



**REGIONAL TRAINING ON SCIENTIFIC BASIS
OF CODEX WITH FOCUS ON
DATA GENERATION AND SUBMISSION
FOR STANDARDS SETTING**

23-25 July 2025 • Zanzibar, Tanzania



Introduction to the GEMS Food Database

Day 1: 23 July 2025

Outline

1. Introduction

2. Registration and Login

3. The GEMS/Food template

4. Calls for data

5. Conclusion



Training Objectives

By the end of this training module, participants will be able to:

- ☐ Register for access and set up a data provider account on the GEMS/Food platform.
- ☐ Review and understand the requirements for data collection and submission using the GEMS/Food template.
- ☐ Respond to periodic calls for data issued by the JECFA Secretariat.

Introduction

Since 1976, the Global Environment Monitoring System – Food Contamination Monitoring and Assessment Programme, which is commonly known as GEMS/Food, has informed:



- governments,
- the Codex Alimentarius Commission and its scientific advisory bodies, such as JMPR and JECFA, and
- other relevant institutions, as well as the public,

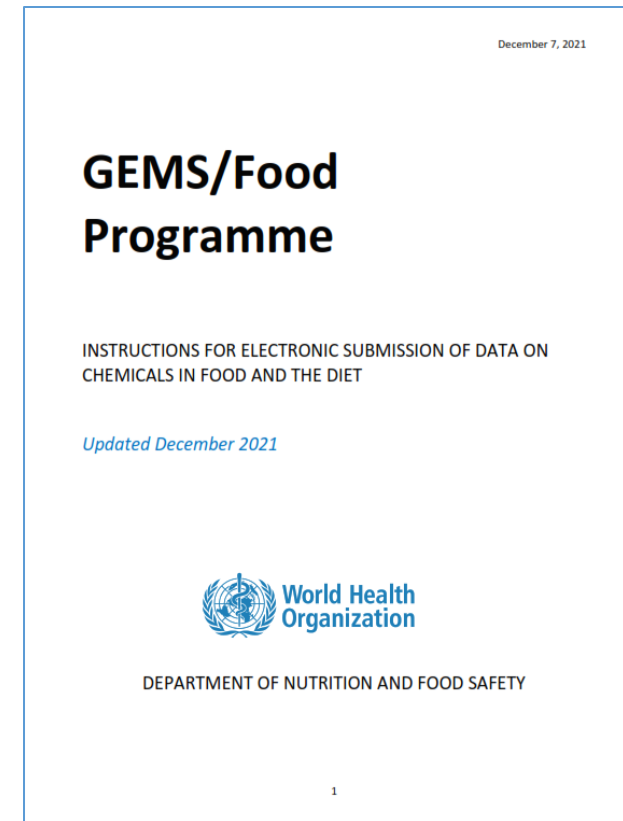
on levels and trends of contaminants in food, their contribution to total human exposure, and significance with regard to public health and trade.

Introduction

The GEMS/ Food Database is a web-based system to access and submit data on contaminant levels in foods.



The screenshot shows the GEMS/Food web interface. At the top, there is a blue header with the World Health Organization logo and the text "GEMS/Food". Below the header, there are two tabs: "Home Page" and "Search". The "Search" tab is active. Below the tabs, there is a breadcrumb trail: "GEMS/Food Contaminants > Search". A "Notes" section contains a message: "Please note that there is a limitation on the number of rows that can be exported in an excel file. You would not be able to export this limit you should do a new search before exporting data in csv file limited for example to certain regions or certain years". Below the notes, there is a search bar with a "Search" button, a "Reset" button, and a "Hide options" link. Below the search bar, there is a "Search Criteria" section with four dropdown menus: "WHO Region(s)" (set to "All"), "Contaminant(s)" (set to "All"), "Food Category(s)" (set to "All"), and "Food Name" (set to "All"). To the right of the dropdown menus, there are two date pickers for "Sampling period from:" and "to:", both set to "(yyyy)".



The cover page of the GEMS/Food Programme instructions. At the top right, it says "December 7, 2021". The title "GEMS/Food Programme" is in large, bold, black font. Below the title, it says "INSTRUCTIONS FOR ELECTRONIC SUBMISSION OF DATA ON CHEMICALS IN FOOD AND THE DIET". Below that, it says "Updated December 2021". At the bottom, there is the World Health Organization logo and the text "DEPARTMENT OF NUTRITION AND FOOD SAFETY". The page number "1" is at the bottom right.

<https://www.who.int/teams/nutrition-and-food-safety/databases/global-environment-monitoring-system-food-contamination>

Introduction

The GEMS/ Food Cluster diets: as part of its dietary exposure assessment mandate, GEMS/Food has developed model diets which are currently used for predicting dietary intake of various chemicals (17 cluster diets).

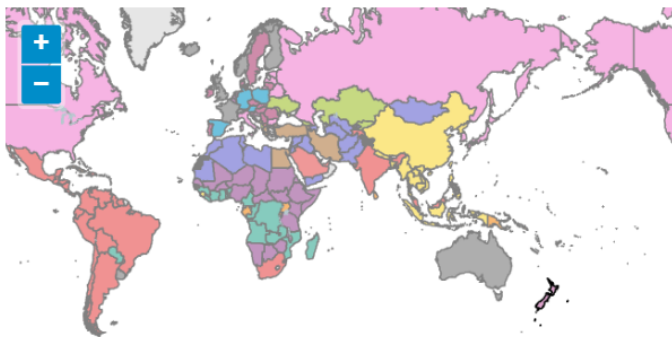


GEMS/Food Cluster Diets - 2012

A part of the FOSCOLLAB

[Click here to download full data set](#)

Clusters and Countries



Select Clusters

| | |
|-----|---|
| G01 | Afghanistan, Algeria, Azerbaijan, Iraq, Jordan, Libya, Mauritania, Mongolia, Morocc... |
| G02 | Albania, Bosnia and Herzegovina, Georgia, Kazakhstan, Kyrgyzstan, Montenegro, R... |
| G03 | Angola, Benin, Burundi, Cameroon, Congo, Côte d'Ivoire, Democratic Republic of t... |
| G04 | Antigua and Barbuda, Bahamas, Barbados, Brunei Darussalam, French Polynesia, G... |
| G05 | Argentina, Bolivia Plurinational State of, Brazil, Cape Verde, Chile, Colombia, Cost... |
| G06 | Armenia, Cuba, Egypt, Greece, Iran Islamic Republic of, Lebanon, Turkey |
| G07 | Australia, Bermuda, Finland, France, Iceland, Luxembourg, Norway, Switzerland, U... |
| G08 | Austria, Germany, Poland, Spain |
| G09 | Bangladesh, Cambodia, China, Democratic People's Republic of Korea, Guinea Biss... |
| G10 | Belarus, Bulgaria, Canada, Croatia, Cyprus, Estonia, Italy, Japan, Latvia, Malta, New ... |
| G11 | Belgium, Netherlands |
| G12 | Belize, Dominica |
| G14 | Comoros, Fiji Islands, Kiribati, Papua New Guinea, Solomon Islands, Sri Lanka, Van... |
| G13 | Ethiopia, Erythrea, South Sudan, Botswana, Burkina Faso, Central African Republic, ... |
| G16 | Gabon, Rwanda, Uganda |
| G17 | Samoa, Sao Tome and Principe |
| G15 | Serbia, Czech Republic, Denmark, Hungary, Ireland, Lithuania, Portugal, Romania, ... |

Registration and Login

- ❑ Data providers should first register and create a WHO login (e-mail address) and password (e-mail should be sent to gems_food@who.int).
- ❑ The institution owning the data should provide the GEMS/Food administrator with contact details to have it listed as a collaborating institution.
- ❑ Once logged in to the database, the user will have access to the Excel templates for contributing data, that allow data providers to enter the national food classification and to map it with the WHO and/or the FoodEx2 classifications.
 - The “Regular template” allows data provider to enter the national food classification and to map it with both the WHO and the FoodEx2 classifications.
 - The “Bulk template” allows data provider having already mapped the national classification with either the WHO or the FoodEx2 classification to enter data directly using one of the 2 coding system.

Food Mapping

- ❑ The national classification should be mapped with either the WHO or the FoodEx2 classification (The local food identifier consists of the name given to the food in the national database).
- ❑ The GEMS/Food code is based on a hierarchical classification with 2 levels:
 - The first level (WHO Food Group) corresponds to 23 broad categories usually reported in food consumption surveys plus one category for feed.
 - The second level (WHO Food Identifier) corresponds to the detailed food descriptors used in the Codex Alimentarius Committees and to foods, processed or not, and analyzed as purchased or as consumed.
- ❑ The FoodEx2 code developed by EFSA and recommended for dietary exposure assessment is already mapped with the WHO code.

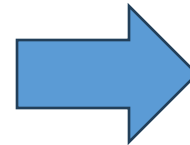
Food Mapping

Food Category(s): **All**

Food Name:

☒ Check all ☒ Uncheck all

- ☐ Alcoholic beverages
- ☐ Animal feed
- ☒ **Cereals and cereal-based products**
- ☐ Composite food (including frozen products)
- ☐ Drinking water (water without any additives except carbon dioxide; includes water ice for consumption)
- ☐ Eggs and egg products



Food Category(s): **Cereals and cereal-based products**

Food Name:

Filter: ☒ Check all ☒ Uncheck all

☐ Buckwheat, kamut, quinoa

- ☐ Bread & other cooked cereal products
- ☐ Buckwheat
- ☐ CEREAL GRAINS
- ☒ **Cereals and cereal-based products NES**
- ☐ Job's tears
- ☐ Maize

If no information on the detailed food category (e.g., "fruit") select a WHO Food Identifier similar to the WHO Food Group (e.g., Fruit and fruit product NES).

If the precise food name is not listed, the more generic sub-group listed in CAPITALS should be chosen.

Current fields in GEMS/Food template

| Column | Field | Field type /Drop-down menu | Mandatory or Optional | Flag language (proposed new or revised) |
|--------|------------------------------------|--|-----------------------|--|
| E | Local Food Identifier | Free text | Mandatory | Provide a <i>brief but descriptive</i> name of the food, such as "Orange roughy" (versus "Fish") or "Polished/white rice" (versus "rice.") |
| F | Serial no of the Record | Free text | Mandatory | One serial number is used for each sample. Data on different contaminants in the same sample should have the same serial number. National institutions should coordinate serial number selection to ensure numbers are informative and non-duplicative. |
| G | Submitting Country/Region/Observer | Drop-down menu <ul style="list-style-type: none"> (List of countries, regions, observers) Unspecified | Mandatory | Identifies country, region, or observer (region unspecified) submitting the data; this is not the country of production. If observer is not listed in dropdown menu, choose Unspecified and note name of Observer in Remarks. |
| H | Contaminant | Drop-down menu <ul style="list-style-type: none"> (List of contaminants) | Optional | Please select a contaminant from the list. A contaminant is required, but manual entry in "Column H: Contaminant" is optional if a contaminant has been added on Worksheet 1: Start. If "multiple" is selected in Worksheet 1: Start, manual entry of contaminants in Field H is required. |
| I | Food Origin | Drop-down menu <ul style="list-style-type: none"> Domestic Imported Mixed origin Unknown | Optional | |
| J | Sampling Date | Free text (YYYY) | Mandatory | |
| K | Sample representative-ness | Drop-down menu <ul style="list-style-type: none"> Random (routine) sampling Targeted sampling Unknown | Mandatory | Targeted sampling refers to targeted follow-up of specific findings of contamination. Random (routine) sampling refers to sampling that is not targeted and can include routine surveillance or sampling specific food types or importing countries. |
| L | Laboratory Identification | Free text | Optional | Laboratory that completed the analysis. |

Current fields in GEMS/Food template

| Column | Field | Field type /Drop-down menu | Mandatory or Optional | Flag language (proposed new or revised) |
|--------|--|---|--|---|
| M | Analytical Quality Assurance | Drop-down menu <ul style="list-style-type: none"> Internal quality assurance and reference standards only. Successful participation in relevant proficiency tests/interlaboratory comparisons during the sampling and analysis period. Official accreditation for the relevant methods during the sampling and analysis period. Unknown quality assurance of the lab. | Optional | |
| N | Measurement units for Contaminant Levels | Drop-down menu <ul style="list-style-type: none"> mg/kg µg/kg ng/kg pg/kg Bq/kg | Mandatory | Check units carefully. Make sure units chosen from dropdown menu align with sample results. |
| O | LOD | Free text | Mandatory for results not quantified (i.e., non-detect) if LOQ is not provided. (Optional) | Enter a numeric value greater than 0 and less than LOQ. This field contains the limit of detection reported by the laboratory. LOD or LOQ are mandatory if non-detect is entered in Results (T). |
| P | LOQ | Free text | Mandatory for results not quantified if LOD is not provided. (Mandatory) | Enter a numeric value greater than 0 and LOD. This field contains the limit of quantification reported by the laboratory. LOD or LOQ are mandatory if non-detect is entered in Results (T). |

Current fields in GEMS/Food template

| Column | Field | Field type /Drop-down menu | Mandatory or Optional | Flag language (proposed new or revised) |
|--------|--|--|-----------------------|--|
| Q | Results based on | Drop-down menu <ul style="list-style-type: none"> Fat content Dry weight As is (raw, fresh, as sold) As consumed | Mandatory | |
| R | Portion analyzed | Drop-down menu <ul style="list-style-type: none"> Edible only Whole food (edible + inedible) | Mandatory | Example: shelled nut (edible) versus unshelled nut (whole food) |
| S | State of food analyzed (Cooked/Raw) | Drop-down menu <ul style="list-style-type: none"> Cooked Raw Unknown | Optional | Example: raw fish versus cooked fish |
| T | Results | Free text | Mandatory | Entering a result is mandatory: either a zero, non-detect, or a numeric result. Zero or non-detect can be entered only if LOQ or LOD are provided. |
| U | Individual vs Aggregated data | Drop-down menu <ul style="list-style-type: none"> Individual Aggregated | Mandatory | |
| V | Confidentiality of Data | Drop-down menu <ul style="list-style-type: none"> Yes Blank | Optional | All data for which "blank" is chosen or no option is selected will be considered as non-confidential in data handling and analysis. |
| W | Remarks/References | Free text | Optional | |
| X | Year of production/harvest | Free text (YYYY) | Optional | |
| Y | Compositional information | Free text | Optional | Information from labels or as determined analytically such as major ingredients, fat content, water content, or percent total cocoa solids. |
| Z-1 | Country/Region of Production of Finished Product | Menu <ul style="list-style-type: none"> Unknown Countries/Regions (A-Z) | Optional | |

Current fields in GEMS/Food template

| Column | Field | Field type /Drop-down menu | Mandatory or Optional | Flag language (proposed new or revised) |
|--------|---|--|-----------------------|--|
| Z-2 | Country/Region of Origin of Raw Materials | Menu <ul style="list-style-type: none"> • Unknown • Countries/Regions (A-Z) | Optional | |
| AA | Product type | Menu: <ul style="list-style-type: none"> • Destined for further processing • Ready to eat • Not applicable • Unknown | Optional | "Destined for further processing" and "ready to eat" are defined for certain contaminants and commodities in the <i>Codex General Standard for Contaminants and Toxins in Food and Feed</i> , CXS-193. See paragraph 48 below. |
| BB | Sampling location in production chain | Menu: <ul style="list-style-type: none"> • Unknown • Production site • Bulk lot transport • Border (import/export) • Market/Retail • Other | Mandatory | Provides information on where the sample was obtained in the production chain. |
| CC | Principle of method of analysis | Menu <ul style="list-style-type: none"> • Method A • Method B • Method Z • Other • Unknown | Optional | |

GEMS/Food Database



GEMS/Food

[Feedback](#) | [Login](#) | [Search](#)

[Home Page](#)

[Search](#)

GEMS/Food Contaminants > Search

Search Criteria

WHO Region(s): Sampling period from: (yyyy)

Contaminant(s): to: (yyyy)

Food Category(s):

Food Name:

Search Results

[Export to file \(csv\)](#) | [Print](#) | [Get link to this search](#) | [Email this search](#)

| Record Type | Region | Contaminant | Food Group | WHO Food Identifier | WHO Food Code | State of food analysed | Result | Units | LOD | LOQ | Year Sample | Sample representativeness (or reliability) | Lab identification | Food origin | Analytical quality assurance | Results based on |
|-------------|--------|-------------|--------------------------|---------------------|---------------|------------------------|--------|-------|------|-------|-------------|--|--------------------|-------------|------------------------------|------------------|
| Individual | PAHO | Abamectin | Fruit and fruit products | Avocado | FI 0326 | Raw | ND | mg/kg | 0.01 | 0.011 | 2015 | Random sampling | 8 | Imported | Officially accredited | As is |
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Calls for Data

- ☐ Data can be submitted to the GEMS/Food database on any food at any time, not just in response to a Call for Data specifying specific foods or time periods of interest.
- ☐ If data are submitted in response to a specific Call for Data, consider noting this information in the Remarks field.
- ☐ Data that fall outside the date frame referenced in a Call for Data can also be submitted. These data may be informative for study of contaminant levels over time



Conclusion

- ❑ Prior to upload, the data submitter should review the file carefully for errors.
- ❑ During upload, the data file is scanned to identify problems before writing data into the database. The data submitter is responsible for correcting errors and re-submitting the template. Datasets can be rejected for a variety of reasons, some of which are listed below.
- ❑ The GEMS/Food database administrator can be contacted for assistance.
 - Reported result < LOD, missing LOQ or LOD when result is non-detect missing LOQ, reported LOD > LOQ
 - Dates entered in the wrong format
 - Mandatory fields incomplete
 - Duplicate entries in the current worksheet or in the database

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