

Global Food Production Trends and Analysis:

A Comprehensive Study from 1961 to 2023 Using Power BI

Introduction:

ABC Company undertook a comprehensive study of global food production trends from 1961 to 2023, leveraging Power BI for insightful visualizations. The analysis encompassed key agricultural commodities, revealing that total rice production amounted to 269 billion tonnes, while wheat production reached 282 billion tonnes. The study highlighted that tea production stood at 2 billion tonnes, with Africa emerging as the leading producer of green coffee. Additionally, the research underscored a steady rise in wheat, maize, and rice production over the years, with wheat showing the most significant increase.

The project also explored the production volumes of apples, avocados, bananas, and oranges by different regions, identifying Europe and Asia as significant contributors. Maize production demonstrated consistent growth, particularly from the late 1980s onward. The study further indicated that grapes had the highest total production among fruits at 43 billion tonnes, followed by apples, bananas, and oranges. This comprehensive analysis equips ABC Company with valuable insights to better understand global food production trends, aiding strategic decision-making in the agricultural sector.

Scenario 1: Sum of Rice Production (tonnes)

This section prominently displays the total global rice production, amounting to 269 billion tonnes over the period from 1961 to 2023. It highlights the significant volume of rice produced, emphasizing its importance as a staple food crop worldwide.

Scenario 2: Sum of Wheat Production (tonnes)

Highlighting the global wheat production, this section shows a total of 282 billion tonnes produced between 1961 and 2023. This underscores wheat's crucial role in global food security and its widespread cultivation.

Scenario 3: Sum of Tea Production (tonnes)

This section shows a gauge chart illustrating the total tea production, amounting to 2 billion tonnes. The visual emphasizes the scale of tea production compared to other major crops.

Scenario 4: Sum of Coffee, Green Production (tonnes) by Entity

A bar chart depicting the distribution of green coffee production among various entities. Africa, Asia, and America are leading producers, reflecting regional contributions to global coffee Supply.

Scenario 5: Sum of Wheat, Maize, and Rice Production (tonnes) by Year

An area chart showing the annual production trends of wheat, maize, and rice from 1961 to 2023. It highlights the growth trajectories and fluctuations of these essential crops over the years.

Scenario 6: Sum of Apples, Avocados, Bananas, and Oranges Production (tonnes) by Entity

This stacked bar chart illustrates the production volumes of apples, avocados, bananas, and oranges by different entities. It highlights the diverse contributions to global fruit production.

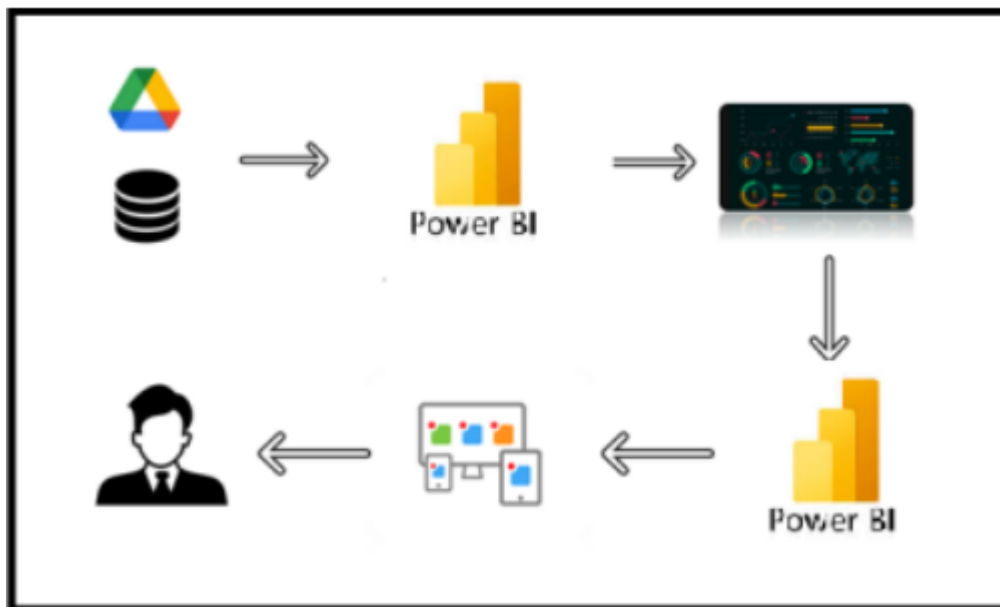
Scenario 7: Sum of Maize Production (tonnes) by Year

A donut chart depicting the yearly maize production distribution across different years. It shows how maize production has evolved, with specific years highlighted for their significant contributions.

Scenario 8: Sum of Grapes, Apples, Bananas, and Oranges Production (tonnes)

This bar chart compares the total production volumes of grapes (43 billion tonnes), apples (39 billion tonnes), bananas (32 billion tonnes), and oranges (26 billion tonnes). It provides a comparative view of the global production scales of these popular fruits.

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

Data collection is the process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions, test hypotheses, evaluate outcomes and generate insights from the data.

Activity 1: Downloading the dataset

Dataset :

<https://www.kaggle.com/datasets/rafsunahmad/world-food-production>

world food production.csv

File Origin: 1252: Western European (Windows) | Delimiter: Comma | Data Type Detection: Based on first 200 rows

Entity	Year	Maize Production (tonnes)	Rice Production (tonnes)	Yams Production (tonnes)	Wheat Production (tonnes)	Tomatoes
Afghanistan	1961	700000	319000	7467702	2279000	
Afghanistan	1962	700000	319000	7420515	2279000	
Afghanistan	1963	713000	319000	8479074	1947000	
Afghanistan	1964	720000	380000	9113779	2230000	
Afghanistan	1965	720000	380000	10067913	2282000	
Afghanistan	1966	720000	337000	10863614	2033000	
Afghanistan	1967	768000	396000	12123091	2280000	
Afghanistan	1968	773000	402000	12840044	2354000	
Afghanistan	1969	785000	407000	14496418	2454000	
Afghanistan	1970	667000	366000	16413323	2081000	
Afghanistan	1971	670000	350000	14232062	1915000	
Afghanistan	1972	720000	400000	11274815	2450000	
Afghanistan	1973	760000	420000	11600265	2700000	
Afghanistan	1974	770000	420000	12099241	2750000	
Afghanistan	1975	780000	435000	13487679	2850000	
Afghanistan	1976	800000	448000	11424861	2936000	
Afghanistan	1977	760000	400000	11006217	2652000	
Afghanistan	1978	780000	428000	10671106	2813000	
Afghanistan	1979	760000	439000	10360042	2663000	
Afghanistan	1980	752000	415000	10773930	2550000	

Extract Table Using Examples | Load | Transform Data | Cancel

Fig 1.1: World Food Production (CSV File)

Activity 1.1: Understand the data

Data contains all the meta information regarding the columns described in the CSV files

Column Description of the Dataset:

- **Entity:** Represents the country or region where the food production data is recorded.
- **Code:** A unique identifier or code for each entity (country or region).
- **Year:** The specific year for which the data is recorded, ranging from 1961 to 2023.
- **Apples_Production (tonnes):** The total annual production of apples measured in tonnes.
- **Avocados_Production (tonnes):** The total annual production of avocados measured in tonnes.
- **Bananas_Production (tonnes):** The total annual production of bananas measured in tonnes.
- **Coffee_green_Production (tonnes):** The total annual production of green coffee measured in tonnes.
- **Grapes_Production (tonnes):** The total annual production of grapes measured in tonnes.
- **Maize_Production (tonnes):** The total annual production of maize measured in tonnes.
- **Rice_Production (tonnes):** The total annual production of rice measured in tonnes.

- **Tea_Production (tonnes):** The total annual production of tea measured in tonnes.
- **Wheat_Production (tonnes):** The total annual production of wheat measured in tonnes.

Milestone 2: Data Preparation

Activity 1: Prepare the Data for Visualization

Preparing the data for visualization involves cleaning the data to remove irrelevant or missing data, transforming the data into a format that can be easily visualized, exploring the data to identify patterns and trends, filtering the data to focus on specific subsets of data, preparing the data for visualization software, and ensuring the data is accurate and complete. This process helps to make the data easily understandable and ready for creating visualizations to gain insights into the performance and efficiency. Since the data is already cleaned, we can move to visualization.

Data Loading

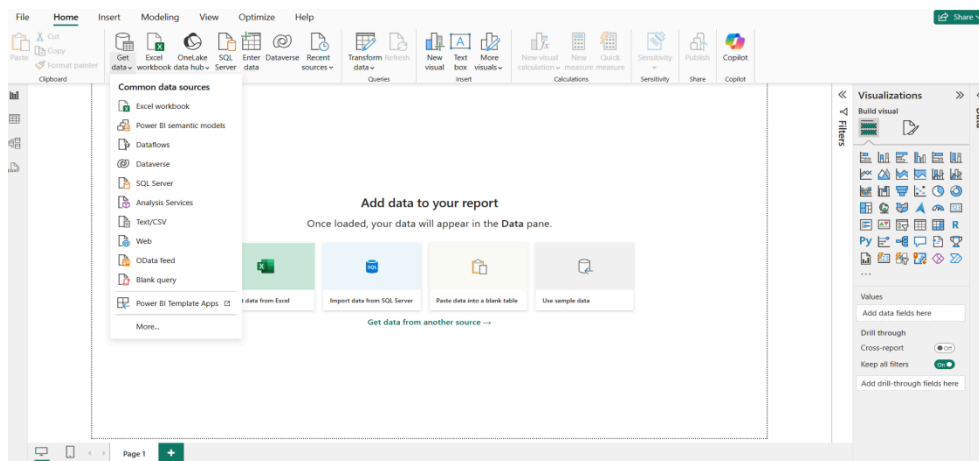


Fig 1.1: Loading Data by selecting Get Data

World Food Production

Fig 1.3: The Data in tonnes

Fig 1.4: The column containing zero values

Cleaning by deleting the zero values

Rice Production (tonnes) ▼	Ya
0	
0	
0	
0	
0	
0	
0	
0	
0	
475415230	
482738720	
650476600	
657198800	
661821000	
658137000	
659920500	
659753660	
673591500	
681251460	
678217100	
690560200	
708148400	
198778130	
207411000	
227561300	
7500	
6300	

**Fig 1.5: Zero values in Rice
Production (tonnes)**

Rice Production (tonnes) ▼
Yams Production (tonnes) ▼
Wheat Production (tonnes) ▼

Sort ascending
Sort descending
Clear sort
Clear filter
Clear all filters
Number filters

Search

☒ (Select all)
☐ 0
☒ 0.03
☒ 0.04
☒ 0.05
☒ 0.07
☒ 1
☒ 2
☒ 3
☒ 4
☒ 5
☒ 8
☒ 10
☒ 11
☒ 12
☒ 13.6
☒ 14
☒ 15
☒ 18
☒ 19
☒ 20
☒ 21
☒ 22

OK
Cancel

Fig:1.6: Deselecting the zero values

After cleaning the data by removing zero values

Rice Production (tonnes)
7000
12697110
12696110
333000
4630004.6
662018.2
439511.24
9796610.8
53613394.8
27065.4
463723.24
117003422
96960319
21511.42
69757536.2
38163539.8
34564798.4
2218165.4
327707838
201552
1252.52
1633695.16
237665.532
2900213.6
829855.82
562914.4
2753703.6

world food production.csv

File Origin: 1252: Western European (Windows) | Delimiter: Comma | Data Type Detection: Based on first 200 rows

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Afghanistan	1980	752000	415000	10773930	2550000	

Extract Table Using Examples | Load | Transform Data | Cancel

Fig: 1.7: Values without zeros

Converting the Decimal values to Whole numbers because we are using the data in tonnes

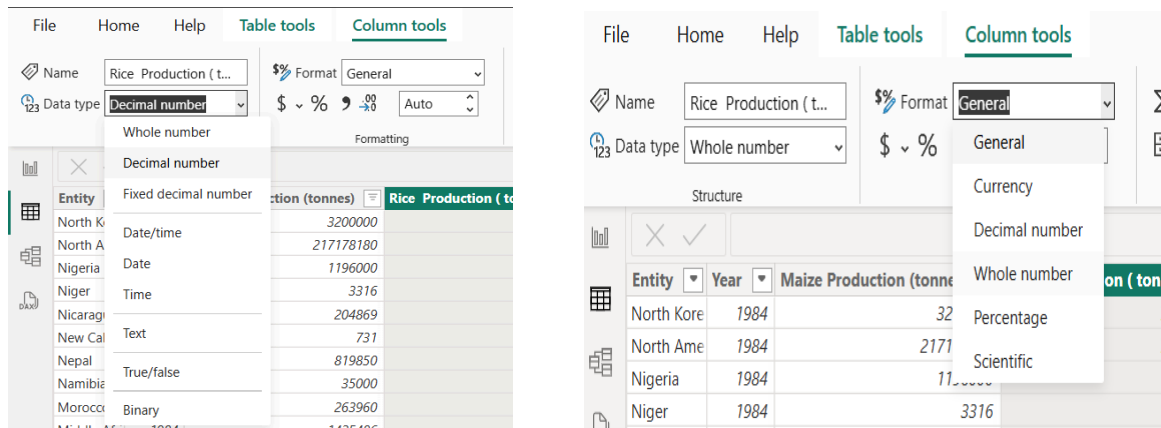


Fig 1.8: Selecting Decimal number and General to convert into Whole numbers

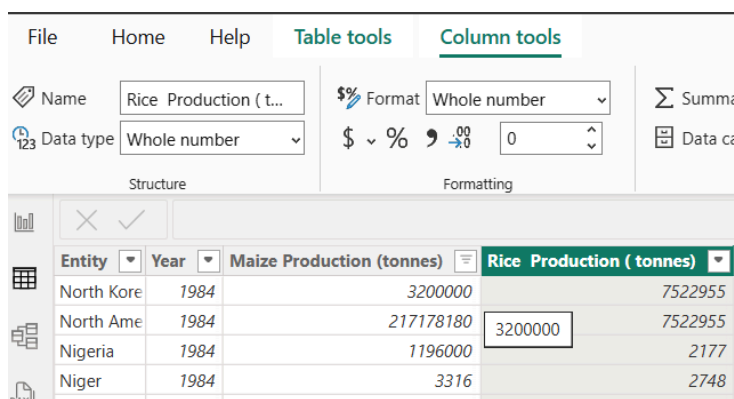


Fig 1.9: After conversion of Whole numbers

Milestone 3: Data Visualization

Data visualization is the process of creating graphical representations of data to help people understand and explore the information. The goal of data visualization is to make complex data sets more accessible, intuitive, and easier to interpret. By using visual elements such as charts, graphs, and maps, data visualizations can help people quickly identify patterns, trends, and outliers in the data.

Activity 1: World Food Production(1961-2023)

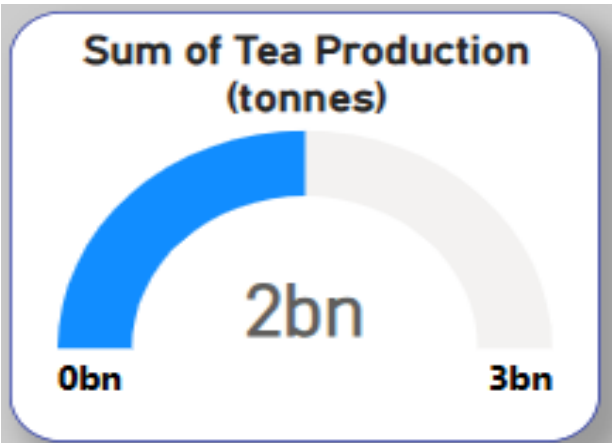
Activity 1.1:The total Rice Production (tonnes)



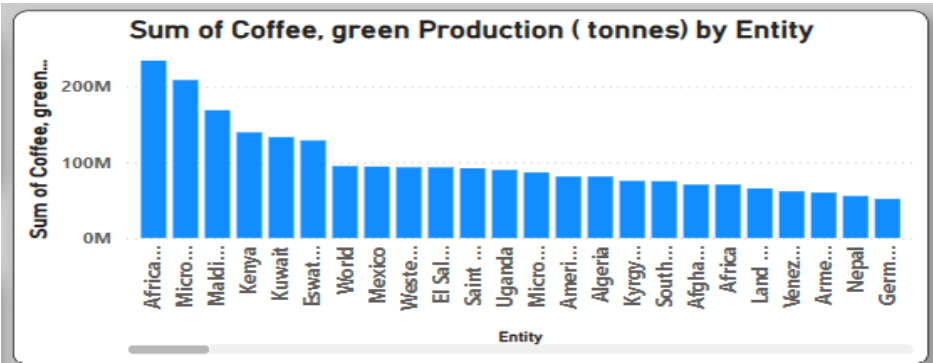
Activity 1.2: The total Wheat Productions (tonnes)



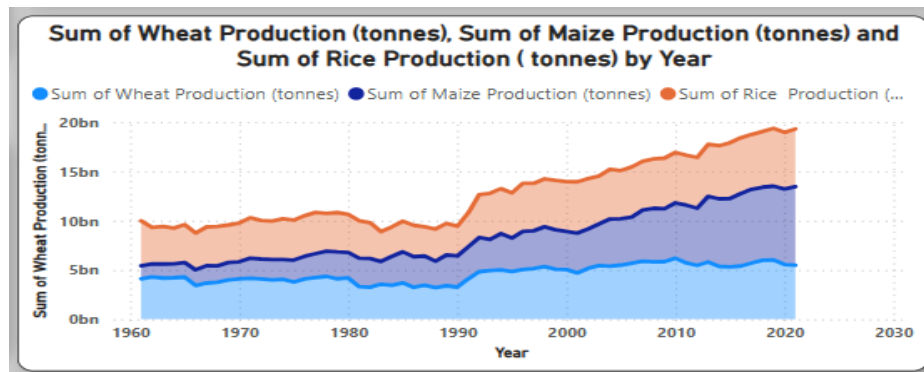
Activity 1.3: The total Tea Production (tonnes)



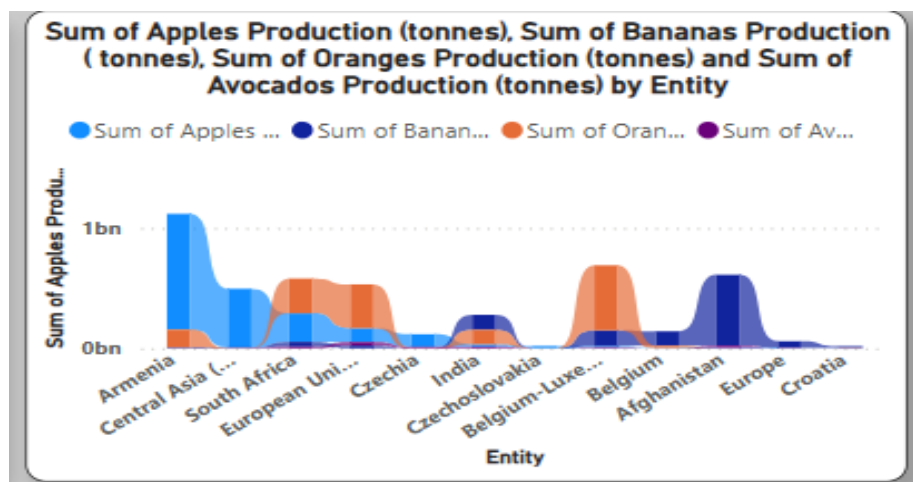
Activity 1.4: The Sum of Coffee,green Production (tonnes) by Entity



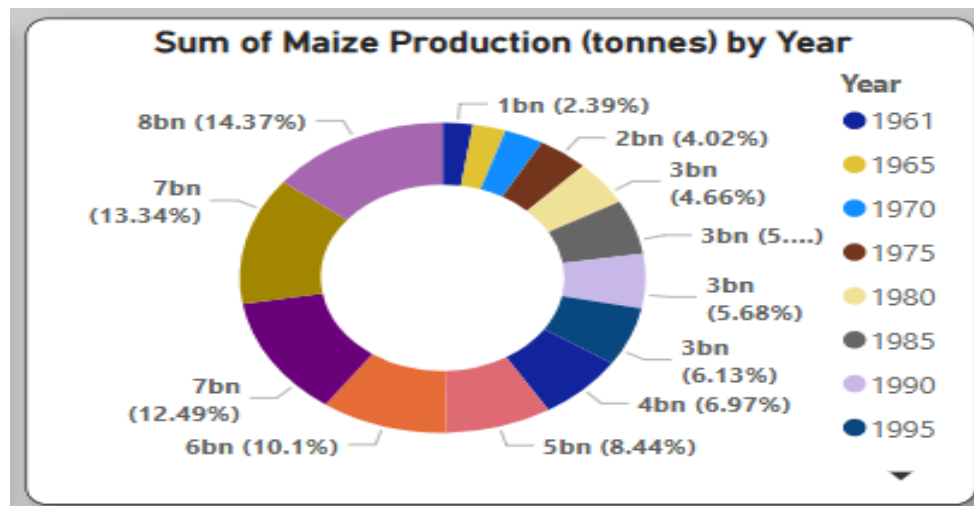
Activity 1.5: The Sum of Wheat Production (tonnes), Sum of Maize Production (tonnes), and Sum of Rice Production (tonnes), by year



Activity 1.6: The Sum of Apples Production (tonnes), Sum of Bananas Production (tonnes), Sum of Oranges Production (tonnes), Sum of Avocados Production (tonnes) and by Entity



Activity 1.7: The Sum of Maize Production (tonnes) by Year



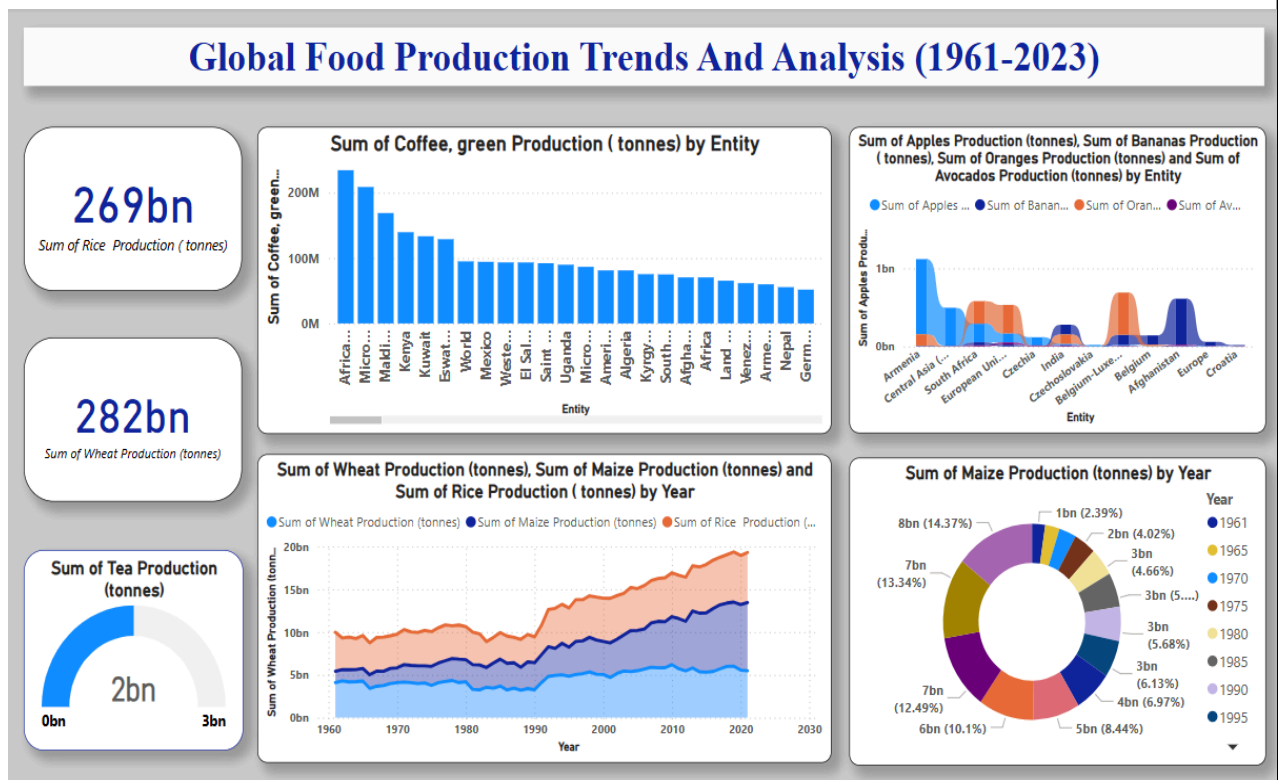
Activity 1.8: The Sum of Grapes, Apples, Bananas, Oranges, Coffee, Avocado Productions (tonnes)

Milestone 4: Dashboard

A dashboard is a graphical user interface (GUI) that displays information and data in an organized, easy-to-read format. Dashboards are often used to provide real-time monitoring and analysis of data and are typically designed for a specific purpose or use case. Dashboards can be used in a variety of settings, such as business, finance, manufacturing, healthcare, and many other industries. They can be used to track key performance indicators (KPIs), monitor performance metrics, and display data in the form of charts, graphs, and tables.

Activity 1: Responsive and Design of Dashboard

Dashboard



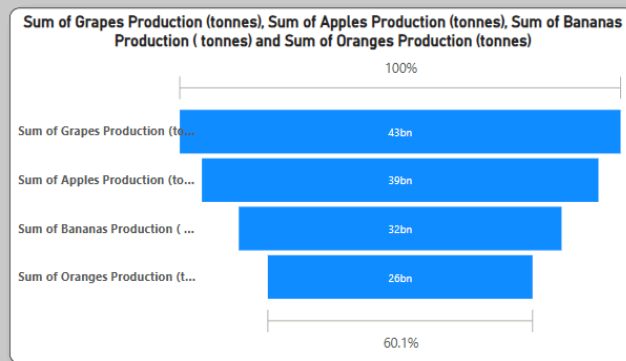
Milestone 5: Report

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, documentation, and communication of results. Reports are suitable for a diverse audience, including decision-makers, analysts, and stakeholders who need a comprehensive understanding of the data.

Activity 1: Design of Report

Designing a report in Power BI involves connecting to data sources, creating visualizations like charts and graphs, customizing their appearance and interactivity, organizing them logically on the canvas, formatting elements for consistency and clarity, and optionally creating dashboards for a summarized view. Throughout the process, it's essential to consider the audience's needs and ensure the report effectively communicates insights from the data. Finally, iterate based on feedback to continually improve the report's design and usefulness.

Report



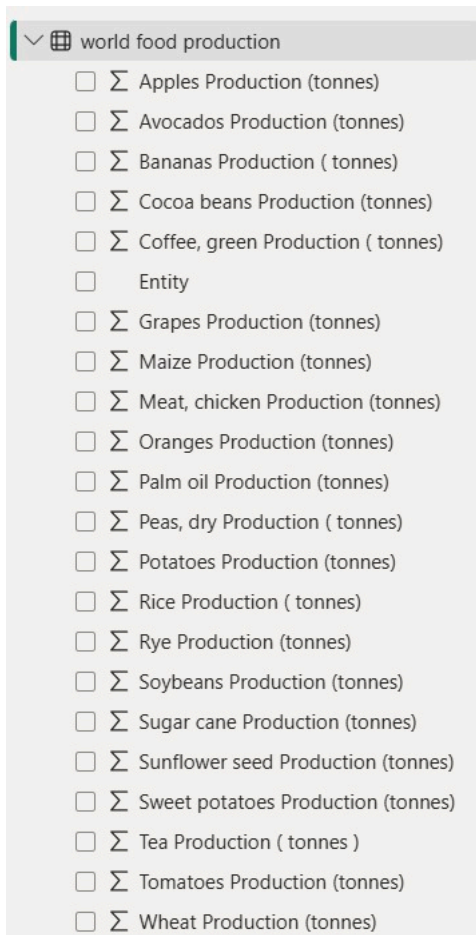
REPORT

- The total global rice production from 1961 to 2023 reached 269 billion tonnes , reflecting its crucial role as a staple food worldwide.
- Over the same period, wheat production recorded an impressive total of 282 billion tonnes , marking the highest output among staple grains.
- The global production of tea amounted to 2 billion tonnes , reinforcing its significance as a widely consumed beverage.
- Africa, America, and Asia are the leading producers of green coffee, with Africa ranking as the top producer, followed by America.
- The production of wheat, maize, and rice has shown a consistent upward trend from 1961 to 2023. Among them, wheat production has demonstrated the most substantial growth.
- Apples, avocados, bananas, and oranges are cultivated in varying quantities across different regions.
- Europe and Asia stand out for their significant contributions to global fruit production.
- Maize production has consistently increased over the decades, with notable surges observed from the late 1980s into the 2000s.
- Grapes hold the highest total production at 43 billion tonnes.
- Apples follow with 39 billion tonnes, while bananas and oranges recorded 32 billion tonnes and 26 billion tonnes, respectively.

Milestone 6: Performance Testing

Activity 1: Amount of Data Loaded

"Amount of Data Loaded" refers to the quantity or volume of data that has been imported, retrieved, or loaded into a system, software application, database, or any other data storage or processing environment. It's a measure of how much data has been successfully processed and made available for analysis, manipulation, or use within the system.



Activity 2: Utilization of Filters

"Utilization of Filters" refers to the application or use of filters within a system, software application, or data processing pipeline to selectively extract, manipulate, or analyze data based on specified criteria or conditions.

Activity 2.1: Selected “Entity” as Filter

Filters

>>

Search

Filters on this visual

Entity

is Afghanistan, Africa (...)

Filter type ⓘ

Basic filtering

Search

☒ Select all

☒ Afghanistan 61

☐ Africa 61

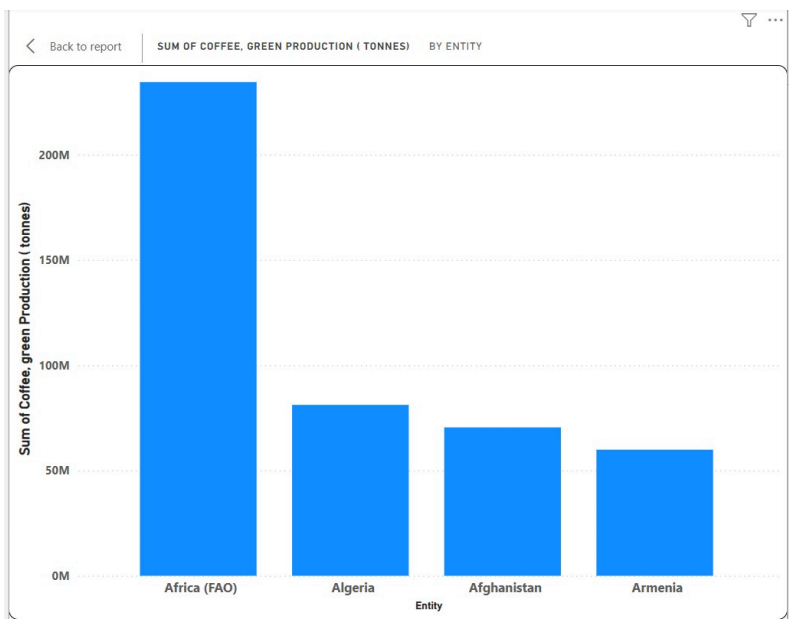
☒ Africa (FAO) 61

☐ Albania 61

☒ Algeria 61

☐ Americas (FAO) 61

☐ Require single selection



Activity 2.2: Selected “Entity” as Filter

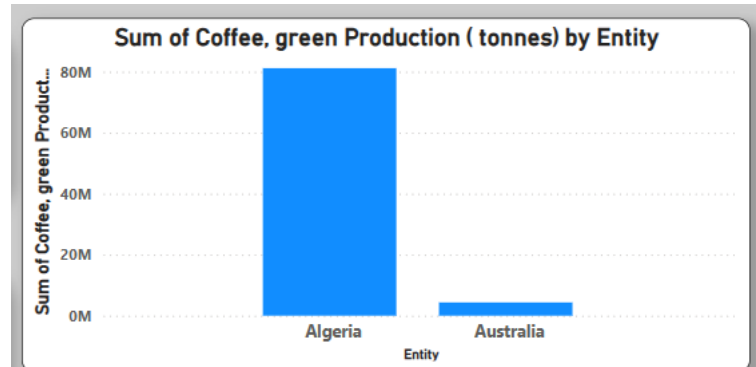
Entity
is Algeria or Australia

Filter type ⓘ
Basic filtering ▼

🔍 Search

☒ Select all

<input type="checkbox"/> Afghanistan	61
<input type="checkbox"/> Africa	61
<input type="checkbox"/> Africa (FAO)	61
<input type="checkbox"/> Albania	61
<input checked="" type="checkbox"/> Algeria	61
<input type="checkbox"/> Americas (FAO)	61



Activity 2.2: No of Visualizations/ Graphs

- The total Oranges Production (tonnes)
- The total Sugar Cane Productions (tonnes)
- The total Soybeans Production (tonnes)
- The total Palm Oil Production (tonnes) by Entity
- The total Grapes Production (tonnes) by Entity
- The total Meat,Chicken Production (tonnes) by Year
- The total Maize Production (tonnes) by Year
- The total Peas, dry Production (tonnes)
- The total Rice Production (tonnes) by Entity
- The total of Grapes, Apples, Bananas, Oranges, Coffee, Avocado Productions (tonnes)

Milestone 7:Project Demonstration & Documentation

https://drive.google.com/drive/folders/1K4wq8EJ3z9LDkvRA_4aVroaXdNNsHuVK?usp=sharing