Global Fortification Data Exchange (GFDx)

Indicator Definitions and Data Inclusion Criteria

16 MARCH 2020

This document describes the full suite of indicators that are currently in the GFDx. For each indicator, a definition, data inclusion criteria, any proxy indicators, and any data caveats are described in detail.

# Country List

The GFDx includes 196 states in its database, criteria being: full members of the United Nations[[1]](#footnote-1) (UN, n=193), permanent UN observer states[[2]](#footnote-2) (n=2, Vatican City and State of Palestine), and states recognized by at least 50% of other UN full member states (n=1, Republic of Kosovo). Territories are not included in the GFDx given complications with disaggregating data from their administrative parent countries. Country names and their spelling are taken from the UN member states listings.

States are classified into geographic regions based on the United Nations[[3]](#footnote-3) and income groups based on the World Bank[[4]](#footnote-4).

The table below indicates the relevant fields which will be collected in the GFDx database. For all of these fields which are food-specific, \_m is added at the end of the field name for maize flour, \_o for oil, \_r for rice, \_s for salt and \_w for wheat flour.

| **Instrument Name** | **Field Name** | **Update Frequency** | **Data Values** | **Details** |
| --- | --- | --- | --- | --- |
| country | country\_code | Static | Number | Country Codes |
| country | country\_name | Static | Text | Country names |
| country | country\_territory | Static | 1 – COUNTRY  2 - TERRITORY | This will be our designation of whether a location is classified as a COUNTRY or as a TERRITORY |
| country | un\_region | Static | 1 - Africa  2 - Americas  3 - Asia  4 - Europe  5 - Oceania | United Nations region |
| maize flour  oil  rice  salt  wheat flour | wb\_income\_status | Annual | 1 - Low income  2 - Lower middle income  3 - Upper middle income  4 - High income | World Bank income status |
| maize flour  oil  rice  salt  wheat flour | wb\_income\_status\_source | Annual | Text | Source of the World Bank income status |
| maize flour  oil  rice  salt  wheat flour | population | Annual | Number | The population of the country as per the United Nations |
| maize flour  oil  rice  salt  wheat flour | population\_source | Annual | Text | Source of the population data per the United Nations |

# Food Vehicles

The GFDx will include five food and condiment vehicles for fortification: maize flour, oil, rice, salt, and wheat flour. While we recognize that other foods are often fortified, such as sugar, dairy products, and other condiments (e.g. fish and soy sauces and bouillon cubes), complementary foods for children over 6 months of age, and others, the GFDx will not include these for the Version 2 launch. Discussions are ongoing to include some or all of these foods within a later version.

# GFDx Indicator Listing

The indicators included within the GFDx are listed below to provide an overview. While every attempt will be made to identify and search for the relevant documentation, we recognize that there may be occasionally erroneous information presented. Countries are always encouraged to reach out the GFDx to provide an update to their data and information.

The GFDx will strive to verify and include all original or primary source information, such as actual legal documents or primary survey data, rather than other published documentation that indicates existence of these primary sources. For all sources, the author, title, country and publication date of the source will be indicated, in English and the original language, unless written in non-Roman script.

Note that all indicators below are given a reference number that corresponds to the numbering within this document. The reference numbers starting with “P” are denoted as proxy indicators, or indirect measures of the direct indicator. These are used in recognition that the direct measures (indicators without “P”) may not always be available. In all cases, the GFDx will strive to include the direct indicators where possible.

| Ref # | Indicator Name | GFDx Version | Category |
| --- | --- | --- | --- |
| 1 | [Mandatory Fortification](#_Mandatory_Fortification) | 1 | [Legislation and Standards](#_Indicators_Related_to_3) |
| 2 | [Mandatory Fortification Year](#_Mandatory_Fortification_Year) | 1 |
| 3 | [Effective Year for Mandatory Fortification](#_Effective_Year_FOR) | 1 |
| 4 | [Fortification Standard](#_Fortification_Standard) | 1 |
| 5 | [Standard Year](#_Standard_Year) | 1 |
| 6 | [Nutrient Levels](#_Nutrient_Levels) | 1 |
| 7 | [Nutrient Compounds](#_Nutrient_Compounds) | 1 |
| 8 | [Legislation Scope](#_Legislation_Scope) | 2 |
| 9 | [Voluntary Fortification](#_Voluntary_Fortification_1) | 1 |
| 10 | [Daily Food Intake](#_Daily_Food_Intake) | 1 | [Industry Organization](#_Indicators_related_to_2) |
| P10-1 | [Proxy: Daily Food Availability](#_Proxy_10-1:_Daily) | 1 |
| 11 | [Total Food Available](#_Total_Food_Available) | 1 |
| 12 | [Amount and Proportion of Industrially Processed Food](#_Amount_and_Proportion) | 2 |
| P12-1 | [Proxy: Estimated Amount and Proportion of Industrially Processed Food](#_Proxy_12-1:_Estimated_1) | 2 |
| 13 | [External Monitoring Protocol](#_External_Monitoring_Protocol_1) | 2 | [Regulatory Monitoring Protocols](#_Indicators_related_to_1) |
| 14 | [Import Monitoring Protocol](#_Import_Monitoring_Protocol_1) | 2 |
| 15 | [Amount and Proportion of Food that is Fortified (Compliance by Product Volumes)](#_Amount_and_Proportion_1) | 2 | [Fortification Quality](#_Indicators_Related_to) |
| P15-1 | [Proxy: Amount and Proportion of Food that is Fortified (Compliance by Market Share)](#_Proxy_15-1:_Proportion) | 2 |
| P15-2 | [Proxy: Amount and Proportion of Food that is Fortified (Quality)](#_Proxy_15-2A:_Proportion) | 2 |
| P15-3 | [Proxy: Estimated Amount/Proportion of Food that is Fortified](#_Proxy_15-3:_Estimated) (Estimated Quality) | 2 |
| P15-4 | [Proxy: Amount and Proportion of Food that is Fortified (Compliance by Facilities/Samples Monitored)](#_Proxy_15-4:_amount) |  |
| 16 | [Population Coverage of Food Vehicle](#_Population_Coverage_of) | 2 | [Population Coverage](#_Indicators_related_to_4) |
| P16-1 | [Proxy: Estimated Population Coverage of Food Vehicle](#_Proxy_16-1:_Estimated_1) | 2 |
| 17 | [Population Coverage of Industrially Processed Food Vehicle](#_Population_Coverage_of_4) | 2 |
| P17-1 | [Proxy: Estimated Population Coverage of Industrially Processed Food Vehicle](#_Proxy_17-1:_Estimated) | 2 |
| 18 | [Population Coverage of Fortified Food Vehicle (Any Level)](#_Population_Coverage_of_5) | 2 |
| P18-1 | [Proxy: Estimated Population Coverage of Fortified Food Vehicle](#_Proxy_18-1:_Estimated) (Any Level) | 2 |
| 19 | [Population Coverage of Fortified Food Vehicle (Meeting Standards)](#_Population_Coverage_of_6) | 2 |
| P19-1 | [Proxy: Estimated Population Coverage of Fortified Food Vehicle (Meeting Standards)](#_Proxy_19-1:_Estimated) | 2 |
| 20 | [Population Coverage of Fortified Food Vehicle (Any Level) Across Populations with that Food](#_Population_Coverage_of_3) | 2 |
| 21 | [Population Coverage of Fortified Food Vehicle (Meeting Standards) Across Populations with that Food](#_Population_Coverage_of_7) | 2 |
| 22 | [Differences in Health Status Before and After Mandatory Food Fortification](#_22._differences_in) | 3 | Health status change |

# Indicators Related to Legislation and Standards

## Mandatory Fortification

**Definition:***The country has legal documentation that has the effect of currently mandating fortification of the food vehicle in question with one or more vitamins or minerals i.e. the documentation indicates that fortification of all or some of the food is compulsory or required.*

**Data Values:**

* YES: Country has such documentation and GFDx has a copy of it.
* NO: A local expert has confirmed that the country does not have such documentation.
* UNKNOWN: A document has not been identified, or does not meet our inclusion criteria.

**Inclusion Criteria: A** published document (ideally the current legislative document) must be available.

**Source: If YES,** the current legislation mandating fortification in the country (or a published document that indicates mandatory legislation). If NO, the individual who confirmed no will be cited as personal communication. If UNKNOWN, no source will be listed and the rest of the fields for this indicator, plus indicators 2 and 3 should be blank.

**Comments:** Any discrepancies or nuance present in the legislation, including any older legislation that may have existed prior to the current one or any time lapses in legislation coverage.

The table below indicates the relevant fields which will be collected in the GFDx database. For all of these fields, \_m is added for maize flour, \_o for oil, \_r for rice, \_s for salt and \_w for wheat flour.

| **Instrument Name** | **Field Name** | **Update Frequency** | **Data Values** | **Details** |
| --- | --- | --- | --- | --- |
| Legislation-maize flour  Legislation-oil  Legislation-rice  Legislation-salt  Legislation-wheat flour | mandatory\_fortification | Static | 1 - YES  2 - NO  3 - UNKNOWN | This is a required field; it cannot be left blank. If unknown, the rest of the fields for this indicator should be blank. |
| mf\_original\_source | Static | Text | Source in the document's original language - CURRENT legislation |
| mf\_original\_source\_english | Static | Text | Source repeated in English |
| mf\_comment | Static | Text | Comments on this indicator, including older legislation or time lapses. |
| mf\_file\_1 | Static | Attached file | CURRENT legislation |
| mf\_file\_2 | Static | Attached file | ORIGINAL legislation or another related file |

## Mandatory Fortification Year

**Definition:***The year in which fortification of the food vehicle was first mandated in the country.*

**Data Values:**

* Year (YYYY): Published year of the original or first legislative document or mandate.
* Blank: Date information is not available.

**Inclusion Criteria:** A published document (ideally the original first legislative document) must be available.

**Source:** The first or original legislation mandating fortification in the country (or a published document that indicates mandatory legislation).

**Comments:** Any discrepancies or nuance present in the fortification year, including any more recent legislation that may have superseded the first or original legislation or any time lapses in legislation coverage.

The table below indicates the relevant fields which will be collected in the GFDx database. For all of these fields, \_m is added for maize flour, \_o for oil, \_r for rice, \_s for salt and \_w for wheat flour.

| **Instrument Name** | **Field Name** | **Update Frequency** | **Data Values** | **Details** |
| --- | --- | --- | --- | --- |
| Legislation-maize flour  Legislation-oil  Legislation-rice  Legislation-salt  Legislation-wheat flour | fortification\_year | Static | Number - YYYY | Blank values indicate unknown and the rest of the fields for this indicator should also be blank. ORIGINAL/FIRST legislation. |
| fy\_original\_source | Static | Text | Source in the document's original language – ORIGINAL/FIRST legislation |
| fy\_original\_source\_english | Static | Text | Source repeated in English. |
| fy\_comment | Static | Text | Comments on this indicator, including more recent legislation or time lapses. |

## Effective Year For Mandatory Fortification

**Definition:***The year in which fortification of the food vehicle first came into force or into effect in the country.*

**Data Values:**

* Year (YYYY): Published effective year of the original or first legislative document or mandate. If no year is given within the legislative document, it is assumed to come into effect immediately and reflects the year of Indicator 2 (Mandatory Fortification Year).
* Blank Value: Date information is not available.

**Inclusion Criteria:** A published document (ideally the original first legislative document) must be available.

**Source:** The first or original legislation mandating fortification in the country (or a published document that indicates mandatory legislation).

**Comments:** Any discrepancies or nuance present in the effective year, or explanation of how the effective year was derived.

The table below indicates the relevant fields which will be collected in the GFDx database. For all of these fields, \_m is added for maize flour, \_o for oil, \_r for rice, \_s for salt and \_w for wheat flour.

| **Instrument Name** | **Field Name** | **Update Frequency** | **Data Values** | **Details** |
| --- | --- | --- | --- | --- |
| Legislation-maize flour  Legislation-oil  Legislation-rice  Legislation-salt  Legislation-wheat flour | effective\_year | Static | Number - YYYY | ORIGINAL/FIRST legislation. ASSUMPTION: If no effective year is provided, it is assumed to come into effect immediately (i.e. same as the year in indicator 2) |
| ey\_original\_source | Static | Text | Source in the document's original language – ORIGINAL/FIRST legislation |
| ey\_original\_source\_english | Static | Text | Source repeated in English. |
| ey\_comment | Static | Text | Explanation of how effective year was derived or assumed. |

## Fortification Standard

**Definition:***The country has legal documentation indicating standardized fortification levels of the food vehicle in question with one or more nutrients.*

**Data Values:**

* YES: Country has such documentation and GFDx has a copy of it.
* NO: A local expert has confirmed that the country does not have such documentation.
* UNKNOWN: A document has not been identified, or does not meet our inclusion criteria.

**Inclusion Criteria:** A published document (ideally the current standard) must be available that indicates the nutrient levels within a standard.

**Source: If YES,** the current standard the country has for fortification (or a published document that indicates nutrient levels within a standard). If NO, the individual who has confirmed no will be cited as personal communication. If UNKNOWN, no source will be listed and the rest of the fields for the indicator and indicator 5 should be blank.

**Comments: A**ny discrepancies or nuance present in the standard, including any older standards that may have existed prior to the current one or any time lapses in existence of a standard.

The table below indicates the relevant fields which will be collected in the GFDx database. For all of these fields, \_m is added for maize flour, \_o for oil, \_r for rice, \_s for salt and \_w for wheat flour.

| **Instrument Name** | **Field Name** | **Update Frequency** | **Data Values** | **Details** |
| --- | --- | --- | --- | --- |
| Legislation-maize flour  Legislation-oil  Legislation-rice  Legislation-salt  Legislation-wheat flour | fortification\_standard | Static | 1 - YES  2 - NO  3 - UNKNOWN | This is a required field; it cannot be left blank. If unknown, the rest of the fields for this indicator should be blank. |
| fs\_original\_source | Static | Text | Source in the document's original language - CURRENT standard |
| fs\_original\_source\_english | Static | Text | Source repeated in English |
| fs\_comment | Static | Text | Comments on this indicator, including older standard or time lapses. |
| fs\_file\_1 | Static | Attached file | Current fortification standard or personal communication |
| fs\_file\_2 | Static | Attached file | Older fortification standard(s) merged into one PDF file and/or personal communication |

## Standard Year

**Definition:***The year in which the current standard or parent document (e.g. food regulations) was issued, whichever is more recent.*

**Data Values:**

* Year (YYYY): Published year of the current standard.
* Blank: Date information is not available.

**Inclusion Criteria:** A published document (ideally the current standard document) must be available.

**Source:** The current standard the country has for fortification (or a published document that indicates nutrient levels within a standard).

**Comments:** Any discrepancies or nuance present in the standard, including any older standards that may have existed prior to the current one.

The table below indicates the relevant fields which will be collected in the GFDx database. For all of these fields, \_m is added for maize flour, \_o for oil, \_r for rice, \_s for salt and \_w for wheat flour.

| **Instrument Name** | **Field Name** | **Update Frequency** | **Data Values** | **Details** |
| --- | --- | --- | --- | --- |
| Legislation-maize flour  Legislation-oil  Legislation-rice  Legislation-salt  Legislation-wheat flour | standard\_year | Static | Number - YYYY | Blank values indicate unknown and the rest of the fields for this indicator should also be blank. |
| sy\_original\_source | Static | Text | Source in the document's original language - CURRENT standard |
| sy\_original\_source\_english | Static | Text | Source repeated in English. |
| sy\_comment | Static | Text | Comments on this indicator, including any prior standards. |

## Nutrient Levels

**Definition:***The level of each nutrient expressed in milligrams per kilogram (mg/kg) that is listed in the current standard at the point of production / import for the food vehicle in question.*

**Data Values:** Number, expressed in mg/kg[[5]](#footnote-5). The number represents the amount of the nutrient to be added to the food, not the amount of the compound; if the standard indicates the level of the compound, the amount of nutrient to add will be calculated. Only one number will be used in this field – if standards provide only one number, this number will be used in the GFDx; if standards provide a range, the calculated mid-point of that range will be used in the GFDx. For standards which allow more than one compound for a given nutrient and a different nutrient level per compound, only one nutrient level and one compound will be recorded in the fields below; the other compounds and their nutrient levels will be noted in the comment field.

*Examples:*

* + If the standard states “60 mg/kg of iron as ferrous sulfate”, the nutrient level is 60 mg/kg.
  + If the standard states “60 mg/kg of ferrous sulfate”, the nutrient level must be calculated – ferrous sulfate is made up of ~1/3 iron, therefore the amount of iron will be 60/3 or 20 mg/kg.
  + If the standard states “20 ±5 mg/kg”, the nutrient level is 20 mg/kg.
  + If the standard states “15 mg/kg ±10%”, the nutrient level is 15 mg/kg.
  + If the standard states “5-10 mg/kg”, the nutrient level is 7.5 mg/kg.

**Inclusion Criteria:** A published document (ideally the current standard) must be available. Nutrients are included in the GFDx if they are added for a nutrition purpose, rather than as a preservative or stabilizer.

**Source:** The current standard the country has for fortification (or a published document that indicates nutrient levels within a standard).

**Comments:** Indicate the nutrient level exactly as written in the standard, including with different units. Note whether the level applies to one type of the food vehicle or one compound, including any differences for other types of that food vehicle or other compounds. Note whether a nutrient is voluntary vs. mandatory.

The table below indicates the relevant fields which will be collected in the GFDx database. For all of these fields, \_m is added for maize flour, \_o for oil, \_r for rice, \_s for salt and \_w for wheat flour.

| **Instrument Name** | **Field Name** | **Update Frequency** | **Data Values** | **Details** |
| --- | --- | --- | --- | --- |
| Micronutrients-maize flour  Micronutrients-oil  Micronutrients-rice  Micronutrients-salt  Micronutrients-wheat flour | level\_b6 | Static | Number - mg/kg | For each level, note ONE number. See examples above for how to derive this number based on how standards are written. |
| comment\_level\_b6 | Static | Text | For each nutrient, note the exact text from standard and any exclusions |
| level\_b12 | Static | Number - mg/kg |  |
| comment\_level\_b12 | Static | Text |  |
| level\_calcium | Static | Number - mg/kg |  |
| comment\_level\_calcium | Static | Text |  |
| level\_fluoride | Static | Number - mg/kg |  |
| comment\_level\_fluoride | Static | Text |  |
| level\_folic\_acid | Static | Number - mg/kg |  |
| comment\_level\_folic\_acid | Static | Text |  |
| level\_iodine | Static | Number - mg/kg |  |
| comment\_level\_iodine | Static | Text |  |
| level\_iron | Static | Number - mg/kg |  |
| comment\_level\_iron | Static | Text |  |
| level\_niacin | Static | Number - mg/kg |  |
| comment\_level\_niacin | Static | Text |  |
| level\_riboflavin | Static | Number - mg/kg |  |
| comment\_level\_riboflavin | Static | Text |  |
| level\_selenium | Static | Number - mg/kg |  |
| comment\_level\_selenium | Static | Text |  |
| level\_thiamin | Static | Number - mg/kg |  |
| comment\_level\_thiamin | Static | Text |  |
| level\_vitamin\_a | Static | Number - mg/kg |  |
| comment\_level\_vitamin\_a | Static | Text |  |
| level\_vitamin\_d | Static | Number - mg/kg |  |
| comment\_level\_vitamin\_d | Static | Text |  |
| level\_vitamin\_e | Static | Number - mg/kg |  |
| comment\_level\_vitamin\_e | Static | Text |  |
| level\_zinc | Static | Number - mg/kg |  |
| comment\_level\_zinc | Static | Text |  |
|  | level\_compound\_original\_source | Static | Text |  |
|  | level\_compound\_original\_source\_english | Static | Text |  |

## Nutrient Compounds

**Definition:***The allowable compounds which can be used to fortify each nutrient that are listed in the current standard at the point of production / import for the food vehicle in question.*

**Data Values:**

* Text: listing of all allowable compounds specific to the nutrient.
* “Unspecified”: If the name of the allowed compounds is not specified within the standard.

For the nutrients pyridoxine (B6), niacin (B3), and riboflavin (B2), it is assumed that the compound has the same name as the nutrient where not otherwise specified.

For some grains, there may be more than one compound per nutrient, more than one nutrient level per compound, and these can vary by flour type (e.g. high- and low-extraction flour). In these cases, we will select one flour type if there are multiple and note this flour type in the comment field for Indicators 6 (Nutrient Levels) and 7 (Nutrient Compounds). We will select or calculate one compound and nutrient level combination present for that flour type and note all the other variations present in the comments.

For Vitamin A, note that there are several terms that may be used to mean the same vitamin A compound. These should therefore be collapsed into three options to be specified in the GFDx: “Beta-carotene”; “Retinyl acetate” (also known as retinol acetate, vitamin A acetate, or acetylretinol in standards); and “Retinyl palmitate” (also known as retinol palmitate and vitamin A palmitate in standards).

Source: Code of Federal Regulations. TITLE 21--FOOD AND DRUGS, CHAPTER I--FOOD AND DRUG ADMINISTRATION, DEPARTMENT OF HEALTH AND HUMAN SERVICES, SUBCHAPTER B--FOOD FOR HUMAN CONSUMPTION (CONTINUED), PART 184 -- DIRECT FOOD SUBSTANCES AFFIRMED AS GENERALLY RECOGNIZED AS SAFE, Subpart B--Listing of Specific Substances Affirmed as GRAS, Sec. 184.1930 Vitamin A. USA. 1/April/2019. [<https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/CFRSearch.cfm?fr=184.1930>]

**Inclusion Criteria:** A published document (ideally the current standard) must be available.

**Source:** The current standard the country has for fortification (or a published document that indicates nutrient levels within a standard).

**Comments:** Specify the compound which relates to the nutrient levels and any other relevant details.

The table below indicates the relevant fields which will be collected in the GFDx database. For all of these fields, \_m is added for maize flour, \_o for oil, \_r for rice, \_s for salt and \_w for wheat flour.

| **Instrument Name** | **Field Name** | **Update Frequency** | **Data Values** | **Details** |
| --- | --- | --- | --- | --- |
| Micronutrients-maize flour  Micronutrients-oil  Micronutrients-rice  Micronutrients-salt  Micronutrients-wheat flour | compound\_b6 | Static | Text | For each nutrient, list all allowable compounds – type capitalizing the first letter of each word and separated by commas. |
| comment\_compound\_b6 | Static | Text | Note the exact text from the standard that indicates the allowed compound(s). For each nutrient, specify if there are certain compounds that relate to certain nutrient levels or other relevant details. |
| compound\_b12 | Static | Text |  |
| comment\_compound\_b12 | Static | Text |  |
| compound\_calcium | Static | Text |  |
| comment\_compound\_calcium | Static | Text |  |
| compound\_fluoride | Static | Text |  |
| comment\_compound\_fluoride | Static | Text |  |
| compound\_folic\_acid | Static | Text |  |
| comment\_compound\_folic\_acid | Static | Text |  |
| compound\_iodine | Static | Text |  |
| comment\_compound\_iodine | Static | Text |  |
| compound\_iron | Static | Text |  |
| comment\_compound\_iron | Static | Text |  |
| compound\_niacin | Static | Text |  |
| comment\_compound\_niacin | Static | Text |  |
| compound\_riboflavin | Static | Text |  |
| comment\_compound\_riboflavin | Static | Text |  |
| compound\_selenium | Static | Text |  |
| comment\_compound\_selenium | Static | Text |  |
| compound\_thiamin | Static | Text |  |
| comment\_compound\_thiamin | Static | Text |  |
| compound\_vitamin\_a | Static | Text |  |
| comment\_compound\_vitamin\_a | Static | Text |  |
| compound\_vitamin\_d | Static | Text |  |
| comment\_compound\_vitamin\_d | Static | Text |  |
| compound\_vitamin\_e | Static | Text |  |
| comment\_compound\_vitamin\_e | Static | Text |  |
| compound\_zinc | Static | Text |  |
| comment\_compound\_zinc | Static | Text |  |

## Legislation Scope

**Provides:** Identification of the types of a food vehicle covered by mandatory fortification legislation; for example, mandatory fortification may not apply to whole wheat flour or mandatory fortification applies to all salt for human consumption including salt for food processing.This information can be used to identify the specific food sources providing additional nutrients through fortification.

**Definition:***The specific types of the food vehicle in question that are expressly required by legislation.*

**Data Values:**

* **TYPES:** Either “All” or “Subset”. Subset would be used in the case where only certain types of a food (e.g. Premier Grade and 1st Grade flours only; or only flours produced in large-scale facilities) are included in legislation. If none are expressly stipulated, then it is assumed all types are included.
* **ORIGINS:** Origins of the food vehicle (“Domestically Produced”, “Imports”, “Exports”). If none are expressly stipulated in the legislation, then it is assumed domestic and imported foods are included and exported foods are excluded.
* **USES:** Uses of the food vehicle (“Household”, “Processed Food”, “Animal Feed”, “Donated Food”). If none are expressly stipulated in the legislation, then it is assumed that household and processed foods are included and foods destined for animal feed and donated foods are excluded. If the legislation states “human consumption” food vehicle, the above sentence applies, but if the legislation states “edible” food vehicle, then animal feed is included.

**Inclusion Criteria:** A published document (ideally the current legislation or standard which provides the legislation scope) must be available.

**Source:** The current legislation or standard the country has for fortification in which scope is indicated (or a published document that indicates the legislation scope).

**Comments:** Indicate the scope of the legislation, exactly as written. For the “Subset” Type category, specify exactly which subsets are included and excluded. Indicate if scope is different in the legislation vs the standard.

**Frequency:** As legislation is released by countries and GFDx data stewards receives document.

The table below indicates the relevant fields which will be collected in the GFDx database. For all of these fields, \_m is added for maize flour, \_o for oil, \_r for rice, \_s for salt and \_w for wheat flour.

| **Instrument Name** | **Field Name** | **Update Frequency** | **Data Values** | **Details** |
| --- | --- | --- | --- | --- |
| Legislation-maize flour  Legislation-oil  Legislation-rice  Legislation-salt  Legislation-wheat flour | legislation\_scope\_types | Static | 1-All  2-Subset | If not specified, apply assumption. Choose one option only. |
| ls\_types\_comment | Static | Text | Exact text from document. If not specified, state assumption that was applied. |
| ls\_types\_comment\_english | Static | Text | Exact text from document translated into English when applicable. If not specified, state assumption that was applied. |
| legislation\_scope\_origins | Static | 1 - Domestically Produced  2 - Imports  3 - Exports | If not specified, apply assumption. Multiple options possible. |
| ls\_origins\_comment | Static | Text | Exact text from document. If not specified, state assumption that was applied. |
| ls\_origins\_comment\_english | Static | Text | Exact text from document translated into English when applicable. If not specified, state assumption that was applied. |
| legislation\_scope\_uses | Static | 1 - Household  2 - Processed Food  3 - Animal Feed  4 - Donated Food | If not specified, apply assumption. Multiple options possible. |
| ls\_uses\_comment | Static | Text | Exact text from document. If not specified, state assumption that was applied. |
| ls\_uses\_comment\_english | Static | Text | Exact text from document translated into English when applicable. If not specified, state assumption that was applied. |
| ls\_source | Static | Text | Source in the document's original language. |
| ls\_source\_english | Static | Text | Source repeated in English. |

## Voluntary Fortification

**Definition:***The country has official documentation and/or a food standard that provides guidance or conditions for fortification, but does not have the effect of mandating or requiring fortification. If a country has mandatory fortification for that food vehicle, it will be categorized by GFDx as not having voluntary fortification, even if some types of the food vehicle or some nutrients may be fortified on a voluntary basis.*

**Data Values:**

* YES: Country has such documentation and GFDx has a copy of it.
* NO: A local expert has confirmed that the country does not have such documentation.
* UNKNOWN: A document has not been identified, or does not meet our inclusion criteria.

Use the table below to determine the value for Voluntary Fortification based on the values for mandatory fortification (indicator 1) and fortification standard (indicator 4). Note that a country cannot be both mandatory and voluntary.

|  |  |  |
| --- | --- | --- |
| **Mandatory Fortification (Indicator 1)** | **Fortification Standard (Indicator 4)** | **Voluntary Fortification (Indicator 9)** |
| YES | YES | NO |
| YES | NO | NO |
| YES | UNKNOWN | NO |
| NO | YES | YES |
| NO | NO | UNKNOWN, unless  NO – if a local expert has indicated NO  YES – if there is a policy document that states fortification is allowed |
| NO | UNKNOWN | UNKNOWN, unless  NO – if a local expert has indicated NO  YES – if there is a policy document that states fortification is allowed |
| UNKNOWN | YES | YES |
| UNKNOWN | NO | UNKNOWN, unless  NO – if a local expert has indicated NO  YES – if there is a policy document that states fortification is allowed |
| UNKNOWN | UNKNOWN | UNKNOWN, unless  NO – if a local expert has indicated NO  YES – if there is a policy document that states fortification is allowed |

**Inclusion Criteria:** Data must be available for both Indicators 1 (Mandatory Fortification) and 4 (Fortification Standard) or there must be a published document (ideally specific legislation or legal documentation stating voluntary fortification) available.

**Source:** The current standard the country has for fortification (or a published document that indicates nutrient levels within a standard) or the current legal documentation allowing fortification.

**Comments:** Any discrepancies or nuance present, such as if fortification is voluntary only for some types of the food vehicle or nutrients.

The table below indicates the relevant fields which will be collected in the GFDx database. For all of these fields, \_m is added for maize flour, \_o for oil, \_r for rice, \_s for salt and \_w for wheat flour.

| **Instrument Name** | **Field Name** | **Update Frequency** | **Data Values** | **Details** |
| --- | --- | --- | --- | --- |
| Legislation-maize flour  Legislation-oil  Legislation-rice  Legislation-salt  Legislation-wheat flour | voluntary\_fortification | Static | 1 - YES  2 - NO  3 - UNKNOWN | Determine based on Indicators 1 and 4 using the above table. If NO or UNKNOWN the rest of the fields for this indicator should be blank, except in the case of citing a local expert who has provided a NO determination. |
| vf\_year | Static | Number - YYYY | Year of original standard (current standard if original is unavailable) or legal documentation stipulating voluntary fortification. |
| vf\_original\_source | Static | Text | Source in the document's original language - CURRENT standard |
| vf\_\_original\_source\_english | Static | Text | Source repeated in English |
| vf\_comment | Static | Text | Comments on this indicator, including if voluntary for only some types of food vehicle or nutrients. |
| vf\_file\_1 | Static | Attached file | Current document or personal communication that stipulated fortification is voluntary |
| vf\_file\_2 | Static | Attached file | Original document or personal communication that stipulates fortification is voluntary |

# Indicators related to INDUSTRY ORGANIZATION

## Daily Food Intake

**Definition:***The average amount of the food vehicle in question that is eaten per grams, per capita, per day.*

**Data Values:** Number, expressed in grams/capita/day (g/c/d).

**Inclusion Criteria:** A published consumption or dietary recall survey or other published and quality-assured data collection method must be available.

**Source:** The sourcewill be the report of the survey or quality-assured data collection method.

**Comments:** The comments section will note any discrepancies or nuance present, especially within the methodology.

### Proxy 10-1: Daily Food Availability

**Use:** If daily food intake is not available.

**Definition:***The average amount of the food vehicle in question that is available for consumption per grams, per capita, per day.*

**Data Calculation:**

**Data Values:** Number, expressed in grams/capita/day (g/c/d).

**Inclusion Criteria:** Published data from food balance sheets or other published and quality-assured data collection method must be available.

**Source:** The sourcewill be the report of the food balance sheet or quality-assured data collection method.

**Comments:** The comments section will note any discrepancies or nuance present.

The table below indicates the relevant fields which will be collected in the GFDx database. For all of these fields, \_m is added for maize flour, \_o for oil, \_r for rice, \_s for salt and \_w for wheat flour.

| **Instrument Name** | **Field Name** | **Update Frequency** | **Data Values** | **Details** |
| --- | --- | --- | --- | --- |
| Maize flour  Oil  Rice  Salt  Wheat flour | food\_intake | Annual | Number - g/c/d | Blank values indicate unknown and the rest of the fields for this indicator should also be blank. |
| food\_intake\_data | Annual | 1 – INTAKE  2 - AVAILABILITY | Indicate name of indicator (10 or 10-1) used in this figure. |
| food\_intake\_year | Annual | Number - YYYY | Year of documented data source |
| fi\_original\_source | Annual | Text | Source in the document's original language. |
| fi\_original\_source\_english | Annual | Text | Source repeated in English. |
| fi\_comment | Annual | Text | Comments on this indicator, especially nuances in methodology |

## Total Food Available

**Definition:***The total annual food supply available in metric tons of the food vehicle in question for human consumption.*

**Data Calculation:**

**Data Values:** Number, expressed in metric tons (MT)

**Inclusion Criteria:** Published data from food balance sheets or other published and quality-assured data collection method must be available.

**Source:** The sourcewill be the report of the food balance sheet or quality-assured data collection method.

**Comments:** The comments section will note any discrepancies or nuance present.

The table below indicates the relevant fields which will be collected in the GFDx database. For all of these fields, \_m is added for maize flour, \_o for oil, \_r for rice, \_s for salt and \_w for wheat flour.

| **Instrument Name** | **Field Name** | **Update Frequency** | **Data Values** | **Details** |
| --- | --- | --- | --- | --- |
| Maize flour  Oil  Rice  Salt  Wheat flour | food\_available | Annual | Number - MT | Blank values indicate unknown and the rest of the fields for this indicator should also be blank. |
| food\_available\_year | Annual | Number - YYYY | Year of documented data source |
| fa\_original\_source | Annual | Text | Source in the document's original language. |
| fa\_original\_source\_english | Annual | Text | Source repeated in English. |
| fa\_comment | Annual | Text | Comments on this indicator, especially description of methodology |

## Amount and Proportion of Industrially Processed Food

**Provides:** *Quantity of food that could be fortified through industrial food processing (if there is no mandatory fortification in a country) and/or expected to be fortified under existing legislation (if there is mandatory fortification in place).*

**Definition:***The total amount (in MT) of industrially processed food AND the percentage of the total food available (Indicator 11) that is processed by an industrial processor AND is required to be fortified according to relevant legislation (if mandatory legislation exists).*

**Industrially Processed:** *A food is considered industrially processed (and thus feasible to fortify) if:*

1. *It is imported[[6]](#footnote-6); or*
2. *It is domestically produced by manufacturers or producers with average rated production capacity[[7]](#footnote-7) as follows:*

* *Wheat and Maize Flours - 20 MT/day grain processing rated capacity[[8]](#footnote-8).*
* *Rice – 5 MT hour paddy processing rated capacity[[9]](#footnote-9).*
* *Oil – 5 MT/day rated capacity[[10]](#footnote-10).*
* *Salt – 5,000 MT/year raw salt rated capacity[[11]](#footnote-11).*

**Required to be Fortified by Law:** *A food is required to be fortified by law if the food type is within the scope of the legislation (Indicator 8). Note that this only applies to countries with mandatory legislation for the food. Without mandatory legislation, only the amount industrially processed is applied and it is assumed that all types of food are allowed by regulations to be voluntarily fortified.*

**Data Calculation:**

**Data Values:**

* Number, expressed as an amount in metric tons (the numerator of the above data calculation).
* Number, expressed in percentage, ranging from 0 to 100%.

**Inclusion Criteria:** Published and quality assured data must be available.

**Source:** The source will generally be data compiled by government, an industry association, or a third party on production and imports based on producer or importer registration, trade reports, or an industry landscape. The methodology used to determine this indicator should be clearly established within the source document.

**Comments:** Note the exact methodology used to determine this indicator and any discrepancies or nuance present.

**Frequency:** According to the regularity with which agencies release regulatory monitoring reports (may be annual or less frequent)

### Proxy 12-1: Estimated Amount and Proportion of Industrially Processed Food

**Use:** If accurate published industry landscape data are not available, but an educated guess can be made based on context, knowledge held by a local technical expert, or other quality assured information.

**Definition:***The estimated total amount (in MT) and estimated percentage of the total food available (Indicator 11) that is processed by an industrial processor AND is required to be fortified according to relevant legislation (if mandatory legislation exists).*

**Data Calculation:**

**Data Values:**

* Number, expressed as an amount in metric tons (the numerator of the above data calculation).
* Number, expressed in percentage, ranging from 0 to 100%.

**Inclusion Criteria:** A documented educated guess, either from published information or in-depth knowledge of the country context must be available and listed as the source of these data.

**Source:** The source will generally be the person/organization that made the estimate.

**Comments:** Note the exact methodology used to determine this indicator and any discrepancies or nuance present.

The table below indicates the relevant fields which will be collected in the GFDx database. For all of these fields, \_m is added for maize flour, \_o for oil, \_r for rice, \_s for salt and \_w for wheat flour.

| **Instrument Name** | **Field Name** | **Update Frequency** | **Data Values** | **Details** |
| --- | --- | --- | --- | --- |
| Maize flour  Oil  Rice  Salt  Wheat flour | industrially\_processed\_mt | Annual | Number - MT | Blank values indicate unknown and the rest of the fields for this indicator should also be blank. |
| industrially\_processed\_pc | Annual | Number - % |  |
| ip\_data | Annual | 1 - Industry production  2 - Educated guess | Indicate full name of indicator or proxy indicator (12 or 12-1) |
| ip\_year | Annual | Number - YYYY | Year of documented data source |
| ip\_source | Annual | Text | Source in the document's original language. |
| ip\_source\_english | Annual | Text | Source repeated in English. |
| ip\_comment | Annual | Text | Comments on this indicator, especially description of methodology |
| ip\_file\_1 | Annual | Attached file | Document or local expert communication |
| ip\_file\_2 | Annual | Attached file | Document or local expert communication |

# Indicators related to regulatory monitoring PROTOCOLS

## External Monitoring Protocol

**Provides:** Evidence that the country has protocols for enforcing fortification at domestic food production facilities.

**Definition:***The country has a document (e.g. manual, rules, operating procedures, checklists, forms, etc.) that identifies roles, responsibilities, and activities. The intended use of the document is for authorized government inspector(s) to monitor a domestic food production facility for food safety and food quality, with specific reference to fortification.*

**Data Values:**

* YES: Country has such documentation and GFDx has a copy of it.
* NO: A local expert has confirmed that the country does not have such documentation.
* NOT APPLICABLE: Country does not domestically produce the food and/or does not have mandatory legislation for the food vehicle.
* UNKNOWN: A document has not been identified, or does not meet our inclusion criteria.

**Inclusion Criteria:** A published document (ideally the current external monitoring protocol) must be available, which the GFDx interprets as a document for regulatory monitoring inspectors to use in their day to day work. This should include what will be done during a government-led inspection and/or audit (e.g. a checklist of activities), but cannot just be a statement that monitoring will happen. Ideally, the document will also include details of who is responsible for monitoring and the timing or frequency of monitoring.

* Note that when a regional document exists for monitoring and a country in that region also has a document for monitoring, the country-specific document will take precedence over the regional document. The exception would be if in reading the regional document, it explicitly states that it takes precedence over a country-specific document that is older.
* Note that in some cases, there may be countries that have monitoring procedures for ANY food, not specifically for FORTIFIED foods. Such documents may also be included and should be noted in the comments section.

**Source:** If YES, the source is the official government document identifying activities for monitoring of domestic food production facilities for food safety and food quality. If NO, the source is the local expert personal communication. If UNKNOWN, the source is blank.

**Comments:** The comments section will note any discrepancies or nuance present, including when there is both a regional and country-specific protocol, when there are additional documents referred to, or when there might be multiple versions or a draft under development. Comments should also contain the specific page numbers in the protocol document where the relevant monitoring activities can be found.

**Frequency:** As documentation is shared by countries and GFDx data stewards receives document. This indicator will only be collected for countries with mandatory fortification of a food, as this is an indication of a legal mandate to monitor.

The table below indicates the relevant fields which will be collected in the GFDx database. For all of these fields, \_m is added for maize flour, \_o for oil, \_r for rice, \_s for salt and \_w for wheat flour.

| **Instrument Name** | **Field Name** | **Update Frequency** | **Data Values** | **Details** |
| --- | --- | --- | --- | --- |
| Monitoring-maize flour  Monitoring-oil  Monitoring-rice  Monitoring-salt  Monitoring-wheat flour | ext\_mon\_protocol | Static | 1 - YES  2 - NO  3 - NOT APPLICABLE  4 - UNKNOWN | Answer Not applicable if there is no domestic production. If Not Applicable is selected, the rest of these fields should be left blank. |
| emp\_source | Static | Text | Source in the document's original language. |
| emp\_source\_english | Static | Text | Source repeated in English. |
| emp\_comment | Static | Text | Comments on this indicator |
| emp\_file\_1 | Static | Attached file | Document with external monitoring protocol (1) |
| emp\_file\_2 | Static | Attached file | Document with external monitoring protocol (2) |

## Import Monitoring Protocol

**Provides:** Evidence that the country has protocols for enforcing fortification at importation sites.

**Definition:***The country has a document (e.g. manual, rules, operating procedures, checklists, forms, etc.) that identifies roles, responsibilities, and activities. The intended use of the document is for authorized government inspector(s) to monitor food imports for food safety and food quality, with specific reference to fortification.*

**Data Values:**

* YES: Country has such documentation and GFDx has a copy of it.
* NO: A local expert has confirmed that the country does not have such documentation.
* NOT APPLICABLE: Country does not import the food and/or does not have mandatory legislation for the food vehicle.
* UNKNOWN: A document has not been identified, or does not meet our inclusion criteria.

**Inclusion Criteria:** A published document (ideally the current import monitoring protocol) must be available, which the GFDx interprets as a document for regulatory monitoring inspectors to use in their day to day work. This should include what will be done during a government-led inspection and/or audit (e.g. a checklist of activities), but cannot just be a statement that monitoring will happen. Ideally, the document will also include details of who is responsible for monitoring and the timing or frequency of monitoring.

* Note that when a regional document exists for monitoring and a country in that region also has a document for monitoring, the country-specific document will take precedence over the regional document. The exception would be if in reading the regional document, it explicitly states that it takes precedence over a country-specific document that is older.
* Note that in some cases, there may be countries that have monitoring procedures for ANY food, not specifically for FORTIFIED foods. Such documents may also be included and should be noted in the comments section.

**Source:** If YES, the source is the official government document identifying activities for monitoring of domestic food production facilities for food safety and food quality. If NO, the source is the local expert personal communication. If UNKNOWN, the source is blank.

**Comments:** The comments section will note any discrepancies or nuance present, including when there is both a regional and country-specific protocol, when there are additional documents referred to, or when there might be multiple versions or a draft under development. Comments should also contain the specific page numbers in the protocol document where the relevant monitoring activities can be found.

**Frequency:** As documentation is shared by countries and GFDx data stewards receives document. This indicator will only be collected for countries with mandatory fortification of a food, as this is an indication of a legal mandate to monitor.

The table below indicates the relevant fields which will be collected in the GFDx database. For all of these fields, \_m is added for maize flour, \_o for oil, \_r for rice, \_s for salt and \_w for wheat flour.

| **Instrument Name** | **Field Name** | **Update Frequency** | **Data Values** | **Details** |
| --- | --- | --- | --- | --- |
| Monitoring-maize flour  Monitoring-oil  Monitoring-rice  Monitoring-salt  Monitoring-wheat flour | imp\_mon\_protocol | Static | 1-YES  2-NO  3-NOT APPLICABLE  4-UNKNOWN | Answer Not applicable if there are no imports of the food. If Not Applicable is selected, the rest of these fields should be left blank. |
| imp\_source | Static | Text | Source in the document's original language. |
| imp\_source\_english | Static | Text | Source repeated in English. |
| imp\_comment | Static | Text | Comments on this indicator |
| imp\_file\_1 | Static | Attached file | Document with external monitoring protocol (1) |
| imp\_file\_2 | Static | Attached file | Document with external monitoring protocol (2) |

# Indicators Related to Fortification Quality

A country can have many different ways to calculate or estimate the fortification quality or compliance against standards. These are defined below:

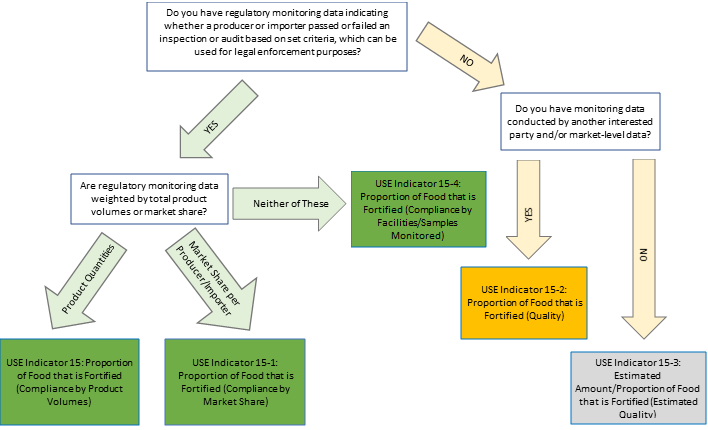
**Compliance:** *Adherence to an order, regulation, or law. In the case of food fortification, foods that are fortified and included within any order, regulation, or law on food fortification (mandatory or voluntary) must adhere to the micronutrient specifications detailed in the nationally adopted standards and/or other food quality, safety, packaging, and labeling requirements. To be deemed “compliant,” food producers or importers must “pass” a pre-determined and objectively defined set of requirements during a site audit/inspection by the government entity responsible for food control. E.g. these requirements can include a certain score or range of scores based on an audit checklist, a premix reconciliation calculation, qualitative tests, and quantitative tests, or a combination of these[[12]](#footnote-12). As such, data accepted into the GFDx will be considered as compliance only if assessed by an authorized government authority[[13]](#footnote-13), is assessed at production or import level[[14]](#footnote-14), and can be used for enforcement of fortification and other food quality requirements.*

***Quality:****The degree to which a product meets stated requirements. Unlike compliance, which must be measured at the point of production or import by authorized government entities, data on quality may be generated by public, private (non-government) or civil society stakeholders. Additionally, it may be collected from places of production, import or markets and may rely on qualitative or quantitative tests, or educated expert estimates. Quality data cannot be used for enforcement of national standards.*

For the purposes of the GFDx, compliance and quality data will be defined as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| **Type of data** | **Compliance** | **Quality** | **Quality – expert opinion** |
| **Data source** | Authorized government entity, e.g. food control | Any interested party | Any interested party with an understanding of the fortification program |
| **Point in distribution where monitoring may occur** | Production  Import | Production  Import  Market | N/A (even if the expert opinion is based on monitoring information, it must be verified through providing the data to GFDx) |
| **Relevant methods** | Audits  Quantitative  Qualitative | Audits  Quantitative  Qualitative | Other: educated guesses/estimates, calculations with assumptions |
| **Data uses** | To verify adherence to a standard, regulation or law, i.e. for enforcement | To assess degree to which product meets stated requirements, i.e., to identify problems, for enforcement advocacy | To provide a general sense of the fortification program’s status; to flag lack of official data |
| **Data presentation** | Reports  Unpublished or not publicly available regulatory monitoring data (e.g. PPT, emailed tables) | Reports  Unpublished or not publicly available 3rdparty data, supported by some visual presentation of the monitoring data (e.g. PPT, emailed tables) | Correspondence, with no supporting presentation of data from monitoring efforts |

The following decision tree summarizes the various options for compliance and quality data and when specific proxies are to be used:



## Amount and Proportion of Food that is Fortified (Compliance by Product volumes)

**Provides:** Estimates of theproportion of food in the country that meets minimum fortification standards.

**Definition:***The total amount (in metric tons) and percentage of industrially processed food that is required by legislation to be fortified (Indicator 12) that is fortified at levels that meet relevant standards.*

**Data Calculation:***[[15]](#footnote-15)*

**Data Assumption:** This calculation assumes that all producers and imports (as required by law to fortify in Indicator 8) with capacity to be considered “industrial” (as per the definitions in Indicator 12) are those producers and imports who were inspected. Since this calculation is not based on compliant quantities, but on compliant producers/imports, it assumes that all quantities produced/imported by a compliant producer or importer are compliant. This calculation also assumes that total production quantities of compliant producers and imports are known.

**Data Values:**

* Number, expressed as an amount in metric tons (the numerator of the above data calculation).
* Number, expressed in percentage, ranging from 0 to 100%.

**Inclusion Criteria:** A published document or quality assured information must be available which ideally includes the methodology of how compliance was defined or determined within the country. Inspections, audits, and product samples taken to derive this indicator must have been from production or import level (rather than market or household level). Exact methodology and sampling definitions should be indicated in the comments field.

**Source:** The source is official government report(s) indicating compliance of producers/importers with national standards based on compliant volumes of products.

**Comments:** The comments section will note any nuance or discrepancies beyond the methodology and sampling definitions.

**Frequency:** According to the regularity with which agencies release regulatory monitoring reports (may be annual or less frequent).

### Proxy 15-1: Amount and Proportion of food that is fortified (compliance by Market Share)

**Use:** If production/import quantity of compliant producers and importers is not known but estimates of industrial market share are available.

**Definition:***The total amount (in metric tons) and percentage of industrially processed food that is required under legislation to be fortified (Indicator 12) that is fortified at levels that meet relevant standards.*

**Industrial Market Share:** *A producer’s or importer’s market share is the proportion of food they produce or import and sell for domestic consumption compared to the total amount of industrially processed or imported food (indicator 12 Numerator). It assumes a 100% market share is achieved by combining all producers who are considered “industrial” or are required by law to fortify[[16]](#footnote-16).*

**Data Calculation:**

**Data Assumption:** This calculation assumes that all producers and imports (as required by law to fortify in Indicator 8), and with the capacity to be considered “industrial” (as per the definitions in Indicator 12) are those producers and imports who were inspected. Since this calculation is not based on compliant quantities, but on compliant producers/imports, it assumes that all quantities produced/imported by a compliant producer or importer are compliant. This calculation also assumes that market share of compliant producers and importers are known.

**Data Values:**

* Number, expressed as an amount in metric tons (calculated by multiplying the percentage by the Total Amount of Industrially Processed Food – numerator of Indicator 12).
* Number, expressed in percentage, ranging from 0 to 100%.

**Inclusion Criteria:** A published document or quality assured information must be available which ideally includes the methodology of how compliance was defined or determined within the country. Inspections, audits, and product samples taken to derive this indicator must have been from production or import level (rather than market or household level). Exact methodology and sampling definitions should be indicated in the comment field.

**Source:** The source is official government report(s) indicating compliance of producers/importers with national standards, based on market share.

**Comments:** The comments section will note any nuance or discrepancies beyond the methodology and sampling definitions.

### Proxy 15-2: Amount and Proportion of Food that is Fortified (Quality)

**Use:** If regulatory monitoring data is not available from points of production or import by an authorized government, but audits, quantitative, or qualitative tests have been performed on food products 1.)by another interested party at any level or 2.) by any authority at market level.

**Definition:** *The total amount (in metric tons) and percentage industrially processed food that is required by legislation to be fortified (Indicator 12) that is confirmed to be fortified at any level (preferred) or to a specified level (if the only data available).*

**Data Calculation (if based on samples):**

**Data Values:**

* Number, expressed as an amount in metric tons (calculated by multiplying the percentage by the Total Amount of Industrially Processed Food – numerator of Indicator 12).
* Number, expressed in percentage, ranging from 0 to 100%.

**Inclusion Criteria:** A published document or quality assured information must be available which ideally includes the methodology of how quality was defined or determined within the country and how samples (if relevant) were collected.

* Note that the sampling and testing methodologies may differ greatly. Ideally, the methodologies below are those used to derive this figure, however, data stewards can also make case-by-case determinations based on the documented methodology, which also should be noted in the comment field:
  + Weighting samples by brand or type market share or volumes;
  + Pooling samples of a given brand and testing composite samples of each brand;
  + Pooling samples of a given geographic region and testing composite samples where brands are unknown;
* An average of samples may also be valid if the sample size is large enough to be nationally representative and representative of brand availability.
* Note that unlike Indicators 15 and 15-1, even if data are collected by an authorized regulatory monitoring agency, if their data for indicator 15-2 are taken from market level, they will not be considered comparable against national standards for compliance determination, but are useful to gauge program performance and fortification quality.

**Source:** The source is either official government reports indicating quality of producers/importers/samples based on quantitative or qualitative product tests at market level, or industry/third-party report(s) indicating quality of producers/importers/samples based on audits, quantitative or qualitative product tests at any level.

**Comments:** The comments section will note any nuance or discrepancies beyond the methodology and sampling definitions.

### Proxy 15-3: Estimated Amount and Proportion of Food that Is Fortified (estimated quality)

**Use:** If no regulatory monitoring data or product sample data are available, but an educated guess can be made based on context and local knowledge by a local technical expert, or other data with cited methods.

**Definition:***The total amount (in metric tons) and percentage of industrially processed food that is required by legislation to be fortified (Indicator 12) and is fortified at any level (quality).*

**Data Values:**

* Number, expressed as an amount in metric tons (calculated by multiplying the percentage by the Total Amount of Industrially Processed Food – numerator of Indicator 12).
* Number, expressed in percentage, ranging from 0 to 100%.

**Inclusion Criteria:** A documented educated guess, either from published information or in-depth knowledge of the country context must be available and listed as the source of these data. The methodology, including how this estimate was made should be documented in the comment field.

**Source:** The source will generally be an estimate by a reputable, local expert or other source.

**Comments:** The comments section will note any nuance or discrepancies beyond the methodology and sampling definitions.

### Proxy 15-4: amount and proportion of food that is fortified (compliance by facilities/samples monitored)

**Use:**If regulatory monitoring data of neither production/import quantity nor industrial market share is available but producers and/or importers have been monitored by an authorized government authority and proportion of compliant facilities or samples is known.

**Definition:***The percentage of industrially processed food that is required by legislation to be fortified (Indicator 12) that is fortified at levels that meet relevant standards (compliance).*

**Data Calculation:**

**Data Assumption:**This calculation assumes that all producers and importers (as required by law to fortify in Indicator 8) with capacity to be considered “industrial” (as per the definitions in Indicator 12) are those producers and importers who were inspected. This calculation also assumes that 1.) the samples collected and tested during the inspections are representative of the volume of production of the facilities monitored, (although this is unlikely to be the case), and 2.) the samples were collected proportionally to the producer/importer’s market share and can thus be weighted equally in the calculation (also unlikely to be the case).

**Data Values:**

* Number, expressed in metric tons (calculated by multiplying the percentage by the Total Amount of Industrially Processed Food – numerator of Indicator 12).
* Number, expressed in percentage, ranging from 0 to 100%.

**Inclusion Criteria:**A published document or quality assured information must be available which ideally includes the methodology of how compliance was defined or determined within the country. Inspections, audits, and product samples taken to derive this indicator must have been from production or import level (rather than market level). Exact methodology and sampling definitions should be indicated in the comments field.

**Source:**The source is official government report(s) indicating compliance of producers/importers/samples with national standards, based on number of samples or facilities tested.

**Comments:**The comments section will note any nuance or discrepancies beyond the methodology and sampling definitions.

The table below indicates the relevant fields which will be collected in the GFDx database. For all of these fields, \_m is added for maize flour, \_o for oil, \_r for rice, \_s for salt and \_w for wheat flour.

| **Instrument Name** | **Field Name** | **Update Frequency** | **Data Values** | **Details** |
| --- | --- | --- | --- | --- |
| Maize flour  Oil  Rice  Salt  Wheat flour | compliance\_mt | Annual | Number – MT | Blank values indicate unknown and the rest of the fields for this indicator should also be blank. |
| compliance\_pc | Annual | Number - % |  |
| compliance\_data | Annual | 1 – Industry Compliance by Production Volumes  2 – Proxy of Industry Compliance by Market Share  3 – Proxy of Fortification Quality by Market/Household Samples  4 – Proxy of Estimated Fortification Quality  5 – Industry Compliance by Facilities/Samples Monitored | 1 – Indicator 15  2 – Indicator 15-1  3 – Indicator 15-2  4 – Indicator 15-3  5 – Indicator 15-4  Indicate full name of indicator or proxy indicator.  Select one option.  1, 2, 5 = compliance  3 = quality (report)  4 = quality (expert opinion) |
| compliance\_year | Annual | Number - YYYY | Year of documented data source |
| compliance\_source | Annual | Text | Source in the document's original language. |
| compliance\_source\_english | Annual | Text | Source repeated in English. |
| compliance\_comment | Annual | Text | Exact methodology and sampling definition from source report.  Note if methodology is not stated. |
| compliance\_file\_1 | Annual | Attached file | Document with compliance figures (1) |
| compliance\_file\_2 | Annual | Attached file | Document with compliance figures (2) |

# Indicators related to Population Coverage

Indicators 16-21 and their proxies are intended to capture the differences between the total population consuming a food vehicle, the population consuming the food vehicle which has been industrially processed, and the population consuming the industrially-processed food vehicle that has been fortified. The following example for rice is an example of the relationship between the indicators.



Population consuming confirmed fortified rice /total population (Indicator 18 or 19)

Total population in country

Population consuming rice/total population (Indicator 16)

Population consuming industrially processed rice/total population (Indicator 17)

Numerator from Indicator 18 or 19/Numerator from Indicator 16 = Indicator 20 or 21: coverage of confirmed fortified rice *only among the population that consumes rice*

%

## Population Coverage of Food Vehicle

**Provides:** The proportion of the population that likely eats the food vehicle in question. It provides the maximum coverage of a food vehicle assuming all of the food vehicle is industrially processed and required by legislation to be fortified.

**Definition:***The proportion of the population (typically measured via household surveys) that report consuming the food vehicle, foods made with that food vehicle, preparing foods with the food vehicle at home, or have the food vehicle in the household on the day of the survey, regardless of whether the food vehicle is fortified or industrially processed.*

**Data Calculation:**

**Data Values:** Number, expressed in percentage, ranging from 0 to 100%.

**Inclusion Criteria:** A published document, ideally a nationally representative survey, information from routine data and health information systems, or other data with cited methods must be available. Data should be nationally representative.

**Source:** The source will be the survey report or other published data with cited methods (e.g. from routine information systems).

**Comments:** The comments section will note the exact methodology definition from the source report.

**Frequency:** According to the regularity with which surveys are conducted (unlikely annual, typically within multiple-year intervals, e.g. every five years

### Proxy 16-1: Estimated Population Coverage of Food Vehicle

**Use:** If a national survey or other published and quality-assured data are unavailable on reported usage of a food vehicle.

**Definition:** *The proportion of the population that is estimated to consume an industrially processed food vehicle (or foods made with that food vehicle), regardless of whether it is actually fortified or industrially processed, based on Indicators 10 (Total Food Intake / Availability) and 11 (Total Food Available), rather than a household survey.*

**Data Calculation:**

NUMERATOR:An estimate of the population with access to the food vehicle.

DENOMINATOR: Total National Population

**Data Values:** Number, expressed in percentage, ranging from 0 to 100%.

**Inclusion Criteria:** Nationally representative data for indicators 10 and 11 must be available.

**Source:** The source will be same used for Indicator 11 (Total Food Available)

**Comments:** The comments section will note the exact methodology definition from the source report.

The table below indicates the relevant fields which will be collected in the GFDx database. For all of these fields, \_m is added for maize flour, \_o for oil, \_r for rice, \_s for salt and \_w for wheat flour.

| **Instrument Name** | **Field Name** | **Update Frequency** | **Data Values** | **Details** |
| --- | --- | --- | --- | --- |
| Maize flour  Oil  Rice  Salt  Wheat flour | coverage\_fv | Annual | Number - % | Blank values indicate unknown and the rest of the fields for this indicator should also be blank. |
| coverage\_fv\_data | Annual | 1 – Data from Survey  2 – Proxy from availability data and population estimates | Indicate full name of indicator or proxy indicator |
| coverage\_fv\_year | Annual | Number - YYYY | Year of documented data source |
| coverage\_fv\_source | Annual | Text | Source in the document's original language. |
| coverage\_fv\_source\_english | Annual | Text | Source repeated in English. |
| coverage\_fv\_comment | Annual | Text | Exact methodology definition from source report. |
| coverage\_fv\_file\_1 | Annual | Attached file | Document with coverage data (1) |
| coverage\_fv\_file\_2 | Annual | Attached file | Document with coverage data (2) |

## Population Coverage of Industrially Processed FOod Vehicle

**Provides:** The proportion of the population that uses a food vehicle (or foods made with that food vehicle) that is industrially processed – considered the maximum potential coverage of fortification for that food (a subset of Indicator 16).

**Definition:***The proportion of the population (typically measured via household survey) that report consuming, preparing foods at home, or have in the household on the day of the survey an industrially processed food vehicle (or foods made with that food vehicle), regardless of whether it is fortified.* The definition ofindustrially processed for each food vehicle is in Indicator 12.

**Data Calculation:**

**Data Values:** Number, expressed in percentage, ranging from 0 to 100%.

**Inclusion Criteria:** A published document, ideally a nationally representative survey, information from routine data and health information systems, or other data with cited methods must be available. Data should be nationally representative.

**Source:** The source will be the survey report or other published and quality assured report.

**Comments:** The comments section will note the exact methodology definition from the source report.

**Frequency:** According to the regularity with which surveys are conducted (unlikely annual, typically within multiple-year intervals, e.g. every five years)

### Proxy 17-1: Estimated Population Coverage of Industrially Processed Food Vehicle

**Use:** If a national survey or other published and quality-assured data are unavailable on reported usage of an industrially processed food vehicle.

**Definition:** *The proportion of the population that is estimated to consume an industrially processed food vehicle, regardless of whether it is fortified, based on Indicators 10 (Total Food Intake / Availability), 11 (Total Food Available), and 12 (Proportion of Industrially Processed Food), rather than a household survey.*

**Data Calculation:**

NUMERATOR:An estimate of the population with access to industrially processed foods.

DENOMINATOR: Total National Population

**Data Values:** Number, expressed in percentage, ranging from 0 to 100%.

**Inclusion Criteria:** Nationally representative data for indicators 10, 11, and 12 must be available.

**Source:** The source will be same used for Indicator 12 (Proportion of Industrially Processed Food)

**Comments:** The comments section will note the exact methodology definition from the source report.

The table below indicates the relevant fields which will be collected in the GFDx database. For all of these fields, \_m is added for maize flour, \_o for oil, \_r for rice, \_s for salt and \_w for wheat flour.

| **Instrument Name** | **Field Name** | **Update Frequency** | **Data Values** | **Details** |
| --- | --- | --- | --- | --- |
| Maize flour  Oil  Rice  Salt  Wheat flour | coverage\_ipfv | Annual | Number - % | Blank values indicate unknown and the rest of the fields for this indicator should also be blank. |
| coverage\_ipfv\_data | Annual | 1 – Data from Survey  2 – Proxy from availability data and population estimates | Indicate full name of indicator or proxy indicator |
| coverage\_ipfv\_year | Annual | Number - YYYY | Year of documented data source |
| coverage\_ipfv\_source | Annual | Text | Source in the document's original language. |
| coverage\_ipfv\_source\_english | Annual | Text | Source repeated in English. |
| coverage\_ipfv\_comment | Annual | Text | Exact methodology definition from source report. |
| coverage\_ipfv\_file\_1 | Annual | Attached file | Document with coverage data (1) |
| coverage\_ipfv\_file\_2 | Annual | Attached file | Document with coverage data (2) |

## Population Coverage of Fortified Food Vehicle (Any Level)

**Provides:** The proportion of the population that reports consuming, or has in the home the fortified food vehicle (or foods made with that food vehicle) fortified at any level (quality) – the population that is currently benefiting from fortification.

**Definition:***The proportion of the population (typically measured via household survey) that report consuming, preparing foods at home, or have in the household on the day of the survey a food vehicle (or foods made with that food vehicle) that is confirmed to be fortified* at any level (quality)*.*

***Quality:*** *The degree to which a product meets stated requirements. Unlike compliance, which must be measured at the point of production or import via regulatory monitoring data, quality relies on tests of products at market or household levels.*

***Fortified at any level:*** *The presence of a nutrient has been assessed qualitatively and the food has been found to contain that nutrient; however, actual levels have not been quantitatively assessed to compare against standards.*

**Data Calculation:**

**Data Values:** Number, expressed in percentage, ranging from 0 to 100%.

**Inclusion Criteria:** A published document, ideally a nationally representative survey, information from routine data and health information systems, or other data with cited methods must be available. Data should be nationally representative. Fortification confirmation (quality) should be completed on household samples. It can also be estimated using Indicator 15 (or any of its proxies using qualitative measures) for the particular brand in the household, if the brand is known (e.g. identification of compliance or quality of that brand via regulatory monitoring, market monitoring, or quantitative tests done on samples taken from households.)

**Source:** The source will be the survey report or other published and quality assured report (e.g. from routine information systems).

**Comments:** The comments section will note the exact methodology definition from the source report.

**Frequency:** According to the regularity with which surveys are conducted (unlikely annual, typically within multiple-year intervals, e.g. every five years)

### Proxy 18-1: Estimated Population Coverage of Fortified Food Vehicle (Any Level)

**Use:** If a national survey or other published and quality-assured data are unavailable on reported usage of a fortified and industrially processed food vehicle.

**Definition:** *The proportion of the population that is estimated to consume a fortified and industrially processed food vehicle, based on Indicators 10 (Total Food Intake / Availability), 11 (Total Food Available), 12 (Proportion of Industrially Processed Food), and 15 (Proportion of Fortified Food), rather than a household survey.*

**Data Calculation:**

NUMERATOR: An estimate of the population consuming a fortified food vehicle.

DENOMINATOR: Total national population

**Data Values:** Number, expressed in percentage, ranging from 0 to 100%.

**Inclusion Criteria:** Nationally representative data for indicators 10, 11, 12, and 15 must be available. Note that any value for Indicator 15 (15, 15-1, 15-2, or 15-3) can be used for this calculation.

**Source:** The source will be same used for Indicator 15 (Proportion of Fortified Food)

**Comments:** The comments section will note the exact methodology definition from the source report.

The table below indicates the relevant fields which will be collected in the GFDx database. For all of these fields, \_m is added for maize flour, \_o for oil, \_r for rice, \_s for salt and \_w for wheat flour.

| **Instrument Name** | **Field Name** | **Update Frequency** | **Data Values** | **Details** |
| --- | --- | --- | --- | --- |
| Maize flour  Oil  Rice  Salt  Wheat flour | coverage\_ffv | Annual | Number - % | Blank values indicate unknown and the rest of the fields for this indicator should also be blank. |
| coverage\_ffv\_data | Annual | 1 – Data from survey  2 – Proxy from availability data and population estimates | Indicate full name of indicator or proxy indicator |
| coverage\_ffv\_year | Annual | Number - YYYY | Year of documented data source |
| coverage\_ffv\_source | Annual | Text | Source in the document's original language. |
| coverage\_ffv\_source\_english | Annual | Text | Source repeated in English. |
| coverage\_ffv\_comment | Annual | Text | Exact methodology definition from source report. |
| coverage\_ffv\_file\_1 | Annual | Attached file | Document with coverage data (1) |
| coverage\_ffv\_file\_2 | Annual | Attached file | Document with coverage data (2) |

## Population Coverage of Fortified Food Vehicle (MEETING STANDARDS)

**Provides:** The proportion of the population that reports consuming, or has in the home the fortified food vehicle (or foods made with that food vehicle) confirmed to be fortified at levels meeting relevant standards – the population that is currently benefiting from fortification.

**Definition:***The proportion of the population (typically measured via household survey) that report consuming, preparing foods at home, or have in the household on the day of the survey a food vehicle (or foods made with that food vehicle) that is confirmed to be fortified* at levels meeting relevant standards[[17]](#footnote-17)*.*

**Data Calculation:**

**Data Values:** Number, expressed in percentage, ranging from 0 to 100%.

**Inclusion Criteria:** A published document, ideally a nationally representative survey, information from routine data and health information systems, or other data with cited methods must be available. Data should be nationally representative. Fortification confirmation should be completed on household samples. It can also be estimated using Indicator 15 (or any of its proxies using quantitative measures) for the particular brand in the household, if the brand is known (e.g. identification of compliance or quality of that brand via regulatory monitoring, market monitoring, or quantitative tests done on samples taken from households.)

**Source:** The source will be the survey report or other published and quality assured report (e.g. from routine information systems).

**Comments:** The comments section will note the exact methodology definition from the source report.

**Frequency:** According to the regularity with which surveys are conducted (unlikely annual, typically within multiple-year intervals, e.g. every five years)

### Proxy 19-1: Estimated Population Coverage of Fortified Food Vehicle (Meeting Standards)

**Use:** If a national survey or other published and quality-assured data are unavailable on reported usage of a fortified and industrially processed food vehicle.

**Definition:** *The proportion of the population that is estimated to consume a fortified and industrially processed food vehicle, based on Indicators 10 (Total Food Intake / Availability), 11 (Total Food Available), 12 (Proportion of Industrially Processed Food), and 15 (Proportion of Fortified Food), rather than a household survey.*

**Data Calculation:**

NUMERATOR: An estimate of the population consuming a fortified food vehicle.

DENOMINATOR: Total national population

**Data Values:** Number, expressed in percentage, ranging from 0 to 100%.

**Inclusion Criteria:** Nationally representative data for indicators 10, 11, 12, and 15 must be available. Note that only the figures from Indicator 15 which were derived from compliance figures (15 and 15-1) can be used to make this calculation.

**Source:** The source will be same used for Indicator 15 (Proportion of Fortified Food)

**Comments:** The comments section will note the exact methodology definition from the source report.

The table below indicates the relevant fields which will be collected in the GFDx database. For all of these fields, \_m is added for maize flour, \_o for oil, \_r for rice, \_s for salt and \_w for wheat flour.

| **Instrument Name** | **Field Name** | **Update Frequency** | **Data Values** | **Details** |
| --- | --- | --- | --- | --- |
| Maize flour  Oil  Rice  Salt  Wheat flour | coverage\_ffv\_quant | Annual | Number - % | Blank values indicate unknown and the rest of the fields for this indicator should also be blank. |
| coverage\_ffv\_quant\_year | Annual | Number - YYYY | Year of documented data source |
| coverage\_ffv\_quant\_data | Annual | 1 – Data from Survey  2 – Proxy from availability data and population estimates | Indicate full name of indicator or proxy indicator |
| coverage\_ffv\_quant\_source | Annual | Text | Source in the document's original language. |
| cov\_ffv\_quant\_source\_english | Annual | Text | Source repeated in English. |
| coverage\_ffv\_quant\_comment | Annual | Text | Exact methodology definition from source report. |
| cov\_ffv\_quant\_file\_1 | Annual | Attached file | Document with coverage data (1) |
| cov\_ffv\_quant\_file\_2 | Annual | Attached file | Document with coverage data (2) |

## Population Coverage of Fortified Food Vehicle (ANY LEVEL) Across Populations with that Food

**Provides:** The proportion of the population that reports consuming or has in the home the fortified food vehicle (or foods made with that food vehicle) which is confirmed to be fortified at any level (quality). Note that the denominator for this indicator is not the total population, but only those who use or consume that food – the population currently benefiting from fortification, within the population of food users.

**Definition: *Among populations that use the food vehicle, t****he proportion of the population (typically measured via household survey) that report consuming, preparing foods at home, or have in the household on the day of the survey a food vehicle that is confirmed to be fortified at any level (quality).*

**Data Calculation:**

**Data Values:** Number, expressed in percentage, ranging from 0 to 100%.

**Inclusion Criteria:** To be included in the GFDx, a published document (ideally a nationally representative survey) or other data with cited methods must be available and listed as the source of these data. Data should be nationally representative. Fortification confirmation should be completed on household samples. It can also be estimated using Indicator 15 (or any of its proxies using qualitative measures) for the particular brand in the household, if the brand is known (e.g. identification of compliance or quality of that brand via regulatory monitoring, market monitoring, or quantitative tests done on samples taken from households.)

**Source:** The source will be the survey report or other published and quality assured report (e.g. from routine information systems).

**Comments:** The comments section will note the exact methodology definition from the source report.

**Frequency:** According to the regularity with which surveys are conducted (unlikely annual, typically within multiple-year intervals, e.g. every five years)

The table below indicates the relevant fields which will be collected in the GFDx database. For all of these fields, \_m is added for maize flour, \_o for oil, \_r for rice, \_s for salt and \_w for wheat flour.

| **Instrument Name** | **Field Name** | **Update Frequency** | **Data Values** | **Details** |
| --- | --- | --- | --- | --- |
| Maize flour  Oil  Rice  Salt  Wheat flour | coverage\_ffv\_hh | Annual | Number - % | Blank values indicate unknown and the rest of the fields for this indicator should also be blank. |
| coverage\_ffv\_hh\_year | Annual | Number - YYYY | Year of documented data source |
| coverage\_ffv\_hh\_source | Annual | Text | Source in the document's original language. |
| cov\_ffv\_hh\_source\_english | Annual | Text | Source repeated in English. |
| coverage\_ffv\_hh\_comment | Annual | Text | Exact methodology definition from source report. |
| coverage\_ffv\_hh\_file\_1 | Annual | Attached file | Document with coverage data (1) |
| coverage\_ffv\_hh\_file\_2 | Annual | Attached file | Document with coverage data (2) |

## Population Coverage of Fortified Food Vehicle (MEETING STANDARDS) Across Populations with that Food

**Provides:** The proportion of the population that reports consuming or has in the home the fortified food vehicle (or foods made with that food vehicle) which is confirmed to be fortified to meet standards. Note that the denominator for this indicator is not the total population, but only those who use or consume that food – the population currently benefiting from fortification, within the population of food users.

**Definition: *Among populations that use the food vehicle, t****he proportion of the population (typically measured via household survey) that report consuming, preparing foods at home, or have in the household on the day of the survey a food vehicle that is confirmed to be fortified* at levels meeting relevant standards[[18]](#footnote-18)*.*

**Data Calculation:**

**Data Values:** Number, expressed in percentage, ranging from 0 to 100%.

**Inclusion Criteria:** To be included in the GFDx, a published document (ideally a nationally representative survey) or other data with cited methods must be available and listed as the source of these data. Data should be nationally representative. Fortification confirmation should be completed on household samples. It can also be estimated using Indicator 15 (or any of its proxies using quantitative measures) for the particular brand in the household, if the brand is known (e.g. identification of compliance or quality of that brand via regulatory monitoring, market monitoring, or quantitative tests done on samples taken from households.)

**Source:** The source will be the survey report or other published and quality assured report (e.g. from routine information systems).

**Comments:** The comments section will note the exact methodology definition from the source report.

**Frequency:** According to the regularity with which surveys are conducted (unlikely annual, typically within multiple-year intervals, e.g. every five years)

The table below indicates the relevant fields which will be collected in the GFDx database. For all of these fields, \_m is added for maize flour, \_o for oil, \_r for rice, \_s for salt and \_w for wheat flour.

| **Instrument Name** | **Field Name** | **Update Frequency** | **Data Values** | **Details** |
| --- | --- | --- | --- | --- |
| Maize flour  Oil  Rice  Salt  Wheat flour | coverage\_ffv\_hh\_quant | Annual | Number - % | Blank values indicate unknown and the rest of the fields for this indicator should also be blank. |
| coverage\_ffv\_hh\_quant\_year | Annual | Number - YYYY | Year of documented data source |
| coverage\_ffv\_hh\_quant\_source | Annual | Text | Source in the document's original language. |
| cov\_ffv\_hh\_quant\_source\_english | Annual | Text | Source repeated in English. |
| coverage\_ffv\_hh\_quant\_comment | Annual | Text | Exact methodology definition from source report. |
| coverage\_ffv\_hh\_quant\_file\_1 | Annual | Attached file | Document with coverage data (1) |
| coverage\_ffv\_hh\_quant\_file\_2 | Annual | Attached file | Document with coverage data (2) |

# INDICATORS RELATED TO HEALTH IMPACT BEFORE & AFTER MANDATORY FOOD FORTIFICATION

## 22. differences in health status Before and After Mandatory Food Fortification

**Provides:** Information whether a given micronutrient biological marker (such as a nutrient measured in blood, urine, hair, nails or feces) and/or prevalence of neural tube defects, and prevalence of xeropthalmia (night blindness\*) has changed after the introduction of mandatory fortification and fortification requires the relevant nutrient for expected nutrient change (e.g. folic acid for prevalence of neural tube defects, iron for serum ferritin). As programmatic implementation details are necessary to understand whether a given fortification program is likely to be effective or not, this indicator does not conclude whether the change in health status is attributable to fortification alone.

**Definition:** *The micronutrient biomarker concentrations, prevalence of nutrient deficiency (typically measured via blood or urine, in a household survey), prevalence of neural tube defects\*\* and/or prevalence of xeropthalmia (e.g. night blindness) before (pre) and after (post) the effective year when fortification started, in nationally representative populations\*\*\* with mandatory food fortification legislation and/or standards in place.*

GFDx has purposively limited the inclusion of functional indicators. Refer to the linked document for a [justification for the exclusion of certain functional indicators in the GFDx](https://www.dropbox.com/s/m78zs6qc58l7mqs/Justification%20for%20health%20impact%20indicators.docx?dl=0).

\* Prevalence criteria for determining the public health significance of xerophthalmia and vitamin A deficiency in children aged 6 months to 6 years: minimum prevalence of Night blindness >1, Bitot spots >0.5, Corneal xerosis/corneal ulceration/keratomalacia >0.01 and Corneal scar >0.05.

\*\*Neural tube defects defined as: spina bifida, anencephaly, and encephalocele

\*\*\*Sub-nationally representative population data will be allowed as long as the post-assessment occurs in the same population targeted in the pre-assessment (such as separate pre-post-assessments that both occur among women of reproductive age).

**Data Calculations:**

1. Biomarker status units from the pre-post assessments will be converted to standard biomarker units.
2. Neural tube defect prevalence is converted to the prevalence per 10,000 for consistency.
   1. Types of neural tube defects may be added together for a sum neural tube defect prevalence *if those cases occur in separate individuals*
      1. e.g. 2 individual spina bifida cases per 10,000 live births + 1 individual anencephaly case per 10,000 = 3 neural tube defects per 10,000). If spina bifida and anencephaly occur in the same individual, this is only counted as 1 case.
   2. No adjustments will be made to standardize the birth denominator (e.g. live births vs. total births)

**Data Values:**

* Biomarker status units; number, expressed in the biomarker status concentration from the pre-post assessments.
* Standard biomarker units; number that represents the biomarker concentration value converted to a standard unit for consistency.
* Prevalence of nutrient deficiency; number, expressed in percentage, ranging from 0 to 100%, that compares the biomarker status units with internationally recognized cut-off values for nutrient adequacy.
* Prevalence of neural tube defects; number, expressed as per ten thousand births\*

Prevalence of Xeropthalmia[[19]](#footnote-19) in children aged 6 months to 6 years.

\*Birth defect prevalence may be reported with differing denominators (e.g. live births or total births), depending on the definition of births in a birth defect surveillance system. GFDx will report the denominator used in the survey/study.

**Pre-Source:** The source will be an evaluation survey or assessment in which baseline data were collected before (pre) the effective year of fortification.

**Post-Source:** The source will be an evaluation survey or assessment that was conducted after (post) the effective year of fortification (if different from Pre-Source). The post-survey or assessment should have been conducted only after the fortification program had been operating for 12 to 18 months in order to determine any significant change in micronutrient status.

**Comments:**

* The comments section will note the statistics relevant to the specific data value.
* The comments section will note the study methodology from the pre-post source(s).
  + For neural tube defects, this includes:
    - Type of neural tube defects included (spina bifida, anencephaly, and/or encephalocele)
    - Pregnancy outcomes included in the numerator (live births, still births, terminations)
    - Definition of the denominator (e.g. live births or total births)
* Comment on any calculations made, including any neural tube defect prevalence calculation
* For Xeropthalmia, this includes Night blindness, Bitot spots, Corneal xerosis/corneal ulceration/keratomalacia and Corneal scar.
* Comment on classification of Xeropthalmia and age of population studied.

**Frequency**: According to the regularity with which surveys are conducted (typically within multiple-year intervals, e.g. every five to ten years, or longer), but unlikely to be annual. If there are data available for multiple pre-post fortification years, the pre-assessment closest to the effective year when fortification started and the post-assessment closest to the present year will be used.

The table below indicates the relevant fields which will be collected in the GFDx database.

| **Instrument Name** | **Field Name** | **Update Frequency** | **Data Values** | **Details** |
| --- | --- | --- | --- | --- |
| Health impact | food\_vehicle | Static | 1, Maize flour  2, Oil  3, Rice  4, Salt  5, Wheat flour | Food assessed in the source. |
| impact\_nutrient | Static | 1, Calcium  2, Folate  3, Iodine  4, Iron  5, Niacin  6, Riboflavin  7, Thiamin  8, Vitamin A  9, Vitamin B12  10, Vitamin B6  11, Vitamin D  12, Vitamin E | Nutrient accessed in country standard. Note nutrient must be mandatory in the country standard. |
| impact\_outcome | Static | Text | Outcome assessed in the source. Include all relevant details such as 1. Nutrient biomarker tested with units; 2. Deficiency cut-off value with units if prevalence assessed; 3. Neural tube defects, subtypes defined; Night blindness and xeropthalmia |
| impact\_population\_pre | Static | Text | Specify the exact population assessed including the age range when applicable. |
| impact\_year\_pre | Static | Number - YYYY | Year of the pre-assessment |
| impact\_population\_post | Static | Text | Specify the exact population assessed including the age range when applicable. |
| impact\_year\_post | Static | Number - YYYY | Year of the post-assessment |
| impact\_mandatory\_year | Static | Number - YYYY | Year mandatory fortification of food vehicle when into effect. This year should come from the GFDx database. |
|  | impact\_mandatory\_yr\_com | Static | Text | Note if the year of mandatory fortification in the pre- post- assessment is different from the date in the GFDx database |
|  | impact\_value\_original\_pre | Static | Number | Original data value from the pre-assessment. |
|  | impact\_value\_convert\_pre | Static | Number | Converted data value from the pre-assessment. Convert into standard units for each nutrient from the table above. If no need to convert, copy original value. |
|  | impact\_value\_convert\_com\_pre | Static | Text | Converted data value from the pre-assessment with units. If no need to convert, copy original value with units. |
|  | impact\_value\_original\_post | Static | Number | Original data value from the post-assessment. |
|  | impact\_value\_convert\_post | Static | Number | Converted data value from the post-assessment. Convert into standard units for each nutrient from the table above. If no need to convert, copy original value. |
|  | impact\_value\_convert\_com\_post | Static | Text | Converted data value from the post-assessment with units. If no need to convert, copy original value with units. |
|  | impact\_pre\_post\_difference | Static | 1, Positive change (increase in continuous values or decrease in deficiency values)  2, Negative change (decrease in continuous values or increase in deficiency values)  3, No change  4, Cannot determine | The difference in the pre- post- assessment data values. Options 1, 2, and 3 must have a statistical link to the value (p-value, confidence, interval, etc.) |
|  | impact\_pre\_post\_diff\_com | Static | Text | The magnitude of difference in the pre- post- assessment data values (e.g. P <0.05) or no statistical test conducted. |
|  | impact\_value\_comment\_pre | Static | Text | Note any relevant statistics from the pre-assessment that are relevant to understand the pre-data value (e.g. adjusted/crude, weighted/unweighted, type of central tendency, value and type of uncertainty). |
|  | impact\_value\_comment\_post | Static | Text | Note any relevant statistics from the post-assessment that are relevant to understand the post-data value (e.g. adjusted/crude, weighted/unweighted, type of central tendency, value and type of uncertainty). |
|  | impact\_methodology\_pre | Static | Text | Note any relevant methodology from the pre-assessment such as study design, geographic representation, or any plausibility of effect due to fortification as identified by authors. |
|  | impact\_methodology\_post | Static | Text | Note any relevant methodology from the post-assessment such as study design, geographic representation, or any plausibility of effect due to fortification as identified by authors. |
|  | impact\_source\_pre | Static | Text | Source of the pre-assessment. |
|  | impact\_source\_post | Static | Text | Source of the post-assessment if different from the pre-assessment. |

# Appendix: Citation Instructions

To cite the GFDx generally use the following: Global Fortification Data Exchange. [Accessed dd/mm/yyyy.] <http://www.fortificationdata.org>.

To cite a specific map or visualization within the GFDx, use the following: “Name of Visualization.” Global Fortification Data Exchange. [Accessed dd/mm/yyyy.] <http://www.fortificationdata.org>.

To cite original sources of data included within the GFDx, use the following: Author. Title. Country. Publication date. [Weblink].

* There is a period at the end of each part of the reference, except for the weblink.
* **AUTHOR**: Institutional author, or for personal communication, use the name of the individual plus their title and institutional affiliation. If there is no institutional author, write “No author”. If there are multiple authors, separate them by a comma.
* **TITLE**: The title should be the full title of the document. For legal documents, also include the document number, if available. If there are multiple parts to the title, separate them by a comma. For personal communication, no title will be needed.
* **COUNTRY**: The country should be that where the document was written or published. This includes for regional documents where the country with data in question is different from the country of publication. If the country of publication is not clearly specified, write “No country”.
* **PUBLICATION DATE**: If there is no publication date, write “No date”. The publication date should be written as dd/Month/yyyy (e.g. 27/March/2017). If the date does not have the day, include the month and year (e.g. March/2017). If the date does not have the day or month, just include the year (e.g. 2017). For personal communication, see below.
* **WEBLINK**: If no website is available, do not add the brackets at the end of the reference.

To cite personal communication sources of data included within the GFDx, use the following: Name, organization. Personal communication. Country. Year.

* **NAME**: First name fully spelled out last name fully spelled out. If there are multiple people who communicated with the GFDx, separate them by a comma (,).
* **ORGANIZATION**: Only include the head title of the organization. For example, if someone works in the Nutrition Department at the Ministry of Health only include the Ministry of Health in the organization name.
* **YEAR**: Write the 4-digit year, such as 2017.
* There is a period at the end of each part of the reference.

To cite scientific publication sources of data included within the GFDx, use the following: Author(s). Title. Journal name. Publication date. [Weblink in brackets]

* **AUTHOR**: Follow this format - Last name fully spelled out, first initials. If there are multiple authors, separate them by a comma (,).
* **TITLE**: If there are multiple parts to the title, separate them by a comma (,).
* **PUBLICATION DATE**: If the date does not have the day, include the month and year, such as March/2017. If the date does not have the day or month, write the 4-digit year, such as 2017.
* **WEBLINK**: If the scientific publication has a weblink, the website is put inside brackets. If no website is available, do not add the brackets at the end of the reference.
* There is a period at the end of each part of the reference.

1. United Nations. Member States. [Accessed 26 February 2018]. See: <http://www.un.org/en/member-states/>. [↑](#footnote-ref-1)
2. United Nations. Non-member States. [Accessed 27 August 2018]. See: http://www.un.org/en/sections/member-states/non-member-states/index.html. [↑](#footnote-ref-2)
3. UN Statistics Division. [Accessed 25 June 2018]. See: <https://unstats.un.org/unsd/methodology/m49/>. (See Geographic Regions in left panel) [↑](#footnote-ref-3)
4. The World Bank. World Bank Country and Lending Groups. [Accessed 26 February 2018]. See: <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups>. [↑](#footnote-ref-4)
5. Note that mg/kg is equivalent to parts per million (ppm) as might also be indicated on standards. Nutrient levels in International Units (IU), which are common for vitamins A, D, and E, will be converted to mg/kg. [↑](#footnote-ref-5)
6. All imported food is assumed to be industrially processed, as facilities that are able to participate in the export market generally have industrial capabilities. Personal communication: Scott Montgomery, Food Fortification Initiative [↑](#footnote-ref-6)
7. Rated production capacity is the maximum production capacity that a food processing facility is able to reach if operating at full capacity. For example, a wheat flour mill may be rated to mill 500 metric tons of wheat grain daily, but their actual processing may only be 300 metric tons of wheat grain. [↑](#footnote-ref-7)
8. World Health Organization. Recommendations on wheat and maize flour fortification: Meeting report: interim consensus statement. 2009. See: <http://www.who.int/nutrition/publications/micronutrients/wheat_maize_fortification/en/>. [↑](#footnote-ref-8)
9. Alavi S. et al (Eds.). April 2008. A2Z. Rice fortification in developing countries: A critical review of the technical and economical feasibility. [↑](#footnote-ref-9)
10. Batch or continuous processing in quantities as low as 1MT/day could have the technological capability and knowledge to fortify. This value is a general rule of thumb and can be adapted for country-specific use as the industrial context warrants. Personal communication: Quentin Johnson, Food Fortification Initiative; Philip Randall, PCubed Consulting; David Morgan, Global Alliance for Improved Nutrition. [↑](#footnote-ref-10)
11. Khan N A, Yusufali R, Bagriansky J, Situma r and Gorstein J. A Review of Country Experiences in Small-Scale Salt Iodization. Submitted to Public Health Nutrition; and Bagriansky J. Engaging small-scale producers in salt iodization: lessons from a 10-country analysis. Working Draft. UNICEF Headquarters, December 2016. [↑](#footnote-ref-11)
12. For further recommendations on compliance determination at food production sites, import sites, and at a national level, see also “Regulatory Monitoring of National Food Fortification Programs: A policy guidance document” at http://www.fortificationdata.org/resources. [↑](#footnote-ref-12)
13. In the rare cases where an external, non-government agency has been authorized to collect regulatory monitoring data at production or import, data will only be accepted as compliance if the report is co-authored by a government agency. [↑](#footnote-ref-13)
14. While regulatory monitoring can occur at market level (commercial monitoring) and may be enforceable if standards/regulations specify required nutrient levels at market, the GFDx will not categorize these data with compliance data collected from production and/or imports since it reflects conditions in food distribution (transportation time, temperature, storage time) that food producers/importers may not have control over. [↑](#footnote-ref-14)
15. Note that either the domestic production figure or the import figure could be omitted if the country does not domestically produce or import the food vehicle in question. [↑](#footnote-ref-15)
16. Indicator 15 (and all proxies that include an element of industrial market share) can be converted to total market share (assuming 100% of market share is achieved by combining ALL producers of a food, regardless of whether they are considered “industrial” or are required by law to fortify) by multiplying the proportion of food that is fortified (Indicator 15, any proxy) with the proportion of food that is industrially processed (Indicator 12, any proxy). [↑](#footnote-ref-16)
17. Note that most standards DO NOT state levels of nutrients at household or market levels; samples taken at these levels SHOULD NOT be compared to standards that only note levels of nutrients at production or import levels. Universal salt iodization guidelines have recommended a global standard of ≥15 mg/kg iodine added to salt, which can be considered a “global standard” with which iodized salt samples tested quantitatively can be compared. [↑](#footnote-ref-17)
18. Note that most standards DO NOT state levels of nutrients at household or market levels; samples taken at these levels SHOULD NOT be compared to standards that only note levels of nutrients at production or import levels. Universal salt iodization guidelines have recommended a global standard of ≥15 mg/kg iodine added to salt, which can be considered a “global standard” with which iodized salt samples tested quantitatively can be compared. [↑](#footnote-ref-18)
19. Xerophthalmia and night blindness for the assessment of clinical vitamin A deficiency in individuals and populations. Vitamin and Mineral Nutrition Information System. Geneva: World Health Organization; 2014 (WHO/NMH/NHD/EPG/14.4; http://apps. who.int/iris/bitstream/10665/133705/1/WHO\_NMH\_NHD\_ EPG\_14.4\_eng.pdf?ua=1, accessed [01-16-2020]). [↑](#footnote-ref-19)