Definition

$$\frac{\text{Food vehicle volume confirmed to be fortified according to the national standard}}{\text{Total food vehicle volume}}$$

Calculation

First, sum the volumes of food vehicle brands that are fortified according to the national standard (i.e., the dummy variable for fortification quality indicator 2.4 is 1).

Then, divide by the respective total food vehicle volume.

Notes

- This indicator is repeated for each nutrient that was measured in the brands of a given food vehicle. For example, if maize flour is fortified with iron and vitamin A and the content of both nutrients was measured/deduced in maize flour brands, then two indicators are constructed: (1) the proportion of maize flour volume that is fortified with iron; and (2) the proportion of maize flour volume that is fortified with vitamin A.
- This indicator is repeated for each food vehicle of interest.
- The national fortification standard may be defined as a range of values or simply as exceeding a minimum value depending on the country of study. This information is obtained from stakeholders in the government or food fortification programs.
- Minimum and maximum values depend on the quantity of the food sample that is being analyzed (small amounts provide larger variation than large amounts), as well as the use of composite or single samples (variation is too high in single samples that usually makes the application of minimum and maximum content values impractical). If the standard specifies a method for sampling and nutrient analysis, it should be followed. Otherwise, preparation of composite samples mixing equal amounts of single samples, and putting into solution a sufficient quantity of the fortified food sample (e.g., 50 grams for the case of fortified salt) should be applied.

Disaggregation

It is recommended that this indicator be disaggregated and reported by other characteristics such as

- origin (locally produced, imported);
- food vehicle type (e.g., palm oil, sunflower oil);
- supplier (producer, import/exporter, distributer, packer/repacker);
- retail outlet type (e.g., supermarket, wholesaler, retail shop); or
- market hub/geographic administrative area (depending on sample design)

Indicator 3.5: Proportion of food vehicle volume that is fortified above standard range (if applicable)

Definition

$$\frac{\text{Fortification volume confirmed to be fortified above the national standard range}}{\text{Total food vehicle volume}}$$

Calculation

First, sum the volumes of food vehicle brands that are fortified above the national standard range (i.e., the dummy variable for fortification quality indicator 2.5 is 1).

Then, divide by the respective total food vehicle volume.

Notes

- This indicator is repeated for each nutrient that was measured in the brands of a given food vehicle. For example, if maize flour is fortified with iron and vitamin A and the content of both nutrients was measured/deduced in maize flour brands, then two indicators are constructed: (1) the proportion of maize flour volume that is fortified with iron; and (2) the proportion of maize flour volume that is fortified with vitamin A.
- This indicator is repeated for each food vehicle of interest.
- This indicator is not calculated for nutrients that do not have a maximum limit defined in the national fortification standards in the country.
- The national standard should be obtained in reference to the fortification standards in the country. The analysts need to obtain this information from stakeholders in the government or food fortification programs.
- Minimum and maximum values depend on the quantity of the food sample that is being analyzed (small amounts provide larger variation than large amounts), as well as the use of composite or single samples (variation is too high in single samples that usually makes the application of minimum and maximum content values impractical). If the standard specifies a method for sampling and nutrient analysis, it should be followed. Otherwise, preparation of composite samples mixing equal amounts of single samples, and putting into solution a sufficient quantity of the fortified food sample (e.g., 50 grams for the case of fortified salt) should be applied.

Disaggregation

It is recommended that this indicator be disaggregated and reported by other characteristics such as

- origin (locally produced, imported);
- food vehicle type (e.g., palm oil, sunflower oil);
- supplier (producer, import/exporter, distributer, packer/repacker);
- retail outlet type (e.g., supermarket, wholesaler, retail shop); or
- market hub/ geographic administrative area (depending on sample design)

4 Assess the coverage of food vehicles, fortifiable food vehicles, and fortified food vehicles among households

Indicator 4.1: Proportion of households that consume a food vehicle

This indicator uses data generated by the food vehicle fortification coverage and potential food vehicle fortification coverage modules of the standard FACT household questionnaire (particularly questions FV1 and PFV1).

Definition

$$\frac{\text{Number of households that reported using a food vehicle or preparing foods with it at home, regardless of whether it is fortifiable or not}}{\text{Number of surveyed households}}$$

Calculation

- First, create a dummy variable for each household that takes the value
- 1 if the household reported consuming the food vehicle, or
- 0 otherwise.

Then, divide the number of households that consume the food vehicle by the number of surveyed households.

Notes

- This indicator is repeated for each food vehicle of interest.
- This indicator can be constructed for foods that are included in the country fortification program or foods that are not included in the program but have the potential to be fortified.

Indicator 4.2: Proportion of households that consume a fortifiable food vehicle

This indicator uses data generated by the food vehicle fortification coverage and potential food vehicle fortification coverage modules of the standard FACT household questionnaire (particularly questions FV1, FV3, FV1, and PFV3).

Definition

$$\frac{\text{Number of households that reported using a food vehicle that is fortifiable, regardless of whether it is fortified or not}}{\text{Number of surveyed households}}$$

Calculation

First, create a dummy variable for each household that takes the value

- 1 if the household reported consuming the fortifiable food vehicle, or
- 0 otherwise (if the household does not consume the food vehicle or consumes a nonfortifiable form of it).

Then, divide the number of households that consume the fortifiable food vehicle by the number of surveyed households.

Notes

- The basic definition of a fortifiable food vehicle is a food vehicle that is produced by large, centralized, and relatively well developed industries and is not processed at home. In some countries for the food vehicle to be considered fortifiable it must be produced by industries with a minimum specified amount of annual production and thus excludes local small (cottage type) industries. In those cases, the calculation of this indicator would need to account for that.
- This indicator is repeated for each food vehicle of interest.
- This indicator can be constructed for foods that are included in the country fortification program or foods that are not included in the program but have the potential to be fortified.

Indicator 4.3: Proportion of households that consume a fortified food vehicle

This indicator uses data generated by the food vehicle fortification coverage module of the standard FACT household questionnaire (particularly questions FV1, FV3, and FV5) as well as data generated by the laboratory analysis of collected food samples.

Definition

$$\frac{\text{Number of households consuming a food vehicle that is confirmed to be fortified (to any extent)}}{\text{Number of surveyed households}}$$

Calculation

First, create a dummy variable for each household that takes the value

- 1 if the food vehicle of interest consumed by the household is confirmed to be fortified based on positive results of the laboratory analyses, or
- 0 otherwise (if the household does not consume the food vehicle, consumes a nonfortifiable form of the food vehicle, or consumes a fortifiable form of the food vehicle that is confirmed to not be fortified by the laboratory analyses).

Then, divide the number of households that consume the fortified food vehicle by the number of surveyed households.

Notes

- This indicator is repeated for each food vehicle of interest.
- This indicator is constructed only for food vehicles that are included in the fortification program.
- If multiple nutrients are analyzed in a food vehicle and there are cases where food vehicles contain only one of the nutrients, the data analyst will need to decide which nutrient to use as the marker to determine whether the household consumes a fortified vehicle and clearly state it in the indicator name. For example, if maize flour is fortified with iron and vitamin A and the presence of added iron is used to construct the indicator, it should be named "the proportion of households that consume maize flour fortified with iron." Alternatively, two indicators can be constructed: (1) the proportion

of households that consume maize flour fortified with iron; and (2) the proportion of households that consume maize flour fortified with vitamin A.

How the results of laboratory analysis are used to assign a fortification status (fortified or not) to a household depends on the survey design—i.e., where the food samples were collected (household or market) and, in some cases, how they were analyzed (refer to section 5.1.2 in the *FACT Manual* for details). The following options apply:

Food samples are collected from households as part of the household assessment:

- Households are assigned a fortification status based on the result of the quantitative laboratory analysis of the composite sample of all food samples of a food vehicle collected in the community where the household was surveyed.
- Alternatively, if individual food samples from households are analyzed qualitatively via a spot test,[1] households are assigned a fortification status based on the qualitative laboratory analysis of the individual food sample provided by the household.
    - o If there are households that do not provide a food sample, then a fortification status cannot be assigned to these households. The data analyst will need to decide how to deal with the missing data based on the frequency of its occurrence.

Food samples are collected from markets as part of the market assessment:

- Households are assigned a fortification status based on the result of the quantitative laboratory analysis of the composite sample of the food vehicle brand reported to be consumed in the household. In this case, the following considerations apply:
    - o Households that report consuming open source/bulk products that are unbranded are linked to a fortification status of this class of products in the laboratory analysis (i.e., open source/bulk samples of a food vehicle that were collected and analyzed in the market assessment).
    - o If there are households that do not know or remember the name of the food vehicle brand they consume, then a fortification status cannot be assigned to these households. The data analyst will need to decide how to deal with the missing data based on the frequency of its occurrence. The following options can be considered:
    - o If the proportion of households with unknown brands is low (e.g., less than 5%), then households with unknown brands can be left as missing and the indicator is only estimated on the available data. If the sample is large enough, then the exclusion of these cases will not result in substantial loss of statistical power.
    - o If the proportion of households with unknown brands is high (e.g., greater than 5%), then
        - The data analyst may consider imputing substitute values to the missing responses; or
        - the indicator may instead be reported categorically with the following values:
        - 1 if the food vehicle brand reported to be consumed by the household is confirmed to be fortified based on the results of the laboratory analyses (i.e., the household is confirmed to consume a fortified food vehicle);
        - 2 if the food vehicle brand reported to be consumed by the household is confirmed to not be fortified based on the results of the laboratory analyses (i.e., the household is confirmed to not consume a fortified food vehicle);
        - 3 if the household consumes the fortifiable food vehicle and the brand reported to be consumed by the household is unknown (i.e., the household consumes a fortifiable food vehicle but it cannot be determined whether the household consumes a fortified food vehicle); or
        - 4 if the household does not consume the food vehicle or consumes a nonfortifiable form of the food vehicle (i.e., household does not consume a fortifiable food vehicle).

1 This method of laboratory analysis is recommended only if the budget permits and analytical spot tests for the nutrient of interest exist.

5 Estimate the consumption of fortifiable food vehicles among target populations

These indicators use data generated by the food vehicle fortification coverage, potential food vehicle fortification coverage, and individual consumption modules of the standard FACT household questionnaire (particularly questions FV1, FV3, FV6, FV8, PFV1, PFV3, PFV6, PFV8, IC1, IC2, and IC3).

This indicator is constructed using one of the following two methods depending on the food vehicle of interest:

1. Adult Male Equivalent (AME) method: This method, based on a household-level assessment, is used for food vehicles that are typically purchased in their raw forms and added in large or small quantities to foods prepared at home (e.g., salt, edible oil, and sugar). It does not account for consumption of the food vehicle outside the home given the difficulty of assessing amounts consumed of these food vehicles in prepared foods obtained outside the household.

2. Food Frequency Questionnaire (FFQ) method: This semi-quantitative method, based on an individual-level seven-day food frequency recall assessment, is used for food vehicles that are commonly consumed in prepared forms that may be made inside the home from the raw food vehicle or outside the home (e.g., wheat flour).

Indicator 5.1A: Median amount of fortifiable food consumed daily among target population groups estimated using the AME method

Definition

Median grams (or milliliters) of the fortifiable food vehicle consumed per day among the target population groups

Calculation

Step 1: Create an indicator that captures the quantity of the fortifiable food vehicle that was purchased by the household in grams (or milliliters, as applicable).

If the household reported purchasing the food vehicle in a unit other than grams or milliliters, then convert it from the specified unit to grams or milliliters.

This indicator is 0 if the household does not consume the food vehicle or if the household consumes the food vehicle in its nonfortifiable form.

Step 2: Create an indicator that captures how long the quantity of the food vehicle purchased typically lasts in days

If the household reported the duration the quantity purchased of a food vehicle lasts in a unit other than days, then convert it from the specified unit to days.

Step 3: Calculate the household daily consumption of the fortifiable food vehicle (in g/day or ml/day).

This is calculated by dividing the quantity purchased in grams (or milliliters) by the duration it lasted in days (i.e., step 1 divided by step 2). This is expressed in grams (or milliliters) per day.

This indicator is 0 if the household does not consume the food vehicle or if the household consumes the food vehicle in its nonfortifiable form.

Step 4: Define the AME value for all household members.

Define the AME value for every member of the household, which depends on the age and sex of the individual. The table below lists the AME values assigned to individuals based on their age and sex.[2]

ADULT MALE EQUIVALENT		
MALE	AGE (y)	FEMALE
0.216721311	0-1	0.216721311
0.311475410	1-2	0.278688525
0.368852459	2-3	0.344262295
0.409836066	3-4	0.377049180
0.442622951	4-5	0.409836066
0.483606557	5-6	0.434426230
0.516393443	6-7	0.467213115
0.557377049	7-8	0.508196721
0.598360656	8-9	0.557377049
0.647540984	9-10	0.606557377
0.704918033	10-11	0.655737705
0.770491803	11-12	0.704918033
0.836065574	12-13	0.745901639
0.909836066	13-14	0.778688525
0.983606557	14-15	0.803278689
1.040983607	15-16	0.819672131
1.090163934	16-17	0.819672131
1.114754098	17-18	0.819672131
1	18-30	0.786885246
0.967213115	30-60	0.770491803
0.803278689	60-150	0.688524590

Step 5: For each household, calculate the sum of the AME values of all household members.

Step 6: Calculate the AME fraction of the different target population groups.

The AME fraction for the different target population groups is calculated by dividing the AME value of an individual in the population group (determined in step 4) by the sum of the AME values of all members of the household this individual belongs to (determined in step 5). For example, if children 6–59 months of age are a target population group, then for each selected child in a household calculate the AME fraction for that child by dividing the child's AME value by the sum of the AME values of all members of that child's household.

Step 7: Calculate the daily fortifiable food consumption of the individuals in the target population.

This is calculated by multiplying the individual AME fraction of the different target population groups (determined in step 6) by the household daily apparent consumption (determined in step 3). This is expressed in grams or milliliters per day.

2 Sununtnasuk, C. (2013) "Household Consumption and Expenditure Surveys: A Tool for Estimating Food and Nutrient Intake," presentation made at Smarter Futures Cost and Economic Benefit Training Workshop, December 10–14, Dar es Salaam, Tanzania. www.spring-nutrition.org/sites/default/files/spring_presentation_hces_tool_sununtnasuk.pdf

Step 8: Calculate the median amount of the fortifiable food vehicle consumed daily among the target population.

Finally, calculate the median amount of the fortifiable food consumed daily among all the individuals in the target population who were surveyed.

Notes

- This indicator uses a household assessment based on the reported quantity of a food vehicle last obtained and the duration it typically lasts in each household.
- This indicator should be repeated for each target population group and food vehicle of interest. For instance, if the target population of the survey is children 6–59 months of age and women of reproductive age (WRA) (15–49 years) and the food vehicles are salt and oil, then there would be four consumption indicators: (1) median grams of fortifiable salt consumed per day by children 6–59 months of age; (2) median milliliters of fortifiable oil consumed per day by children 6–59 months of age; (3) median grams of fortifiable salt consumed per day by WRA; and (4) median milliliters of fortifiable oil consumed per day by WRA.
- This indicator can be constructed for foods that are included in the country fortification program or for foods that are not included in the program but have the potential to be fortified.

Disaggregation

If this indicator is calculated for children 6–59 months of age, it can be further disaggregated by children's age groups if the sample size allows. Children should be grouped by ages that have similar recommended feeding practices—e.g., 6–8 months, 9–11 months, 12–23 months, and 24–59 months.

Indicator 5.1B: Median amount of fortifiable food consumed daily among target population groups estimated using the FFQ method

Definition

Median grams (or milliliters) of the fortifiable food vehicle consumed per day among the target population groups

Calculation

Step 1: For each food item in the food frequency recall module, convert the reported portion size typically consumed by the individual into grams.

When developing this module, gather recipes for each of the listed food items and determine the amount in grams of the food vehicle used to produce one portion of each food item. For example, one slice of bread contains 25 grams of wheat flour. Then, determine the amount of wheat flour contained in each portion size of bread listed on the photograph grid. If one slice of bread is found to contain 25 grams of wheat flour, then half a slice contains 12.5 grams, two slices contains 50 grams, three slices contains 75 grams, and so on. Refer to the "FACT Household Questionnaire Customization Guidelines" for instructions on how to develop recipe data for each food item.

Step 2: For each food item in the food frequency recall module, calculate the amount in grams of the food vehicle consumed by the individual for that food item over the seven-day recall period.

This is calculated by multiplying the frequency at which the food item was consumed in the preceding week (i.e., the number of times it was consumed in the preceding seven days) by the typical portion size in grams (determined from step 1).

Step 3: For each food item in the food frequency recall module, calculate the daily amount in grams of the food vehicle consumed by the individual for that food item.

This is calculated by dividing the weekly grams consumed for each food item (determined from step 2) by seven.

Assign 0 to each food item that the individual does not report consuming in the preceding seven days.

Step 4: Calculate the individual's total consumption per day of the food vehicle from all food items (in grams per day).

This is calculated by summing the daily amounts of the food vehicle consumed for each food item (determined from step 3).

Step 5: Calculate the median amount of fortifiable food consumed daily among the target population.

Finally, calculate the median amount of fortifiable food consumed daily among all the individuals in the target population who were surveyed.

Notes

- This indicator uses an individual assessment based on a seven-day food frequency recall of prepared food items that are made with the fortifiable food vehicle and commonly consumed in the regions where the household assessment is implemented.
- This indicator should be repeated for each target population group and food vehicle of interest.
- This indicator can be constructed for foods that are included in the country fortification program or for foods that are not included in the program but have the potential to be fortified.

Disaggregation

If calculating this indicator for children 6–59 months of age, it can be further disaggregated by children's age groups if the sample size allows. Children should be grouped by ages that have similar recommended feeding practices—e.g., 6–8 months, 9–11 months, 12–23 months, and 24–59 months.

6 Estimate the contribution of fortified food vehicles to the intake of select nutrients in the diets of target populations

These indicators use data generated by the food vehicle fortification coverage and individual consumption modules of the standard FACT household questionnaire (particularly questions FV1, FV3, FV6, FV8, IC1, IC2, and IC3) as well as data generated by the laboratory analysis of collected food samples.

Indicator 6.1: Actual median percentage of daily estimated average requirement (EAR) for a nutrient met from consumption of a fortified food vehicle among target population groups

This indicator estimates the actual contribution from fortified foods based on current consumption patterns and measured fortification contents from food samples collected in the survey.

The **estimated average requirement (EAR)** for a nutrient is defined as "the average daily intake that is estimated to meet the requirements of half of the healthy individuals in a particular life stage and gender subgroup."[3]

Note that this indicator is constructed using other indicators that have already been defined in this document:

Before this indicator can be constructed, the following indicators must be built for each food vehicle and nutrient: (1) the amount of fortifiable food consumed daily among target population groups (indicator 5.1), and (2) a fortification content based on the measured nutrient content of the food vehicle by community or brand (from the laboratory analyses).

How the results of laboratory analysis are used to assign fortification content to a household depends on the survey design—i.e., where the food samples were collected (household or market) (refer to section 5.1 in the *FACT Manual* for details). The following options apply:

Food samples were collected from households that are part of the household assessment:

- Households are assigned a fortification content based on the result of the quantitative laboratory analysis of the composite sample of all food samples of that food vehicle collected in the community where the household was surveyed.

Food samples were collected from markets that are part of the market assessment:

- Where consumption (indicator 5.1) is assessed by AME, households are assigned a fortification content based on the result of the quantitative laboratory analysis of the composite sample of the food vehicle brand reported to be consumed in the household.

3 World Health Organization and Food and Agriculture Organization (2006). *Guidelines on food fortification with micronutrients*. Retrieved from www.who.int/nutrition/publications/guide_food_fortification_micronutrients.pdf

  - o If there are households that do not know or remember the name of the food vehicle brand they consume, then the data analyst will need to decide how to assign a fortification content using other criteria (e.g., mean content of brands available in a certain geographic area) or an imputation method.

- Where consumption (indicator 5.1) is assessed by FFQ, the data analyst will need to decide how to assign a fortification content using other criteria (e.g., mean content of brands available in a certain geographic area) or an imputation method. (This is because the FFQ method accounts for intake of the food vehicle from all sources, not just in the home, as with the AME.)

Definition

$$\text{Median}\left(\frac{\text{Target individual's daily nutrient intake from consumption of fortified food vehicles}}{\text{Target individual's daily nutrient EAR}} \times 100\right)$$

Calculation

Step 1: Convert the amount of fortifiable food consumed daily among individuals in the target population to kg/day (or other unit as appropriate).

The amount of fortifiable food consumed daily among the target population determined in indicator 5.1 will be defined in grams/day or milliliters/day (depending on the food vehicle). This will need to be converted into kg/day (or other unit as appropriate). Note that the unit of the nutrient intake (defined in step 2 below as the amount of food vehicle consumed multiplied by the assigned fortification content) needs to match the unit the nutrient EAR is defined in.

Step 2: Calculate the daily nutrient intake from the amount of fortifiable food vehicle consumed daily among individuals in the target population.

Multiply the amount of fortifiable food vehicle consumed daily (determined in step 1) by the assigned fortification content of the food vehicle.

This indicator is 0 if an individual in the target population is a member of a household that does not consume the food vehicle or the fortifiable food vehicle.

If multiple foods in the fortification program are fortified with the same nutrient, repeat this step for each food vehicle that is fortified with that particular nutrient, and sum the resulting nutrient intakes from each food vehicle to get the total nutrient intake from all fortified food vehicles before continuing to step 3.

Step 3: Define the daily nutrient EAR for the individuals in the target population.

Define the EAR of the select nutrient for the individuals in the target population based on their age, gender, and, if female, physiological status (i.e., pregnant or lactating). These requirements are set out by the United States Institute of Medicine[4] or the World Health Organization and the Food and Agriculture Organization of the United Nations.[5]

Step 4: Calculate the percentage of EAR.

Divide the individual's daily nutrient intake from the consumption of fortified food vehicles (determined in step 2) by the daily nutrient-specific EAR for the individual (determined in step 3). Multiply this value by 100 to convert it to a percentage.

4 Food and Nutrition Board, Institute of Medicine (2001) *Dietary Reference Intakes for vitamin A, vitamin K, arsenic, boron, chromium, copper, iodine, iron, manganese, molybdenum, nickel, silicon, vanadium, and zinc.* Washington DC: National Academies Press.

5 World Health Organization and Food and Agriculture Organization of the United Nations (2004). *Vitamin and mineral requirements in human nutrition,* 2nd ed. Geneva: World Health Organization. Retrieved from: http://www.who.int/nutrition/publications/micronutrients/9241546123/en/

Step 5: Calculate the median across the target population.

Take the median of the percentage of EAR (determined in step 4) across all individuals in the target population.

Notes

- This indicator is repeated for each target population group and nutrient.
- Where the requirements of some nutrients are not normally distributed, as is the case with iron among children and women of reproductive age, the data analyst may choose to present this indicator as percentage of the recommended nutrient intake (RNI) or recommended dietary allowance (RDA).
- The base population in that case is all children aged 6–59 months. Furthermore, depending on the nutrient being assessed, this indicator might also not be applicable to children aged 6–11 months as the EAR for some nutrients is not defined for that subpopulation. The base population in that case is all children aged 12–59 months.
- This indicator is constructed only for foods that are included in the country fortification program.

Disaggregation

If this indicator is being calculated for children 6–59 months of age, it should be further disaggregated by children's age groups if the sample size allows. The age groups are defined according to feeding practices: 6–8 months, 9–11 months, 12–23 months, and 24–59 months. The former two groups will not be relevant if the nutrient EAR is not defined for these subpopulations.

Indicator 6.2: Modeled median percentage of daily EAR for a nutrient met from consumption of a fortified food vehicle among target population groups

This indicator is equivalent to indicator 6.1 with the exception that it is calculated using the target fortification content according to the national standard for each food vehicle. Thus, it estimates what the potential contribution from fortified foods would be if all fortifiable foods are fortified according to standard based on current consumption patterns.

Definition

$$\text{Median}\left(\frac{\text{Target individual's daily nutrient intake from the modeled consumption of food vehicles that are fortified at the target national standard}}{\text{Target individual's daily EAR for that select nutrient}} \times 100\right)$$

Calculation

This indicator is constructed in exactly the same way as indicator 6.1 with the exception of step 2. In step 2, instead of assigning the individual the fortification content from the laboratory analysis that was assigned to the individual's household, all individuals are assigned the target fortification content according to the national standard. Therefore, step 2 is as follows:

Step 2: Calculate the individual's modeled intake of the nutrient from the consumption of food vehicles that are fortified according to national standards.

Multiply the individual's amount of fortifiable food vehicle consumed daily (determined in step 1) by the target fortification content according to the national standard.

This indicator is 0 if the target population groups are members of households that do not consume the food vehicle or the fortifiable food vehicle.

Notes

- This indicator is repeated for each target population group and nutrient.
- Where the requirements of some nutrients are not normally distributed, as is the case with iron among children and women of reproductive age, the data analyst may choose to present this indicator as a percentage of the RNI or RDA instead of EAR.
- The base population in that case is all children aged 6–59 months. Furthermore, depending on the nutrient being assessed, this indicator might not be applicable to children aged 6–11 months as the EAR for some nutrients is not defined for that subpopulation. The base population in that case is all children aged 12–59 months.
- The national standard should be obtained in reference to the fortification standards in the country. The analysts need to obtain this information from stakeholders in the government or food fortification program.
- This indicator can be constructed for foods that are included in the country fortification program or foods that have the potential to be fortified (using a hypothetical target national standard).

Disaggregation

If this indicator is being calculated for children 6–59 months of age, it should be further disaggregated by children's age groups if the sample size allows. The age groups are defined according to feeding practices: 6–8 months, 9–11 months, 12–23 months, and 24–59 months. The former two groups will not be relevant if the nutrient EAR is not defined for these subpopulations.

7 Assess awareness of food fortification among households

These indicators use data generated by the fortification knowledge module of the standard FACT household questionnaire (particularly questions FK1, FK2, and FK3).

Note that not all the below indicators are constructed for a FACT survey. The indicators need to be chosen based on how this module is asked in the questionnaire. See the standard FACT household questionnaire for two ways to ask this module and accordingly construct indicators 7.1 to 7.3 or indicators 7.4 to 7.6.

Indicator 7.1: Proportion of households that have heard about fortified foods

Definition

$$\frac{\text{Number of households that report having heard of fortified foods}}{\text{Number of surveyed households}}$$

Calculation

First, create a dummy variable for each household that takes the value

- 1 if the household reported having heard of fortified foods, or
- 0 otherwise.

Then, divide the number of households that have heard of fortified foods by the number of surveyed households.

Indicator 7.2: Proportion of households that report hearing about fortified foods by information source

Definition

$$\frac{\text{Number of households that report having heard of fortified foods by a given information source}}{\text{Number of surveyed households that reported hearing of fortified foods}}$$

Calculation

For every information source, create a dummy variable for each household that reported hearing of fortified foods that takes the value

- 1 if the household reported hearing of fortified foods through that information source, or
- 0 otherwise.

Then, divide the number of households that have heard of fortified foods through that information source by the number of surveyed households that reported hearing of fortified foods.

Repeat this indicator for each information source.

Indicator 7.3: Proportion of households that are aware of the benefits of fortified foods

Definition

$$\frac{\text{Number of households that correctly report at least one of the benefits of food fortification}}{\text{Number of surveyed households}}$$

Calculation

First, create a dummy variable for each household that takes the value

- 1 if the household correctly reported at least one of the benefits of food fortification (i.e., fortified/enriched/added micronutrients, good for health, better quality, or food is good for growth and development of children), or
- 0 otherwise.

Then, divide the number of households that are aware of the benefits of fortified foods by the number of surveyed households.

Notes

- The analyst may choose to also construct this indicator as a proportion of the subpopulation of households that have heard of fortified foods, in which case the denominator is the number of surveyed households that reported hearing of fortified foods. This information might shed light on the effectiveness of the fortification program's behavioral communication strategy.

Indicator 7.4: Proportion of households that have ever seen the fortification logo

Definition

$$\frac{\text{Number of households that report having seen the fortification logo}}{\text{Number of surveyed households}}$$

Calculation

First, create a dummy variable for each household that takes the value

- 1 if the household reported having ever seen the fortification logo, or
- 0 otherwise.

Then, divide the number of households that have seen the logo by the number of surveyed households.

Indicator 7.5: Proportion of households that report positive attributes of the logo

Definition

$$\frac{\text{Number of households that report at least one positive attribute of the fortification logo}}{\text{Number of surveyed households}}$$

Calculation

First, create a dummy variable for each household that takes the value

- 1 if the household reported at least one positive attribute of the fortification logo (i.e., fortified/enriched/added micronutrients, good for health, better quality, or food is good for growth and development of children), or
- 0 otherwise.

Then, divide the number of households that reported positive attributes of the logo by the number of surveyed households.

Notes

- The analyst may choose to also construct this indicator as a proportion of the subpopulation of households that have seen the fortification logo, in which case the denominator is the number of surveyed households that have seen the fortification logo. This information might shed light on the effectiveness of the fortification program's behavioral communication strategy.

Indicator 7.6: Proportion of households that report that the fortification logo influences their decision to buy the food

Definition

$$\frac{\text{Number of households that report that the logo influences their decision to buy}}{\text{Number of surveyed households}}$$

Calculation

First, create a dummy variable for each household that takes the value

- 1 if the household reported that the logo influences their decision to buy the food, or
- 0 otherwise.

Then, divide the number of households that reported that the logo influences their decision to buy by the number of surveyed households.

Notes

- The analyst may choose to also construct this indicator as a proportion of the subpopulation of households that have seen the fortification logo, in which case the denominator is the number of surveyed households that have seen the fortification logo. This information might shed light on the effectiveness of the fortification program's behavioral communication strategy.

8 Identify vulnerable population subgroups using risk factors associated with poor nutrient intakes, and assess the relationship between these groups and the coverage and contribution of fortified foods

The purpose of this objective is to estimate indicators of risk that are associated with poor micronutrient intakes and determine their association with the coverage and contribution of fortified food vehicles.

Note that in this section we present the indicators of risk in their final form—i.e., as proportions of households or individuals who are at risk. It is not these indicators, however, that will be used to disaggregate the indicators from objectives 3, 4, and 5. Rather, all these indicators are built on dummy variables that take the value 1 if the household/individual is at risk and 0 if not. These dummy variables will be used as the disaggregating variables.

These indicators use data generated by the following modules of the standard FACT household questionnaire: household roster, household characteristics and assets, water, sanitation and hygiene, short birth history, household hunger scale, child feeding practices, dietary diversity, and health and nutrition.

Indicator 8.1: Proportion of households that live in a rural area

Definition

$$\frac{\text{Number of households that live in a rural area}}{\text{Number of surveyed households}}$$

Calculation

First, create a dummy variable for each household that takes the value

- 1 if the household lives a rural area, or
- 0 otherwise.

Then, divide the number of households that live in a rural area by the number of surveyed households.

Indicator 8.2: Proportion of households that are at risk of acute poverty

This indicator is defined according to the Multidimensional Poverty Index (MPI), an international measure of acute poverty. The MPI "captures the severe deprivations that each person simultaneously faces with respect to education, health and living standards."[6]

Definition

$$\frac{\text{Number of households that have a MPI score} \geq 0.33}{\text{Number of surveyed households}}$$

Calculation

The MPI is multidimensional in the sense that it is a weighted sum of indicators of health, education, and living standards. Equal weighting is given to indicators within dimensions and to dimensions within the MPI (see Table 2: Dimensions, indicators, and weights of the MPI).

Table 2: Dimensions, indicators, and weights of the MPI

Dimensions	Indicators	Weights
Education	Years of schooling	1/6
	Child school attendance	1/6
Health	Child mortality	1/6
	Nutrition	1/6
Living standards	Electricity	1/18
	Sanitation	1/18
	Drinking water	1/18
	Flooring	1/18
	Cooking fuel	1/18
	Asset ownership	1/18

Source: The dimensions, indicators, and weights are as defined in S. Alkire, A. Conconi, G. Robles, and S. Seth. (2015) *Multidimensional Poverty Index – Winter 2014/2015: Brief Methodological Note and Results.* Oxford Poverty and Human Development Initiative (OPHI), University of Oxford.

Each dimension has a defined set of indicators, and for each indicator there is a deprivation condition and weight. If a household is deprived in a third or more of the 10 (weighted) indicators, the MPI identifies the household as being at risk of poverty.

While the dimensions, indicators, and weights are fixed for all countries, the conditions of deprivation may vary from one country to another. In order to construct this indicator, the data analyst must know the specific conditions of deprivation in the country of study. These can be obtained from the OPHI website. Once the specific deprivation conditions are known, then the analyst can proceed in the indicator construction in the following way:

Step 1: Create a variable for each of the 10 indicators of poverty in Table 2: Dimensions, indicators, and weights of the MPI that captures whether the household meets the deprivation condition of that indicator or not.

For each indicator of poverty, create a dummy variable for each household that takes the value

- 1 if the household is deprived for this indicator, or
- 0 otherwise.

Step 2: Calculate the MPI score for each dimension (education, health, and living standards) separately.

For each dimension, the score is calculated by weighting each dummy created in step 1 by its specified weight in Table 2: Dimensions, indicators, and weights of the MPI and then summing up the weighted score along each dimension. For example, the household MPI health dimension score is calculated by first multiplying the dummy that was created for the child mortality indicator in step 1 by 1/6, multiplying the dummy that was created for the nutrition indicator in step 1 by 1/6, and then summing these two values.

6 Oxford Poverty and Human Development Initiative, Global Multidimensional Poverty Index, http://ophi.org.uk/multidimensional-poverty-index/.

Each dimension score should be equal to or less than 1/3.

Step 3: Calculate the household total MPI score.

This is calculated by summing up the score of all three dimensions. The household total MPI score should be equal to or less than 1.

Step 4: Determine whether the household is multidimensionally poor.

Create a dummy variable for each household that takes the value

- 1 if the household has an MPI score ≥ 1/3, or
- 0 otherwise.

Step 5: Estimate the proportion of households that are multidimensionally poor.

Divide the number of households that are multidimensionally poor by the number of surveyed households.

Indicator 8.3: Proportion of households that have low socioeconomic status

This indicator is defined according to the Demographic and Health Survey (DHS) wealth index, which is a composite measure of a household's cumulative living standards and is constructed using principal component analysis. The index is calculated using data on a household's ownership of selected assets, materials used for housing construction, and types of water access and sanitation facilities.

Definition

$$\frac{\text{Number of households that have a DHS wealth index in the bottom two quintiles}}{\text{Number of surveyed households}}$$

Calculation

Step 1: Calculate the DHS wealth score for each household.

This indicator is calculated using the DHS wealth index methodology. All information necessary to build the DHS wealth index can be found on the DHS website, which has detailed country-specific instructions and syntax on how to construct this index.

Step 2: Divide households into wealth quintiles based on their wealth score.

Step 3: Determine whether the household has low socioeconomic status.

Create a dummy variable for each household that takes the value

- 1 if the household is in the bottom two wealth quintiles, or
- 0 otherwise.

Step 4: Estimate the proportion of households that have low socioeconomic status.

Divide the number of households that are in the bottom two wealth quintiles by the number of surveyed households.

Notes

- While this indicator suggests creating a dummy out of the DHS wealth index for ease of use, it is also recommended that the analyst tabulate and present the wealth quintiles to see how they are spread across the survey's geographical units.

Indicator 8.4: Proportion of households that have women of reproductive age with low dietary diversity

This is defined according to the minimum dietary diversity for women of reproductive age (MDD-W), a food group diversity indicator that reflects micronutrient inadequacy.[7] A household is classified as having low dietary diversity if the selected woman of reproductive age (15–49 years old) (WRA) did not meet the MDD-W, meaning she consumed foods from fewer than 5 out of 10 defined food groups the previous day or night.

Definition

$$\frac{\text{Number of households that have a WRA who consumed food items from fewer than 5 out of 10 defined food groups the previous day or night}}{\text{Number of surveyed households}}$$

Calculation

The 10 defined food groups that are used for the construction of this indicator are

- grains, white roots and tubers, and plantains;
- pulses (beans, peas, and lentils);
- nuts and seeds;
- dairy;
- meat, poultry, and fish;
- eggs;
- dark green leafy vegetables;
- other vitamin A–rich fruits and vegetables;
- other vegetables; and
- other fruits.

Step 1: For each of the 10 food groups, create an indicator that captures whether the WRA has consumed foods from that food group in the past 24 hours.

For each food group, create a dummy variable for each WRA that takes the value

- 1 if the WRA consumed foods from that food group in the past 24 hours, or
- 0 otherwise.

Step 2: Calculate the dietary diversity score of the WRA.

This is calculated by summing up the 10 food group dummy variables (created in step 1).

Step 3: Determine whether the WRA does not meet the MDD-W.

Create a dummy variable for each WRA that takes the value

- 1 if the WRA's dietary diversity score (as determined by step 2) is <5, or
- 0 otherwise.

Step 4: Estimate the proportion of households with a WRA who does not meet the MDD-W.

Divide the number of WRA who do not meet the MDD-W by the number of surveyed households.

7 Food and Agriculture Organization and FHI 360 (2016) *Minimum Dietary Diversity for Women: A Guide for Measurement*. Rome: FAO. www.fao.org/3/a-i5486e.pdf

Notes

- As shown, this indicator assumes that the main population group sampled is WRA and is measured at the level of the household, including all surveyed households.
- If the main population group sampled is not WRA, then this indicator is measured at the level of the household excluding households that do not contain a WRA. Households may not contain a WRA if there are two target populations in the survey (e.g., children 6–59 months of age and WRA), the main population group sampled is children 6–59 months of age, and the respondent who provides the information about the children is their caregiver (who is most often a WRA but not always). Because not all households will necessarily contain a WRA, when disaggregating the results on the coverage and contribution of fortified foods by this risk factor, households that do not contain a WRA are excluded from the analyses. In that case, the calculation is done as shown above except that in step 4 the number of WRA who do not meet the MDD-W is divided by the number of surveyed households that contain a WRA. (Note: This is currently the most common design in FACT surveys to avoid complex sampling designs.)

Indicator 8.5: Proportion of households that are food insecure

This indicator is defined according to the Household Hunger Scale (HHS). The HHS is an indicator that captures household reactions to the experience of food deprivation or insecurity in a score on a scale from 0 to 6.[8] A household is classified as food insecure if it has moderate or severe household hunger according to the HHS (i.e., its HHS is greater than 1).

Definition

$$\frac{\text{Number of households that have a Household Hunger Scale (HHS) >1}}{\text{Number of surveyed households}}$$

Calculation

Step 1: Recode the answers to each of the HHS occurrence questions into a categorical score.

The standard FACT household questionnaire includes three HHS occurrence questions:

- How many times in the last month was there ever no food to eat of any kind in your house because of lack of resources to get food?
- How many times in the last month did you or any household member go to sleep at night hungry because there was not enough food?
- How many times in the last month did you or any household member go a whole day and night without eating anything at all because there was not enough food?

For each of the three questions, create a categorical variable that recodes the answers to the question into the following values:

- 0 if the household has not experienced hunger,
- 1 if the household has experienced hunger for less than ten days a month, or
- 2 if the household has experienced hunger for ten days or more days in a month.

Step 2: Calculate the HHS for each household.

Sum the scores of all the occurrence questions that were calculated in step 1.

8 The HHS module and scoring were adapated from T. Ballard, J. Coates, A. Swindale, and M. Deitchler, (2011) *Household Hunger Scale: Indicator Definition and Measurement Guide*. Washington, DC: Food and Nutrition Technical Assistance II Project, Family Health International 360; and M. Deitchler, T. Ballard, A. Swindale, and J. Coates, (2010) *Validation of a Measure of Household Hunger for Cross-Cultural Use*. Washington, DC: Food and Nutrition Technical Assistance II Project (FANTA-2), FHI 360.

Step 3: Determine whether the household has moderate or severe hunger.

Create a dummy variable for each household that takes the value

- 1 if the household's HHS > 1, or
- 0 otherwise.

Step 4: Estimate the proportion of households that are food insecure.

Divide the number of households with HHS >1 by the number of surveyed households.

Indicator 8.6: Proportion of households that have infants and young children with poor feeding practices

This indicator is defined according to different infant and young child feeding (IYCF) indicators. It defines good infant and young child feeding as exclusive breastfeeding in children less than 6 months and as age-appropriate feeding practices (defined in terms of continued breastfeeding, dietary diversity, and meal frequency) in children 6–59 months of age.[9] A household is classified as having poor IYCF practices if the selected child within the household has an IYCF score equal to 0.

Definition

$$\frac{\text{Number of households that have a child whose IYCF score = 0}}{\text{Number of surveyed households}}$$

Calculation

Step 1: Calculate the IYCF score for the sampled child in each household.

The IYCF score is an age-specific score that is calculated differently for children less than 6 months old and children aged 6–59 months.

For children younger than 6 months: The IYCF score is determined by the child's breastfeeding status. The IYCF score takes the value 1 if the child is exclusively breastfed and 0 if the child is not exclusively breastfed. In the FACT standard household questionnaire, a child is defined as exclusively breastfed if the child is currently breastfed and she/he does not receive any other foods or drinks including water.

For children aged 6–59 months: The IYCF score is determined by the Infant and Child Feeding Index (ICFI), which is an age-specific score on a scale from 0 to 6, calculated as the sum of the age-specific breastfeeding score (BFS), the age-specific dietary diversity score (DDS), and the age-specific meal frequency score (MFS). The IYCF score is constructed as follows:

1. Calculate the ICFI:

First, calculate the three subscores (BFS, DDS, and MFS) based on the age group of the child as in Table 3, then sum them.

- The BFS values correspond to whether a child is currently breastfed or not. For example, if the child is aged 12–23 months and is currently breasted, then the BFS for that child is equal to 1. If the child is aged 9–11 months and is not currently breastfed, then the BFS for that child is 0.
- The DDS values correspond to the value of the child's dietary diversity score (CDDS), which is a score on a scale from 0 to 7, calculated from the child's reported consumption of food items during the previous 24 hours. For example, if a child is aged 13 months and has a CDDS of 2, then the DDS for that child is equal to 1.
    - o The seven defined food groups used for the construction of the CDDS are
        - milk or milk products;

9 E. Guevarra, K. Siling, F. Chiwile, M. Mutung., J. Senesie, W. Beckley, H. Hassane, et al., "IYCF Assessment with Small-Sample Surveys: A Proposal for a Simplified and Structured Approach," *Field Exchange* 47 (2014), www.ennonline.net/fex/47/iycf.

- grains, roots, or tubers;
- vitamin A–rich fruits and vegetables or dark green leafy vegetables;
- other fruits and vegetables;
- pulses, nuts, and seeds;
- meat, poultry, and fish; and
- eggs.

o For each of these seven food groups, create an indicator that captures whether the child has consumed foods from that food group in the past 24 hours.

o Then, calculate the CDDS by summing up the seven food group indicators calculated in the previous step.

- The MFS values correspond to the number of times in the last 24 hours the child was fed any type of food (mashed, pureed, solid, or semi-solid food) as a meal or snack. For example, if a child aged 40 months ate three times in the last 24 hours, then the MFS for that child is equals 2, while if a child aged 10 months had food twice in the last 24 hours, then the MFS for that child equals 1.

Table 3: Subscores of the Infant and Child Feeding Index

Sub-scores of the ICFI score	6–8 months		9–11 months		12–23 months		24–59 months	
	Value	Score	Value	Score	Value	Score	Value	Score
BFS (determined by whether child is currently breastfed or not)	Yes	+2	Yes	+2	Yes	+1	Yes	0
	No	0	No	0	No	0	No	0
DDS (determined by the child's dietary diversity score [CDDS])	0	0	0	0	0	0	0	0
	1	+1	1 or 2	+1	2 or 3	+1	3 or 4	+2
	≥2	+2	≥3	+2	≥4	+2	≥5	+3
MFS (determined by the number of times child was fed in the last 24 hours)	0	0	0	0	0	0	0	0
	1	+1	1 or 2	+1	2	+1	2	+1
	≥2	+2	≥3	+2	3	+2	3	+2
					≥4	+3	≥4	+3

2. Calculate the IYCF score:

For all households whose sampled child is aged 6–59 months, create an IYCF indicator score that takes the value 1 if the child has an ICFI score of 6 and 0 otherwise (i.e., the child's ICFI score < 6).

Step 2: Determine whether the household has poor IYCF practices.

Create a dummy variable for each household that takes the value

- 1 if the sampled child from that household has an IYCF score = 0, or
- 0 otherwise.

Step 3: Estimate the proportion of households that have infants and young children with poor feeding practices.

Divide the number of households that have a child with an IYCF score = 0 by the number of surveyed households.