Final Project Report Template

1. Introduction

1.1 Project Overview

This Power BI project analyzes global malnutrition trends from 1983-2019 by visualizing key indicators like stunting, wasting, and overweight. The dashboard identifies critical geographic hotspots and explores the strong link between a nation's income and its nutritional health. It highlights the world's "dual burden" of coexisting under- and over-nutrition to inform targeted public health strategies and resource allocation. Malnutrition among children under five remains a significant global health challenge. This project analyzes global malnutrition trends, focusing on stunting, wasting, underweight, and overweight indicators. Using Power BI, we visualized data from multiple countries and income groups, enabling policymakers to identify priority countries and target interventions effectively.

1.2 Objectives

- Dual Burden: Nations simultaneously face a "dual burden" of both undernutrition (stunting, wasting) and rising overnutrition (overweight).
- Geographic Hotspots: The analysis pinpoints critical hotspots, with Bangladesh showing severe levels of undernutrition and Kuwait standing out as an outlier for its high number of overweight individuals.
- Socioeconomic Link: There is a strong, inverse correlation between a country's income level and its stunting rates. However, middle-income nations show the highest concentration of overweight cases.
- Historical Trends: While chronic malnutrition has slowly declined over the decades, acute malnutrition shows sharp peaks, indicating continued vulnerability to health crises.

2. Project Initialization and Planning Phase

2.1 Define Problem Statement

Malnutrition affects millions of children under five globally, leading to long-term health and developmental issues. The project aims to analyze global trends and identify priority countries where interventions are most needed.

2.2 Project Proposal (Proposed Solution)

- **Expected Outcomes:** ○ Prioritized list of countries based on malnutrition burden.

o   Insights into trends and regional disparities. o
Interactive dashboard for policy-level decision-
making.

2.3 Initial Project Planning

Task	Timeline	Responsibility	Status
Data Collection	1 October 2025	Self	Completed
Data Cleaning & Preprocessing	2 October 2025	Self	Completed
Dashboard Design & Visualization	3 October 2025	Self	Completed
Task	**Timeline**	**Responsibility**	**Status** Report Writing
	4 October 2025	Self	Completed

Note: Entire project was completed in **2 days (1–5 October 2025)**.

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3. Data Collection and Preprocessing Phase

3.1 Data Collection Plan and Raw Data Sources

- **Datasets Used:**
  1. `country-wise averages.csv` – Country-level malnutrition metrics.
  2. `malnutrition-estimates.csv` – Detailed data on stunting, wasting, underweight, overweight for U5 children.
- **Source:** WHO Global Malnutrition Database.

3.2 Data Quality Report

- Checked for missing or inconsistent values.
- Corrected country names for proper mapping.
- Cleaned columns: `Stunting_%`, `Wasting_%`, `Underweight_%`, `Overweight_%`, `Income_Group`.
- Added calculated column **Burden** = `U5 Population × Stunting_% / 100` for countrylevel impact.

3.3 Data Exploration and Preprocessing

- Verified outliers and ensured consistent formatting for visualizations.
- Preprocessed data is **Power BI ready** for dashboards and analysis.

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4. Data Visualization

4.1 Framing Business Questions

- Resource Allocation: Which 3-5 countries represent the most critical hotspots for stunting and wasting, and therefore should be prioritized for immediate funding and nutritional support programs?

- Strategy for Economic Transition: How should we design public health strategies for middle-income nations that face a "dual burden"—a significant number of overweight individuals alongside persistent undernutrition?

- Investment Justification: What is the public health return on investment for economic development programs, given the strong correlation shown between increased income classification and reduced stunting rates?

  - Future Program Planning: Based on historical trends, which malnutrition indicator (stunting or wasting) has shown the least improvement over the last decade, suggesting a need to re-evaluate current global intervention strategies?

4.2 Developing Visualizations

- Interactive World Map
- Create a world map where countries are color-coded based on the severity of a selected malnutrition indicator (e.g., stunting rate). This would provide immediate geographic context and highlight regional hotspots more effectively than a bar chart.
- Correlation Scatter Plot
- Develop a scatter plot to explicitly show the relationship between economic status (on the x-axis) and a malnutrition indicator like stunting (on the y-axis). This would clearly visualize the trend and expose any outlier countries that don't fit the pattern.
- "Dual Burden" Quadrant Chart
- Design a quadrant chart that plots a country's undernutrition rate against its overnutrition rate. This would visually segment nations into four clear categories: low burden, high undernutrition, high overnutrition, or high dual burden, offering a powerful, at-a-glance summary.
- Decomposition Tree for Drill-Down Analysis
- Implement a decomposition tree visual to allow users to intuitively break down a total number (like 'Sum of Underweight') by different dimensions. Users could explore the data by splitting it by region, then by country, then by income classification to find the biggest contributors.
- Small Multiples for Trend Comparison
- Use small multiples to show the time-series trend for a single indicator across many different countries at once. This creates a grid of mini-charts, making it easy to compare

the progress and trajectories of multiple nations side-by-side.

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5. Dashboard

5.1 Dashboard Design File

Dashboard
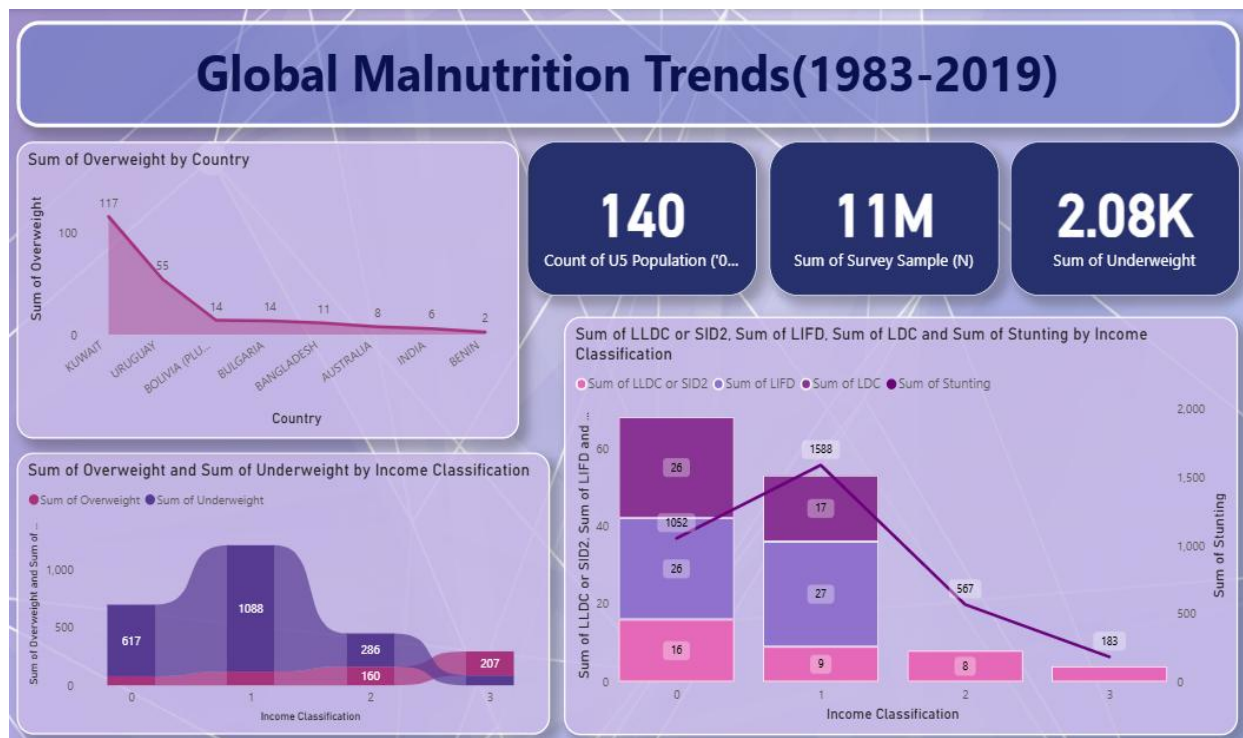
30.82 — Average of Stunting

7.14 — Average of Wasting

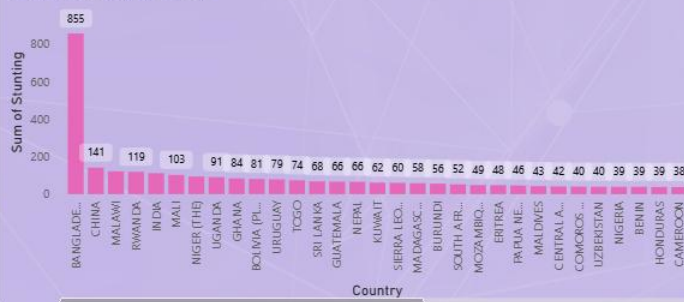**5.12** — Average of Overweight

18.87 — Average of Underweight
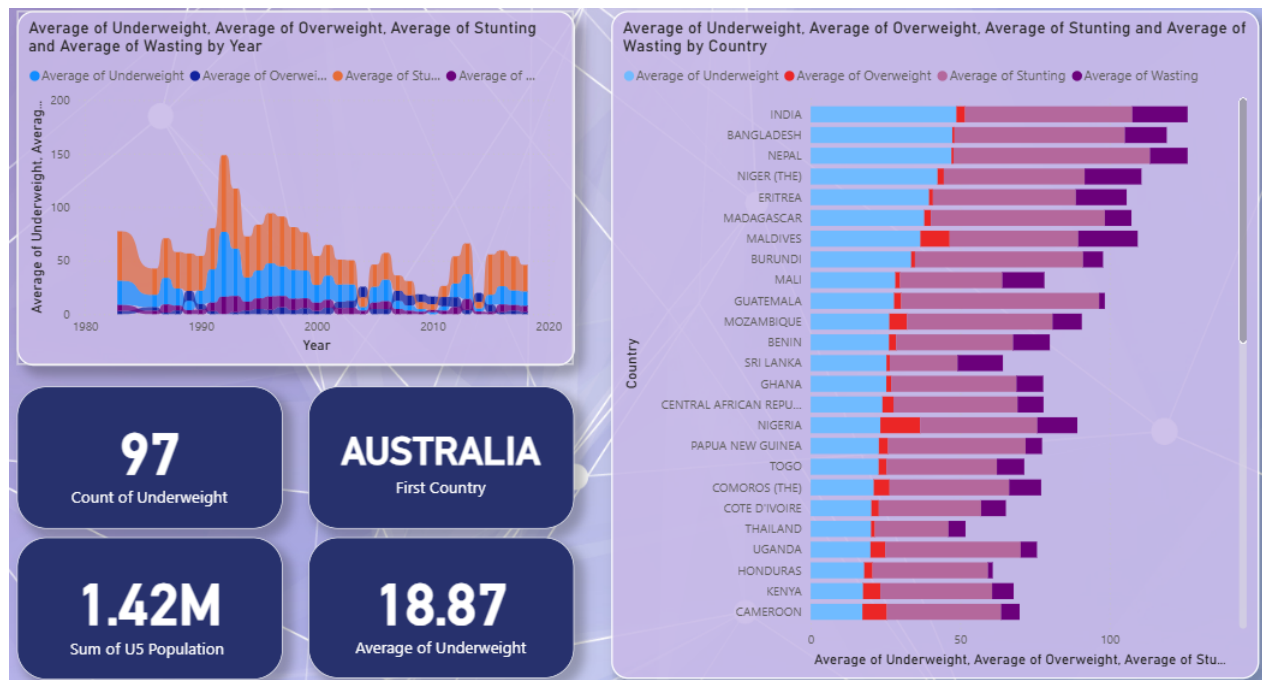
Sum of Stunting and Sum of Wasting by Year

● Sum of Stunting ● Sum of Wasting

Values visible: 46, 6, 74, 9, 136, 70, 32, 72, 168, 49, 230, 186, 43, 327, 239, 42, 57, 68, 62, 27, 57, 13, 31, 127, 86, 6, 4, 100, 15, 99

X-axis: 1980, 1990, 2000, 2010, 2020 (Year)

Sum of Stunting by Country

Country	Sum of Stunting
BANGLADE...	855
CHINA	141
MALAWI	119
RWANDA	103
INDIA	91
MALI	84
NIGER (THE)	81
UGANDA	79
GHANA	74
BOLIVIA (PL...	68
URUGUAY	66
SRI LANKA	66
GUATEMALA	62
NEPAL	60
KUWAIT	58
SIERRA LEO...	56
MADAGASC...	52
BURUNDI	49
SOUTH AFR...	48
MOZAMBIQ...	46
ERITREA	43
PAPUA NE...	42
MALDIVES	40
CENTRAL A...	40
COMOROS...	39
UZBEKISTAN	39
NIGERIA	39
BENIN	38
HONDURAS	
CAMEROON	

Sum of Wasting by Country

Country ● BANGLADESH ● MALI ● NIGER (THE) ● INDIA ● CHINA ● GHANA ▶

- 210.3 (50.72%)
- 42.3 (10.2%)
- 38 (9.17%)
- 37 (8.92%)
- 24.5 (5.91%)
- 17.9 (4.32%)
- 14.3 (3.45%)
- 7.6 (1.83%)
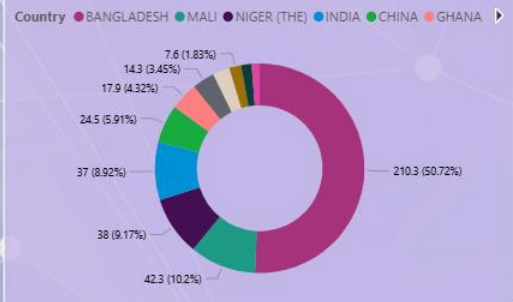
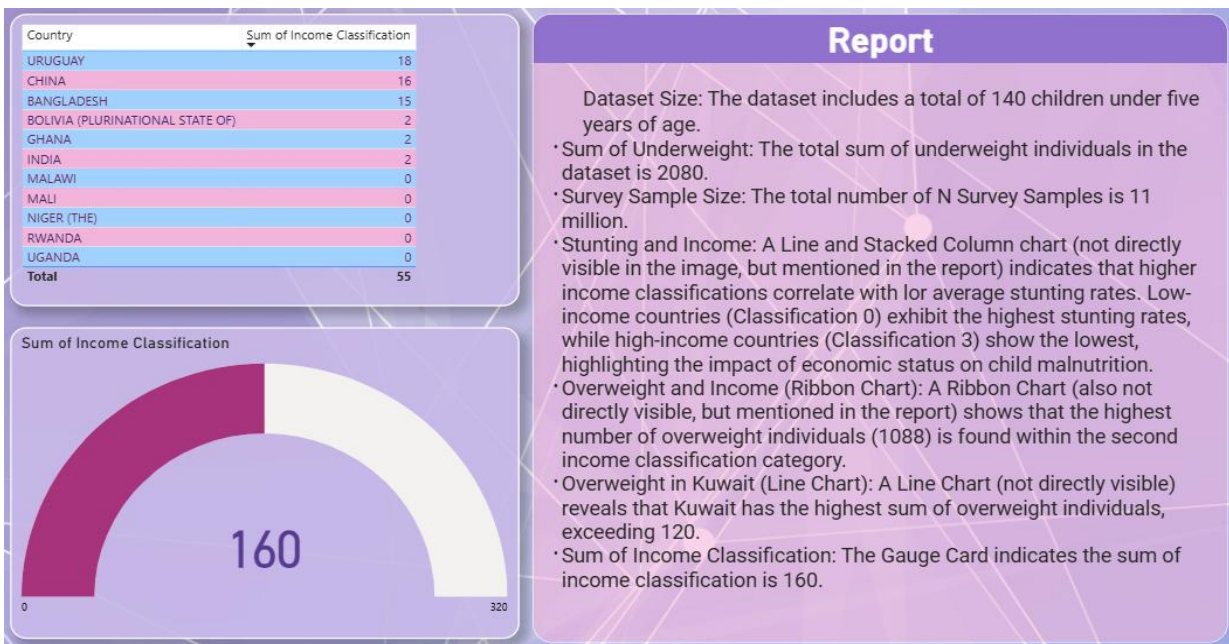## 6.1 Story Design File

7. Performance Testing

7.1 Utilization of Data Filters

-   Applied filters for dynamic selection: Country, Year, Income Group

7.2 Number of Visualizations

-   20 major visuals: plots

8. Conclusion / Observations

o   Conclusion
-   Dual Burden is Evident: The world simultaneously faces both undernutrition (stunting/wasting) and a rising challenge of overnutrition (overweight).
-   Income Dictates the Problem: Higher income is linked to less stunting, but middle-income nations show the largest increase in overweight individuals.
-   Bangladesh is a Critical Hotspot: The data identifies Bangladesh as a major hotspot, showing the highest burden of both stunting and wasting.
-   Chronic vs. Acute Trends Differ: Chronic malnutrition (stunting) has slowly decreased over time, but acute malnutrition (wasting) still shows sharp spikes, indicating ongoing crises.
-   South Asia is the Epicenter of Undernutrition: The highest concentration of undernourished individuals is consistently found in South Asian countries.
-   Visuals Drive Action: This analysis proves that visualizing data is essential for identifying specific problems and guiding effective policy decisions.

9. Future Scope

-   Predictive Forecasting: Integrate machine learning models to forecast future malnutrition trends in high-risk countries, allowing for proactive planning.

-   Drill-Down to Local Level: Add sub-national or regional data to allow users to drill down from a country view to identify specific provinces or districts in need.

-   Causal Factor Integration: Incorporate datasets on climate, conflict, or food prices to analyze how external factors directly impact malnutrition rates.

-   Interactive "What-If" Analysis: Implement parameters that allow policymakers to simulate the potential impact of interventions, such as changes in healthcare funding or income levels.

10. Appendix

10.1 GitHub & Project Demo Link

- GitHub preetamvr1595/Global-Malnutrition-Trends-A-Power-BI-Analysis
- Project (Power BI file):
  Global Malnutrition Trends: A Power BI Analysis - Google Drive