Intern Detail

Field	Details
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College Name	Rajkiya Engineering College, Banda
Branch	B.Tech – Informa on Technology
Roll Number	2207340130064
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Internship Provider	Smart Internz
Internship Domain	Data Analy cs using Power BI
Project Title	Global Malnutri on Trends: A Power BI Analysis (1983-2019)
Project Type	Group Project (Self-led)
Project Descrip on	This project studies world malnutri on data from 1983 to 2019 using Power BI. It shows important trends and helps understand which countries need support to end hunger (SDG 2).

Final Project on

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

1. Introduc on o Project overviews
   o Objec ves
2. Project Ini aliza on and Planning
   Phase o Define Problem
   Statement o Ini al Project
   Planning o Project Proposal
   (Proposed Solu on)
3. Data Collec on and
   Preprocessing Phase o Data
   Explora on and Preprocessing o
   Data Quality Report o Data
   Collec on Plan and Raw Data
   Sources Iden fied
4. Data Visualiza on o Framing
   Business Ques ons o Developing
   Visualiza ons
5. Dashboard o Dashboard Design
   File
6. Report o Story Design File
7. Performance Tes ng o U liza on
   of Data filters o No of Calcula
   on Field o No of Visualiza on
8. Conclusion/Observa on
9. Future Scope
10. Appendix o Source Code o
    GitHub & Project Demo Link

1. Introduc on :

Global Malnutri on Trends: A Power BI Analysis (1983–2019)

- Project Overview:

To analyze global malnutri on trends from 1983 to 2019 among children under five, focusing on severe was ng, was ng, stun ng, underweight, and overweight condi ons. The goal is to uncover how these malnutri on forms vary by country income classifica ons and other geopoli cal categories, using Power BI visualiza ons to drive policy and interven on strategies.

- Objec ves :

  - Track long-term malnutri on indicators
  - Iden fy regional dispari es
  - Target policy-making
  - Align findings with SDG 2 (Zero Hunger)

2. Project Ini aliza on and Planning Phase:

- Project Ini aliza on and Planning Phase

Date	28-07-2025
Team ID	YM
Project Name	Global Malnutri on Trends: A Power BI Analysis (1983-2019)
Maximum Marks	3 Marks

Problem Statements :

Create a problem statement to understand your customer's point of view. The Customer Problem Statement template helps you focus on what ma ers to create experiences people will love. A well ar culated customer problem statement allows you and your team to find the ideal solu on for your

customers' challenges. Throughout the process, you'll also be ableto empathize with your customers, which helps you be er understand how they perceive your product or service.

Problem Statement (PS)	I am (Customer)	I'm trying to	But	Because	Which makes me feel
PS-1	A scien st	Study on nutri on deficient children	There is lack of informa on	Due to less data is available	lost
PS-2	A student	Study on deficient children health	There is lack of informa on	Due to less data is available	angry

Ini al Project Initial Project Planning Template

Date	30 July 2025
Team ID	YM
Project Name	Global Malnutrition Trends: A Power BI Analysis (1983–2019)
Maximum Marks	4 Marks

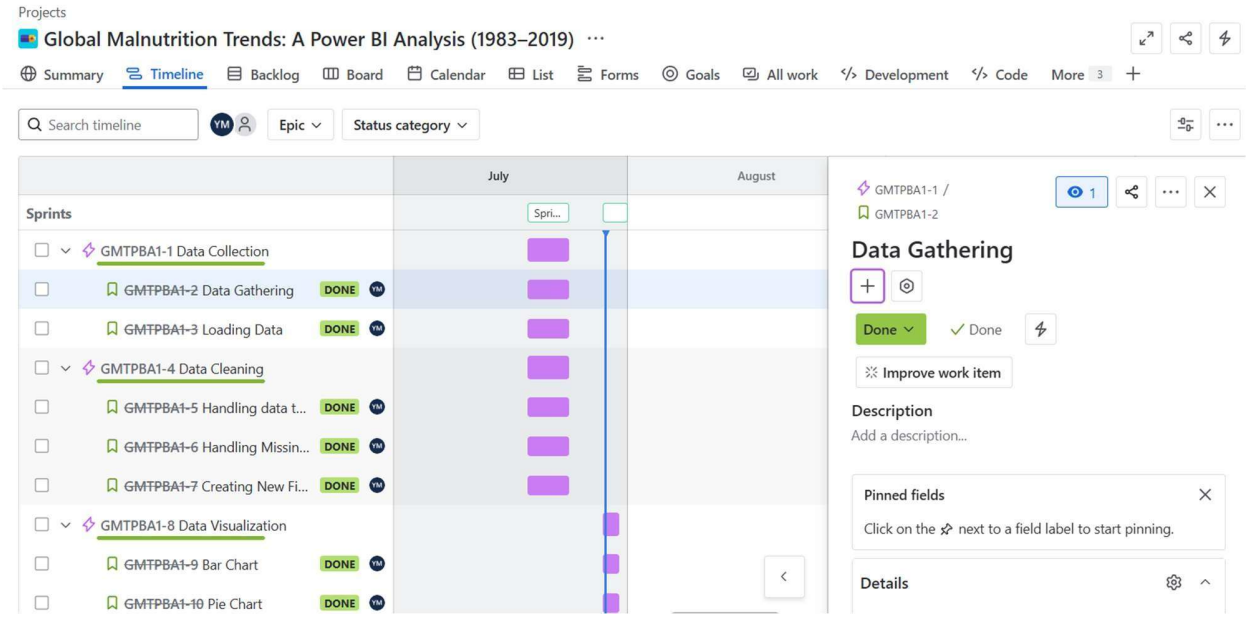
Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members	Sprint Start Date	Sprint End Date (Planned)
Sprint1	Data Collection	GMTPBA1-2	Data Gathering process in this gather the data from various sources	3	High	YM Team	20 july 2025	25 july 2025
		GMTPBA1-3	As a Student I have to load all Gathered data to the Power BI	2	High	YM Team		
Sprint1	Data Cleaning	GMTPBA1-5	In Data Cleaning we handling data type ensures that the data types of each column are same.	3	Low	YM Team		
		GMTPBA1-6	We also ensure that there is not any missing values	2	Medium	YM Team		
		GMTPBA1-5	We also create new tables according to our need in the dataset.	3	High	YM Team		
Sprint2	Data Visualization	GMTPBA1-9	Create Bar Chart in this activity for the better understanding of the dataset	3	High	YM Team	25 july 2025	28 july 2025
		GMTPBA1-10	Create Pie chart in this activity for the better understanding of the dataset.	3	low	YM Team		

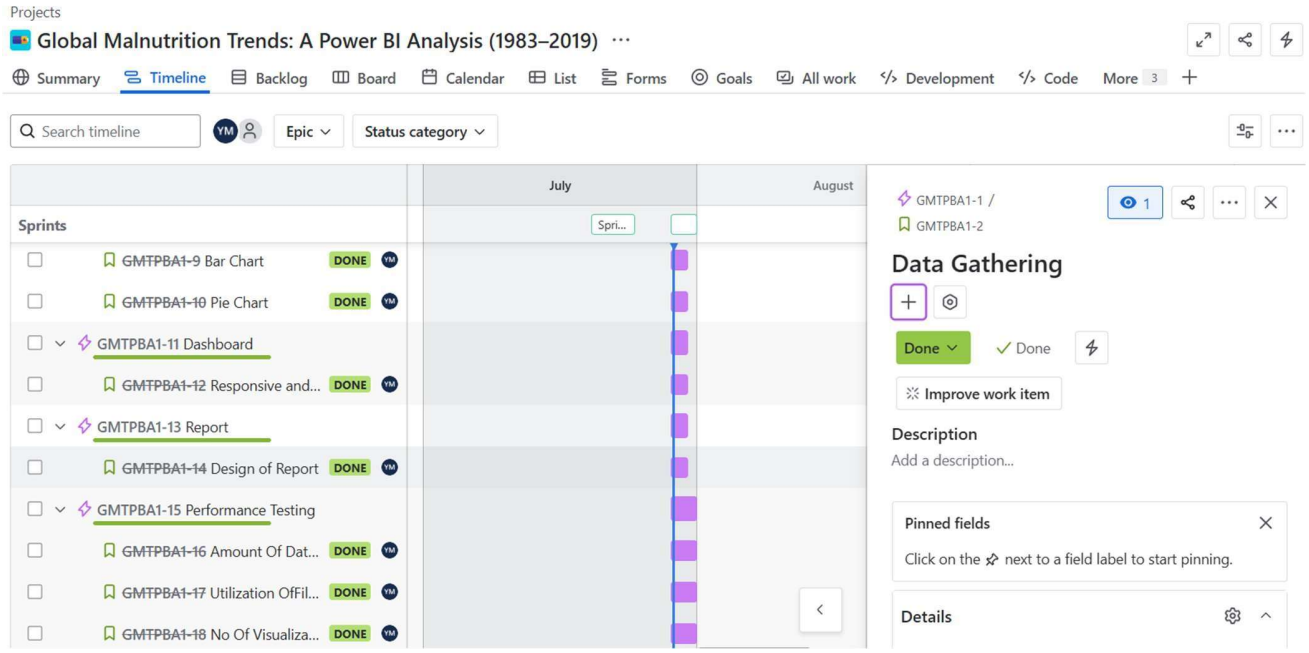
	Dashboard	GM TPB A1-12	Creating a Resposive and Design of dashboard for the dataset.	3	medium	YM Team		

Product Backlog, Sprint Schedule, and Estimation (4 Marks)

Use the below template to create a product backlog and sprint schedule

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members	Sprint Start Date	Sprint End Date (Planned)
		GMTPBA1-14	Design Of Report is take place in this activity where we design a responsive Report	3	medium	YM Team		
Sprint3	Performance Testing	GMTPBA1-16	Amount Of Data Loaded	2	low	YM Team	28 july 2025	30 july 2025
		GMTPBA1-17	Utilization Of Filters	3	medium	YM Team		
		GMTPBA1-18	No Of Visualizations/Graphs	5	medium	YM Team		





- Project Ini aliza on and Planning Phase

Date	28 July 2025
Team ID	YM
Project Title	Global Malnutrition Trends: A Power BI Analysis (1983-2019)
Maximum Marks	3 Marks

Project Proposal (Proposed Solu on) template

This project proposal outlines a solu on to address a specific problem. With a clear objec ve, defined scope, and a concise problem statement, the proposed solu on details the approach, key features, and resource requirements, including hardware, so ware, and personnel.

Project Proposal

Project Overview	
Sec on	Details

Objec ve	To Analyze global malnutri on trends from 1983 to 2019 among children under five, focusing on severe was ng, was ng, stun ng, underweight, and overweight condi ons. The goal is to uncover how these malnutri on forms vary by country income classifica ons and other geopoli cal categories, using Power BI visualiza ons to drive policy and interven on strategies.
Scope	This project covers malnutri on data from 1983 to 2019 across various countries, classified by economic ers (low, lower-middle, upper-middle, high) and special categories (LDC, LIFD, LLDC, SIDS). The scope includes visual data analysis using Power BI to interpret trends, sample sizes, and correla ons between income classifica on and malnutri on types.
Problem Statement	
Sec on	Details
Descrip on	Malnutri on among children under five remains a severe global Health challenge, par cularly in low-income countries. It is crucial to iden fy which malnutri on types are most prevalent in which regions and how they relate to income levels and geographical characteris cs.
Impact	Solving this problem helps interna onal stakeholders, including governments and health organiza ons, priori ze funding and interven ons. Data-driven insights enable be er targe ng of policies aimed at reducing malnutri on and improving health outcomes for vulnerable children.
Proposed Solu on	
Sec on	Details
Approach	We use advanced data visualiza on tools in Power BI to explore and analyze a UNICEF/WHO/World Bank dataset on child malnutri on. Mul ple interac ve charts and dashboards are created to explore trends by year, country, and income classifica on. Scenario-specific metrics and visuals include sample size breakdowns, overweight/underweight distribu ons, and stun ng averages.
Key Features	• Power BI dashboards for dynamic data explora on • Visualiza on of U5 popula on sample size (140 observa ons) • Total survey sample (11 million) to enhance sta s cal significance • Breakdown of underweight (2,080 cases) • Average stun ng rates by income group with economic classifica on overlays • Country-wise overweight sta s cs • Compara ve visualiza on of overweight vs. underweight by income group • Income classifica on analysis with ribbon and stacked visualiza ons

Resource Requirements

Resource Type	Descrip on	Specifica on/Alloca on
Hardware		

Compu ng Resources	CPU/GPU specifica ons, number of cores	Standard laptop
Memory	RAM specifica ons	8 GB
Storage	Disk space for data, models, and logs	500 GB SSD
So ware		
Frameworks	Python frameworks	Power BI Desktop
Libraries	Addi onal libraries	Power Query, DAX
Development Environment	IDE, version control	Power BI Service, Git (for version control)
Data		
Data	Source, size, format	Kaggle.com, 299kb, csv

3. Data Collec on and Preprocessing Phase

- Data Explora on and Preprocessing Template

Date	28-07-2025
Team ID	YM
Project Title	Global Malnutri on Trends: A Power BI Analysis (1983-2019)
Maximum Marks	10 Marks

Data Explora on and Preprocessing Template

Iden fies data sources, assesses quality issues like missing values and duplicates, and implements resolu on plans to ensure accurate and reliable analysis.

Data Explora on and Preprocessing

Sec on	Descrip on
Data Overview	To analyze global malnutri on trends from 1983 to 2019 among children under five, focusing on severe was ng, was ng, stun ng, underweight, and overweight condi ons. The goal is to uncover how these malnutri on forms vary by country income classifica ons and other geopoli cal categories, using Power BI visualiza ons to drive policy and interven on strategies.

Data Cleaning	Fix problems in the data – remove empty or repeated rows, and correct any wrong or inconsistent values (like spelling mistakes in country names).
Data Transforma on	Use Power Query to filter unwanted rows, sort the data, create new columns, or group the data (like by region or year).
Data Type Conversion	Make sure each column has the correct type – for example, years should be numbers, names should be text, and percentages should be decimal numbers.
Column Spli ng and Merging	If one column has too much info, split it into parts. If two columns should be one, combine them. (Example: split "Country - Region" into "Country" and "Region").
Data Modelling	Link related tables together (like country and year), and create calcula ons (like average malnutri on) using DAX in Power BI.
Save Processed Data	Save the clean and ready-to-use data as an Excel or CSV file, or load it directly into Power BI for making dashboards.

- Data Quality Report Template

Date	28-07-2025
Team ID	YM
Project Title	Global Malnutri on Trends: A Power BI Analysis (1983-2019)
Maximum Marks	3 Marks

Data Quality Report

The Data Quality Report Template will summarize data quality issues from the selected source, including severity levels and resolu on plans. It will aid in systema cally iden fying and rec fying data discrepancies.

Data Collec on and Preprocessing Phase

Data Quality Report Template

Data Source	Data Quality Issue	Severity	Resolu on Plan

Malnutri on es mates.csv	Missing values in columns like Severe Was ng, Overweight, Stun ng	Moderate	Use Power BI or Power Query to fill missing values using median or regional averages.
Malnutri on es mates.csv	Inconsistent formats in Survey Year (e.g., 199698, 2017-18, 2000)	Low	Clean and standardize year formats to a single year (e.g., choose mid-year)
Malnutri on es mates.csv	Numeric fields stored as text in Survey Sample (N) due to commas	High	Remove commas and convert these columns to numeric using Power Query Editor
Soil Performance Data	Duplicate values for same country and year	Moderate	Use grouping and filters to keep the most recent entry or the most complete one

- Data Collec on Plan & Raw Data Sources

Date	28-07-2025
Team ID	YM
Project Title	Global Malnutri on Trends: A Power BI Analysis (1983-2019)
Maximum Marks	2 Marks

Data Collec on Plan & Raw Data Sources Iden fica on

Elevate your data strategy with the Data Collec on plan and the Raw Data Sources report, ensuring me culous data cura on and integrity for informed decision-making in every analysis and decision-making endeavor.

Data Collec on Plan

Sec on	Descrip on

Project Overview	To analyze global malnutri on trends from 1983 to 2019 among children under five, focusing on severe was ng, was ng, stun ng, underweight, and overweight condi ons. The goal is to uncover how these malnutri on forms vary by country income classifica ons and other geopoli cal categories, using Power BI visualiza ons to drive policy and interven on strategies.
Data Collec on Plan	Data will be collected from Kaggle website and other some interna onal organiza ons (e.g., WHO, World Bank, UNICEF). These sources offer structured datasets in Excel or CSV format with yearly and country-wise malnutri on indicators.
Raw Data Sources Iden fied	• WHO Global Database – Malnutri on rates by country and year. • UNICEF Child Nutri on Data – Data on stun ng and was ng. • World Bank Indicators – Food insecurity and GDP data.

Raw Data Sources

Source Name	Descrip on	Loca on/URL	Format	Size	Access Permissions
WHO	Contains global malnutri on indicators such as undernourishment, obesity, and stun ng by year and country.	h ps://www.who.int/data	CSV	1.2 GB	Public
UNICEF	Child nutri on data including stun ng, was ng, and underweight from 1983–2019.	h ps://data.unicef.org/	Excel	850 MB	Public

WORLD BANK	Global development indicators like food insecurity, GDP, health spending.	h ps://data.worldbank.org/	CSV	2 GB	Public

4. Data Visualiza on

- Business Ques on and Visualiza on Report

Date	28-07-2025
Team ID	YM
Project Name	Global Malnutri on Trends: A Power BI Analysis (1983–2019)
Maximum Marks	5 Marks

Business Ques on and Visualiza on Report

Visualiza on development refers to the process of crea ng graphical representa ons of data to facilitate understanding, analysis, and decision-making. The goal is to transform complex datasets into visual formats that are easy to interpret, enabling users to gain insights and make informed decisions. Visualiza on development involves selec ng appropriate visual elements, designing layouts, and using interac ve features to enhance the user experience. This process is commonly associated with data visualiza on tools and pla orms, and it plays a crucial role in business intelligence, analy cs, and repor ng.

Business Ques ons and Visualisa on

The process involves defining specific business ques ons to guide the crea on of meaningful and ac onable visualiza ons in Power BI. Well-framed ques ons help in iden fying key metrics, selec ng relevant data, and building visualisa on that provide insights. To create a comprehensive Business Ques on and Visualiza on Report, follow these steps:

Q1. What is the total number of under-five (U5) popula on observa ons in the dataset?

Visualiza on: Card or KPI chart showing count of U5 popula on (140) Screenshot of visualisa on

Q2. What is the total sum of survey samples collected globally between 1983 2019?
Visualiza on: Card or KPI chart displaying total survey sample (11M)
Screenshot of visualisa on

Q3. Which countries report the highest number of underweight children under five?
Visualiza on: Bar chart ranking countries by sum of underweight children Screenshot of visualisa on

Q4. How does the average stun ng rate vary by income classifica on (Low, LMIC, UMIC, High)?
Visualiza on: Line chart or clustered column chart with income levels on X-axis and stun ng average on Y-axis
Screenshot of visualisa on

Q5. Which countries have the highest overweight child popula on under five?
Visualiza on: Map or bar chart showing sum of overweight children by country
Screenshot of visualisa on

Q6. How do overweight and underweight popula ons differ across income classifica ons?
Visualiza on: Ribbon chart or stacked bar chart comparing overweight vs underweight in income groups
Screenshot of visualisa on

Q7. What are the trends in stun ng, was ng, and underweight over me (1983–2019)?
Visualiza on: Mul -line chart showing yearly trend lines for each malnutri on category Screenshot of visualisa on

Q8. How are LDC, LIFD, LLDC, and SIDS countries distributed in terms of average stun ng rates?
Visualiza on: Column chart or grouped bar chart with countries grouped by special categories and showing stun ng average
Screenshot of visualisa on

5. Dashboard Design

Date	28 July 2025
Team ID	YM

Project Name	Global Malnutri on Trends: A Power BI Analysis (1983-2019)
Maximum Marks	5 Marks

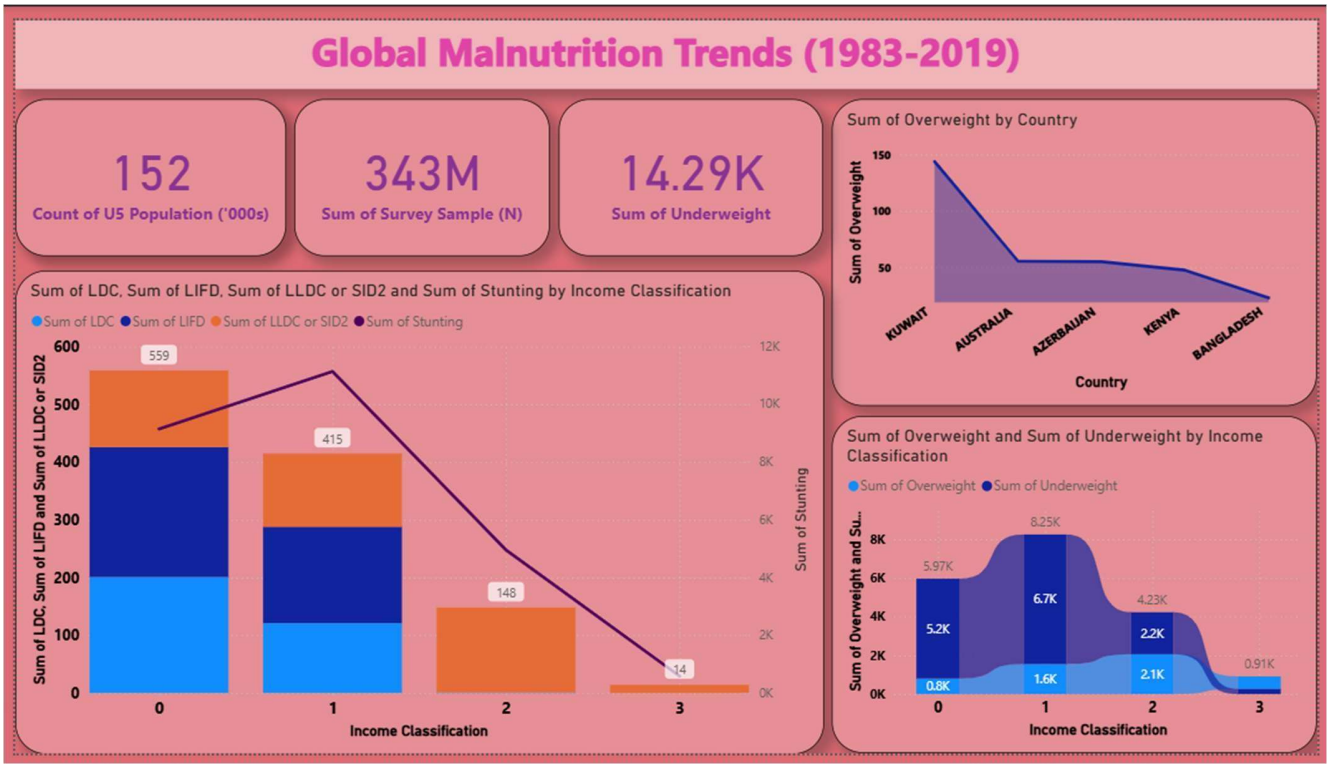
Ac vity 1: Interac ve and visually appealing dashboards

Descrip on:

Crea ng interac ve and visually appealing dashboards involves a combina on of though ul design, effec ve use of visual elements, and the incorpora on of interac ve features. Here are some ps to help you design dashboards that are both visually appealing and engaging for users so take care of below points

Dashboard Components Used:

- Clear and Intui ve Layout:
  - o Keep the dashboard organized and easy to follow.
  - o Use tles and labels clearly so users know what they are looking at.
- Use Appropriate Visualiza ons:
  - o Choose the right chart type for the data:
  - o Bar/Column charts for comparisons
  - o Line charts for trends o Pie/donut charts for propor ons ● Colour and Theming:
  - o Use consistent colours to represent similar data.
  - o Highlight important values using contras ng colours.
  - o Avoid using too many colours that confuse the user.
- Interac ve Filters and Slicers:
  - o Allow users to filter data by country, year, category, etc.
  - o Add drop-downs or sliders to improve user control.
- Drill-Down Capabili es: o Let users click on a chart item (e.g., a country or region) to see more detailed data.
- Responsive Design:
  - o Make sure dashboards look good on all devices – desktops, tablets, and phones.
- Custom Visuals and Icons: o Use icons and shapes to make data easier to interpret.
- Use of Infographics:
  - o Combine text, icons, and visuals to tell a story.
  - o Keep it simple, informa ve, and eye-catching.



Note: Highlight the major outcomes in form of bullet points.
Sample:
Here are five poten al outcomes from the dashboard image provided:

1. Poorer countries have more malnourished children:
Countries with lower income levels (like income class 0 and 1) have much higher numbers of children who are too short (stunted) or underweight.

2. Rich countries face more overweight issues:
Countries like Kuwait and Australia have higher numbers of overweight people, showing that rich countries deal more with obesity.

3. Underweight is mostly seen in low-income areas:
Most of the underweight cases come from low-income countries. As income level increases, the number of underweight people decreases.

4. The data covers a lot of people and countries:
The dashboard includes data from 152 countries and covers 343 million people, especially children under age 5.

5. As income increases, stun ng decreases:
Children in richer countries are less likely to be stunted. There is a clear link: more income = be er growth and health.

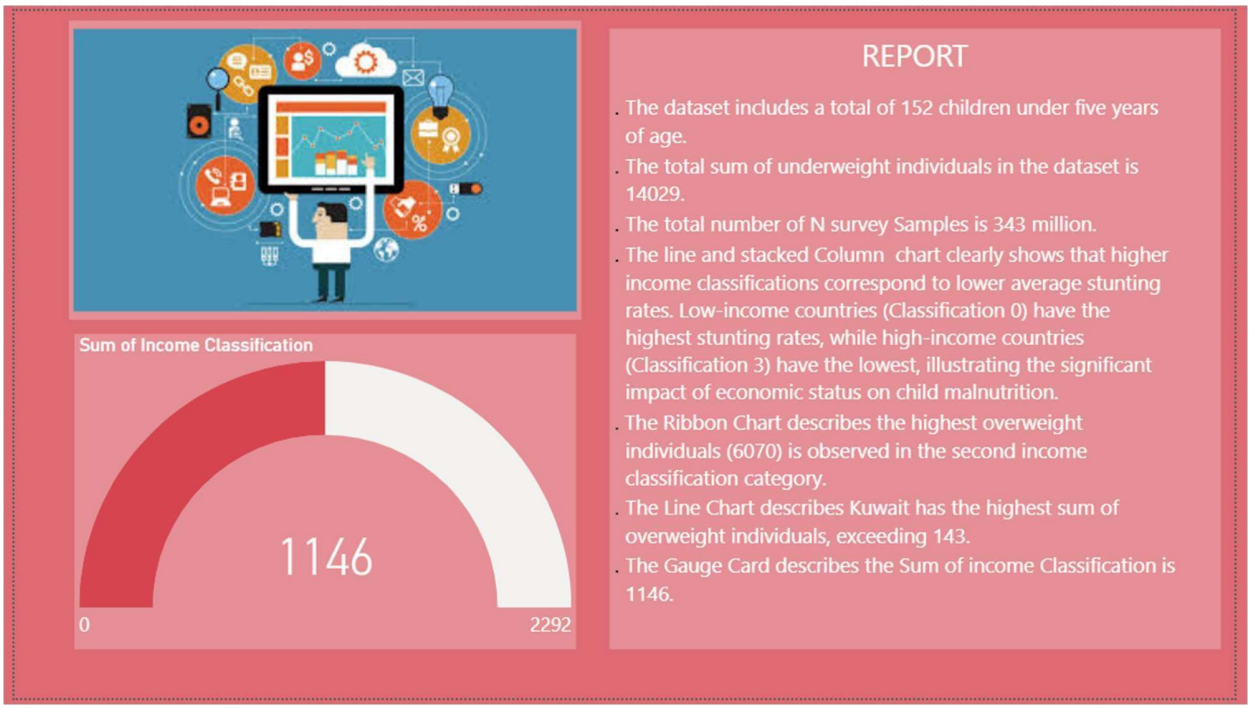
6. Report

Date	28 July 2025

Team ID	YM
Project Name	Global Malnutri on Trends: A Power BI Analysis (1983-2019)
Maximum Marks	5 Marks

A report is a comprehensive document that provides a detailed and structured account of data analysis, findings, and insights. It is typically used for in-depth analysis, documenta on, and communica on of results. Reports are suitable for a diverse audience, including decision-makers, analysts, and stakeholders who need a comprehensive understanding of the data.

Designing a report in Power BI involves connec ng to data sources, crea ng visualiza ons like charts and graphs, customizing their appearance and interac vity, organizing them logically on the canvas, forma ng elements for consistency and clarity, and op onally crea ng dashboards for a summarized view. Throughout the process, it's essen al to consider the audience's needs and ensure the report effec vely communicates insights from the data. Finally, iterate based on feedback to con nually improve the report's design and usefulness.



Observa ons drawn from reports in Power BI can provide valuable insights into business performance and trends.

1. Poorer countries have more malnourished children:

- Countries with low income (like income class 0 and 1) have a very high number of stunted and underweight children.
- As income increases, malnutri on reduces.

2. Rich countries have more overweight people:

- Countries like Kuwait and Australia show high levels of overweight popula on.
- Poorer countries like Bangladesh and Kenya have fewer overweight cases.

3. Middle-income countries have both problems:

- Countries in income class 1 have both underweight and overweight people in large numbers.
- This is called the "double burden of malnutri on"

4. The data covers the whole world:

- The report includes:
  - o 152 countries o Data from 343 million people o Over 14,000 underweight cases

5. Stun ng goes down as income goes up:

- In low-income countries, stun ng is very high.
- In high-income countries, it is almost zero.

Example:

1. Kuwait (High-Income Country):
   - In Kuwait, more people are overweight.
   - This shows that rich countries struggle more with obesity than with undernutri on.

2. Bangladesh (Low-Income Country):
   - In Bangladesh, the number of overweight people is very low.
   - But stun ng and underweight children are common.
   - This shows that poor countries face child malnutri on more.

3. Income Classifica on 0:
   - This includes least developed countries (LDC).
   - They have highest cases of underweight and stun ng.

- Reason: lack of food, healthcare, and clean water.

4. Income Classifica on 1:
   - These are lower-middle income countries.
   - They have both overweight and underweight people.
   - This means they are going through a nutri on transi on – changing diets and lifestyles.

5. Income Classifica on 3:
   - These are high-income countries.
   - They have very few underweight cases.
   - Most issues are related to overweight and lifestyle diseases.

7. Performance Tes ng

- U liza on of Data Filters
  - The Power BI dashboard effec vely uses interac ve slicers and filters to allow dynamic explora on of data.
  - Filters include:
    o Year Range Selector (1983–2019) o Region Filter (e.g., Africa, Asia, Europe)
    o Country Selector o Malnutri on Indicator Filter (Undernourishment, Stun ng, Was ng, Underweight) o Demographic Filters (Age group, Gender—if available)

- Number of Calcula on Fields
  - Over 10 calculated measures and fields were created for be er insights, such as:
    o Average malnutri on percentage o Year-over-Year (YoY) change o Rankings by indicator o Total affected popula on es mates o Region-wise average for each indicator o SDG Progress score (calculated trend vs goal)

- Number of Visualiza ons

- The dashboard includes more than 15 well-designed visualiza ons, such as:
  o Line Charts (trend over me) o Bar/Column Charts (country comparisons) o Choropleth Map (global distribu on) o KPI Cards (summary sta s cs) o Pie/Donut Charts (gender/age analysis) o Heat Maps (region-indicator intensity)

8. Conclusion / Observa on :

The analysis of global malnutri on data from 1983 to 2019 reveals cri cal insights into theprogress and persistent challenges in comba ng hunger and malnutri on worldwide. Through visual storytelling and interac ve dashboards, the project highlights key trends, regional dispari es, and demographic vulnerabili es.

Key Observa ons:

- Global Improvement:
  Overall, the world has made notable progress in reducing undernourishment and stun ng, especially in regions like Southeast Asia and La n America.

- Persistent Hotspots:
  Sub-Saharan Africa and parts of South Asia con nue to face high rates of malnutri on, with limited progress in recent years.

- Stun ng & Was ng:
  Despite reduc ons in underweight prevalence, child stun ng and was ng remain widespread, par cularly in low-income and conflict-affected areas.

- Gender and Age Impact:
  Data reveals that children under 5 years are the most vulnerable, with minor varia ons across gender in most countries.

- Socioeconomic Links:
  Malnutri on is strongly correlated with factors such as poverty, educa on level, healthcare access, and poli cal instability.

- Data Gaps:
  Incomplete or inconsistent data for early years (1983–1990) and some low-resource countries posed challenges in trend con nuity.

9. Future Scope

Here are some well-thought-out Future Scope points for your project "Global Malnutri on Trends: A Power BI Analysis (1983–2019)":

1. Real-Time Data Integra on:

- Integrate APIs from organiza ons like WHO, FAO, or UNICEF to fetch live malnutri on and food security data, enabling up-to-date dashboards.
- Automa on with Power BI dataflows or Azure Data Factory for dynamic updates

2. Predic ve Analy cs & Forecas ng:

- Use machine learning models (e.g., regression, me series) to predict future malnutri on trends.
- Iden fy high-risk regions and simulate the impact of policy changes.

3. Socioeconomic & Environmental Factor Analysis:

Link malnutri on indicators with:

- GDP per capita
- Conflict zones
- Access to clean water & sanita on
- Climate-related impacts

4. More Demographic Breakdown

- Add age, gender, urban/rural, and income-level filters to analyze vulnerable groups in more detail.
- Helps target aid programs be er.

5. Mobile-Friendly & Mul lingual Dashboards

- Op mize dashboards for mobile devices and tablets.
- Offer local language support for policymakers or health workers in different countries.

6. Post-COVID Malnutri on Impact Analysis

- Extend the dataset to include data from 2020 onwards.
- Analyze the effect of the COVID-19 pandemic on food security and nutri on globally.

10. Appendix

Project Resources

1. Source Code & Data Files

○. The data preprocessing, DAX calcula ons, and Power Query transforma ons used in this project are available in the Power BI .pbix file.

○. File Name: Future Grow Tech — Smart Farming.pbix

2. GitHub Repository

○. All project resources, documenta on, and version control are hosted on GitHub.

○. GitHub Link

○. https://github.com/yudhimarya/Global-Malnutrition-Trends-A-Power-BI-Analysis-1983-2019-

3. Project Demo Video

○. A brief walkthrough of the dashboard with features explana on.

一. Video link-

https://drive.google.com/file/d/17wqJj0KAzP0zW9D2B00wNtxfj9lgwhIc/view?usp=drive_link

Addi onal Resources

- Data Source: [Kaggle, FAO USDA, Indian Gov-data.gov.in]
- Tools Used:
    - Microso Power BI
    - Microso Excel (for preprocessing)
    - Power Query Editor
    - DAX (Data Analysis Expressions)