INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE
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**UFED**
Urban Food Environments and Diets Tool

# DIET ASSESSMENT

# Diet Quality Questionnaire (DQQ)

## Overview

The Diet Quality Questionnaire (DQQ) is a standardized tool adapted to each country that assesses diet quality by identifying the most frequently consumed foods, called sentinel foods, within each food group at the population level. It can also be applied at subnational levels, such as regions, districts or urban areas, provided the food lists reflect the local setting. It has been used in national surveys like the DHS and Gallup.

The DQQ generates indicators of dietary adequacy such as the minimum diet diversity for women (MDD-W), as well as indicators for NCD risk such as the global dietary recommendation score (GDR). The DQQ has an accompanying, country-adapted tool for use with infants and young children called the IYCF-DQQ. The IYCF-DQQ measures healthy and unhealthy eating practices in this target group, and food groups are aligned with the adult DQQ, which can facilitate data collection, analysis and interpretation of results, particularly for diet quality monitoring systems and/or surveys with paired mother – child questionnaires such as the Demographic and Health surveys (DHS).

See DDQ results from 120 countries 197+

Data from the DQQ also feeds into the Food Systems Dashboard

## Rationale

Aligns with commonly used dietary quality indicators, easy to use and incorporate into existing surveys, automated analysis, low cost with no need for a food composition table. The DQQ is adapted to 120 countries, with translations into national languages and commonly used foods unique to each country. Data has been collected in many countries as a part of the Gallup poll as well as part of the DHS and Feed the Future programs. Data collection for the DQQ is quick, taking only five minutes to administer and provides comparable food group level consumption data and a straightforward way to generate MDD-W and other diet quality indicators.

## Type of data

The DQQ uses a binary (yes/no) questionnaire for recall over a 24-hour reference period to assess consumption across 29 predefined food groups. Of those, 18 are considered health-protective (e.g., vegetables, fruits, legumes, whole grains), and 11 are considered unhealthy or risk-associated (e.g., sugar-sweetened drinks, ultra-processed snacks, fast food). The DQQ does

not collect quantitative intake data (i.e., grams or portion sizes). Each food group is assessed using sentinel foods, and if any amount of that food is eaten, it is marked "consumed." These are aggregated to generate indicators like the Global Dietary Recommendations (GDR) score (see Indicator section below) and its sub-metrics, which reflect adherence to World Health Organization (WHO) guidelines. The tool is designed for population-level or sub-group level analysis, making it suitable for tracking diet quality trends, comparing across regions or countries, and informing the design, monitoring and evaluation of nutrition programs and policies.

Measured at the population or subgroup level, it can be used for comparisons within or across countries, to track population-level changes in diet quality, as for the design, monitoring and evaluation of programs and policies to improve diet quality.

# Indicators

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| **GDR Score** | The Global Diet Recommendation (GDR) score is a measure of dietary quality and diversity using food-group consumption data aligned to the World Health Organization (WHO) guidelines for healthy diets. The GDR score ranges from 0-18, with higher scores indicating more recommendations met. Recall data is collected from food consumption in the past day and night. Like other simpler dietary assessment tools, it cannot be used to measure nutrient adequacy because it does not measure quantities consumed.<br><br>The GDR score - like the GDQS - is designed to have two sub-components. The GDR and its sub-metrics (see below) are recommended as they are designed to assess the extent to which the diet is protective against diet-related NCDs and for diet-related NCD risks.<br><br>***Can also be tabulated using the GDQS, 24HR recall (quantitative)** |
| **GDR Score-Sub-metrics** | *The NCD-Protect and NCD-Risk scores are interpretable and context-sensitive tools for tracking diet-related NCD risk. Healthy sub-metrics are robust for tracking nutrient adequacy and diet quality improvements. Unhealthy sub-metrics require further refinement and validation to reliably capture moderation and NCD risk. NCD-Risk showed moderate correlations and lower agreement, reflecting greater variability in how unhealthy food intake is captured across contexts (Hanley-Cook 2024).*<br><br>**NCD-Protect:** An average score for the population based on food consumption from nine health-protective food groups. Higher scores show the presence of more healthy foods and correlates positively with achieving global dietary recommendations (e.g., daily 400g of fruits & vegetables, whole grains, pulses, nuts or seeds, at least 25g fiber) (Herforth 2020).<br><br>**NCD-Risk:** a population-level indicator that reflects the consumption of foods associated with increased risk of noncommunicable diseases (NCDs). It is based on whether individuals consumed any of eight food groups to limit or avoid, such as sugar-sweetened beverages, processed meats, and fried or fast foods, during the previous day. This indicator is also a proxy for ultra-processed food intake. A higher NCD-Risk score indicates greater intake of unhealthy foods and is negatively associated with meeting WHO global dietary recommendations (i.e., <10% total energy from free sugars, <10% of total energy from saturated fat, <30% from total fat, <5g of salt daily, <350–500g red meat weekly) (Herforth 2020). The NCD sub-metrics were developed to align to World Health Organization guidelines on the prevention of chronic disease<br><br>A recent study suggests that composite metrics such as the GDR and the GDQS may have limited equivalence across contexts, and that they should be used with caution and ideally alongside their subcomponents. This is because consumption of healthy and unhealthy foods often co-occurs, reducing the discriminatory power of composite metrics. |

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| **IYCF-DQQ** | A country-adapted IYCF-DQQ for infant and young child feeding has also been developed with an online indicator calculator, can calculate minimum diet diversity for this age group as well as other IYC indicators. |
| **FV-GDR** | The Fruit and Vegetable - Global Diet Recommendations score (FV-GDR), is an indicator that can easily be generated from the DQQ to measure fruit and vegetable consumption at the population-level. The FV-GDR has been validated against a 24-hour recall as a reference for FV intake and was correlated with actual). |

## *Additional notes on indicators*

- Both the GDQS and the DQQ can be used to calculate other commonly used indicators of diet quality such as the Diet Diversity Scores (DDS) and the Minimum Dietary Diversity for Women (MDD-W) score. The DQQ has also been adopted by the DHS and Feed the Future to collect data on MDD-W.
- The GDQS and the DQQ cannot be used to calculate the intake of specific nutrients that are over- or under-consumed in the population. Quantitative intake data on macro- and micronutrients is needed as well as the use of a food composition table and conversion factors, such as the data provided by a 24-hour dietary recall, weighed food record or quantitative food frequency questionnaire.
- The DQQ cannot be used to calculate indicators such as the quantity of food groups consumed because it uses sentinel foods to assess presence or absence of a food group but not quantities (or frequencies) consumed.

## Pros

- Very low cost (<1%) compared to the cost of a quantitative dietary intake survey (can cost $1 per respondent in country), simple closed-ended questions (yes/no answers) for consumption of common sentinel foods (adapted to 120 country contexts). Free indicator calculators automate analysis of DQQ data for the standard DQQ (adult calculator) and for the IYCF-adapted DQQ (IYCF calculator).
- The DQQ includes categories of ultra-processed foods (UPFs) to track increasing consumption of these foods (e.g., instant noodles, fast food, soft drinks), particularly useful for urban areas where these foods are increasingly part of the diet, which allow for the calculation of a UPF consumption indicator to monitor changes in consumption.
- The IYCF-DQQ also includes a complementary unhealthy food consumption indicator that represents common salty or sweet unhealthy foods consumed, as well as a "zero fruit or vegetable consumption" indicator for this age group.

## Cons

- The DQQ is not designed to assess individual diets, it is a population-level tool for dietary quality assessment.
- As it does not quantify intake, the DQQ excludes foods typically consumed in small amounts (<15 g) such as condiments, flavoring ingredients, garnishes) as there is a risk of overestimating dietary diversity if foods eaten in very small amounts are reported. is also not appropriate for occasionally consumed foods or foods that are consumed in small quantities (only commonly consumed foods are included in the questionnaire).
- Like other simple tools to measure diet, the DQQ is not designed to measure energy or nutrient intake and therefore does not replace a 24HR recall.

**FYI:** The DQQ does not include 3 optional food groups usually collected with the minimum diet diversity for women indicator (MDD-W). The groups not included in the DQQ are organ meats, red palm oil, insects, and other small protein foods. However, if the user is interested in these food groups, they can be added to a country-specific DQQ to improve local relevance.

**TIP: Use standard DQQ for global benchmarking, and modified versions for local programmatic use**: Adding or removing food groups changes the scoring structure and compromises comparability across countries, thus modified DQQs are typically not suitable for global comparisons. That said, if the same modified DQQ is used consistently over time in a country or region it can show trends or be used for program monitoring, policy evaluation, or seasonal comparisons.

# Tool and indicator validation

To ensure these indicators are reliable and meaningful, validation studies have been conducted across diverse settings and populations.

Validation is essential in determining the suitability of a dietary assessment instrument, focusing on its validity, misreporting and measurement errors. Validity assesses how accurately the instrument reflects actual intake, usually in comparison with other methods. Misreporting, influenced by factors like social desirability or memory limitations, can impact accuracy. Measurement errors, either systematic (bias) or random, affect the reliability of findings. Every dietary assessment method has its own set of potential biases and errors – no method is perfect.

The validity of the DQQ for collecting population-level food group consumption data to derive diet quality indicators compared to the 24HR recall (Uyar 2023). During its development, the DQQ was validated against dietary recommendations using data from the US and Brazil (Herforth et al 2020). The DQQ, however, was not validated against measures of nutrient adequacy or NCD outcomes like other indicators of diet quality/diversity (DDS, MDD-W, and GDQS) were, using data from LMICs in Africa and Asia. The GDQS was also validated against several NCD outcomes (Hanley-Cook 2024).

## Lower-resource adaptations

*In settings with limited resources, adaptations to the GDQS tool and data collection methods can help maintain data quality while reducing costs and logistical burdens.*

- Like the GDQS, the DQQ can also be incorporated into existing surveys and provide ready to go tools that help avoid misclassification error and lower burdens on respondents and enumerators (app, module, indicator calculators/code)
- The DQQ can be implemented more quickly with less preparation. The GDQS typically requires one month of preparatory work
- The DQQ can be administered in-person and by phone. For example, the DQQ has been incorporated into the phone-based Gallup poll in more than 85 countries

## Higher-resource adaptations

*Conversely, in high-resource contexts, expanded data collection and broader geographic coverage can enhance the depth and utility of GDQS findings.*

- Increase the frequency of data collection (e.g., to capture seasonal and/or temporal changes in diets)
- Expand geographic scope - such as adding a rural population group for comparison
- Add questions to the DQQ such as food items or food groups of interest that are not covered in the sentinel lists or add questions about where foods were obtained. *Caution*: Additional questions cannot be added within the DQQ module or analyzed together with DQQ questions because this affects the validity of the tool

# Sampling and data collection considerations

Regardless of resource level, thoughtful sampling and data collection strategies are essential to ensure representativeness and relevance of DQQ data.

The sampling approach depends on the user's question of interest and target population, but it is crucial to ensure a study's sample is representative of the target population. The two primary sampling approaches are probability and non-probability sampling. There are several methods of probability sampling, including simple random sampling, where any member of the target population has an equal chance of being selected into the study, interval sampling, in which people of the targeted group are continually available and selected into a sample (i.e., consumers in a market), and stratified sampling, which divides the target population into groups for sampling, and/or cluster sampling which uses groupings from which the sample population is selected.

In urban settings, administrative boundaries and enumeration areas can help organize sampling. In many countries, lists of enumeration areas can be acquired, after which a sample frame or list of households or targeted individuals from each of those areas are developed, from which households or individuals are sampled. Correcting for over- or under sampling through sample weighting is essential to improve data accuracy. If the question of interest is to assess changes at population-level in dietary quality due to a program or policy, it is critical that the sampling frame include populations that have been exposed to those interventions. Non-probability sampling methods, such as convenience and snowball sampling, can be used when ease of access is prioritized.

Careful conceptualization of the relationship between food environments and diets helps guide geographic focus and sampling strategy, ensuring more meaningful and representative results. For example, if your question of interest is to compare between

areas of differing levels of urbanization, the geographic frame could include urban, peri-urban, and rural areas, and a sampling strategy would need to select a representative sample of households and individuals.

As the DQQ can be administered via different means such as in-person or phone, consider whether the method selected will capture populations that may be difficult to access (e.g., urban conflict-affected setting, populations without good phone service or access). The DQQ utilizes sentinel food lists and analyzes data at food group level but does not assess intake of nutrients that are under- or overconsumed. The DQQ and GDQS are not the best tools to use if you are interested in infrequently consumed foods. The DQQ can be administered via phone and has also been used with digital tools as a crowd-based system for high frequency data collection. In contrast, the GDQS app requires in-person interviews to facilitate the accurate estimation of quantities consumed at the food group level. For the DQQ, country adapted modules have been developed with context-specific sentinel food lists.

## Other data sources

When primary data collection is not feasible, alternative data sources can complement or substitute DQQ-based assessments, though each comes with its own trade-offs.

While it is ideal to collect primary data, real world limitations to data collection in urban settings may prevent this, including on the implementing side (e.g., budget/resource constraints) and in the field (e.g., difficulty in accessing populations, conflict-affected settings). It may be helpful to examine secondary data sources, either as background to inform primary data collection or in place of it, if data collection is not feasible.

| Data Sources | Pros | Cons | Indicators |
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| Household consumption and expenditure surveys (HCES)<br>[Household-level consumption] | Low cost, nationally -representative<br>-Conducted regularly (every 3-5 years) with a large sample<br>-Contains other variables such as data on socioeconomic status, education, and other determinants relevant to nutrition<br>-often also includes acquisition data (food acquired from purchases, production, in-kind) | -Need nutrition and data analysis expertise<br>-Modules are heterogenous across countries, making comparisons challenging<br>-Does not differentiate between subgroups to estimate differences in probability of deficiencies in high-risk groups<br>-Household level (no individual dietary data), does not address intra-household allocation issues that may affect household members<br>-May have issues with accurately recording food consumed away from home (FAFH) which are very important in urban settings (e.g., street foods, meals consumed at school) | -Diet diversity (Household diet diversity score)<br>-Food consumption (Food consumption score)<br>-Nutrient availability: macronutrient and micronutrient availability per capita per day (micronutrient availability requires use of FCT), per capita energy intake.<br>-Consumption patterns (frequency or shares of animal-sourced foods, staple foods, ultra-processed foods) |
| Global Dietary Database<br>[Individual-level diets] | -Harmonized data (variables, units, food definitions) for individual-level dietary data from nutrition surveys for 188 countries | -Need nutrition and data analysis expertise<br>-Surveys use different designs and tools<br>-Certain food categories excluded (e.g., poultry, dairy-based desserts, highly processed or packaged foods, mixed dishes and recipes, condiments and spice, supplements) | -Includes 51 dietary factors including 14 foods, 7 beverages, 12 macronutrients, and 18 micronutrients |
| GIFT Database (FAO)<br>[Individual-level dietary diversity] | -Data are disaggregated by sex and age.<br>-Individual quantitative food consumption data coded with the FoodEx2 classification system, data are screened and formatted using R<br>-dashboards presenting indicators and summary statistics on foods and diets<br>-Can link food groupings to own dietary data (dataset available upon request) | -Need nutrition and data analysis expertise, particularly as outliers and missing data not removed from original datasets and energy and nutrient values are provided directly from surveys (does not link food consumption datasets to food composition data)<br>-Data not available for some countries<br>-Many datasets are old and often not nationally representative<br>-No data on statistical weights | -Statistics on food consumption can be calculated for individual food items or using the nutrition-sensitive food groups (e.g., sources of micro- and macronutrients in the diet, macronutrient contribution to total intake)<br>-Estimated usual intakes of selected nutrients (with SPADE tool)<br>-MDD-W (and Food group diversity score, individual food group consumption)<br>-Food consumption (daily diet g/per person per day, proportion of food groups consumed (%), calories per person per day)<br>-other indicators for food safety (dietary exposure to chemicals) and environmental impacts of food consumption (emission, water, and land use) |
| Demographic and Health Surveys | -Nationally representative data on dietary diversity | -Need nutrition and data analysis expertise<br>-Alternatively, the DHS StatCompiler and mobile app allows for automatic indicator calculation and disaggregation | MDD-W<br>-IYCF practices (MAD, MDD, MMF)<br>-Percentage consuming food group (PLW, WRA) |

| Data Sources | Pros | Cons | Indicators |
|---|---|---|---|
| Gallup World Poll (GWP)<br>(Global Diet Quality Project) | -Global coverage and standardization (140 countries, including those that lack nutrition surveillance data)<br>-Integration with economic, social and health indicators<br>-Frequent updates (every 5 years)<br>-Samples adults aged 15+ (not just women) | -Other national surveys tend to align more closely with DHS than GWP.<br>-GWP often collects data in lean seasons, potentially underestimating MDD-W compared to DHS.<br>-Validating MDD-W for males aged 15–49 could expand GWP's utility.<br>-Greater variability in GWP estimates than DHS. | MDD-W, DDS<br>-All-5, protective, and unhealthy food consumption<br>-Healthy diet pattern for NCD prevention<br>-Zero fruit or vegetable consumption<br>-Consumption (yes/no) of food groups included in the DQQ |

# Illustrative research using these tools and indicators in urban settings

- Individual and School-level Factors Associated With Non-Communicable Disease Risk Score Among Urban Schoolchildren in Lebanon: A Multi-Level Analysis (Haber 2024)
- Improving dietary diversity and food security among low-income families during financial crisis using cash transfers and mHealth: experience from two selected districts in Sri Lanka (Wijesinghe 2024)
- Food choice, embodied knowledge, and circumscribed agency: factors influencing adolescent girls' and boys' dietary practices in three states in northern Nigeria (Conrad 2024)

## DQQ and Dietary Assessment-Related Resources


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