



FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative

Guidelines for Market-based Food Environment Assessments

Data Analysis Instructions



USAID
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Introduction

This document provides instructions for the data analysis sheets, the Excel sheets in which you will input data collected via the data collection sheets included in the annex document. These instructions correspond directly to the spreadsheets included as part of the Food Environment Assessment Package. The Excel sheets are recommended templates for data analysis. Graphs are suggested and are auto-populated if you use the sheets. Activity teams should review the analysis sheets in full and adapt them where needed before using them. You will see references to sections and tabs in the spreadsheets—not the data collection sheets. We recommend reading these instructions alongside the corresponding data analysis sheet (i.e., have “Assessment 1: Market Mapping [Data Analysis]” open as you review these instructions).

Assessment 1: Market Mapping

Data analysis instructions

1. Community Mapping, Phase 1: Input data collected from the data collection sheets for secondary subnational administrative area mapping (Community-level mapping of markets data sheet [Annex 5]) in the Assessment 1: Market Mapping data analysis template for each of the six selected secondary subnational administrative areas.
2. In the secondary subnational administrative area Background (Part 1 of Annex 5 tab), write out the researcher’s name and the date as specified.
3. For Facilities and Infrastructure (Parts 2a and 2b, 3, and 4 of Annex 5 tab), write ‘1 for Yes’ or ‘0 for No’ to indicate the presence of the specified facility/infrastructure, whether the community arrangement is centered or noncentered, and whether towns have available transportation.
4. For Distance to Points of Interest (Part 5 of ‘Annex 5’ tab), write out the distance in kilometers.
5. For Travel Time (Part 6 of ‘Annex 5’ tab), write out time in minutes.
6. For ‘Types of Market Food Environments (Part 3 of ‘Annex 5’ tab), use the data analysis template to input data in each respective ‘A5 Secondary unit#’ tab in the correct section for the quantity of types, quantity of days of operation, hours of operation, and GPS locations. Add a row in the data analysis template for multiple locations (e.g., add rows as needed in each respective ‘A5 Secondary unit#’ tab for market food environment types). There are currently five rows for each type of market food environment. The ‘Annex 5’ tab will auto-populate for Part 3a. Quantity of Market Food Environments using information entered into the ‘A5 Secondary unit#’ tabs. Part 3. c-f should be filled out following the *Instructions* in the data analysis template with data from the ‘A5 Secondary unit#’ tabs (i.e., these data are not auto-populated). These data are to then be used to create graphs.
 - a. Write ‘1’ for every occurrence of each of the different types of market food environments in the respective ‘A5 Secondary unit#’ tab. Write ‘0’ if none of a type are present.
 - i. A graph has been created in the ‘Annex 5’ tab that includes each of the six secondary subnational administrative areas (community level) on the x-axis and total prevalence (sum of the amounts) of types of market food environments on the y-axis. Please double-check for accuracy.
 - b. Write the number of days of operation per week for each type of market food environment (‘A5 Secondary unit#’ tab). If multiple locations of a type of market food environment exist, select the location with the greatest number of days of operation (‘Annex 5’ tab).

- i. A graph has been created with the greatest number of days of operation per week (per type of market food environment) on the x-axis and each of the six secondary subnational units on the y-axis. Please double-check for accuracy.
 - c. Next, specify the Days of Operation of Market Food Environments in the data analysis template based on operation on weekdays and/or weekends. Write 'Open Weekdays Only', 'Open Weekends Only', or 'Open Weekdays and Weekends' ('A5 Secondary unit#' tab). If there are multiple locations, select availabilities of all locations ('Annex 5' tab). Use this information in the descriptive write-up of findings.
 - d. Write the average hours of operation of market food environments per day/week ('A5 Secondary unit#' tab). If multiple locations of a type of market food environment exist, select the location with the greatest number of hours of operation ('Annex 5' tab).
 - i. A graph has been created with the greatest average number of hours of operation per day (per type of market food environment) on the x-axis, and each of the six secondary subnational units is plotted on the y-axis. Please double-check for accuracy.
 - e. Next, specify Hours of Operation of Market Food Environments in the data analysis template based on operation in the morning, afternoon, and evening time. Write Morning, Afternoons, and/or Evenings as suitable (Mornings [till noon], Afternoons [till 5 p.m.], Open Evenings [5 p.m. onward] in the 'A5 Secondary unit#' tab. If there are multiple locations, select the availabilities of all locations ('Annex 5' tab). Use this information in the descriptive write-up of findings.
 - f. Write the GPS location for each type of market food environment in Degrees, Minutes, and Seconds format for Latitude and Longitude (e.g., 6°49'0.01" N -8°46'59.99" W). Use this information to create a table to include in the write-up of findings.
 - g. The Modified Retail Food Environment Index (mRFEI) will be auto-calculated at the secondary subnational administrative area level in the 'Annex 5' tab in the data analysis template. The calculation includes the number of healthy and unhealthy food environments based on the classifications above (also in the data analysis template). Note: Mixed food vendors should be placed in an appropriate category depending on the majority types of items (use in tough-to-classify situations without a clear majority [60 percent] of food type sold; categorize as either Healthy or Unhealthy mixed food).
 - i. A graph has been created with each of the six secondary subnational administrative areas (community level) on the x-axis and the mRFEI on the y-axis. Please double-check for accuracy.
 - h. Include photographs taken of each type of market food environment in an annex of the findings report.
7. Input data collected from the data collection sheets for the market-level mapping (Annex 6) in the 'Annex 6' tab (Market-level Mapping) of the Assessment 1: Market Mapping Data Analysis Template for each of the 12 markets (daily and weekly).
 8. For Types of Market Vendors (Part 3 of Annex 6), use the data analysis template to input data in the correct section for the quantity of food vendor types.
 9. Write the quantity of presence of each type of food vendor as a number. Write '0' if none of a type is present.
 - a. A graph has been created with types of food vendors on the x-axis and quantity of food vendors on the y-axis.
 10. The mRFEI has been calculated at the market level in the 'Annex 6' tab in the data analysis template. Input the number of healthy and unhealthy food vendors based on the classifications above (also in the data analysis template).

- a. A graph has been created with each of the six study site locations (i.e., secondary subnational administrative areas on the community level) on the x-axis and community-level mRFEI on the y-axis.
- b. A graph has been created with the type of market (daily or weekly) on the x-axis and average mRFEI on the y-axis.

11. Include photographs taken of each type of food vendor in the Annex of the findings report.

Assessment 2: Seasonal Food Availability Calendars

Data analysis instructions

1. Input data collected from the Annex 8 data collection sheet in the Data Analysis Template for each of the 12 markets.
2. Input the information from Parts 1, 2, and 3 (market and vendor information) from Annex 8 into the respective tab in the Data Analysis Template.
3. Input the final matrices of seasonal food availability from Part 4 of Annex 8 into the 'Seasonal Availability Score' tab in the Data Analysis Template for all markets. As information is recorded for *each* food item, select the applicable market name, primary subnational administrative area, secondary subnational administrative area, and market type from the drop-down menu included in the 'Annex 8, Part 4' tab. **Important:** If a food group is not available, enter the respective market name, primary subnational administrative area, secondary subnational administrative area, and market type, then record the missing food group as 'not available' and score as '0' for each month in the 'Seasonal Availability Score' tab. **Repeat this twice**, so there are two entries, using the example in the spreadsheet (Market X and food group 'oils and fats' and the 'Mkt X' tab). Following these exact instructions will enable the pivot tables to populate with data while including zero values for missing food groups, thus enabling consistency in data visualization across multiple markets.
4. It is important to be consistent and enter food items in lowercase and singular form. For example, enter apple as (1) 'apple' across all markets and avoid entering apple as (2) Apples, Apple, apples. If data are entered as in the latter example (2), one apple entry will appear as three unique foods.
5. A column for translation is also included. If this column is not necessary, simply hide the column or minimize it in the spreadsheet.
6. Next to the provided common names, the team should input the scientific species names for the fruits, vegetables, and other whole foods.
7. For each of the foods listed, please add the respective food group from the drop-down menu in the 'Annex 8, Part 4' tab according to the food groups from the Healthy Diet Basket (HDB; you may also use the country's respective food-based dietary guidelines [FBDGs]¹). The six food groups are listed below for this example. For each market site, the average annual availability score for each food item (Seasonal Availability Avg Score) will then be used to calculate an overall average 'Availability Score' for each of the six food groups. For example, to find the average annual

¹ FBDGs respective to the country where the assessment is implemented may be used in place of the HDB food groups. If revising food groups, the data analysis templates must also be revised to reflect this change.

'Availability Score' for fruit, we would include the annual average score of all fruit items listed (see data analysis sheet).

- a. Starchy staples
 - b. Vegetables
 - c. Fruits
 - d. Animal source foods
 - e. Legumes, nuts, and seeds
 - f. Oils and fats
8. There is a tab for each of the 12 markets in the Assessment 2 data analysis sheet that will auto-populate a pivot table that includes the average score for each food group over 12 months. In order for the pivot tables and charts to display properly, make sure to open the Pivot Table Editor and filter for each respective market under each respective tab. For example, for the 'Mkt 1' tab, you will need to open the Pivot Table Editor, filter by market, and select 'Market 1' from the drop-down menu. Rename each chart title in each tab to reflect what is being illustrated. Market X is already filtered out of the 'Mkt' pivot tables, but be sure to check this as the example Market X information should not be included with the actual data.
 9. An overall score across all six food groups will then be calculated for each market by totaling the scores for each of the six food groups (Final Calculation Availability Score).
 - a. A series of graphs have been created based on the HDB with the calendar month on the x-axis and the average availability scores on the y-axis by (i) the 3 primary subnational administrative areas, (ii) the 6 secondary subnational administrative areas (community level), and (iii) each of the 12 markets (this has already been completed in each 'Mkt' tab). Note: The data analysis template is set up to easily filter by the three geographic levels of interest.
 - b. The diversity is illustrated in the 'Diversity Count' tab, which shows the total diversity of foods in each food group for all 12 markets.
 - c. There are numerous other ways to illustrate the data (e.g., a heat map table), so as long as the data are entered carefully following the instructions, the pivot tables should be accurate.

Assessment 3: Market Food Diversity Index

Data analysis instructions

1. Input the background information collected from Parts 1 and 2 of the data collection sheet for the Market Audit (Annex 9) in the respective Data Analysis Template for each of the 12 markets for Assessment 3: Market Food Diversity Index.
2. Next, fill in data from Part 2 of the Market Food Diversity Index Market Audit (Annex 9) for each of the 12 markets by inputting a '0' for absence and a '1' for presence of a specific food group (enter '0' or '1' only; do not write 'NA'). Write local examples. There is an extra column for translation if needed.
3. The 'Annex 9 Market Audit' tab will use the data from the Market Food Diversity Index (MFDI) Market Audit 'Annex 9' tab to calculate the MFDI using the benchmarks of the diet quality questionnaire (DQQ) and minimum dietary diversity for women (MDD-W).
 - a. The calculation of the MFDI based on the various benchmarks involves summing the presence of the various food groups at market, using the food group listing in Table 4.
 - b. When calculating the MDD-W scores, it will be necessary to merge some of the food items to meet the various classification benchmarks. This has already been completed in the 'Annex 9 Market Audit' tab.

4. A series of graphs has been created with the MFDI benchmarked to the DQQ and MDD-W food groups. Location is on the x-axis and the MFDI score is on the y-axis.
 - a. MFDI (DQQ) is plotted on the y-axis and the market on the x-axis for all market locations.
 - b. MFDI (MDD-W) is plotted on the y-axis and the market on the x-axis by (i) the six secondary subnational administrative areas (community level) and (ii) market type and locations. Note: The 'Annex 9 Market Audit' tab is set up so you may create a pivot table for MDD-W.
5. Input the background information collected from Parts 1 and 2 of the data collection sheet for the Vendor Audit (Annex 10) in the respective Data Analysis Template for each of the 12 markets for Assessment 3: Market Food Diversity Index.
6. Next, fill in data from Part 3 of the Vendor Inventory ('Annex 10 Vendor Audit' tab) for each of the 10 vendors selected for all 12 markets. First, record either 'yes' or 'no' for the vendor presence in the market. Next, list all of the available foods per category by inputting a '0' for absence (i.e., No = 0) or total number foods present (i.e., if 'Yes' was recorded, count the number of foods written in the collection sheet) for each of the DQQ food groups. For example, the fruit vendor has a fruit selection that includes orange, cantaloupe, banana, and apple; enter a '1' for 'Citrus', enter '1' for 'Vitamin A rich fruits', and enter 2 for 'Other fruits' in addition to writing out these examples under 'List'. In this example, the fruit vendor also has flour and rice, so a value of '2' is entered in addition to listing the foods 'flour' and 'rice' under 'Foods made from grains'.
7. The data entered in Part 3 'Annex 10 Vendor Audit' tab will be used to consolidate total food group diversity and MFDI (DQQ and MDD-W) from the 10 vendors in each of the 12 markets for each DQQ food group in a table ('Annex 10 Part 3 Table' tab).
8. The MFDI (DQQ and MDD-W) is also calculated (from the selected 10 vendors) for all 12 markets and may be used to create a figure.

Assessment 4: Healthy Eating Index of Food Supply (Adapted Version)

Data analysis instructions

1. Input the background information collected in Parts 1 and 2 of the data collection sheet for the Market Audit of the Healthy Eating Index of Food Supply (Annex 11) in the respective Data Analysis Template for each of the 12 markets for Assessment 4: Healthy Eating Index of Food Supply (adapted version). **Please do not enter data or edit cells** in the gray-shaded regions of the data analysis sheets. These regions are auto-populated with the respective data for all markets.
2. Fill in data from Part 3 of the Healthy Eating Index Market Audit (Annex 11) for each of the 12 markets by inputting points for the availability of the recommended quantity for each food group:
 - 5 points if the recommended quantity is available
 - 2.5 points if the recommended quantity is not available
 - 0 points if the food group is not present
3. The data from the HEI Market Audit will be used to calculate the Healthy Eating Index of Food Supply (adapted version) in the 'Annex 11' tab (spreadsheet) by tallying the total points from each food group for every market individually.
4. Interpret the data with a higher score as representing greater alignment with the HDB. A lower score represents a lower alignment with the HDB.

5. A chart for the Healthy Eating Index of Food Supply (adapted version) will be created in the 'Annex 11' tab, with the Healthy Eating Index of Food Supply on the x-axis and the market on the y-axis.
6. Data entry for Assessment 4: Healthy Eating Index of Food Supply (adapted version) Phase 2 (Annex 12) will be completed according to the instructions listed in Assessment 5.

Assessment 5: Cost of a Healthy Diet at Market (Adapted Version)

Data analysis instructions

Assessment 4: Healthy Eating Index of Food Supply (Adapted Version)

1. Fill in data from the vendor interviews (Annex 12) in the Assessment 4 data analysis template. There is a tab in the template for each of the six daily markets (e.g., 'Anx 12 Mkt X' tab for each daily market location). Specify the food items and quantities available (by weight) for each of the six food groups in the HDB. If field-collected weight measurements were not recorded in kilograms, make sure to convert them to kilograms in the data analysis template. Note: The 'Anx 12 Mkt X' tabs calculate the percentage of recommended quantities of the respective food group available based on a family of five adults for one week benchmarked against the HDB. The calculations are created by dividing the total amount of the food group available [weight in kilograms] by the recommended quantity based on a family of five adults for one week.)
2. Fill in price data in the Assessment 4 data analysis template to include (1) price per weight unit, (2) the two lowest-cost, commonly purchased items identified by the respective vendor (both recorded in the field), and (3) the two absolute least-cost food items (auto-calculated in the data analysis template). Make sure local currency is recorded consistently across all data collection sheets and in the data analysis template. This information will be used in the Assessment 5 data analysis template.
3. **Please do not enter data or edit cells** in the gray-shaded regions of the data analysis sheets. These regions are auto-populated with the respective data for all markets.
4. Data from the 'Anx 12 Mkt X' tabs for each of the six daily markets will be used to calculate the percentage of recommended quantity available to feed five adults for one week based on the HDB in the '% Rec Quant Available (chart)' tab of the data analysis template.
5. Use the chart to interpret each market's ability to supply the recommended quantity needed to feed five adults for one week for each of the six HDB food groups. Food groups with values of 100 percent or more represent greater alignment with the HDB. Food groups with values less than 100 percent are interpreted as having lower alignment with the HDB.

Assessment 5: Cost of a Healthy Diet (Adapted Version)

6. Fill in quantity weights and price data from the vendor interviews (Annex 12) for each of the six daily markets that are pertinent for calculating Cost of a Healthy Diet (CoHD).
7. In the 'Annex 12' tab of the data analysis template for Assessment 5, record the two absolute least-cost items (these two items are calculated in the '**Daily Markets' tabs in the data analysis template for Assessment 4**) and the two lowest-cost, commonly consumed items (identified by the vendors from the Vendor Interviews) for each HDB food group for each of the six daily markets. Be consistent with units and use kilograms for weight and local currency for price.
8. **Please do not enter data or edit cells** in the gray-shaded regions of the data analysis sheets. These regions are auto-populated with the respective data for all markets.

9. In the Assessment 5 data analysis template, the six 'Mkt X' tabs correspond to each of the six daily markets and are linked to the 'Annex 12' tab. Each 'Mkt X' tab will be used to auto-calculate the average of the two absolute least-cost food items and the average of the two lowest-cost commonly purchased food items for each HDB food group. It is not necessary to enter data into the 'Mkt X' tabs as long as values are input properly into the 'Annex 12' tab.
10. The 'Mkt X' tabs are linked to the 'CoHD Graph' tab where the two total dietary costs are calculated for each daily market (i.e., the average absolute least-cost diet and the average lowest-cost commonly purchased diet). It is not necessary to enter data into the 'CoHD Graph' tab as long as values are input properly into the 'Annex 12' tab.
11. In the 'CoHD Graph' tab, one graph is created, with the six secondary subnational administrative areas (community level) on the x-axis and the average of the two price data points for meeting dietary recommendations on the y-axis (i.e., average absolute least-cost diet and the average lowest-cost commonly purchased diet).
12. Use the price of the least-cost foods to calculate the minimum cost of meeting overall FBDG.
13. Two additional graphs with location on the y-axis and Cost of a Healthy Diet at Market on the x-axis are also shown for both the average absolute least-cost diet and the average lowest-cost commonly purchased diets.

Assessment 6: The Environmental Profile of a Community's Health (Adapted Version)

Data analysis instructions

1. Input data from Community Observation Walk data collection sheet (Annex 13) into the respective tab of the Assessment 6: Environmental Profile of a Community's Health data analysis template.
2. A series of graphs will be created using data from the Community Observation Walk in the 'Comm EPOCH Charts' tab to enable comparisons across locations and between weekly and daily markets. While these graphs are pre-created, please double-check the scale to ensure all data are captured. Graphs include:
 - a. A graph with the counted number of advertisements on the x-axis and market location on the y-axis, with a legend including each type of advertisement
 - b. Another graph with the total count of advertisements highlighting both 'foods to limit' and 'healthy foods', with the count of advertisements on the x-axis and market location on the y-axis.
 - c. A graph with the location of advertisement (e.g., billboard, bus, wall) in the legend, with a total tally of advertisements on the x-axis and market location on the y-axis.
3. Next, input data from the Market Observation Walk (Annex 14) in the respective tab of the Assessment 6: Environmental Profile of a Community's Health data analysis template.
4. Using data from Part 3 of Annex 14, a series of graphs will be created using data from the Market Observation Walk in the 'Mkt EPOCH Charts' tab to enable comparisons across locations and between weekly and daily markets. While these graphs are pre-created, please double-check the scale to ensure all data are captured. Graphs include:
 - a. A graph for each market with the type of advertisement in the legend, a total tally of advertisements on the x-axis, and market location on the y-axis

- b. A graph for the total count of advertisements highlighting both healthy foods and foods to limit in the legend, the total tally of advertisements on the x-axis, and the market location on the y-axis
5. Using data from Part 4 of Annex 14, for each market, write a qualitative description of the information procured from food stalls serving meals, noting whether menus, table information, and wall signs are present, as well as any specific types of foods highlighted that are healthy or unhealthy.

Assessment 7: The Produce Desirability Tool for Low- and Middle-Income Countries (Adapted Version)

Data analysis instructions

1. In the Assessment 7: The Produce Desirability Tool for Low- and Middle-Income Countries Data Analysis Template, input the ProDes Tool Criteria from Annex 15 into the 'Annex 15' tab.
2. In the Assessment 7: The Produce Desirability Tool for Low- and Middle-Income Countries Data Analysis Template, input the Produce Desirability (ProDes) Sensory Analysis Data from Annex 16 into the 'Annex 16' tab. Remember to maintain the order of fruits and vegetables from the data collection sheets (e.g., 'fruit type 1' is always 'apples', 'fruit type 2' is always 'bananas', 'vegetable type 1' is always 'spinach'). Cells are linked in the data analysis sheet and will maintain the same order following entry from Annex 15. Note: Please do not override cells shaded in gray unless you find a formula that needs to be edited.
3. Upon entering the data in the 'Annex 16' tab, the scores for each sensory attribute for each fruit item from each vendor will be automatically calculated in the 'ProDes Score Calc' tab by averaging the score for the three replicates. The average score for each fruit item between the two vendors will also be automatically averaged to report the scores of each sensory attribute per fruit item for each market (12 markets). Spot-check a few of the automatic calculations to ensure the accuracy and integrity of the data analysis sheet.
4. Total ProDes scores have been calculated separately for fruits and for vegetables. The scores have been averaged for each fruit item from each vendor for each observational sensory measure to calculate the total ProDes scores for fruits and vegetables (see heat map in 'ProDes Score Calc' tab).
5. A graph has been created for each fruit item for each of the 12 markets, with the market plotted on the x-axis and the total ProDes scores for each sensory attribute on the y-axis. A similar graph has been created for vegetables.



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