



AGRICULTURAL PRODUCTION OF INDIA

Objective:-

- ▶ The goal of this project is to solve the problems of various crops Cultivation or the Production in India.
- ▶ Development of the reports and the Dashboards from which one can simply understand about the area, production and yield of different crops and their cultivation and production cost by the financial year in India and as well as in different states and also that one can understand which crop and its variety is suitable for their region.

Problem Statement

- ▶ The Agriculture business domain, as a vital part of the overall supply chain, is expected to highly evolve in the upcoming years via the developments, which are taking place on the side of the Future Internet. This paper presents a novel Business-to-Business collaboration platform from the agri-food sector perspective, which aims to facilitate the collaboration of numerous stakeholders belonging to associated business domains, in an effective and flexible manner.

Benefits


- Better understanding of cultivated area of India and its states.
- Better understanding of Production and Yield of different Crops.
- Better understanding of the Production and type of the Cultivation cost of different crops which also effect in deciding the MSP of crops in India.
- Recommendation of the crops and its variety for the cultivation according to the Region.

Data Sharing Agreement :

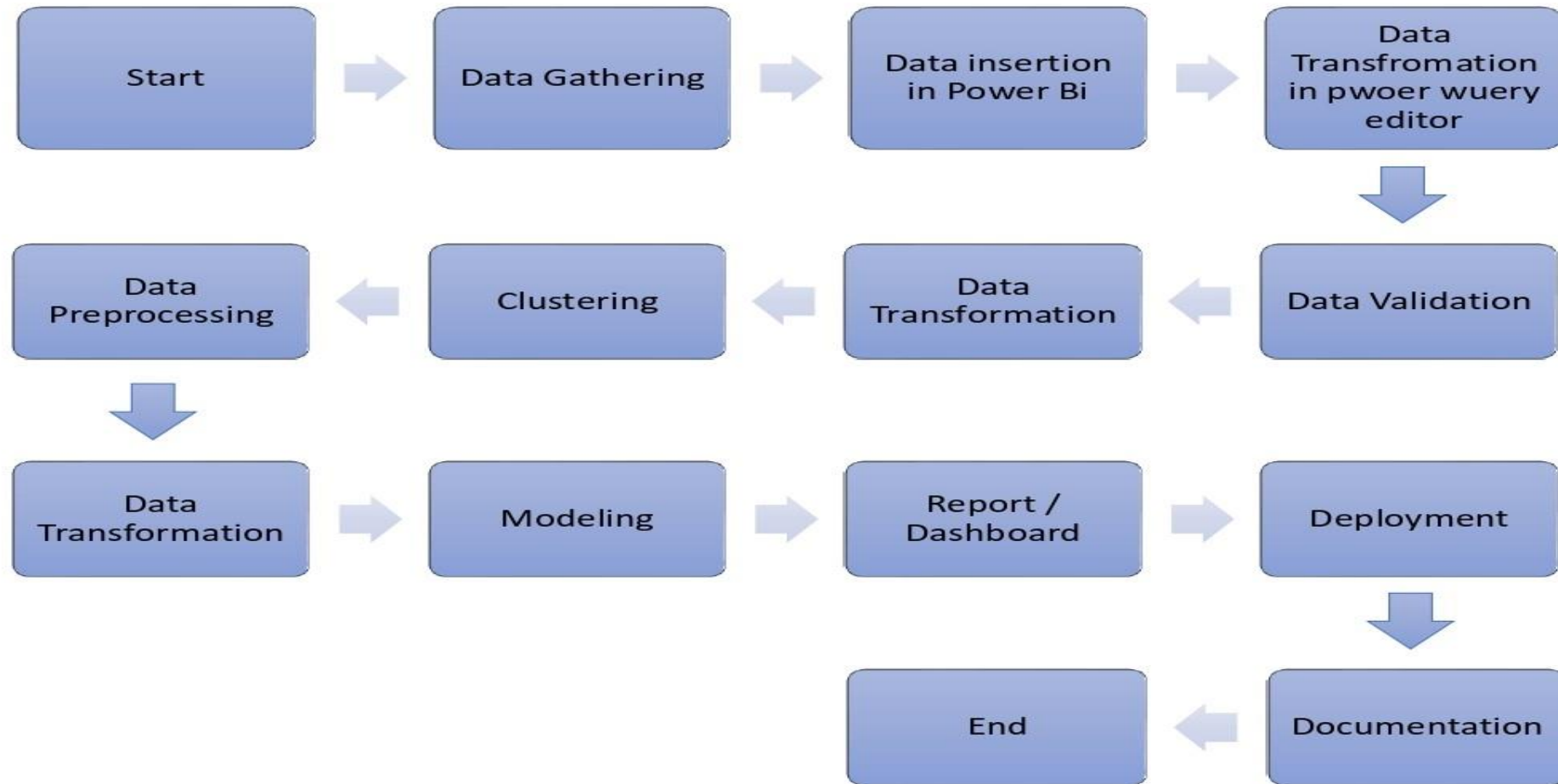
- Main File name (Agriculture Data)
- No of files under main file (5)
- Files Names under main file (Agriculture 1, Agriculture 2, Agriculture 3, Agriculture 4 and Produce)
- Length of date stamp(8 digits)
- Length of time stamp(6 digits)
- Column names (Crop, State, cost of cultivation, cost of production, area, production, yield, Financial year, Variety,
- Column data type (Integer, Decimal, Date and String)

Data Description:-

- ▶ Agricultural data contains mainly Area, production and yield and financial year of different crops and other columns as like cost, recommended zone and variety.
- ▶ Crops: Different types of crops.
- ▶ Production: Agricultural production is the use of crops and animal products to enhance human life sustainably.
- ▶ Area: Crops are cultivated at this area.
- ▶ 4. Yield: It is also called Production per unit area.
- ▶ 5. Year of Financial year: Crops grown or produce in that specific time.
- ▶ 6. Cost of Cultivation (A2+FL): The A2 + FL cost includes all cash transactions and payments made by the farmer, including the cost of family labour It also includes the rental value of the leased land.

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- ▶ Cost of Cultivation (C2): C2 includes A2 + FL cost as well as the rent of owned land and interest on owned capital. Hence, the MSP calculated on the basis of C2 cost is much higher as compared to A2 + FL.
 - ▶ Cost of Production (C2): It is C2 type production cost.
 - ▶ Variety: It includes the variety of Crops.
 - ▶ Recommended zone: Suitable region for a better production for the crops

Architecture



Data Insertion in Microsoft Power Bi:

- All the files of Agricultural data was in csv format. So, after opening the Microsoft Power Bi, I have imported all the files in the Microsoft Power Bi.
- Data was unstructured so I have transferred the data in Power Query Editor for the further process.

Data Validation and Data Transformation :

- First I have done some basic transformation of the data such as- removing error, removing null values, getting first row as header if required in the Power Query Editor.
- The data was so messy so I have extracted the important data from the files and transformed it according to the requirement.
- In the transformation process I have done different transformation such as- pivoting and unpivoting columns, removing error, removing null values, creation of new tables.
- Validation of date column:- I have validated the columns data type the most unstructured columns was date type data.

Report and dashboard:

I have made some report and dashboard according to the requirement-

1. Production and yield of Rice of Indian states by their cultivated area and financial year.
2. Production and yield of Wheat of Indian states by their cultivated area and financial year.
3. Production and yield of Coarse Cereals of Indian states by their cultivated area and financial year.
4. Cost of Cultivation and production of different crops and their Yields by their Area.
5. Production of Food Grains and Oilseeds of different Crops by their financial Year.
6. Comparison of Production of different Crops by their Financial year Crop recommendation for the Cultivation.

Deployment:-

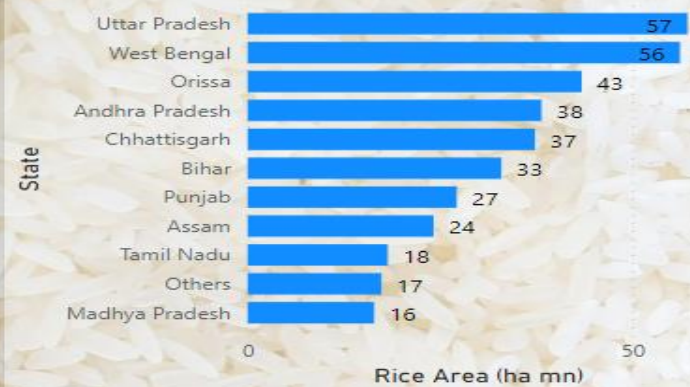
After making the Report and dashboards I have published it on the Microsoft Power Bi Service from Microsoft Power Bi Desktop.

Insights:-

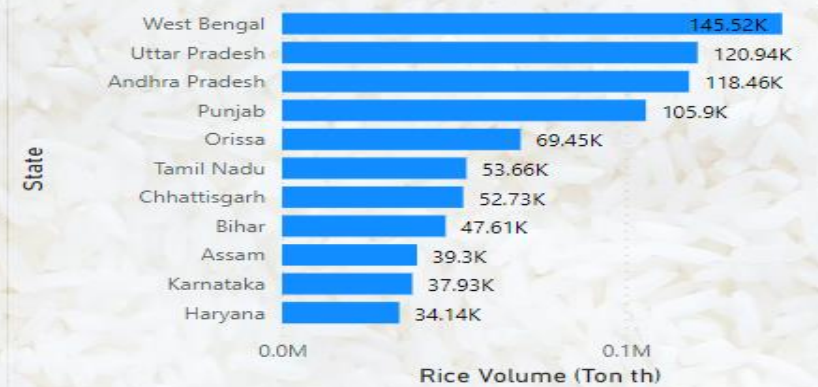
- ▶ I have made total 7 dashboards for analyzing the data.
- ▶ From the first dashboard Production and Yield of Rice by their financial year-

Rice Production and Yield

Rice Area (ha mn) by State



Rice Volume (Ton th) by State



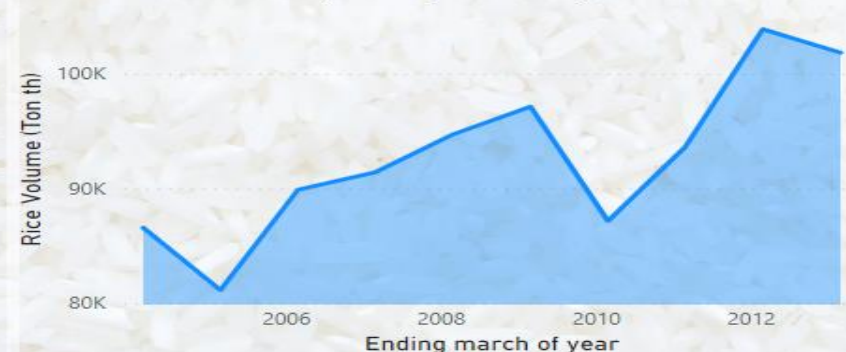
Rice Yield (kg/ha) by State



Rice Area (ha mn) by Year



Rice Volume (Ton th) by Ending march of year

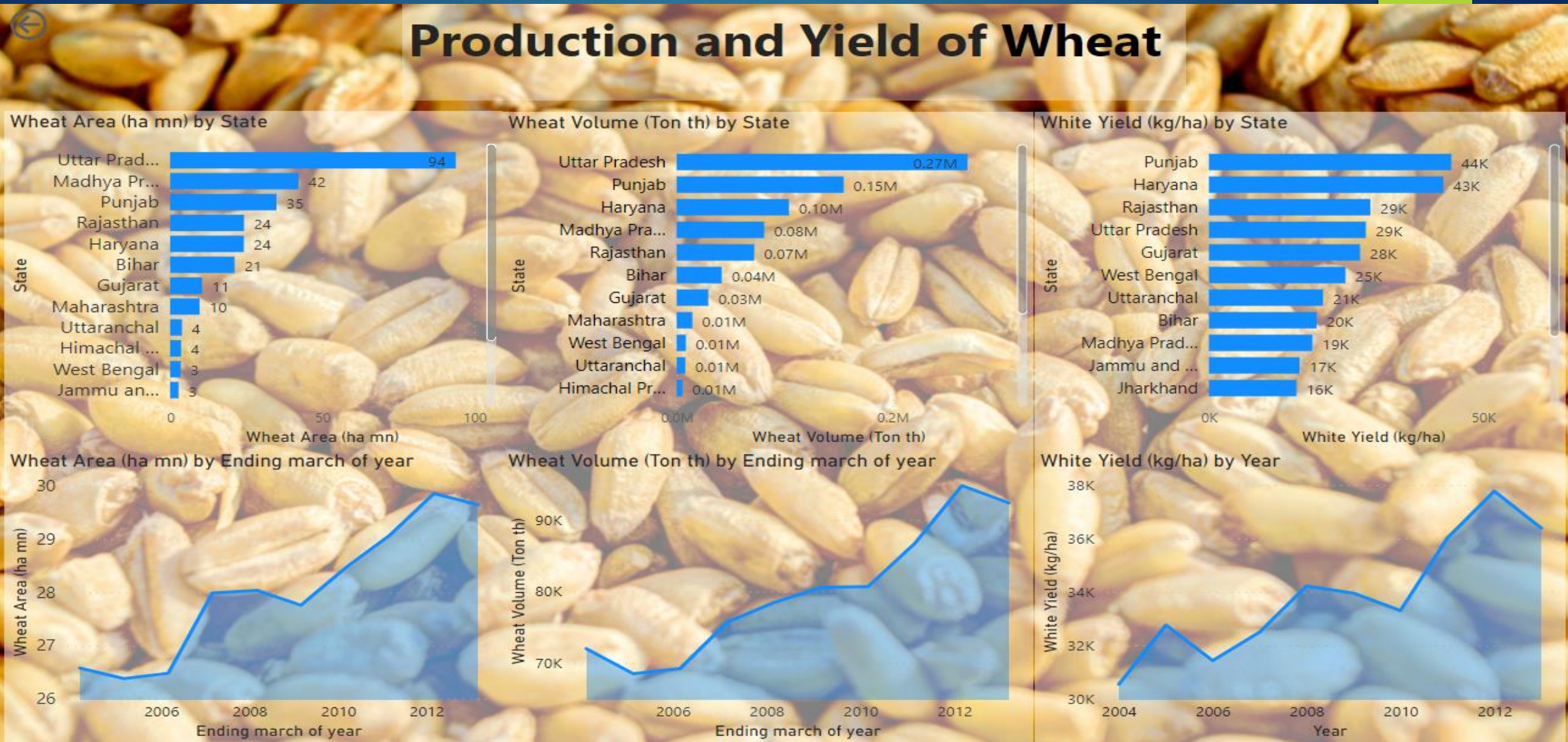


Rice Yield (kg/ha) by Year



- ▶ Uttar Pradesh was on the top for using the area (57 hectare million) for cultivating Rice, West Bengal for The volume (145.52 K Ton Thousand) and Punjab for the yield (39K Kg/hectare).
- ▶ In the Area chart we can see the Area, Volume and Yield as a total of all the states by the financial year.
- ▶ Between financial year 2004-2013, In 2009 the area used for the Rice cultivation was the maximum with (45.52 mn ha) and in 2005 was the lowest with (41.91 ha mn).
- ▶ Between financial year 2004-2013 , In 2012 the Rice Volume was maximum with (103878.70 Ton th) and in 2005 was minimum with (81154.70 Ton th).
- ▶ Between financial year 2004-2013, In 2013 the Rice Yield was the maximum with (39375.00 Kg/ha) and in 2005 was minimum with (32199.00 Kg/ha).
- ▶ From 2004-2013 the Rice Production and Yield followed uptrend.
- ▶ Similarly we can see the Rice area, production and yield for the individual state by accessing the dashboard.

► From the second dashboard Production and yield of Wheat by their financial year-



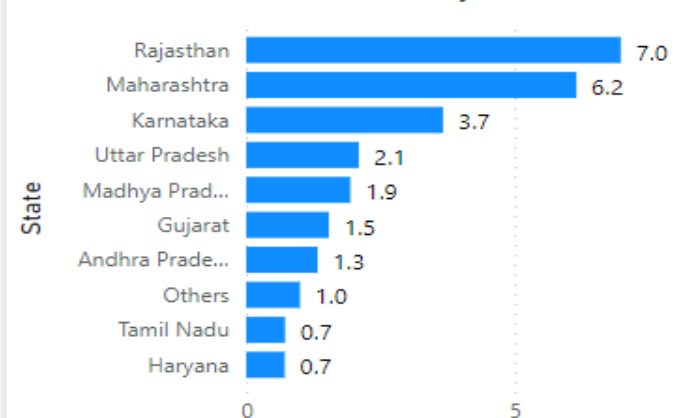
- ▶ Uttar Pradesh was on the top for using the area (94 hectare million) for cultivating Wheat, Uttar Pradesh for The volume (0.27 Million Ton Thousand) and Punjab for the yield (44K Kg/hectare).
- ▶ In the Area chart we can see the Area, Volume and Yield as a total of all the states by the financial year.
- ▶ Between financial year 2004-2013, In 2012 the area used for the Wheat cultivation was the maximum with (29.86 mn ha) and in 2005 was the lowest with (26.38 ha mn).
- ▶ Between financial year 2004-2013 , In 2012 the Wheat Volume was maximum with (94761.30 Ton th) and in 2005 was minimum with (68525.40 Ton th).
- ▶ Between financial year 2004-2013, In 2012 the wheat Yield was the maximum with (37771.00 Kg/ha) and in 2004 was minimum with (30545.00 Kg/ha).
- ▶ From 2004-2013 the Rice Production and Yield followed uptrend.
- ▶ Similarly we can see the Wheat area, production and yield for the individual state by accessing the dashboard.

- From the third dashboard Production and yield of coarse cereals-

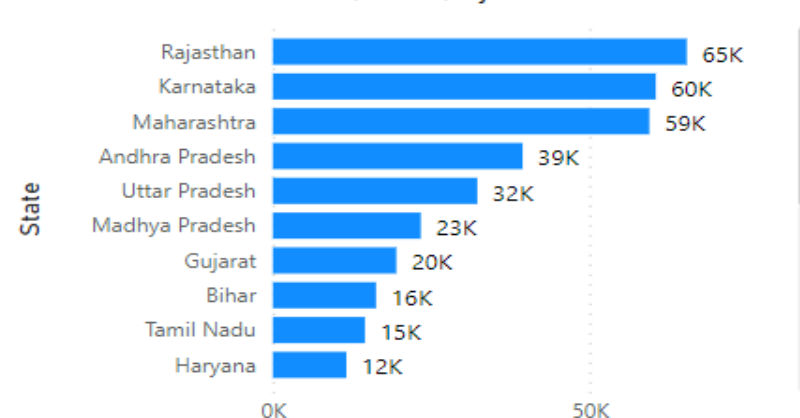


Production and Yield of Coarse Cereals

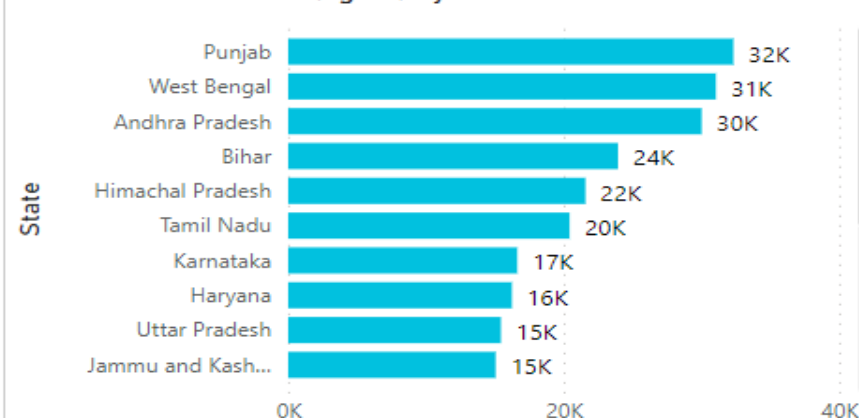
Coarse Cereals Area (ha mn) by State



Coarse Cereals Volume (Ton th) by State



Coarse Cereals Yield (kg/ha) by State



Coarse Cereals Area (ha mn) by Year



Coarse Cereals Volume (Ton th) by Year



Coarse Cereals Yield (kg/ha) by Year



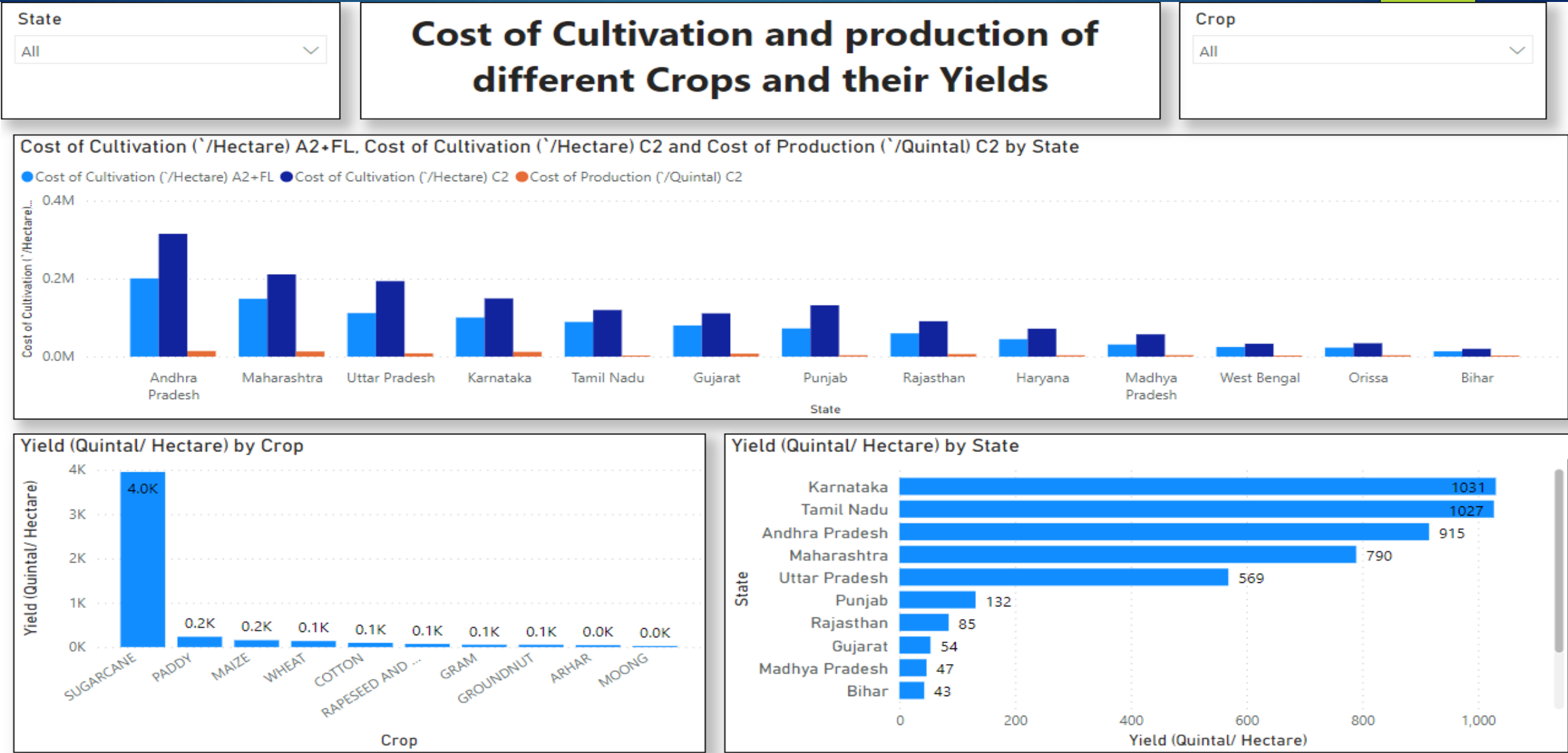
- ▶ Rajasthan was on the top for using the area (7.0 hectare million) for cultivating Coarse Cereals, Rajasthan for The volume (65 K Ton Thousand) and Punjab for the yield (32K Kg/hectare).
- ▶ In the Area chart we can see the Area, Volume and Yield as a total of all the states by the financial year.
- ▶ Between financial year 2004-2013, In 2006 the area used for the Coarse Cereals cultivation was the maximum with (1.73 mn ha) and in 2013 was the lowest with (1.30 ha mn).
- ▶ Between financial year 2004-2013 , In 2011 the Coarse Cereals Volume was maximum with (41929.20 Ton th) and in 2005 was minimum with (33140.40 Ton th).
- ▶ Between financial year 2004-2013, In 2013 the Coarse Cereals Yield was the maximum with (38294.00 Kg/ha) and in 2006 was minimum with (25495.00 Kg/ha).
- ▶ From 2004-2013 the Coarse Cereals Production and Yield followed uptrend.
- ▶ In the volume there is a sharp increase between 2007-08 and 2010-11 and a sharp decrease between 2009-10
- ▶ Similarly we can see the Coarse Cereals area, production and yield for the individual state by accessing the dashboard.


- If we analyze the insights of three above dashboards throw a tabular format-

Parameters	Top State for the Crops		
	Rice	Wheat	Coarse Cereals
Area	Uttar Pradesh	Uttar Pradesh	Rajasthan
Volume	Best Bengal	Uttar Pradesh	Rajasthan
Yield	Punjab	Punjab	Punjab

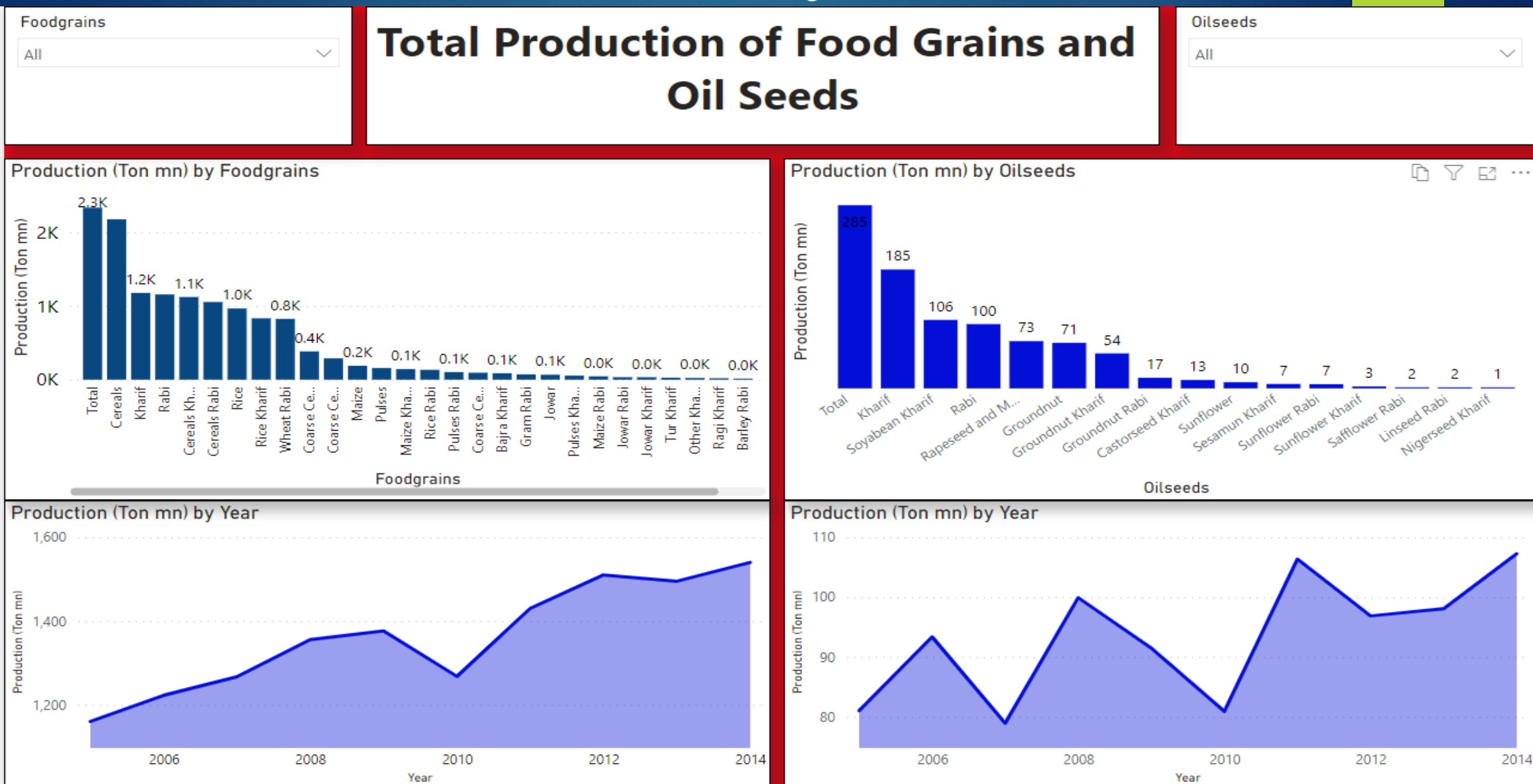
- So we can say that Punjab is the most Yields state than the other states.


► From the fourth dashboard Cost of Cultivation and Production of different Crops and their Yields.



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- ▶ In this dashboard there are only 10 crops- Arhar, cotton, gram, groundnut, maize, moong, paddy, rapeseed and mustard, sugarcane, wheat.
 - ▶ Cost of cultivation(C2) is higher than the Cost of Cultivation(A2+FL).
 - ▶ Andhra Pradesh's cultivation cost is higher than the other states.
 - ▶ Yield of Sugarcane is highest than the other crops.
 - ▶ Karnataka is the top state in the matter of Yield.

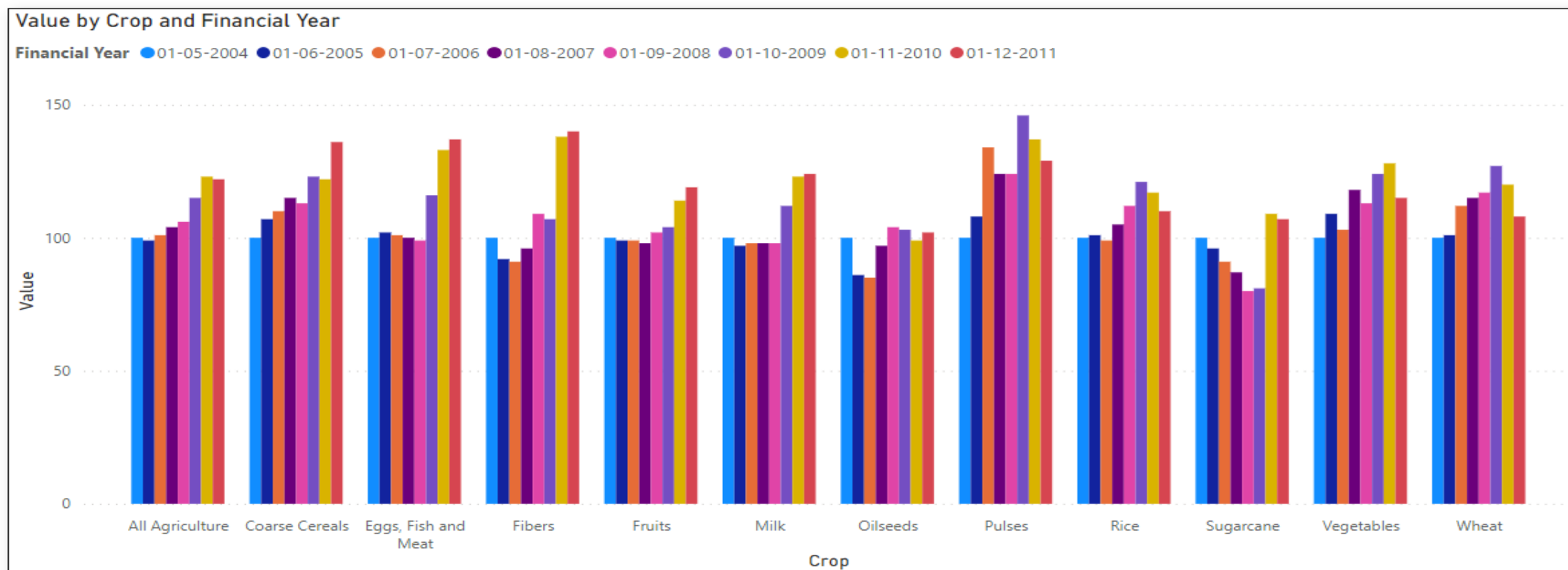
► From the fifth dashboard Total Production of Food grains and Oilseeds-




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- ▶ Total Production of Food grain is 2.3 K Ton Mn and total Production of Oilseeds is 285 Ton Mn.
 - ▶ Kharif season Production of Food grains and Oilseeds is higher than the Rabi season.
 - ▶ In the Food grain cereals contribution in Production is higher than the other food grain crops. It contributes about 2.2 K Ton Mn from the 2.3 K Ton Mn.
 - ▶ In the Oilseeds Soyabean kharif is top Oilseeds in the production than the other oilseeds.
 - ▶ From the area chart, Production of food grains increases by increases the financial year.
 - ▶ Production of Oilseeds followed an uptrend by increases the financial year.

- From the sixth dashboard- Comparison of production of different Crops by their financial year-

Comparison of Production of different Crops by their Financial Year



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- ▶ In this dataset all the Production of different years shown as a comparison of the production of 2004. So we are comparing all the Production of different years as taking a base of 2004's production.
 - ▶ If we leave the financial year 2005 then from the year 2004-2011 all the agricultural Production increased year by year in the comparison of 2004.
 - ▶ In 2009, the production of pulses was highest than the other agricultural Production between 2004-2011.
 - ▶ From 2004-2011 Coarse cereals followed uptrend.
 - ▶ Eggs, Fish and Meats their Production was about flat till 2004-2008 but after that there was a sharp increase from 2008-2011.
 - ▶ Fibers and fruits Production has rapidly increases in the last years.

- From the seventh dashboard Crop Recommendation for the Cultivation.

Crop Recommendation for the Cultivation

Crop

Wheat



Wheat

Crop

108


Season/ duration in days

DBW39

Variety

Eastern Uttar Pradesh, Bihar, Jharkhand, West Bengal (except Hills), Orissa, Assam and the place of North Eastern states in late sown condition.

Recommended Zone

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- ▶ In this dashboard there is a crop slicer. Choose the crop from the slicer and you will get the recommendation for the cultivation that which region variety is better for that crop and how much time will it take.

Q & A:

Q1) What's the source of data?

The data is provided by the Ineuron in the format of google drive link.

Q 2) What was the type of data?

The data was the combination of numerical and Categorical values.

Q 3) What's the complete flow you followed in this Project?

Refer slide 5th for better Understanding

Q 4) After the File validation what you do with incompatible file or files which didn't pass the validation?

Files like these are moved to the Achieve Folder and a list of these files has been shared with the client and we removed the bad data folder.

Q 5) How logs are managed?

We are using different logs as per the steps that we follow in validation and modeling like File validation log , Data Insertion ,Model Training log , prediction log etc.

Q 6) What techniques were you using for data pre-processing?

- ✦ Removing unwanted attributes
- ✦ Visualizing relation of independent variables with each other and output variables
- ✦ Checking and changing Distribution of continuous values
- ✦ Removing outliers
- ✦ Cleaning data and imputing if null values are present.
- ✦ Converting categorical data into numeric values.
- ✦ Scaling the data



Q 9) What are the different stages of deployment?

I have deployed it on the Microsoft Power Bi Service.

Thankyou