# Tech Saksham

Case Study Report

## Data Analytics with Power BI

# “POWER BI ENABLED CROP PRODUCTION ANALYSIS”

### “GOVERNMENT ARTS COLLEGE(A),KUMBAKONAM”

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Trainer Name

Master Trainer

# ABSTRACT

In the digital world, data has become an invaluable asset for the agricultural sector. The proposed project, “Power BI enables crop production of analysis,” aims to leverage Power BI, a leading agricultural intelligence tool, to analyze and visualize real-time crop production data. This project will enable agricultural sectors to gain deep insights into farmers expectations and preferences for making crops and enhance crop yield satisfaction every year. The real-time analysis will allow farmers to respond in selecting or preferring crops each year and identify opportunities for making profit. The project will also contribute to the broader goal of digital transformation in the agricultural sector, promoting efficiency and innovation in crop production.

# INDEX

# CHAPTER 1

# INTRODUCTION

## 1.1 Problem Statement

Food is the major source of energy. Every living organism on this planet needs food to stay alive and to continue all other essential life processes. Plants are the main source of food on which both humans and animals depend. We cannot imagine life without food.

With the rapidly growing population, demand for more food, loss of produced crops, and other problems in the agricultural output are the main reasons for the scarcity of food and are the biggest concern in some parts of the world facing today.

## 1.2 Proposed Solution

The scarcity of food led to an increase in the requirement for strategies that can help in the management of the crops produced. Using the Power BI project, it collects data on crop production each year, analyzes the data, compares data from previous years, and knows the top crops, states, and districts in the data fields. With this project, we can also plan which crops will be profitable in the current year.

## 1.3 Feature

- **Real-Time Analysis:** The dashboard will provide real-time analysis of crop production data.
- **Segmentation:** It will segment agricultural fields based on various parameters every year, like various crops, states, districts, etc.
- **Analysis of crop production:** The dashboard will identify and display various parameters every year, like crop yielding profit or loss, yielding area of states and districts, and yielding crops in the fields.
- **Predictive Analysis:** It will use historical data to predict future crop production and make decisions.

## 1.4 Advantages

Using Power BI, we can analyze crop production data and provide some protection for low-level crops. We can create crop protection that helps keep plants healthy and maintain sustainable yields. The choice of plant protection strategy depends on the type of culture grown and the threat. At the same time, measures must be timely and, wherever possible, preventive. The factors include

- Technological Factors
- Environmental Factors
- Systematic Factors

## 1.5 Scope

The scope of this project extends to all Indian agricultural institutions that aim to leverage data to make decisions and increase crop production every year. The project can be further extended to incorporate more data sources and advanced analytics techniques into producing and increasing the level of crops. The project is also useful for various states in India to promote various crops in their fields. Furthermore, the project contributes to the broader goal of digital transformation in the agricultural sector, promoting efficiency, innovation in crop production, and preventing external factors.

# CHAPTER 2

# SERVICES AND TOOLS REQUIRED

## 2.1 Services Used

- **Data collection:**
  - Gathering crop production data from ICAR, including various parameters like seasons, states, districts, crops, production of years, etc.
- **Data storage:**
  - The Power BI storage gives the crop performance report a single location to check on the current, past, and future performance of the crops you grow.
- **Data Analysis:**
  - Power BI provides various tools and charts to analyze data efficiently.
  - This analysis explains how to view and explore data and how to interact with it by working with reports.

## 2.2 Tools and Software used

**Tools**:

- **Power BI**: The main tool for this project is Power BI, which will be used to create interactive dashboards for real-time data visualization.

- **Power Query**: This is a data connection technology that enables you to discover, connect, combine, and refine data across a wide variety of sources.

**Software Requirements**:

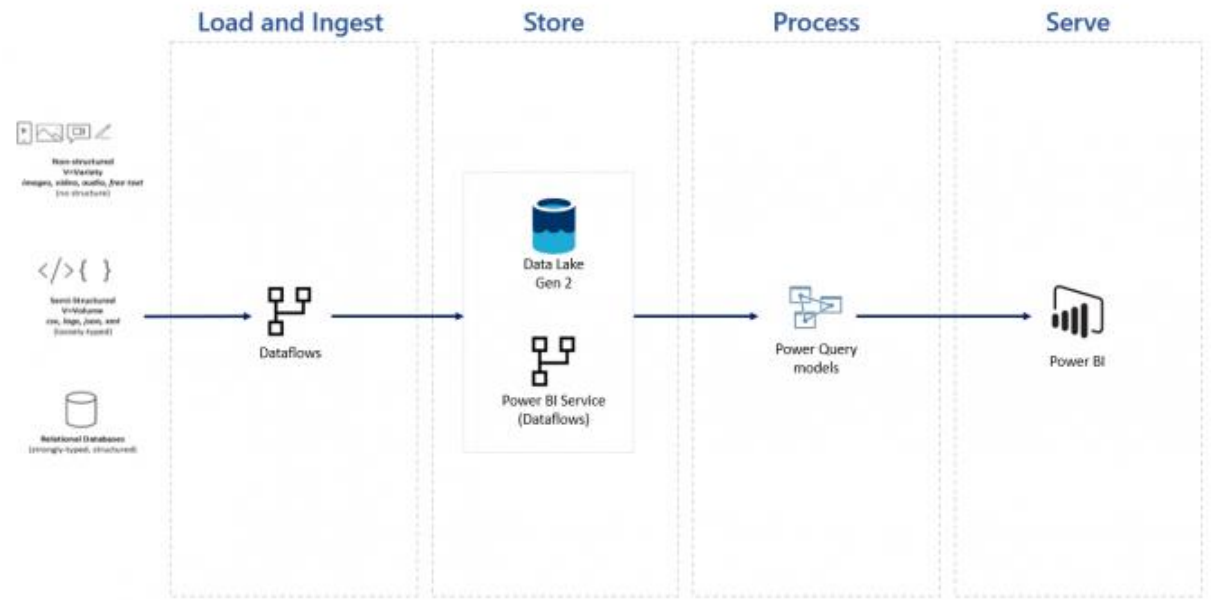
- **Power BI Desktop**: This is a Windows application that you can use to create reports and publish them to Power BI.
- **Power BI Service**: This is an online SaaS (Software as a Service) service that you use to publish reports, create new dashboards, and share insights.
- **Power BI Mobile**: This is a mobile application that you can use to access your reports and dashboards on the go.

# CHAPTER 3

# PROJECT ARCHITECTURE

## 3.1 Architecture




Here's a high-level architecture for the project:

1. **Data collection:** Gathering crop production data from ICAR, including various parameters like seasons, states, districts, crops, production of years, etc.

2. **Data storage:** The Power BI storage gives the crop performance report a single location to check on the current, past, and future performance of the crops you grow.

3. **Real-time data:** Power BI supports real-time data processing, which means users can view up-to-date data in their dashboards and reports.

4. **Data visualization:** Using data visualization to make the most of the data on crop production, it needs to be recontextualized. Using graphs, charts, maps, and images, you can reconfigure the way data is presented and use it for strategic decision-making.

5. **Data Access:** The dashboards created in Power BI can be accessed through Power BI Desktop, Power BI Service (online), and Power BI Mobile.

6. **Track and Analysis trend:** Power BI tracks the performance of crop production. Power BI has solutions that can display data through a holistic lens that shows how crop production has changed from year to year (period to period).

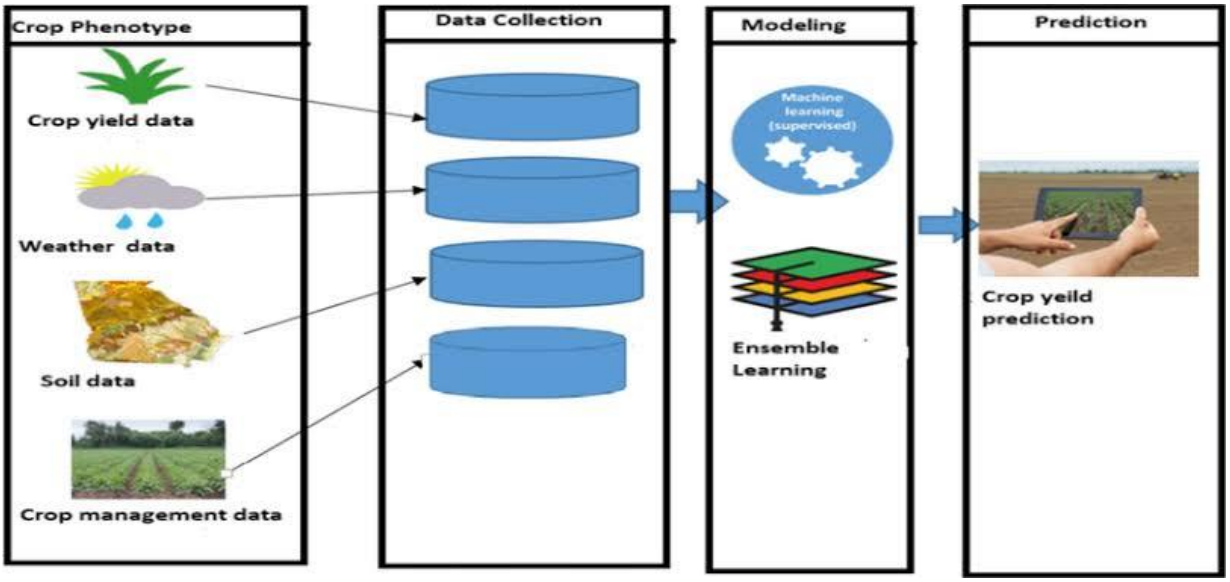
# CHAPTER 4

# MODELING AND RESULT

1. **Data collection:** Gathering crop production data from ICAR, including various parameters like seasons, states, districts, crops, production of years, etc.

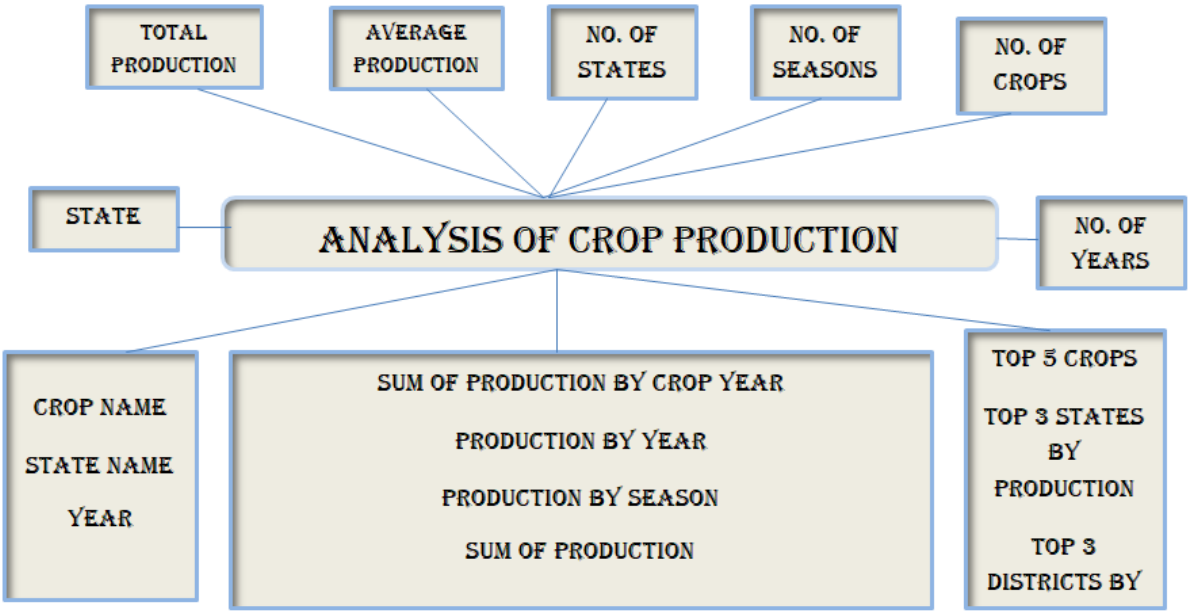
2. **Data Preparation:** Import the collected data into Power BI and prepare it for analysis. This may involve cleaning the data, handling missing values, and formatting the columns appropriately.

3. **Data Modeling:** Create a data model in Power BI that includes a table for crop production in season, states, districts, years, etc., and differentiate the data column with a pie chart, line chart, bar chart, etc.



# ENABLED CROP PRODUCTION OF ANALYSIS



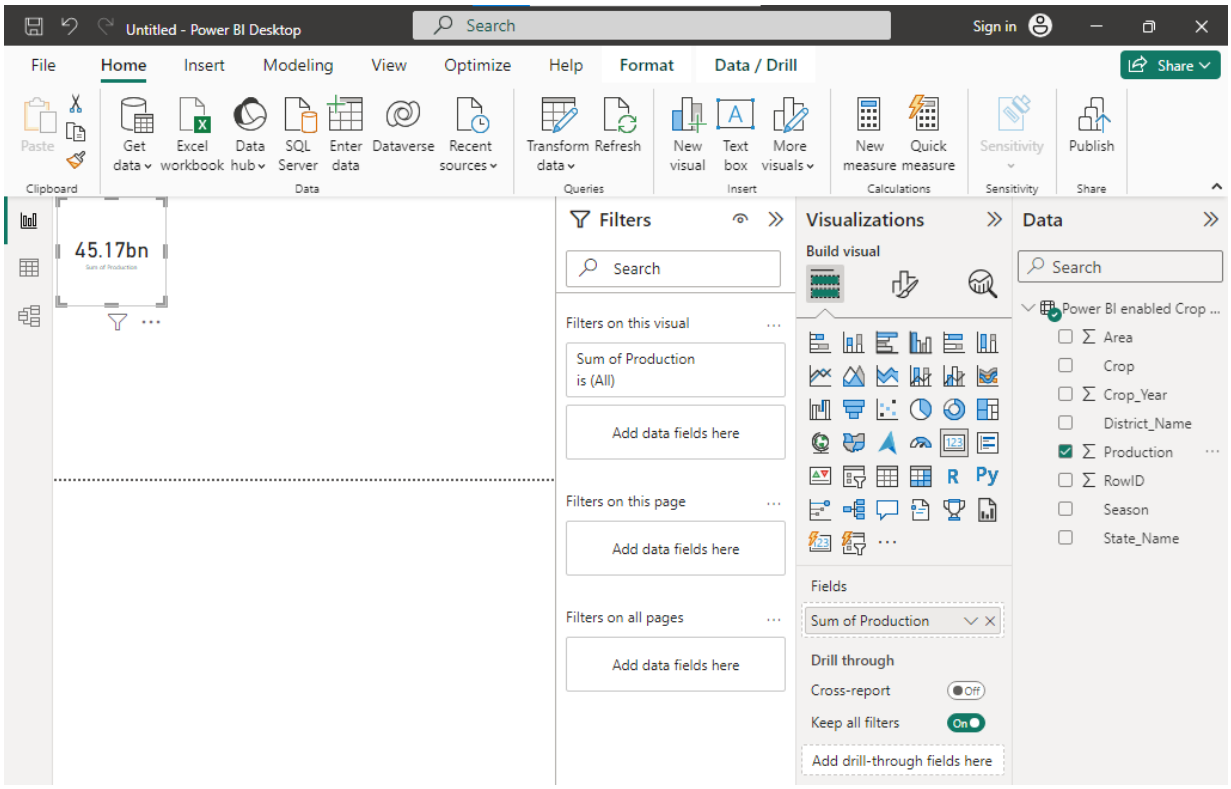

 

**COLLECTION OF CROP PRODUCTION DATA**

| RowID | State_Name | District_Name | Crop_Year | Season | Crop | Area | Production |
|---|---|---|---|---|---|---|---|
| 0 | Bihar | NALANDA | 2005 | Rabi | Wheat | 81934 | 160425 |
| 1 | Assam | KARBI ANGLONG | 2019 | Whole Year | Onion | 257 | 514 |
| 2 | Gujarat | ANAND | 2020 | Summer | Maize | 100 | 100 |
| 3 | Karnataka | UTTAR KANNAD | 2013 | Rabi | Groundnut | 2872 | 4572 |
| 4 | Uttar Pradesh | JAUNPUR | 2016 | Rabi | Onion | 110 | 1290 |
| 5 | Assam | MARIGAON | 2014 | Rabi | Rapeseed &Mustard | 6535 | 2719 |
| 6 | Odisha | SONEPUR | 2006 | Winter | Rapeseed &Mustard | 91 | 6 |
| 7 | Rajasthan | DHOLPUR | 2017 | Whole Year | Garlic | 1 | 1 |
| 8 | Karnataka | BELGAUM | 2018 | Whole Year | Coconut | 336 | 3212 |
| 9 | Bihar | MUNGER | 2020 | Summer | Moong(Green Gram) | 125 | 78 |
| 10 | Chhattisgarh | JANJGIR-CHAMPA | 2013 | Kharif | Other Kharif pulses | 223 | 107 |
| 11 | Assam | KARBI ANGLONG | 2019 | Rabi | Rapeseed &Mustard | 19337 | 8652 |
| 12 | Uttar Pradesh | SHRAVASTI | 2005 | Kharif | Groundnut | 72 | 58 |
| 13 | Gujarat | PATAN | 2019 | Kharif | Moong(Green Gram) | 9100 | 3300 |
| 14 | Tamil Nadu | KARUR | 2008 | Whole Year | Sweet potato | 20 | 309 |
| 15 | Uttar Pradesh | KASGANJ | 2019 | Rabi | Tobacco | 5247 | 28554 |
| 16 | Haryana | MAHENDRAGARH | 2006 | Rabi | Wheat | 45074 | 186000 |
| 17 | Assam | DHEMAJI | 2017 | Whole Year | Turmeric | 321 | 211 |
| 18 | Assam | BAKSA | 2015 | Kharif | Small millets | 284 | 127 |
| 19 | Kerala | PATHANAMTHITTA | 2008 | Whole Year | Sugarcane | 224 | 10950 |
| 20 | Chhattisgarh | JANJGIR-CHAMPA | 2018 | Rabi | Linseed | 2497 | 658 |
| 21 | Chhattisgarh | DHAMTARI | 2020 | Whole Year | Banana | 46 | 1520 |
| 22 | Karnataka | BELLARY | 2016 | Rabi | Maize | 3418 | 7487 |
| 23 | Assam | TINSUKIA | 2020 | Autumn | Rice | 5806 | 7964 |

TOTAL PRODUCTION

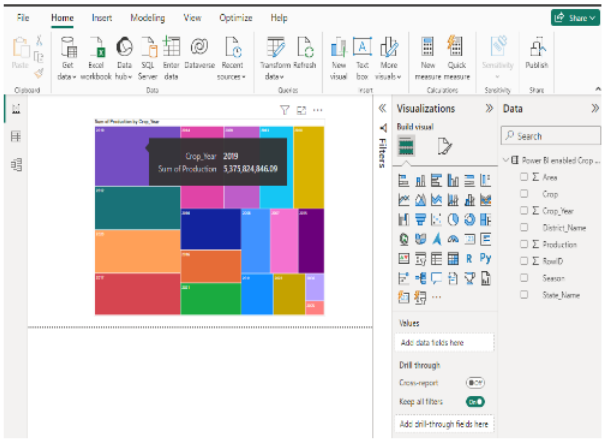



The production column is used to calculate the sum of production and give the result.

SUM OF PRODUCTION BY CROP YEAR

The crop year column and production column are used to calculate the sum of production by crop year.

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| 11 | Assam | KARBI ANGLONG | 2019 | Rabi | Rapeseed &Mustard | 1395 | 8652 |
| 12 | Uttar Pradesh | SHRAVASTI | 2005 | Kharif | Groundnut | 7 | 58 |
| 13 | Gujarat | PATAN | 2019 | Kharif | Moong(Green Gram) | 910 | 3300 |
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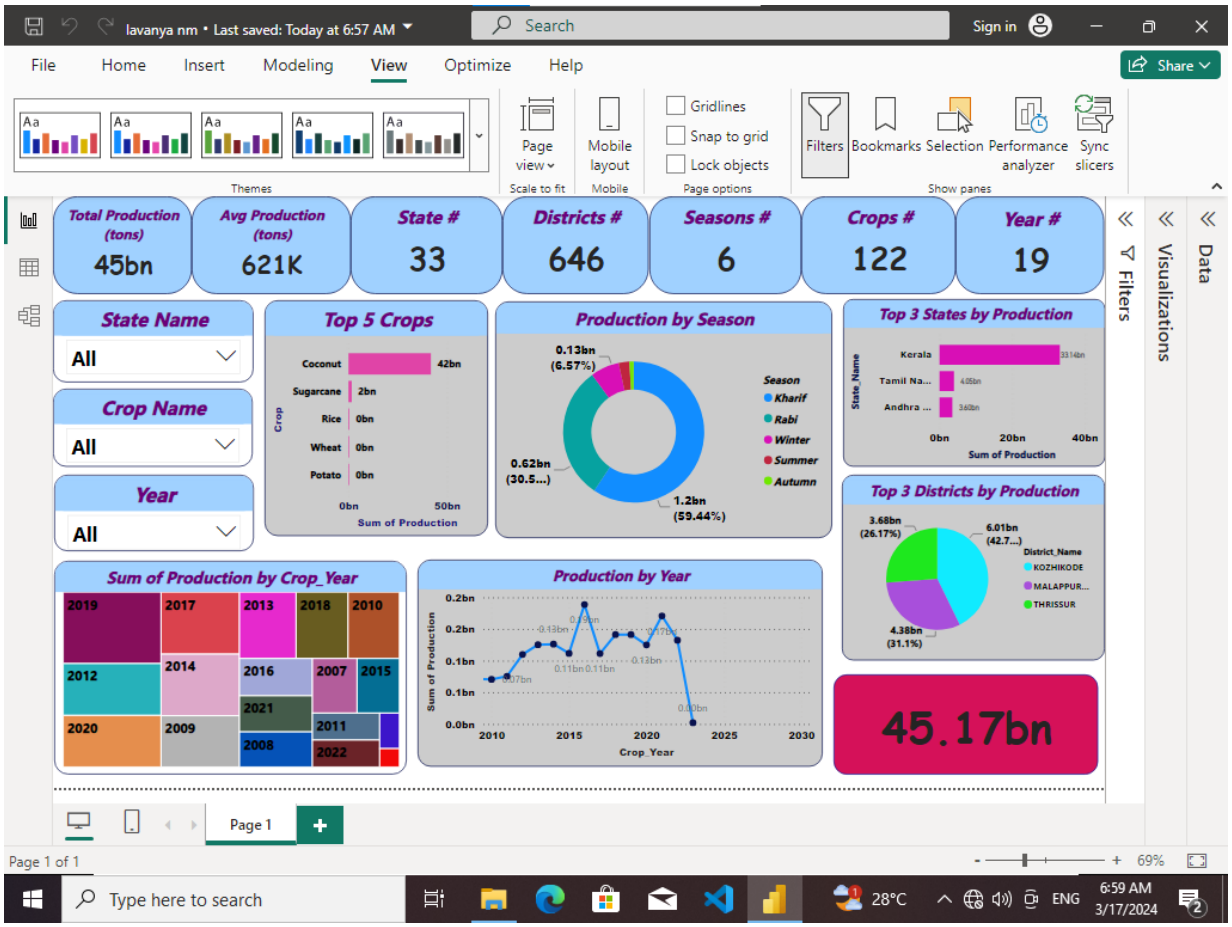
| 20 | Chhattisgarh | JANJGIR-CHAMPA | 2018 | Rabi | Linseed | 249 | 658 |
| 21 | Chhattisgarh | DHAMTARI | 2020 | Whole Year | Banana | 4 | 1520 |
| 22 | Karnataka | BELLARY | 2016 | Rabi | Maize | 343 | 7487 |
| 23 | Assam | TINSUKIA | 2020 | Autumn | Rice | 589 | 7964 |

# Dashboard



# CONCLUSION

The project "Power BI enabled crop production analysis" using Power BI has successfully demonstrated the potential of data analytics in the agricultural sector. The crop performance report in Power BI gives a single location to check on the current, past, and future performance of the crops you grow.

Performance is measured in the form of a gross margin per area and a total gross margin. In the various seasons, an estimation is based on your plan and the yield and price you set in Power BI. At the end of the season, this will be the total gross margin for that crop (including all fields growing the same crop) based on the recorded yield and the price forecast in Power BI.

# FUTURE SCOPE

This dataset is a comprehensive collection of information on agricultural activities, including crop production. The data covers a wide range of crops and provides detailed information on factors such as yield, acreage, and prices. This dataset is vital for informing policy decisions related to agriculture, and for understanding the sector's impact on the economy and the environment.

Moreover, the data can be used by farmers to make informed decisions about their production strategies, including crop selection, fertilization, and irrigation practices. Additionally, this data can help researchers develop innovative solutions to address challenges facing the agricultural sector, such as climate change and resource depletion.

# REFERENCES


1. Michael Hart, 2017, “Quick Insights with Power BI”, Accessed online at https://powerbi.microsoft.com/en-us/documentation/powerbi-service-auto-insights/
2. Michele Hart, 2017, “Create a new Power BI report”, Accessed online at https://powerbi.microsoft.com/en-us/documentation/powerbi-service-create-a-new-report/
3. Ajayan, 2017, “How should I collaborate on & share dashboards and reports?”, Accessed online at https://powerbi.microsoft.com/en-us/documentation/powerbi-service-how-should-ishare-my-dashboard/

# LINK

https://github.com/Lavanyasubu