Global Malnutrition Trends: A Power BI Analysis (1983-2019)

INTRODUCTION

ABC Company is conducting a comprehensive analysis of global malnutrition trends among children under five from 1983 to 2019. Utilizing data from UNICEF, WHO, and the World Bank, the study examines the prevalence of severe wasting, wasting, stunting, underweight, and overweight conditions across various economic and regional classifications. Countries are categorized by income levels (low, lower-middle, upper-middle, and high) and classifications such as Least Developed Countries (LDC), Low Income Food Deficient (LIFD), Land Locked Developing Countries (LLDC), and Small Island Developing States (SIDS).

The study aims to identify correlations between economic status and malnutrition rates, leveraging Power BI's advanced visualization tools, including stacked bar charts and line graphs, to provide clear, data-driven insights. By analyzing historical data, the project seeks to pinpoint regions most affected by malnutrition and assess whether economic growth has contributed to improvements in child nutrition over time.

Malnutrition remains a critical global health issue, disproportionately impacting children in lower-income regions. Beyond health concerns, malnutrition affects cognitive development, education, and long-term economic productivity. This research highlights key patterns, prioritizing areas that require urgent intervention and support. By providing evidence-based recommendations, ABC Company aims to guide policymakers, humanitarian organizations, and global health institutions in crafting targeted strategies to combat child malnutrition and improve health outcomes worldwide.

Scenarios & Metrics

Scenario 1: Count of U5 Population (140)
Represents the number of observations related to the under-five population, indicating the dataset's sample size.

Scenario 2: Sum of Survey Sample (11M)
Total survey sample collected is 11 million, ensuring robust data analysis and accurate insights.

Scenario 3: Sum of Underweight (2.08K)
The total number of underweight cases recorded is 2,080, highlighting a key malnutrition issue among children under five.

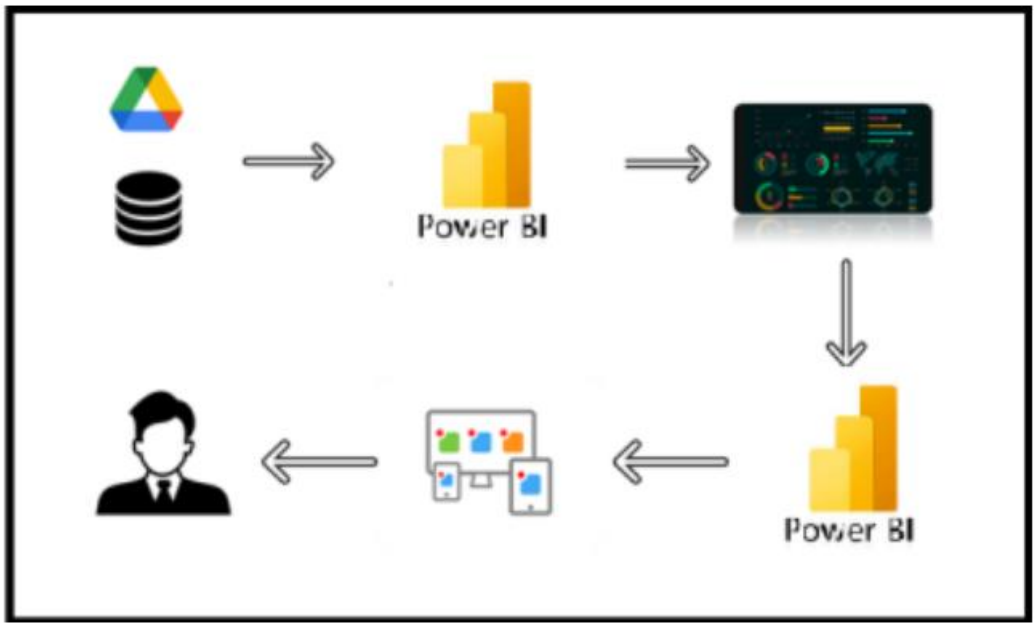
Scenario 4: Stunting by Income (LDC, LIFD, LLDC, SIDS)
Analysis shows that average spending increases with income levels, reflecting economic impact on malnutrition.

Scenario 5: Sum of Overweight by Country
Displays the total number of overweight children across various countries, based on the dataset.

Scenario 6: Overweight and Underweight under Income Classification
Ribbon visualization illustrating the relative size of overweight and underweight populations in different income brackets

Scenario 7: Sum of Income Classification
Represents total income within each bracket, though interpretation is limited without knowing the population size per bracket.

Technical Architecture:



Project Flow

To accomplish this, we have to complete all the activities listed below,

- Data Collection
  - Collect the dataset,
  - Connect Data with Power BI
- Data Preparation
  - Prepare the Data for Visualization
- Data Visualizations
  - Visualizations
- Dashboard

- Responsive and Design of Dashboard

- Report
  - Report Creation
- Performance Testing
  - Utilization of Data Filters
  - No. of Calculation fields
  - No. of Visualizations/Graphs
- Project Demonstration & Documentation
  - Record explanation Video for project end to end solution
  - Project Documentation-Step by step project development procedure

Milestone 1: Data Collection & Extraction from Database

Objective: Gather and measure relevant data systematically to support research analysis.

Process: Extract information on key malnutrition indicators from UNICEF, WHO, and World Bank databases.

Purpose: Enable accurate research conclusions, hypothesis testing, and outcome evaluation.

Outcome: A structured dataset ready for further analysis and visualization.

Activity 1: Downloading the Dataset

Please use the link to download the dataset: Link

Column Descriptions:

- **ISO Code:** Standardized two-letter country codes.
- **Country:** Name of the country.
- **Survey Year:** Year when survey data was collected.
- **Year:** Specific year of the data point.
- **Income Classification:** Classification by income level (0: Low, 1: Lower-Middle, 2: Upper-Middle, 3: High).
- **LDC:** Indicator for Least Developed Countries (LDCs).
- **LIFD:** Indicator for Low Income Food Deficient (LIFD) countries.
- **LLDC or SID2:** Classification (1: Land Locked Developing Countries, 2: Small Island Developing States, 0: Others).
- **Survey Sample (N):** Total number of surveyed individuals.
- **Severe Wasting:** Percentage of children with severe wasting.
- **Wasting:** Percentage of children with wasting.

- **Overweight:** Percentage of overweight children.
- **Stunting:** Percentage of children with stunting.
- **Underweight:** Percentage of underweight children.
- **U5 Population ('000s):** Population of children under five years (in thousands).

Activity 2: Connect Data with Power BI

- With Power BI, users can seamlessly connect to a wide range of data sources, including databases, cloud services, spreadsheets, and streaming data. This capability allows organizations to consolidate disparate data sources into a single, unified platform, breaking down data silos and enabling holistic analysis.

Data Loading - Link

Milestone 2: Data Preparation

Preparing the data for visualization involves:

Cleaning: Removing irrelevant or missing data.

Transforming: Formatting data for easy visualization.

Exploring: Identifying patterns and trends.

Filtering: Focusing on specific subsets of data.

Ensuring Accuracy: Verifying completeness and correctness.

Since the data is already cleaned, we can proceed to visualization.

Data Cleaning - Link

Milestone 3: Data Visualization

Data visualization involves creating graphical representations of data to make complex datasets more accessible, intuitive, and easier to interpret. By utilizing charts, graphs, and maps, we can quickly identify patterns, trends, and outliers, facilitating data-driven decision-making.

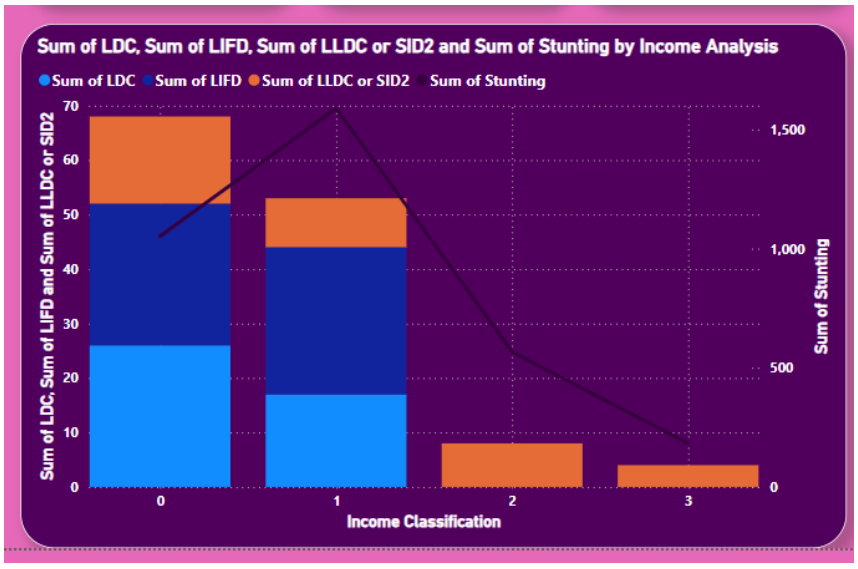
Global Malnutrition Trends (1983-2019)

Activity 1.1: Count of U5 Population

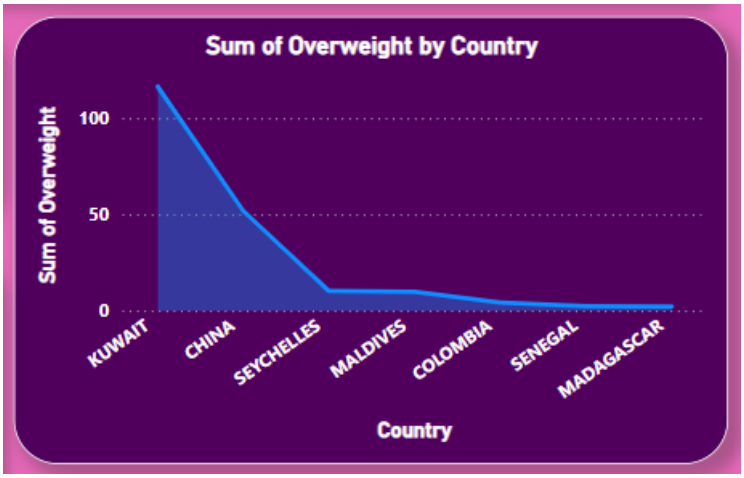
Activity 1.2: Sum of Survey Sample

Activity 1.3: Sum of Underweight

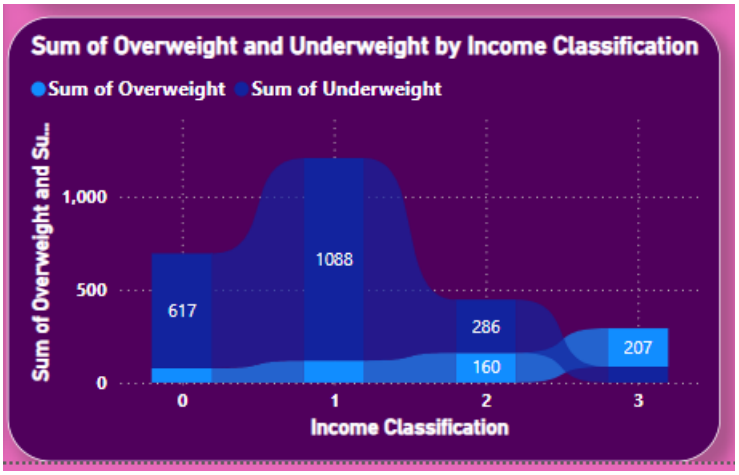
Activity 1.4: Sum of LDC, LIFD, LLDC or SID2 and Average of Stunting by Income Analysis



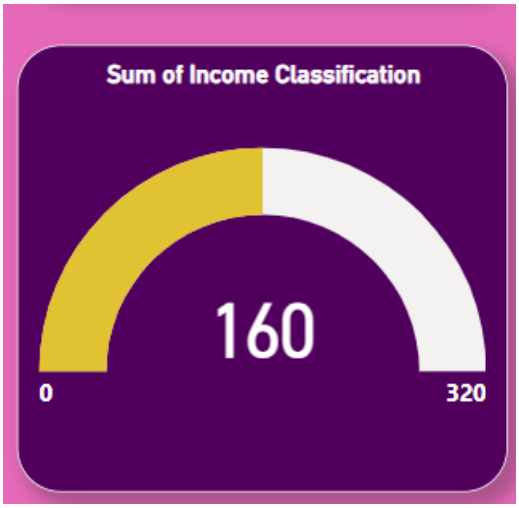
Activity 1.5: Sum of Overweight by Country



Activity 1.6: Sum of Overweight and Underweight under Income Classification.



Activity 1.7: Sum of Income Classification

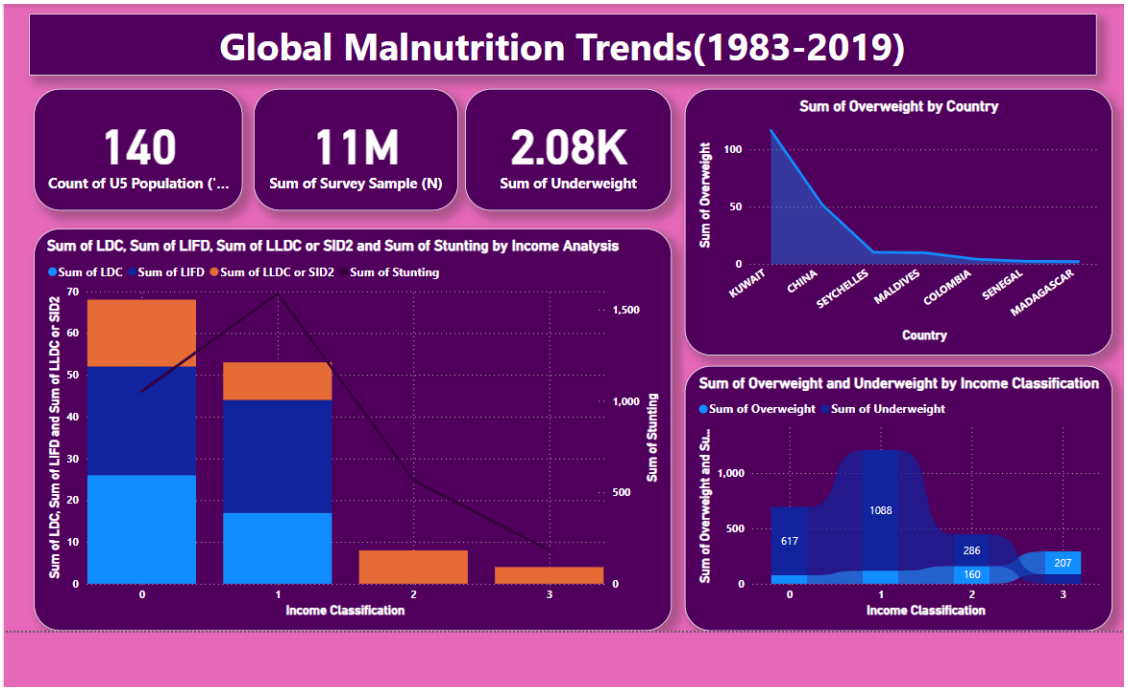


Milestone 4: Dashboard

A dashboard is a graphical user interface that presents data in an organized and visually intuitive manner, enabling real-time monitoring and analysis. It helps track key performance indicators (KPIs), monitor trends, and display insights through charts, graphs, and tables.

In this project, the malnutrition dashboard will showcase key metrics such as underweight, stunting, wasting, overweight prevalence, and income classifications. Using Power BI, the dashboard will provide interactive visualizations to help policymakers and stakeholders identify critical areas for intervention.

Activity 1- Responsive and Design of Dashboard



Dashboard Explanation - Link

Milestone 5: Report

A report is a structured document that presents a detailed analysis of data, findings, and insights. It serves as a key tool for decision-makers, analysts, and stakeholders, offering a comprehensive understanding of malnutrition trends.

This report will include:

Introduction: Overview of global malnutrition trends (1983-2019).

Data Collection & Preparation: Sources, methodology, and cleaning processes.

Visualization & Analysis: Key metrics and insights from Power BI dashboards.

Findings & Recommendations: Identified patterns, correlations, and policy suggestions.

Power BI Report Design

Designing a report in Power BI involves the following key steps:

Connecting to Data Sources – Importing and integrating datasets from sources like UNICEF, WHO, and the World Bank.

Creating Visualizations – Using charts, graphs, and tables to present malnutrition trends.

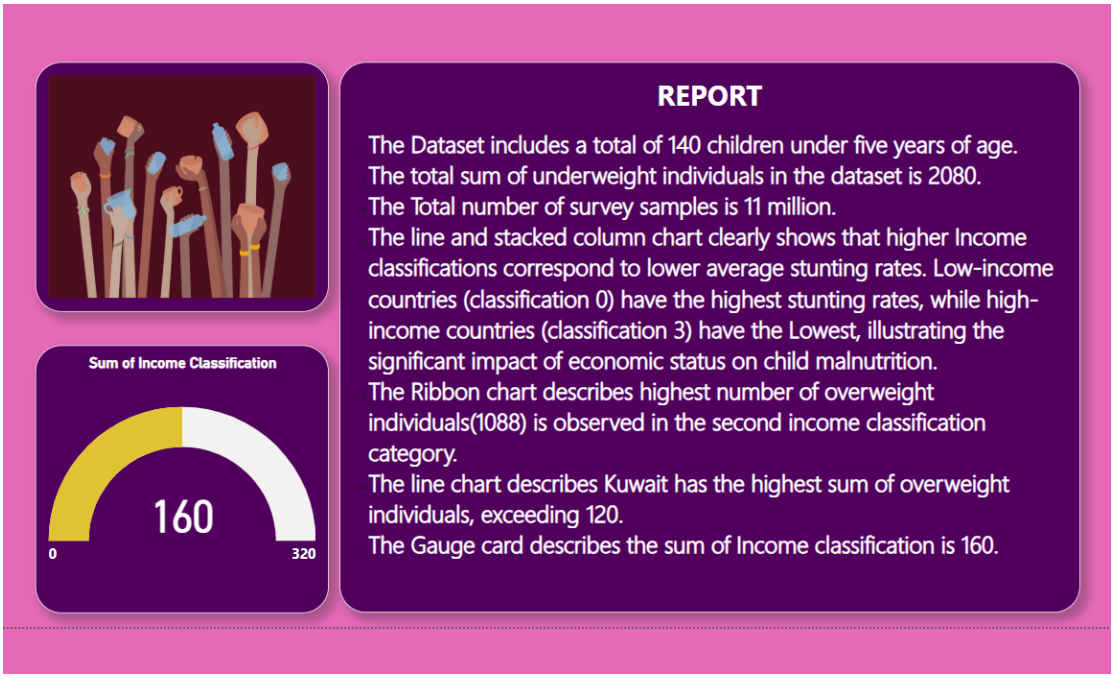
Customizing Appearance & Interactivity – Applying filters, slicers, and drill-through features for deeper insights.

Organizing the Layout – Structuring the report logically with clear sections for key metrics, trends, and comparisons.

Ensuring Consistency – Formatting visuals, fonts, and colors for clarity and readability.

Building Dashboards – Summarizing critical insights for quick decision-making.

Iterating & Refining – Gathering feedback and refining the report to enhance usability.



Report Explanation: Link

Milestone 6: Performance Testing

Performance testing ensures that Power BI dashboards and reports function efficiently under various conditions. It evaluates data processing speed, visualization load times, and system responsiveness to optimize user experience and insight delivery.

Key Performance Testing Aspects:

6.1 Amount of Data Loaded

Measures the volume of data imported, retrieved, or processed in the system.Ensures that all required data is successfully loaded for analysis.

Data Load Time: Assesses the time taken to import and refresh datasets.

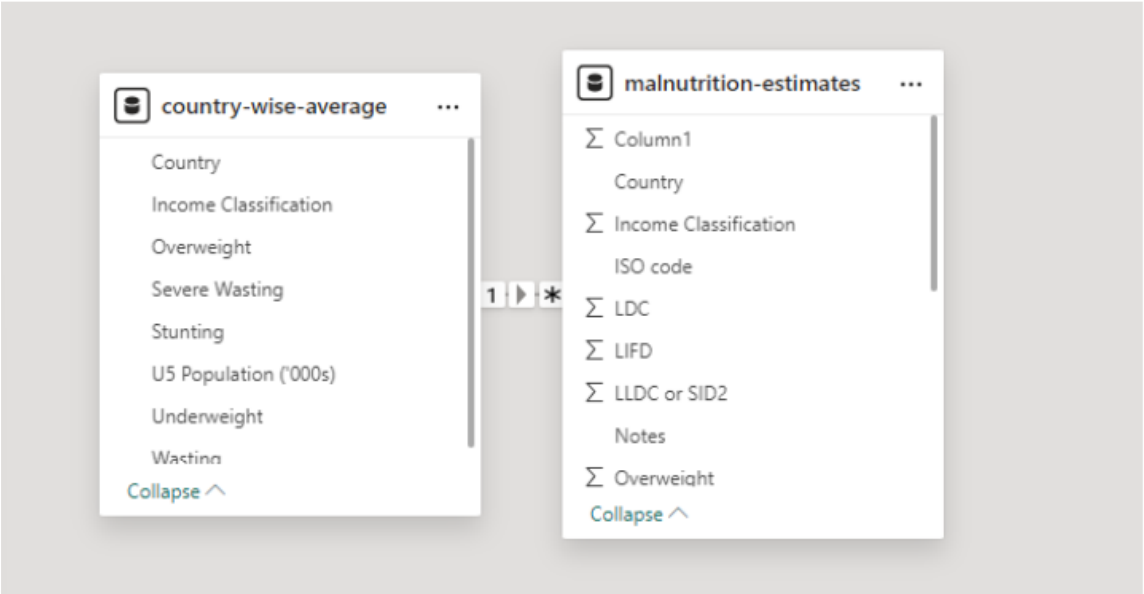
Identifies bottlenecks in data extraction and transformation.

Report Rendering Speed: Evaluates how quickly charts, graphs, and tables are displayed. Ensures seamless user experience in Power BI.

Query Performance: Tests DAX queries and Power BI's data model efficiency. Optimizes complex queries for faster execution.

Scalability & Resource Utilization: Assesses performance under larger datasets and multiple users. Monitors memory, CPU, and storage usage for efficiency.

Optimization Techniques: Uses data reduction strategies, indexing, and query optimizations. Applies best practices for faster report performance.

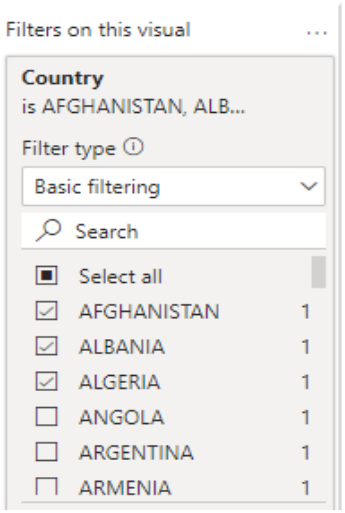


6.2 Utilization of Filters

Filters play a crucial role in data analysis and visualization by enabling users to refine and focus on specific subsets of data. In Power BI, filters help in dynamically adjusting reports based on user selections, improving interactivity and insights.

Activity 2.1: Selected "Country" as a Filter

The "Country" filter allows users to view malnutrition data for specific nations.It helps in analyzing trends and comparisons across different regions.Users can drill down into individual countries, making insights more granular and actionable.



6.3 Number of Visualizations/Graphs

The analysis includes multiple visualizations to represent malnutrition trends effectively:

Count of U5 Population – Displays the total number of under-five children in the dataset.

Sum of Survey Sample (N) – Represents the total survey sample size for robustness.

Sum of Underweight – Highlights the number of underweight children.

Sum of Overweight by Country – Shows overweight cases across different countries.

Total Income Classification – Represents the income distribution of countries.

Sum of Overweight and Underweight by Income Classification – Compares overweight and underweight cases across income groups.

Sum of LDC, LIFD, LLDC, or SIDS and Average of Stunting by Income Analysis – Examines stunting trends across economic classifications.

Milestone 7: Project Demonstration & Documentation

Creating a record explanation video for project's end to end solution is crucial for ensuring clarity and transparency in implementation. This project demonstration video

and documentation serves as a comprehensive guide, detailing every aspect of the project from inception to completion.

Drive Link - Link