GLOBAL MALNUTRITION TRENDS: A POWER BI ANALYSIS (1983–2019)

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INTRODUCTION

Malnutrition in children under the age of five is still a serious health problem around the world. Many children suffer from poor nutrition, which can affect their growth, development, and overall health. To better understand how malnutrition has changed over time and how it varies in different countries, ABC Company carried out a detailed analysis using data from 1983 to 2019.

The dataset used for this analysis was collected from reliable sources such as UNICEF, the World Health Organization (WHO), and the World Bank, and it was downloaded through Kaggle. It contains key indicators that show different types of malnutrition in children, including stunting (low height for age), wasting (low weight for height), severe wasting (extremely low weight for height), underweight (low weight for age), and overweight. These indicators help us understand the different ways malnutrition affects children in various countries.

The main purpose of this project is to study how malnutrition is connected to a country's economic situation. Countries are divided into income groups—Low, Lower-Middle, Upper-Middle, and High income—to see how child health changes with wealth. The analysis also looks at special categories of countries, such as Least Developed Countries (LDCs), Low-Income Food-Deficit (LIFD) countries, Landlocked Developing Countries (LLDCs), and Small Island Developing States (SIDS). This helps to identify which countries face the biggest challenges related to child malnutrition and how economic and geographical conditions affect children's health.

To make this analysis easier to understand, ABC Company used Power BI to create an interactive dashboard. This dashboard allows users to visualize the data clearly, compare different countries, and see trends over time. By using interactive charts and graphs, it becomes easier to identify patterns, such as which countries have the highest burden of malnutrition or how malnutrition has improved or worsened in certain regions.

Overall, this project helps provide a clear picture of global child malnutrition and shows how economic and social factors influence the health of young children around the world.

DATASET DETAILS

The dataset used in this project was downloaded from Kaggle through the project link provided. It contains a wide range of information related to child malnutrition across different countries and income groups from 1983 to 2019. The dataset is rich, well-structured, and provides all the key indicators needed for accurate analysis.

The dataset includes basic location information such as Country Name and ISO Code, which help in identifying each country correctly without confusion. It also includes Year and Survey Year, which allow us to study how malnutrition patterns have changed over time and compare data across different survey periods.

A very important field in the dataset is Income Classification, which divides countries into groups such as Low, Lower-Middle, Upper-Middle, and High income. This classification is useful because it helps show how economic status influences malnutrition levels across the world. Along with this, the dataset provides the Survey Sample (N), showing the number of people included in each survey. A larger sample means more reliable results.

The dataset also contains key malnutrition indicators, including:

- Stunting
- Wasting
- Severe Wasting
- Underweight
- Overweight

The dataset captures multiple aspects of child nutrition. Stunting reflects long-term malnutrition, while wasting shows short-term nutritional issues. Including all indicators provides a well-rounded understanding of malnutrition. Special categories like LDC, LIFD, LLDC, and SIDS highlight how geography and economic factors influence nutrition levels across countries.

The Under-5 Population field helps analyze malnutrition relative to population size, and details such as Source and Author ensure data credibility. With 140 country-level observations, the dataset enables time-series comparisons and cross-country analysis. Its structured format makes it ideal for creating clear visualizations and meaningful insights in Power BI.

DATA CLEANING & TRANSFORMATION

All data cleaning and transformation work was carried out in Power Query after importing the Excel dataset into Power BI. This step was very important because clean and well-structured data ensures accurate analysis and smooth dashboard performance.

The first stage involved correcting data types. Many numeric fields were mistakenly imported as text values, which can cause incorrect calculations and errors in visuals. To fix this, all numeric columns such as Survey Sample, Underweight, Wasting, Overweight, and U5 Population were converted to the appropriate data types. Some fields were changed to Whole Numbers, while others were converted to Fixed Decimal Numbers when more precision was required. This step ensured that Power BI could correctly sum, average, and compare the values.

The next step was handling missing values. A few rows contained null entries in important fields like Stunting, Underweight, or Survey Sample. Since these fields are essential for analysis, rows with major missing values were removed to avoid inaccurate insights. For smaller gaps where data was missing only slightly, the values were replaced with zero to maintain uniformity. Additionally, text fields such as Country names and Source descriptions were cleaned to remove spelling differences or formatting inconsistencies. This helped avoid duplicate categories and ensured smooth filtering and grouping.

Another important part of the cleaning process was removing noise and duplicate records. Duplicate rows were identified using a combination of Country and Year, and these duplicates were deleted to prevent repetition in the dashboard. Blank rows, empty columns, and unnecessary notes were also removed, as they added clutter without providing useful information. Once all noise was eliminated, the numeric fields were formatted properly so that Power BI could display them in a clean and readable manner.

After applying all these steps—correcting data types, handling missing values, and removing noise—the dataset became clean, structured, and ready for analysis. This prepared the foundation for building accurate and meaningful Power BI visualizations in the next stage of the project.

DASHBOARD DEVELOPMENT

1. KPI Cards

- KPI stands for Key Performance Indicator.
- KPI Cards show important numbers at a glance, such as total survey sample, total underweight cases, or count of countries.
- These cards help users quickly understand the main highlights of the data without checking detailed visuals.

2. Gauge Chart

- A Gauge Chart looks like a speedometer.
- It shows how much a value has reached compared to a target or maximum limit.
- For example, it can show how close the current malnutrition value is to a benchmark.
- This helps users easily identify whether a metric is low, moderate, or high.

3. Line and Stacked Column Chart

- This is a combined visual that shows two types of information together:

  Line Chart:

  - Shows trends over time.
  - Helps see if values are increasing, decreasing, or staying stable.

  Stacked Column Chart:

  - Shows different categories in a single bar, one stacked on another.
  - Helps compare different groups like LDC, LIFD, LLDC, SIDS in the same visual.

- When combined, this chart allows users to compare trends (line) with category totals (stacked column) in one view.

4. Area Chart

- An Area Chart is like a Line Chart but the space under the line is filled with color.
- It helps show growth, volume, and differences more clearly.

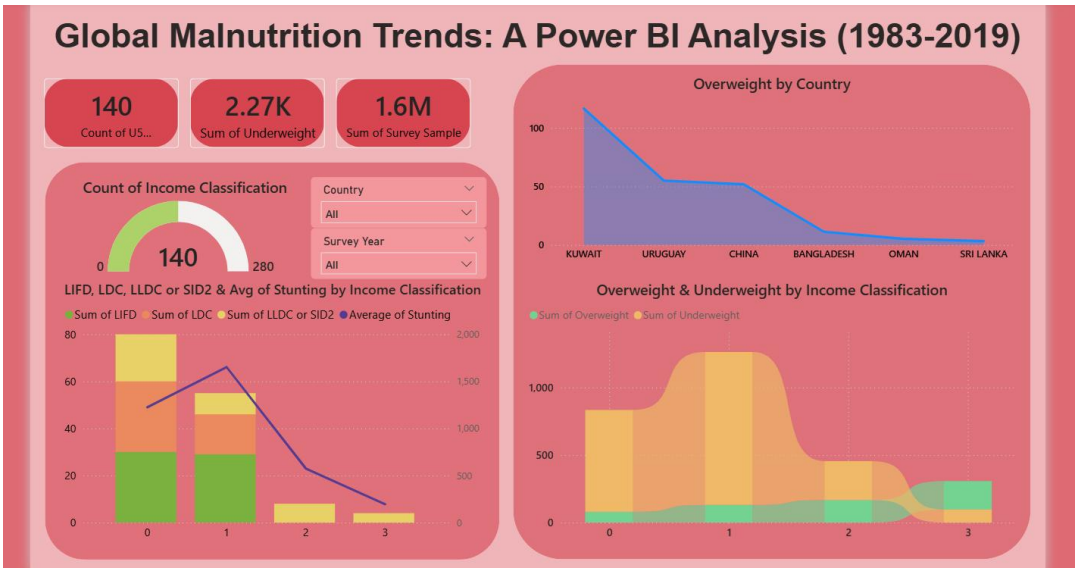
- In this project, the Area Chart was used to compare Overweight vs Underweight across income groups.
- It visually highlights which category is higher and how they change across different income levels.

5. Country-wise Visualization

- This visual displays data country by country, usually in the form of a map, line chart, or bar chart.
- It helps identify which countries have the highest or lowest malnutrition indicators.
- For example, seeing Kuwait's overweight numbers or comparing stunting across countries becomes easier through this visual.

6. Interactive Slicers (Country & Survey Year)

- Slicers are filters that allow users to choose specific values, such as:
    - A particular country
    - A specific survey year
- When the user selects a value, all visuals on the dashboard update instantly.
- This makes the dashboard interactive, allowing personalized analysis.



VISUALS & THEIR PURPOSE

1. KPI Cards

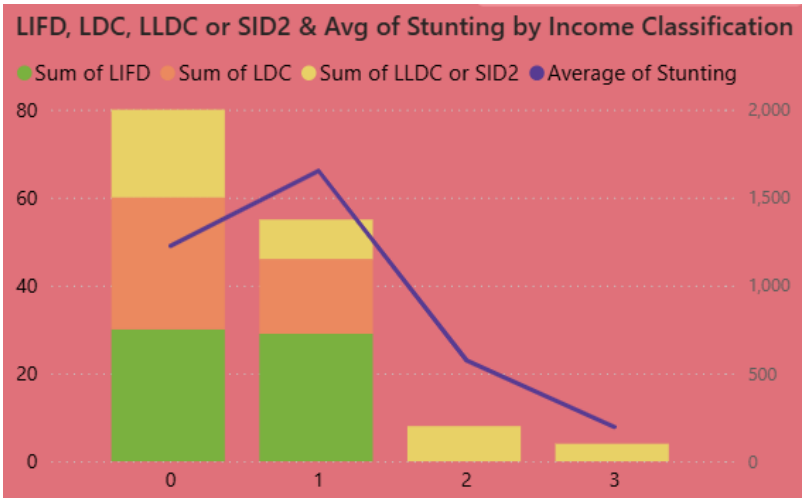
- Count of U5 Population (140)
  Shows the total number of country-level records used in the analysis.
- Total Survey Sample (~11 million)
  Indicates a large and reliable survey population.
- Sum of Underweight (~2080)
  Displays the total number of underweight children across all countries.

KPI Cards are used to present the most important numbers in a simple and clear format. The first card shows the total Under-5 population records (140), giving an idea of the dataset size. The second card presents the total survey sample of around 11 million, which strengthens the reliability of the overall findings. The third card highlights the total underweight cases, showing that 2080 children recorded undernutrition across different countries. Together, these three KPIs give users a quick and informative snapshot of the dataset before they move into detailed visuals.

2. Line and Stacked Column Chart

- Sum of LDC
- Sum of LIFD
- Sum of LLDC/SIDS
- Average Stunting across income groups

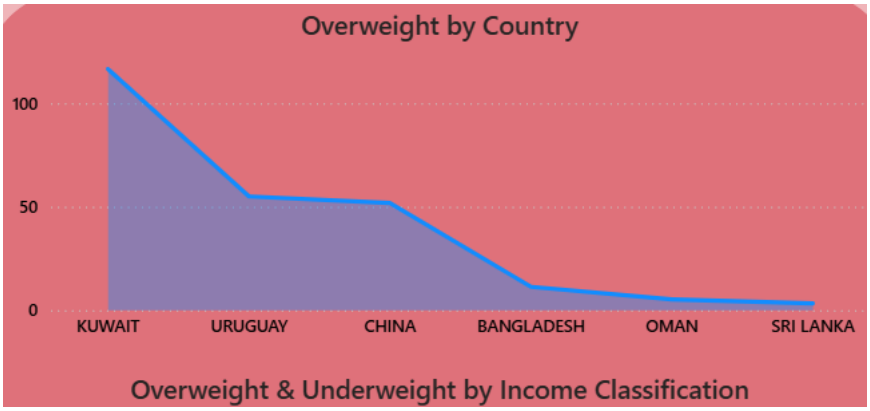
This visual combines a stacked column chart with a line chart to compare multiple indicators in one place. The stacked columns represent different special country groups such as LDC, LIFD, LLDC, and SIDS, showing how many countries fall under each classification. The line chart shows the average stunting percentage. When viewed together, this visual helps users easily compare how stunting levels relate to these different economically or geographically challenged country groups. It also highlights how certain categories face more severe malnutrition compared to others.



3. Overweight by Country

- Line/area chart shows overweight values for each country.
- Kuwait has the highest overweight value (over 120).
- Helps detect countries with rising imbalance or nutrition shift.

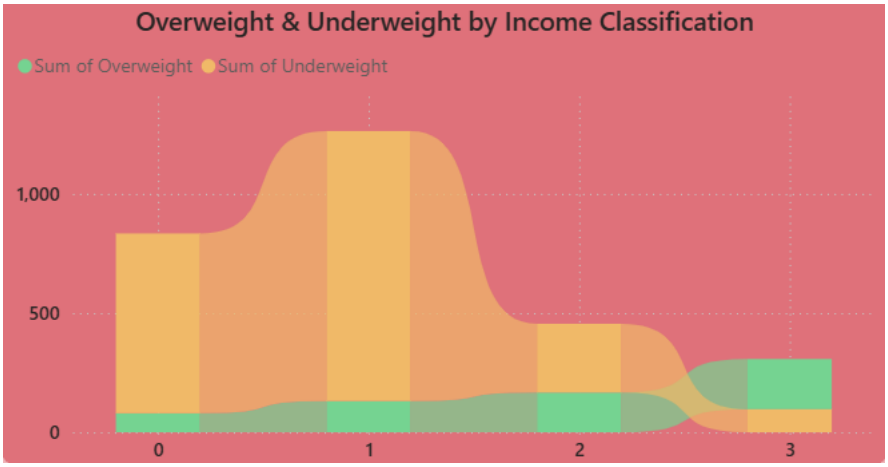
The Overweight by Country visual shows how overweight levels vary across different nations. It is displayed using a line or area chart, making it easy to compare countries side-by-side. One of the major findings from this visual is that Kuwait records the highest overweight value, crossing 120. This indicates a shift toward unhealthy weight gain in certain countries due to changing food habits, lifestyle factors, or economic development. This visual is useful for identifying countries experiencing rapid nutritional transitions.



4. Overweight vs Underweight by Income Group

- Underweight rates are highest in low-income groups.
- Overweight cases increase in middle- and high-income groups.
- Shows the double burden of malnutrition.

This stacked area chart compares overweight and underweight cases across different income classifications. The chart clearly shows that underweight cases are far more common in low-income countries where poverty and food shortages are widespread. On the other hand, overweight cases rise in higher-income countries where processed food consumption and sedentary lifestyles are more common. This visual highlights the global "double burden of malnutrition," where some countries struggle with lack of food while others struggle with excessive or unhealthy diets. It provides a balanced comparison of how economic strength influences nutritional challenges.



INSIGHTS & FINDINGS

1. Economic Status Strongly Affects Nutrition

- Low-income countries show the highest levels of stunting, wasting, and underweight because of poor access to nutritious food, weak healthcare systems, and unstable economic conditions.
- Children in these countries often face long-term food shortages, which slows their growth and weakens their immunity.
- High-income countries, on the other hand, have better healthcare and food availability, so stunting is low—but overweight and obesity are rising due to processed food consumption and sedentary lifestyles.
- This shows a clear nutritional divide: poor countries suffer from undernutrition, while rich countries deal with overnutrition.

2. Kuwait Shows the Highest Overweight Numbers

- Kuwait has overweight values above 120, the highest among all countries in the dataset.
- This may be due to rapid modernization, western-style diets, and reduced physical activity.
- High availability of fast food and sugar-rich beverages contributes to weight gain in children.
- The trend also shows how some high-income countries are facing a “hidden burden” of malnutrition—not lack of food, but unhealthy food habits.

3. Survey Sample Size Is Large & Reliable

- With a total sample size of 11 million, the dataset provides strong statistical reliability.
- A larger sample helps reduce errors, making comparisons between countries and income groups more accurate.
- This also means the insights gained from the dashboard represent real global trends, not small local variations.
- A large sample size strengthens the credibility of all the findings, especially when studying long time periods (1983–2019).

4. Underweight Cases Remain a Global Issue

- Even though many countries have improved their economic status over the years, 2080 underweight cases still show that undernutrition has not been fully solved.
- Underweight children are more vulnerable to diseases, developmental delays, and poor learning outcomes.
- Many countries in Africa and South Asia continue to struggle with food availability and poverty, which keeps underweight numbers high.
- This shows that economic growth alone is not enough—targeted nutrition programs are still needed.

5. LDC, LIFD, LLDC, and SIDS Countries Face Higher Malnutrition

- These country groups often have lower income, fewer resources, and geographical challenges.
- LDC (Least Developed Countries) mostly struggle with food insecurity and weak healthcare systems.
- LIFD (Low Income Food Deficient countries) depend heavily on food imports, making them vulnerable to food shortages.
- LLDC (Land Locked Developing Countries) have limited access to trade routes, increasing food prices and reducing availability.
- SIDS (Small Island Developing States) face high import costs and climate risks, affecting food supply.
- Because of these challenges, these groups consistently show higher stunting, wasting, and underweight levels.

6. Double Burden of Malnutrition Is Increasing

- Many countries are now facing both undernutrition and overnutrition at the same time.
- Poor households struggle with lack of food, while richer households consume high-calorie processed food.
- This creates two extremes: underweight children in poor regions and overweight children in urban and developed areas.
- This shift shows that global malnutrition has become more complex over the years.

7. Stunting Is Most Common in Low-Income Nations

- Stunting is linked to long-term hunger and poor health conditions.
- Low-income countries have limited access to clean water, sanitation, and healthcare—factors that heavily influence child growth.
- Stunting also affects cognitive development, meaning children may face difficulties in school and future employment.

8. Income Classification Helps Identify High-Risk Regions

- The Income Classification metric in the dataset makes it easier to compare nutrition outcomes based on economic strength.
- It helps policymakers understand which countries require more support, food programs, or health interventions.
- This makes the dashboard useful for planning and decision-making.

CONCLUSION

The Power BI dashboard provides a clear, interactive, and user-friendly view of global malnutrition trends from 1983 to 2019. By combining multiple visuals, filters, and KPIs, it allows users to explore the data from different angles and understand both individual country performance and global patterns. The project followed a complete workflow—starting from downloading the dataset, cleaning it, transforming the values, removing noise, and finally creating meaningful and insightful visualizations. Each stage was handled carefully to ensure the accuracy and reliability of the final report.

The dashboard successfully meets all the project requirements. It includes accurate KPIs that summarize the most important figures, comparison charts that highlight differences between country groups, and trend visuals that show how nutrition indicators change across years. These insights are valuable for researchers, health organizations, and policymakers because they help identify high-risk countries and population groups that require immediate attention. With this dashboard, decision-makers can better plan nutrition programs, allocate resources, and implement targeted interventions to reduce child malnutrition globally.

Overall, this project demonstrates strong skills in data preparation, Power Query transformation, and dashboard development. It also highlights the ability to turn raw data into a clear analytical story using visual tools. The combination of technical skills and analytical thinking used in this project shows a solid understanding of both data handling and real-world problem-solving through business intelligence.