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.

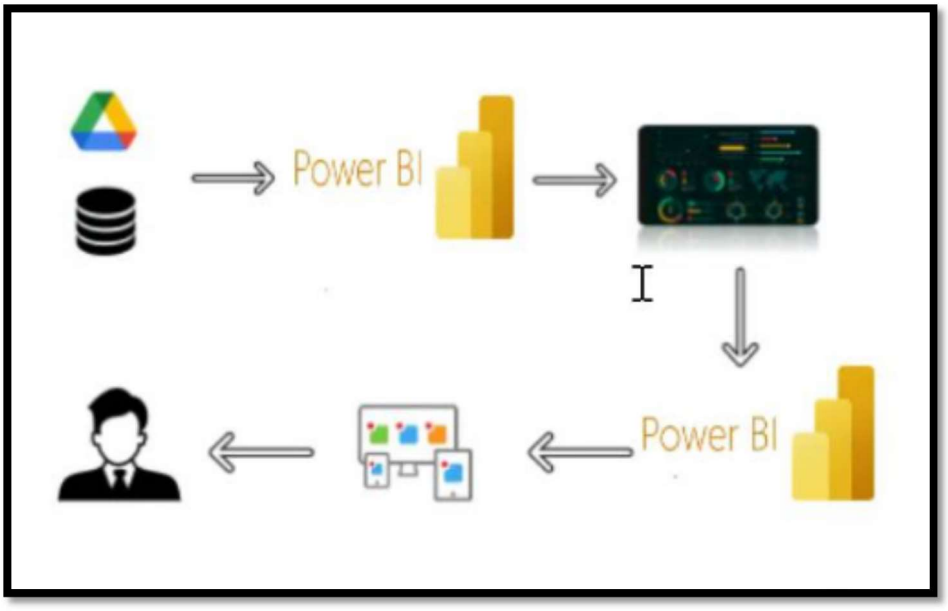
Scenario 7:Sum of Maize Production (tonnes) by Year

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.

<u>Technical Architecture :</u>



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 key variables in a systematic manner to analyze trends, test hypotheses, evaluate outcomes, and generate meaningful insights.

Downloading the Dataset :

Please use the link to download the dataset: LINK

Activity 1.1: Understanding the Data

The dataset contains metadata information related to global food production trends from 1961 to 2023, including various agricultural commodities. The key columns in the dataset are described below:

Column Descriptions:

- **Entity**: Represents the country or region where food production data is recorded.
- **Code**: A unique identifier or code for each country/region.
- **Year**: The specific year of data collection (1961-2023).
- **Apples_Production (tonnes)**: Total annual production of apples in tonnes.
- **Avocados_Production (tonnes)**: Total annual production of avocados in tonnes.
- **Bananas_Production (tonnes)**: Total annual production of bananas in tonnes.
- **Coffee_Green_Production (tonnes)**: Total annual production of green coffee in tonnes.
- **Grapes_Production (tonnes)**: Total annual production of grapes in tonnes.
- **Maize_Production (tonnes)**: Total annual production of maize in tonnes.
- **Oranges_Production (tonnes)**: Total annual production of oranges in tonnes.
- **Rice_Production (tonnes)**: Total annual production of rice in tonnes.
- **Tea_Production (tonnes)**: Total annual production of tea in tonnes.
- **Wheat_Production (tonnes)**: Total annual production of wheat in tonnes.
- This structured data will be used in Power BI to visualize and analyze global food production trends, identifying key patterns, regional contributions, and historical shifts in production.

Milestone 2: Data Preparation:

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.

3.1: Data Loading: LINK

3.2 Data Cleaning: LINK

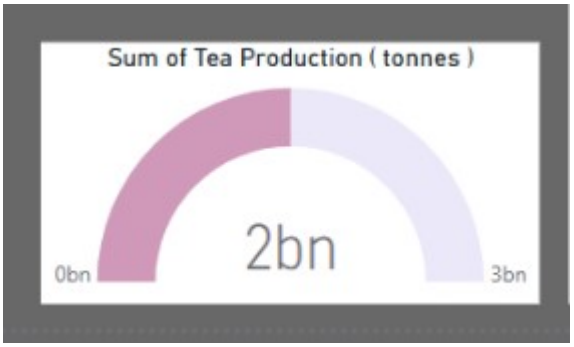
Milestone 3: Data Visualization

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.

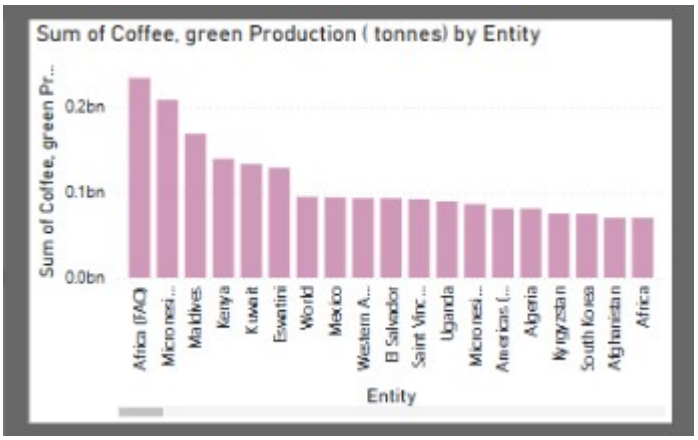
Activity 1.1: Sum of Rice Production (tonnes)

Activity 1.2: Sum of Wheat Production (tonnes)

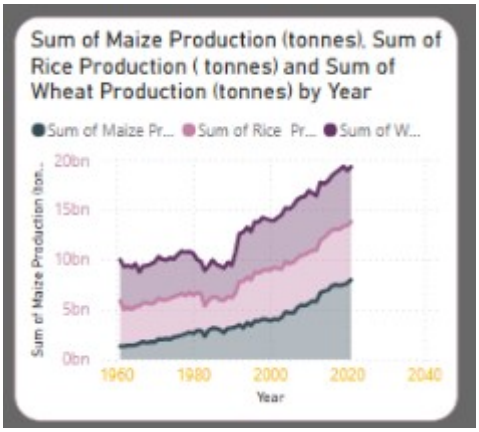
Activity 1.3: Sum of Tea Production (tonnes)



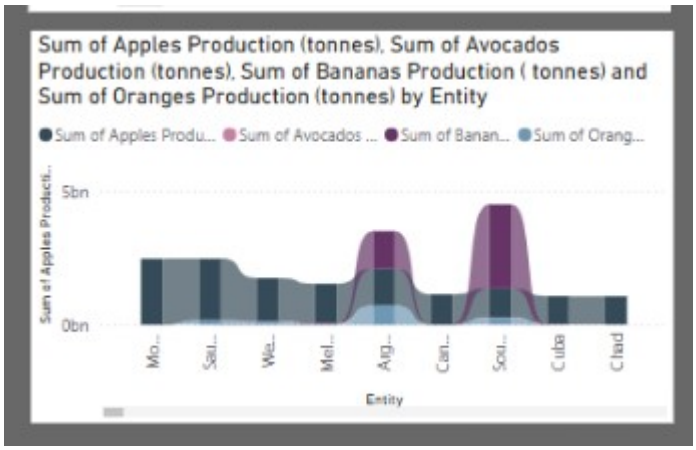
Activity 1.4: Sum of Coffee, Green Production (tonnes) by Entity



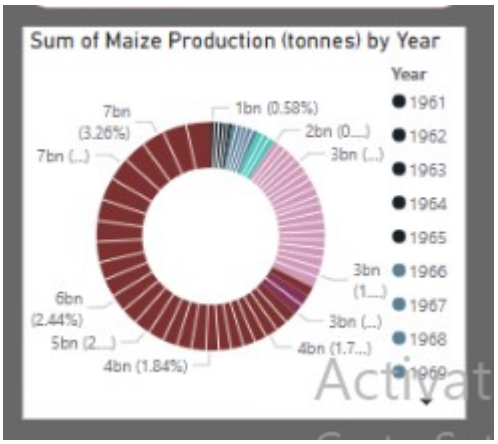
Activity 1.5: Sum of Wheat, Maize, and Rice Production (tonnes) by Year



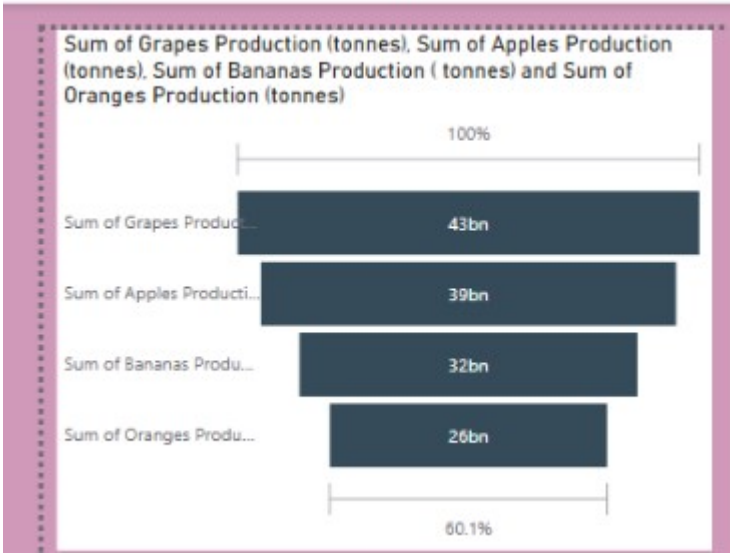
Activity 1.6: Sum of Apples, Avocados, Bananas, and Oranges Production(tonnes) by Entity



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

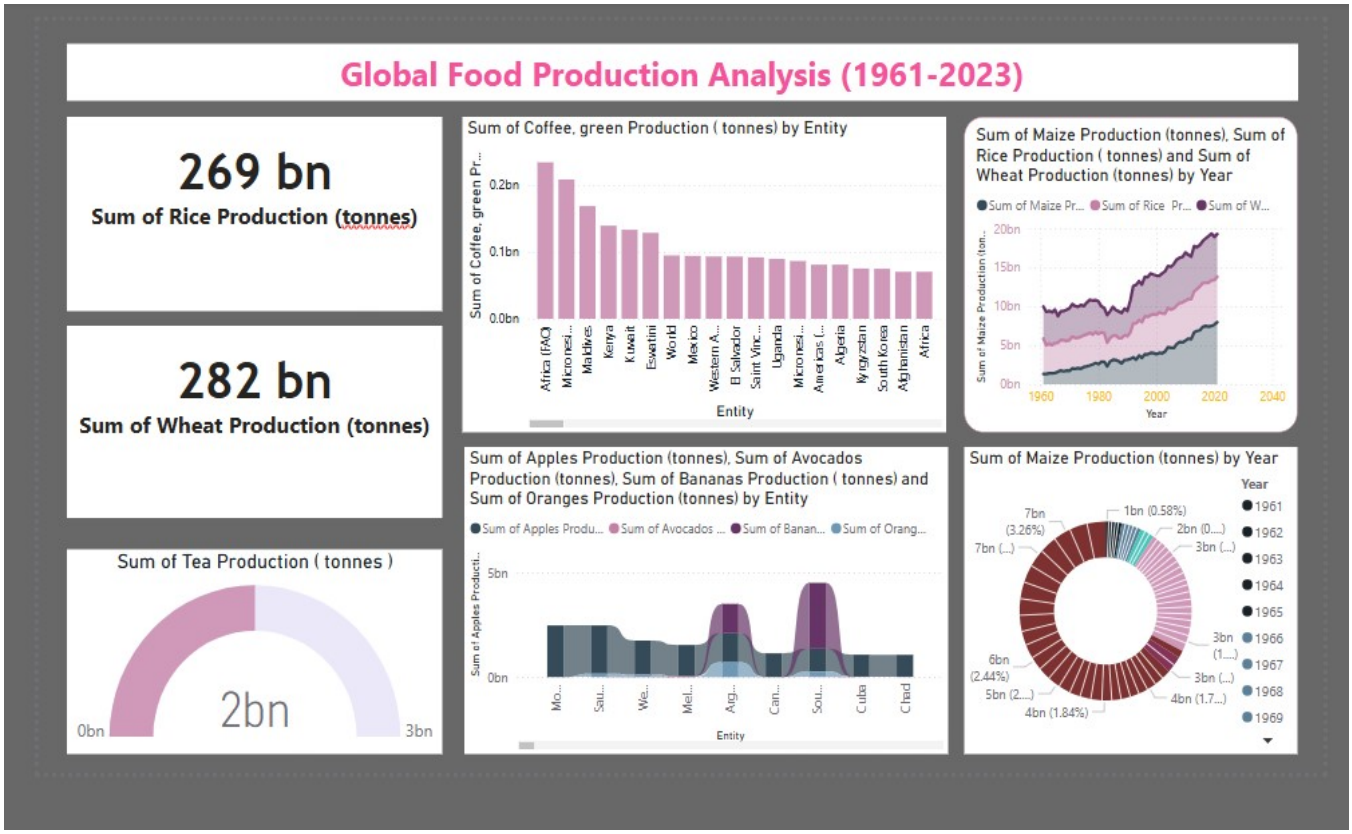


Activity 1.8: Sum of Grapes, Apples, Bananas, and Oranges Production (tonnes)



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

Explanation video link: LINK

Dashboard:

Link recording

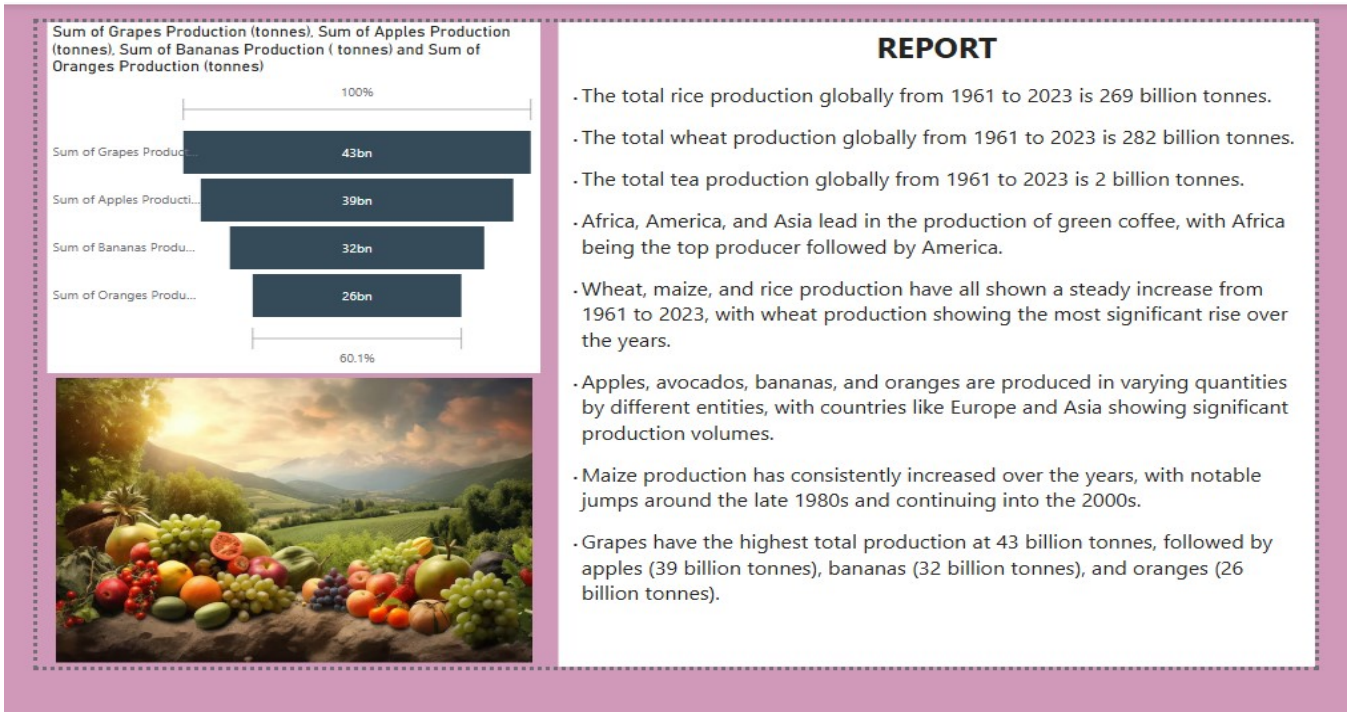
Milestone 5: Report

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.

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.

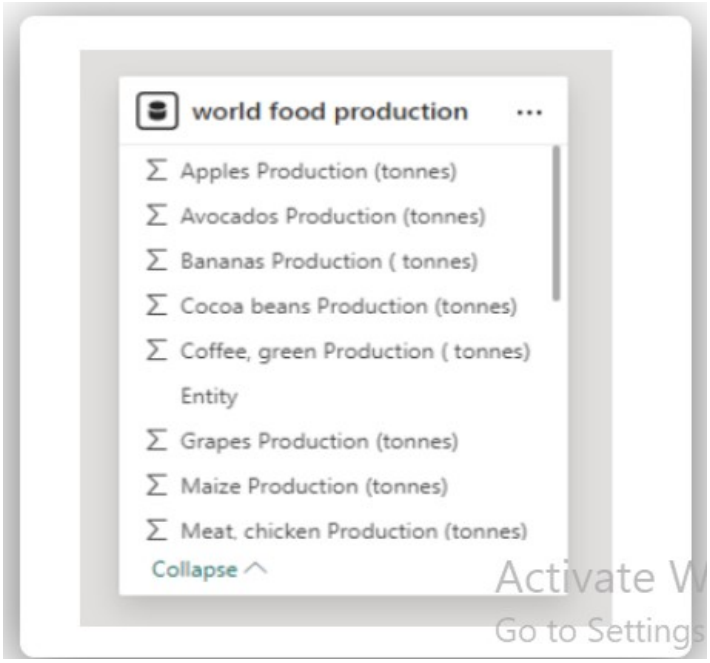
Explanation video link: LINK



Milestone 6: Performance Testing

Amount of Data Loaded:

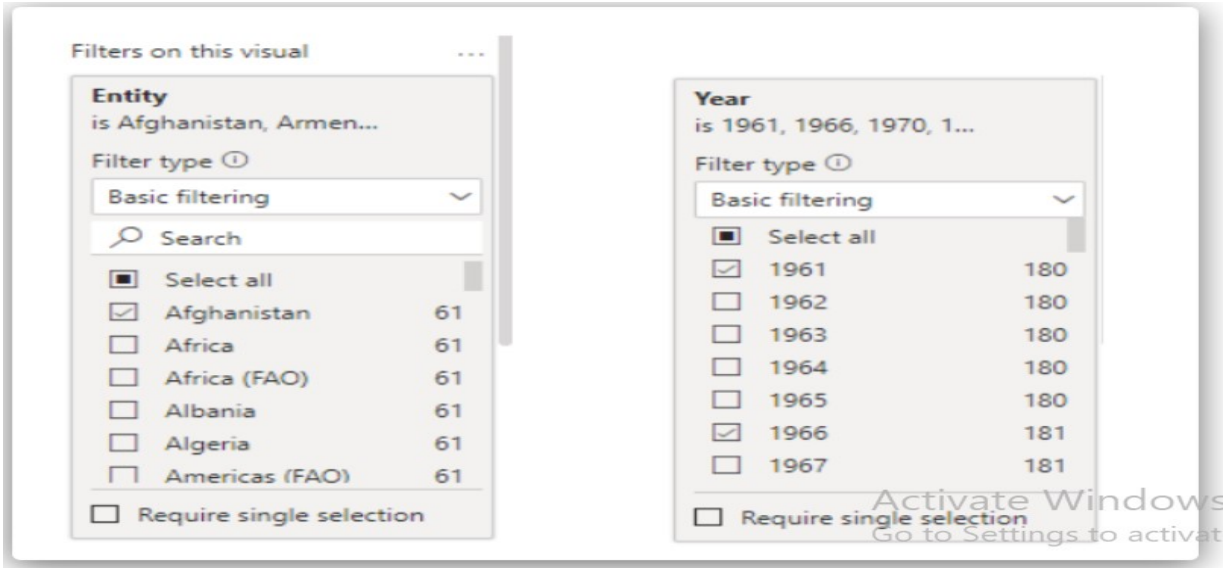
"Amount of Data Loaded" refers to the quantity or volume of data that has been imported, retrieved, or loaded into a system, software application, database, or any other data storage or processing environment. It's a measure of how much data has been successfully processed and made available for analysis,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



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 "Country" as a Filter



No of Visualizations/ Graphs:

- Sum of Rice Production (tonnes)
- Sum of Wheat Production (tonnes)
- Sum of Tea Production (tonnes)
- Sum of Coffee, Green Production (tonnes) by Entity
- Sum of Wheat Production (tonnes), Maize Production (tonnes), Rice Production (tonnes) by Year
- Sum of Apples, Avocados, Bananas, Oranges Production (tonnes) by Entity
- Sum of Maize Production (tonnes) by Year
- Sum of Grapes, Apples, Bananas, Oranges Production (tonnes)

Milestone 7: Project Demonstration & Documentation

Below mentioned deliverables to be submitted along with other deliverables

Activity 1: - Record explanation Video for the project's end-to-end solution

Creating a record explanation video for a project's end-to-end solution is crucial for ensuring clarity and transparency in its implementation. This video serves as a comprehensive guide, detailing every aspect of the project from inception to completion.

Activity 2: - Project Documentation-Step by step project development procedure

Create document as per the template provided