Final Report of Global Food Production Trends And Anlysis(1961 -2023)

Index

1. INTRODUCTION

1.1 Project Overview:

The Global Food Production System aims to optimize food production, reduce wastage, and enhance sustainable practices using advanced AI and IoT technologies. The system addresses critical challenges such as climate change, resource scarcity, supply chain inefficiencies, and the resistance to adopting innovative practices.

1.2 Purpose:

The purpose of this project is to create an intelligent solution that leverages data analytics, IoT integration, and predictive modeling to improve productivity, reduce wastage, and promote sustainable agriculture.

2. IDEATION PHASE

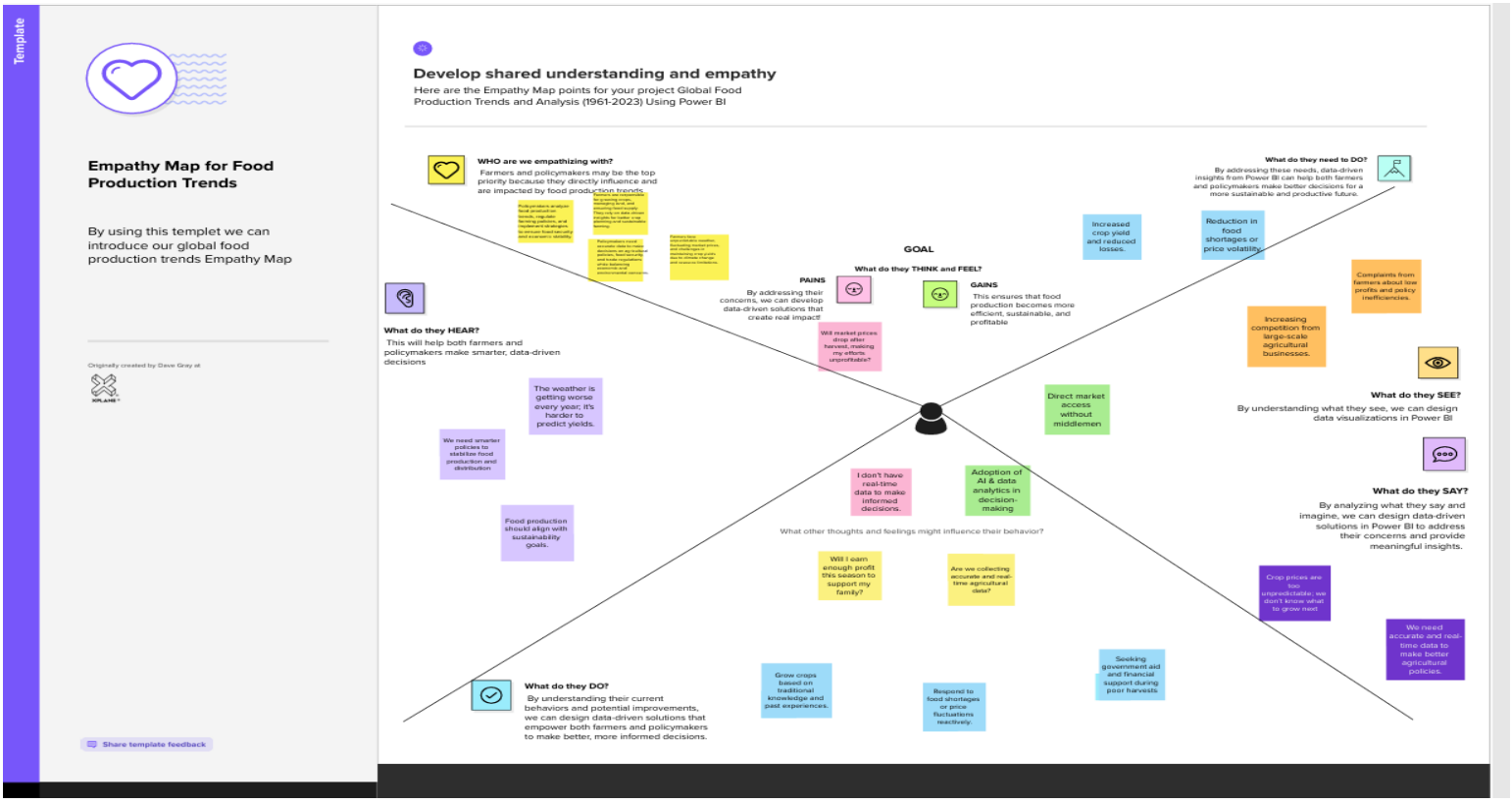
2.1 Problem Statement:

The global food production system is plagued by challenges such as climate change, inefficient resource management, and food wastage. These problems lead to reduced crop yields and significant losses in the supply chain.

2.2 Empathy Map Canvas:

The empathy map highlights stakeholders like farmers, policymakers, agritech innovators, and food distribution managers. Their primary concerns include crop yield, sustainable practices, and resource optimization.

- **Example:**



2.3 Brainstorming:

Template

Global Food Production Trends - Brainstorming

By using this templet we can introduce our global food production trends brainstorming concept

- **10 minutes** to prepare
- **1 hour** to collaborate
- **2-3 people** recommended

Before you collaborate

Before Collaborating on this session , we done little bit preparation like reviewing the key concepts , familiarize ourselves with the tools we'll be using, and understand the objectives will help us to get the most relevant experience . A lillte bit preparation goes a long long wayin making our learining skills smoother and more productive

10 minutes

A **Team gathering**

There are three team members in a team, where one is going to lead the project, another one is going to design and develop suitable visualization and third one is going to provide insights into data sources and trends.

B **Set the goal**

The primary goal of this project is to develop a Power BI solution that accurately predicts global food availability and trends using real-time data.
To archive a primary objectives by integrating ,cleaning ,preprocessing the data

C **Learn how to use the facilitation tools**

Ensure every team member contributes ideas and insights. Structure the session with clear steps: idea generation, grouping, and prioritization.

Open article

1 Define your problem statement

How might we leverage data visualization to uncover critical insights from global food production trends and identify key factors influencing food security and sustainability?"

5 minutes

PROBLEM

How might we develop a Power BI solution to accurately predict global food availability and trends using real-time data?

Key rules of brainstorming

To run an smooth and productive session

- Stay in topic.
- Encourage wild ideas.
- Defer judgment.
- Listen to others.
- Go for volume.
- If possible, be visual.

2 Brainstorm

Following are some ideas which disrcibes our project objectives.

10 minutes

Bhaskar Paymal

- Global Food Availability Prediction: Use historical data and current trends to predict future food availability and shortages.
- Food Trends Dashboard: Use color-coded maps to represent surplus and deficit areas
- Food Price Prediction: Incorporate factors like inflation, transportation costs, and supply chain disruptions.

Gayatri Patil

- Visualizing food production with the help of given entity.
- Risk mitigation strategies to reduce food insecurity by potential crises.
- Calculating yearly production the food and represent it in suitable visualization.

Disha Patil

- Impact analysis of climate changes on crops of food.
- Combine various factors like food availability, accessibility, and utilization into a comprehensive index..
- Country wise distribution of the food .

3 Group ideas

Here are ideas which shared by every group member.And the clustering is also given for extra information.

20 minutes

Cluster NO 1:

- Sustainable Farming
- Climate change impact on crop yields
- Most produced food items over the decades
- Effects of economic policies on food production

Cluster No 2:

- Top food-producing countries and regions
- Reducing Food Wastage
- Organic Farming by using natural fertilizers
- Effects of economic policies on food production

Cluster No 3:

- Vertical Farming growing crops in stacked layers to save space.
- Reducing Food Wastage
- Sustainability and food security challenges
- Climate change impact on crop yields

Group Of Similar Clusters

- Reducing Food Wastage
- Effects of economic policies on food production
- Top food-producing countries and regions
- Climate change impact on crop yields

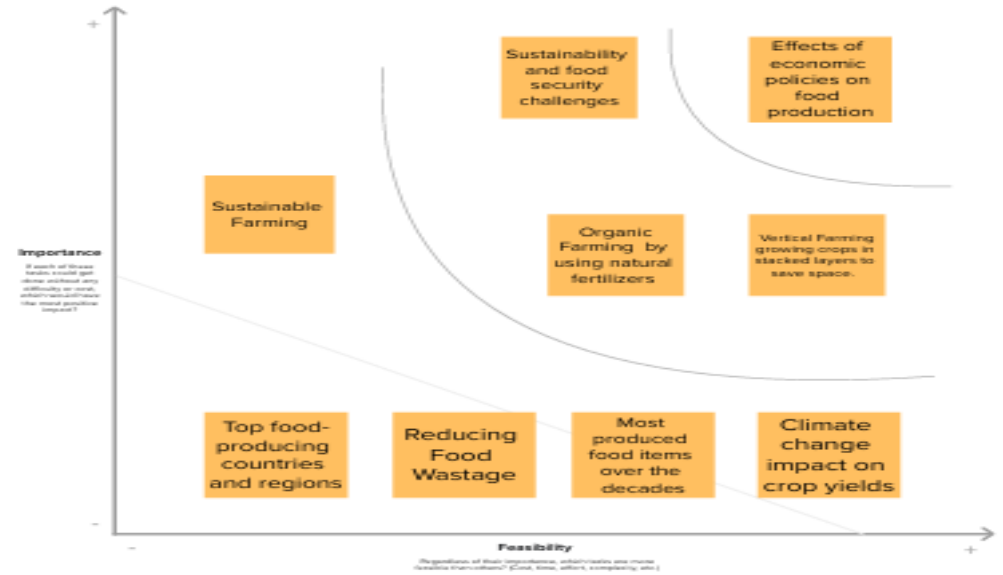
4

Prioritize

Placing our ideas on this grid to determine which ideas are important and which are feasible.

20 minutes

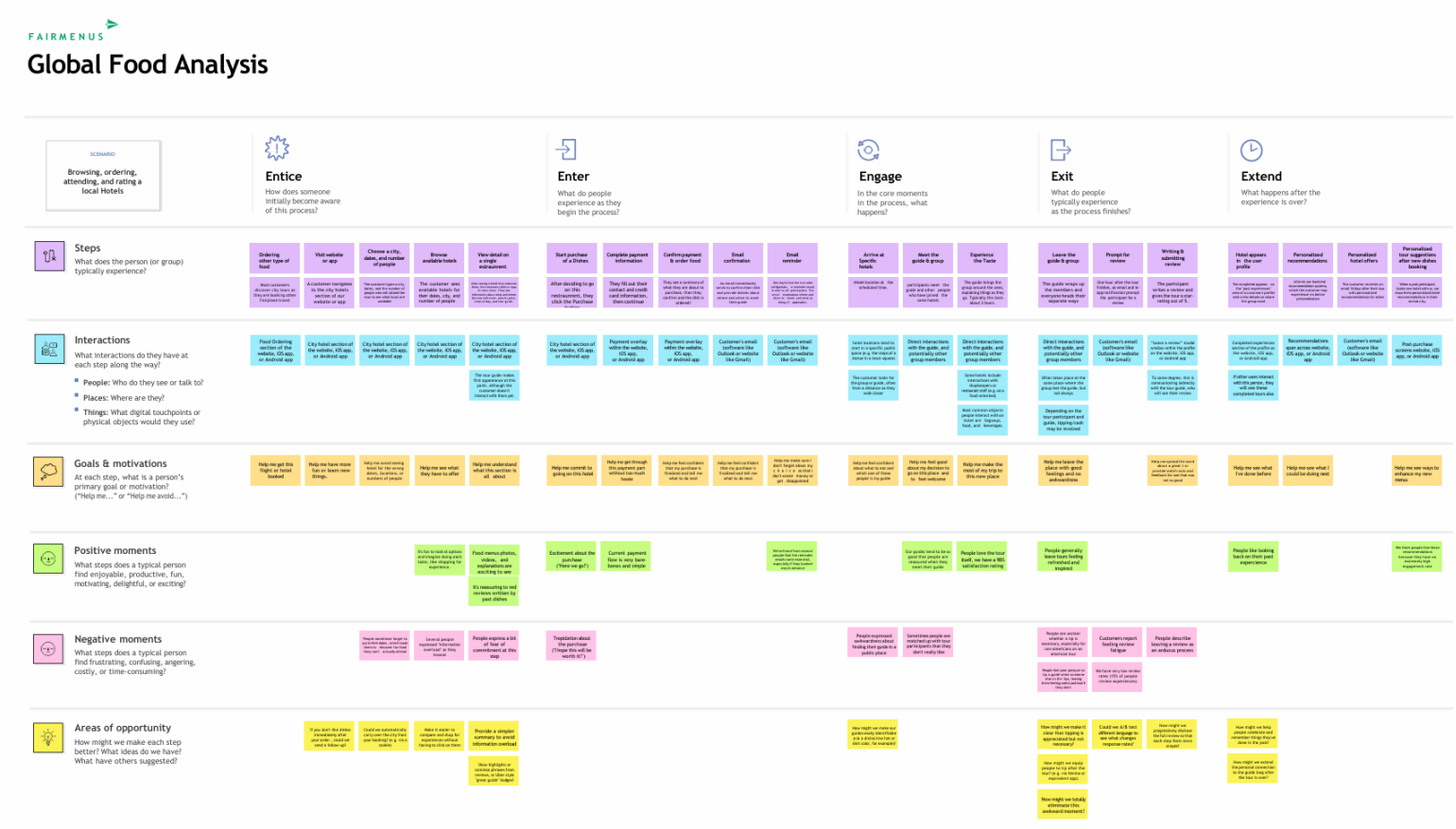
TIP



3.REQUIREMENT ANALYSIS

3.1 Customer Journey Map:

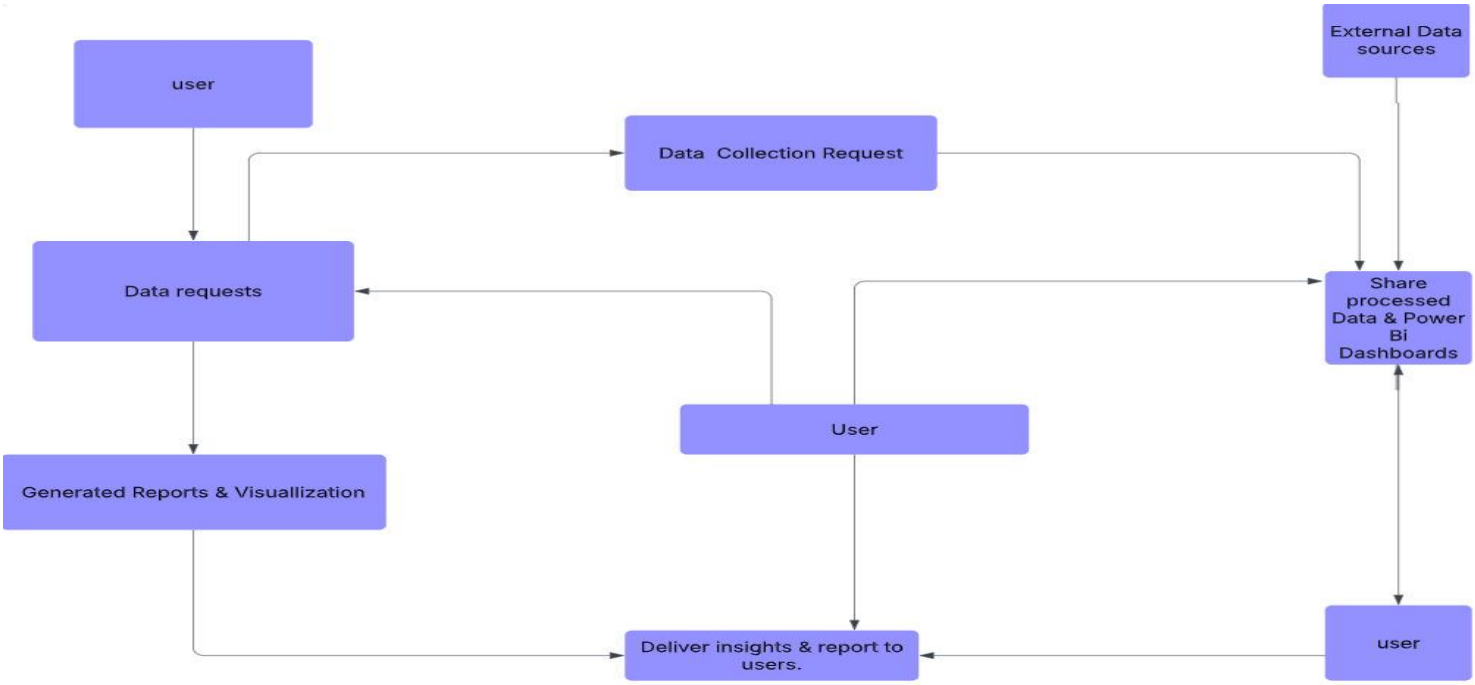
Identifies key stakeholders and their interactions with the system. Includes farmers, agronomists, supply chain managers, and policymakers.



3.2 Solution Requirement:

- Real-time data collection from sensors.
- Predictive analytics for crop yield forecasting.
- Efficient irrigation management using IoT.
- Supply chain transparency with blockchain integration.

3.3 Data Flow Diagram:



3.4 Technology Stack:

- Power BI
- SQL/Azure
- DAX(Power BI)
- Power BI Service

4. PROJECT DESIGN

4.1 Problem Solution Fit:

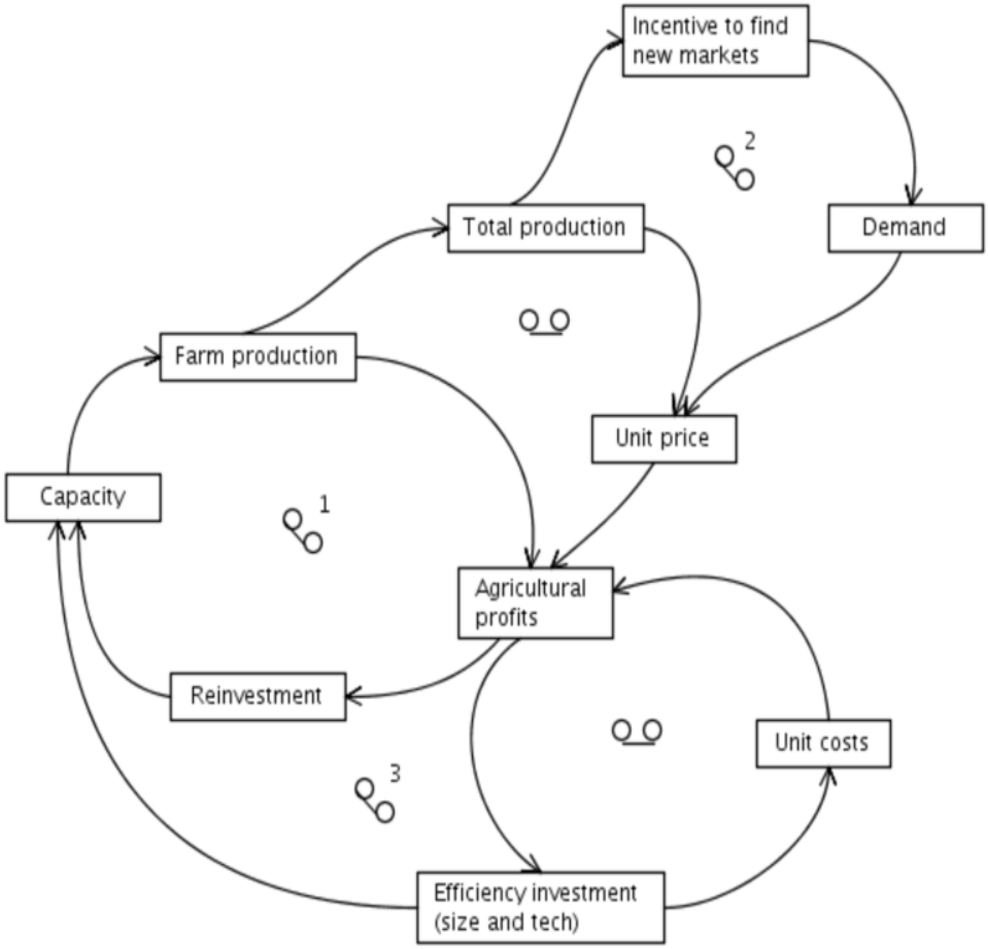
The system aligns with the need for efficient resource management and enhanced agricultural productivity.

4.2 Proposed Solution:

A comprehensive system that monitors soil moisture, climate conditions, and crop health using IoT and AI. Predictive analytics will forecast yields and suggest optimal resource allocation.

4.3 Solution Architecture:

A multi-layered architecture that includes data acquisition, data processing, analytics, and dashboard visualization.



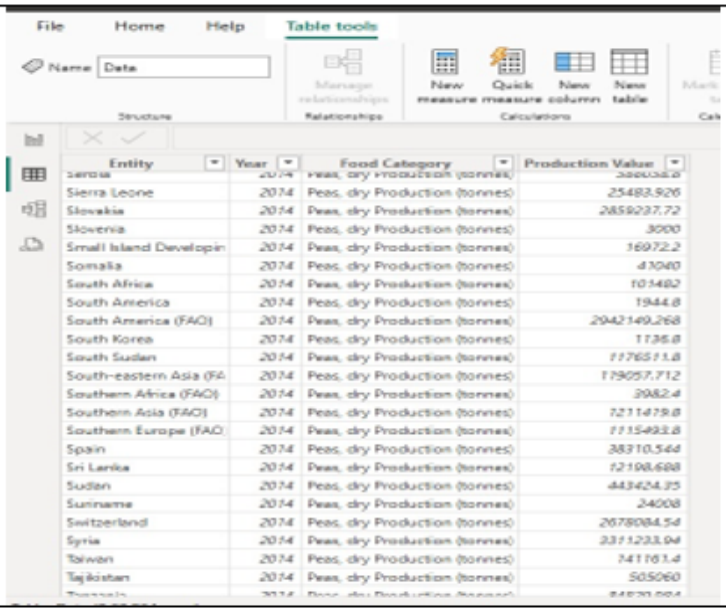
5. PROJECT PLANNING & SCHEDULING

Phase 1: Requirements Gathering and Analysis
Phase 2: System Design and Architecture
Phase 3: Development and Integration
Phase 4: Testing and Validation
Phase 5: Deployment and Maintenance

Project Tracker, Velocity & Burndown Chart: (4 Marks)

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	5	7 Days	11 Feb 2025	17Feb 2025	5	17Feb 2025
Sprint-2	6	7 Days	18 Feb 2025	25 Feb 2025	6	25 Feb 2025
Sprint-3	9	7 Days	25 Feb 2025	2 Mar 2025	9	2 Mar 2025
Sprint-4	7	7 Days	5 Mar 2025	11 Mar 2025	7	11 Mar 2025

6. FUNCTIONAL AND PERFORMANCE TESTING

S.No.	Parameter	Screenshot / Values
1.	Data Rendered	The dataset has **11,912 entries** with **24 columns**. Columns include: • **Entity** (Country or region) • **Year** (1961 to 2023) • Production quantities for various crops and food products, such as: ○ **Maize, Rice, Wheat, Tomatoes, Tea, Sweet potatoes, Sunflower seeds** ○ **Sugar cane, Soybeans, Rye, Potatoes, Oranges, Peas** ○ **Palm oil, Grapes, Coffee, Cocoa beans, Chicken meat, Bananas, Avocados, Apples** After transforming data it only consists 4 columns.
2.	Data Preprocessing	
3.	Utilization of Data Filters	Top 7 Production Values Bottom 7 Production Vlaues

		Top 10 Production value by year
4.	DAX Queries Used	1.Top producing Country = VAR TopCountry =TOPN(1, SUMMARIZE(Data, Data[Entity], "TotalProduction", SUM(Data[Production Value])), [TotalProduction], DESC) RETURN CONCATENATEX(TopCountry, Data[Entity], ", ") 2. TOP 5 countries = VAR Topcountries= TOPN(5, SUMMARIZE(Data, Data[Entity], "TotalProduction", SUM(Data[Production Value])), [TotalProduction], DESC) RETURN CONCATENATEX(ADDCOLUMNS(TopCountries, "Rank", RANKX(TopCountries, [TotalProduction], , DESC)), [Rank] & " : " & [Entity], " | ") 3. Target = SUM(Data[Production Value])*0.2
5.	Dashboard design	

7. RESULTS

7.1 Output:

Report:

Dashboard:


File
Share
Chat in Teams
Comment
Subscribe to dashboard
Edit
Ask a question about your data
49bn
46bn
43bn
43bn
37bn
Asia
Peru
World
Argentina
Western...
Albania
Oceania
400.25bn
2.00T
2.00T
226
Sum of Production Value
BY YEAR
40bn
30bn
20bn
1960
1980
2000
2020
Bottom 5 Production Value by Country
Sum of Production Value
60bn
50bn
40bn
Asia
Peru
World
Argentina
Western Africa (FA...
Albania
Oceania
Entity
Top 5 Production Value ...
Bottom 5 Production Va...

8. ADVANTAGES & DISADVANTAGES

8.1 Advantages:

- Reduces food wastage through accurate forecasting
- Enhances crop productivity using AI-driven insights
- Improves decision-making with data-driven analytics

8.2 Disadvantages:

- High initial cost for IoT device setup
- Potential resistance to new technology adoption

9. CONCLUSION

The proposed solution addresses global food production challenges by integrating modern technologies for precision agriculture and supply chain optimization. The system provides valuable insights, reduces wastage, and enhances overall productivity.

Power BI's interactive dashboards enable data-driven decisions, enhancing productivity and sustainability while empowering stakeholders to address agricultural challenges proactively

10. FUTURE SCOPE

1.Real-Time Monitoring: Utilize Power BI dashboards to monitor crop health, water usage, and supply chain efficiency in real time.

2. **Predictive Analytics:** Integrate AI and machine learning models to forecast yields, climate patterns, and resource optimization.

3.Data Integration: Combine data from IoT sensors, weather forecasts, and agricultural databases for comprehensive analysis.

4. Customized Dashboards: Create tailored visualizations for farmers, policymakers, and supply chain managers.

5.Sustainability Tracking: Monitor environmental impacts and resource utilization to promote sustainable practices.

11. APPENDIX

- **Source Code:**

1. Top producing Country = VAR TopCountry =TOPN(1, SUMMARIZE(Data, Data[Entity], "TotalProduction", SUM(Data[Production Value])), [TotalProduction], DESC) RETURN CONCATENATEX(TopCountry, Data[Entity], ", ")

2. TOP 5 countries = VAR Topcountries= TOPN(5,
   SUMMARIZE(
   Data,
   Data[Entity],
   "TotalProduction", SUM(Data[Production Value])
   ),
   [TotalProduction],
   DESC
) RETURN
   CONCATENATEX(
   ADDCOLUMNS(
   TopCountries,
   "Rank",
   RANKX(TopCountries, [TotalProduction], , DESC)
   ),
   [Rank] & " : " & [Entity],
   " | "
)

3. Target = SUM(Data[Production Value])*0.2

- **Dataset Link:**

  https://drive.google.com/file/d/1rY2wsV6A5o7GxdOzdP7dRpKPQ7on9XM-/view?usp=drive_link

- **GitHub & Project Demo Link:**

https://github.com/36bhaskar2004/Global-Food-Production-Trends-and-Analysis-A-Comprehensive-Study-from-1961-to-2023-Using-Power-BI.git

https://drive.google.com/file/d/1MR69holjcnFXsQjYTMmC0w_3UQT3cy8/view?usp=drive_link