Agriculture Data Analytics in Crop Yield Estimation using IBM Cognos

INTRODUCTION

1.1 *Overview*

India is an agriculturally rich country with millions of acres of fertile land and plenty of natural resources. India ranks second in worldwide agricultural production, and the main reason behind it is the versatility of the cropping pattern, availability of fertile soil, and water, and the government's agriculture-centred policies. However, the agricultural production doesn't remain the same every year in India and there are many factors that affect the agriculture in India.

1.2 *Agriculture Industry in India Trends:*

The market in India is primarily driven by rapid population growth. This is further supported by the inflating rural and urban income levels that have led to the growing demand for agricultural products across the country. In line with this, the increasing adoption of advanced methods, such as blockchain, artificial intelligence (AI), geographic information system (GIS), drones and remote sensing technologies, along with the launching of several e-farming applications, is providing a boost to the market. Moreover, the presence of favourable government policies across India in order to support and upgrade the overall agricultural infrastructure, including credit facilities for farmers and crop insurance schemes and various incentives for the movement of agriculture products by air transport worldwide, is impacting the market favourably. The market is further driven by the widespread preference for organic agricultural products among the masses. Other factors, including the rising development of allied services, such as cold storage and warehouses, diverse agro-climatic conditions, a high proportion of agricultural land, and rapid digitization, are also positively influencing the market across India.

1.3 Purpose

This project is based on an understanding the crop production of India

LITERATURE SURVEY

2.1 *Existing problem*

The Existing problem is to find answers for question including but not limited to

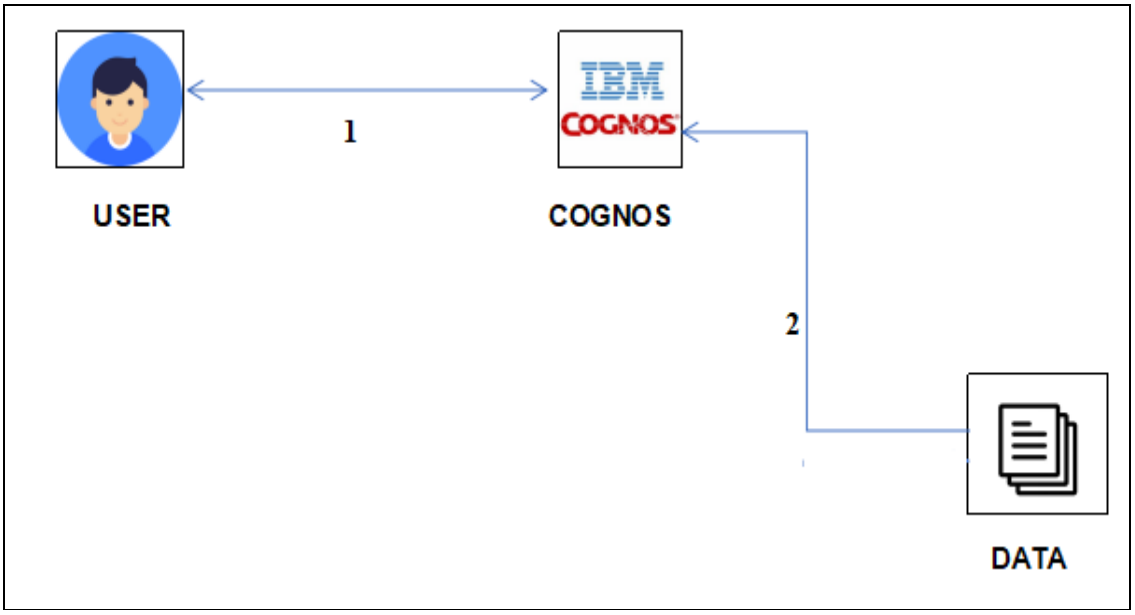
- What is total production of crops in various seasons
- Year wise total area of production
- Year wise changes on production
- State wise area of production
- How Production is distributed of various crops in different states
- What are the major Indian agriculture industry trends?

2.2 *Proposed solution*

Analytics helps in Identifying key question about how is the agriculture pattern. By converting raw data in to meaningful visualizations, picture becomes very clear and we can make various interpretations based of these visualizations.

THEORETICAL ANALYSIS

3.1 *Block diagram*



3.2 *Required Services:*

1) IBM Cognos Analytics

WORKFLOW

4.1 *Broader workflow is as under:*

1. First of all, we have to create IBM Cognos Analytics on Cloud account.

2. Then we have to upload the dataset which we will use analyse using visualization.

3. Depending on the data that is uploaded, if can make certain modifications also using “Prepare Data” function

4. Once we have our desired modification done or if we have uploaded clean data then we can proceed on making visualisation as needed.

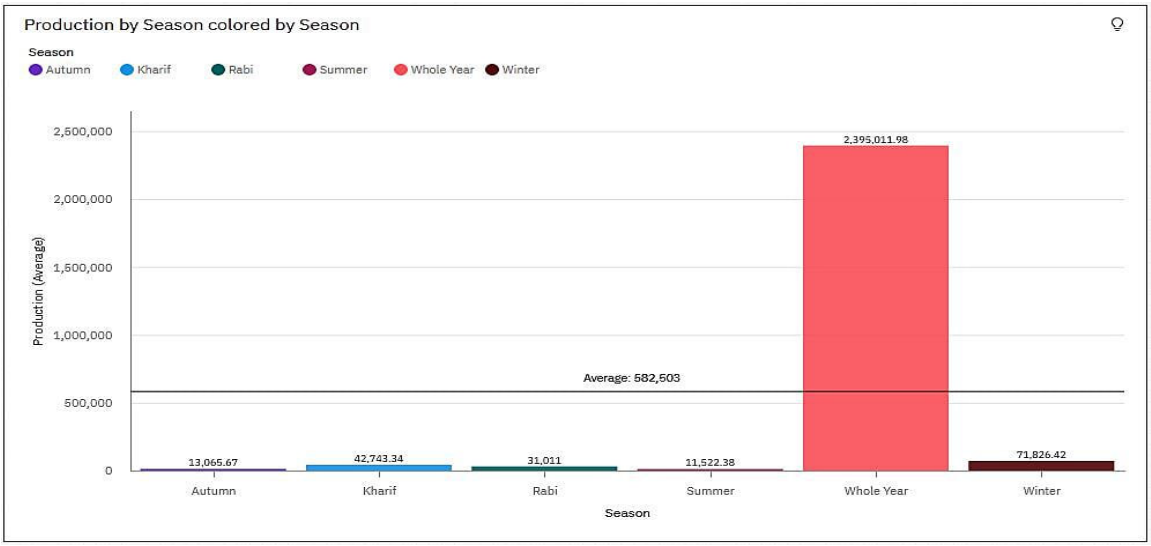
5. This visualisation is dynamic and we can change them by just dragging and dropping field from dataset, selecting various option available for modification, make calculation etc

6. We can add filters which adds to the power of visualisations

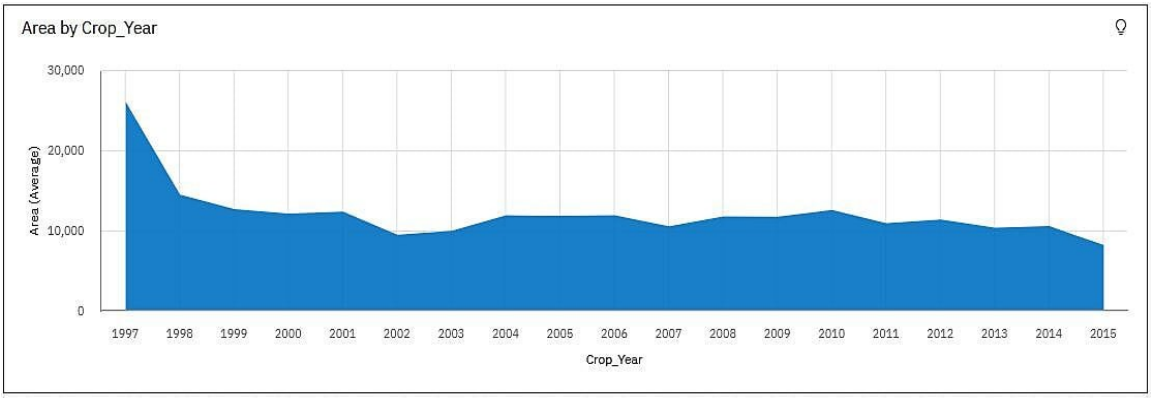
7. These visualisations help in identifying the underlying patterns which are otherwise not even possible by looking at raw data.

OUTCOMES

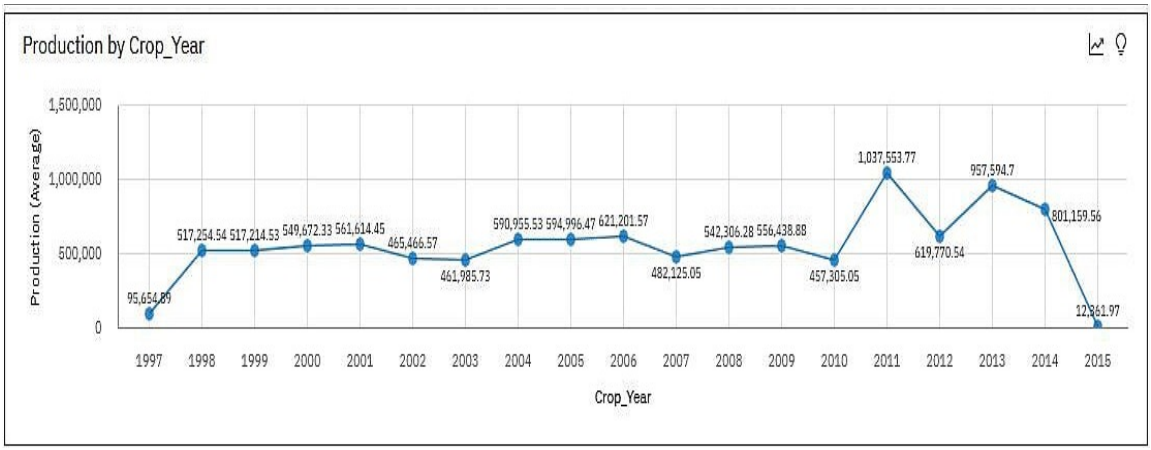
- If we try to see the pattern of production distributed according to season then in India, then cumulative value of crops that are grown through out the year is the highest. It is followed by winter crops and then kharif season crops



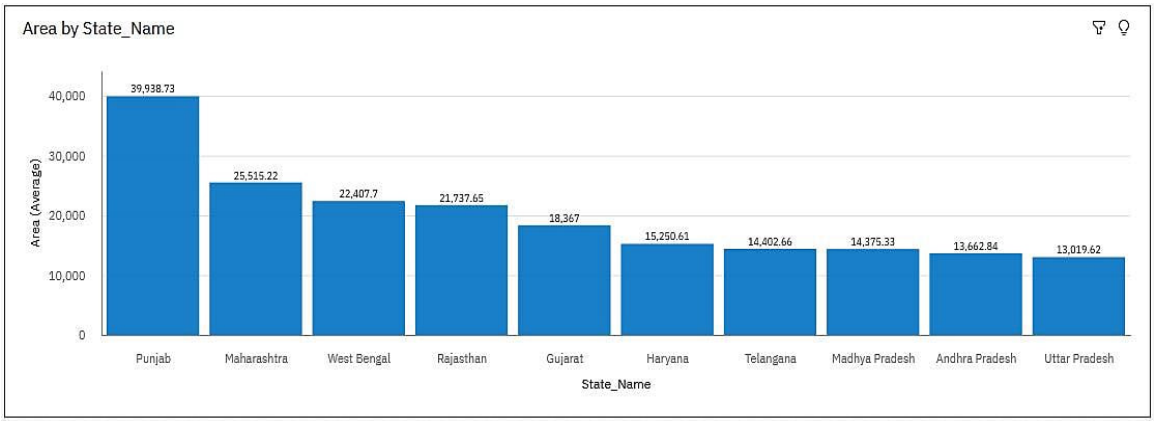
- Area used for production of crops has been constantly reducing as it is evident from the below graph



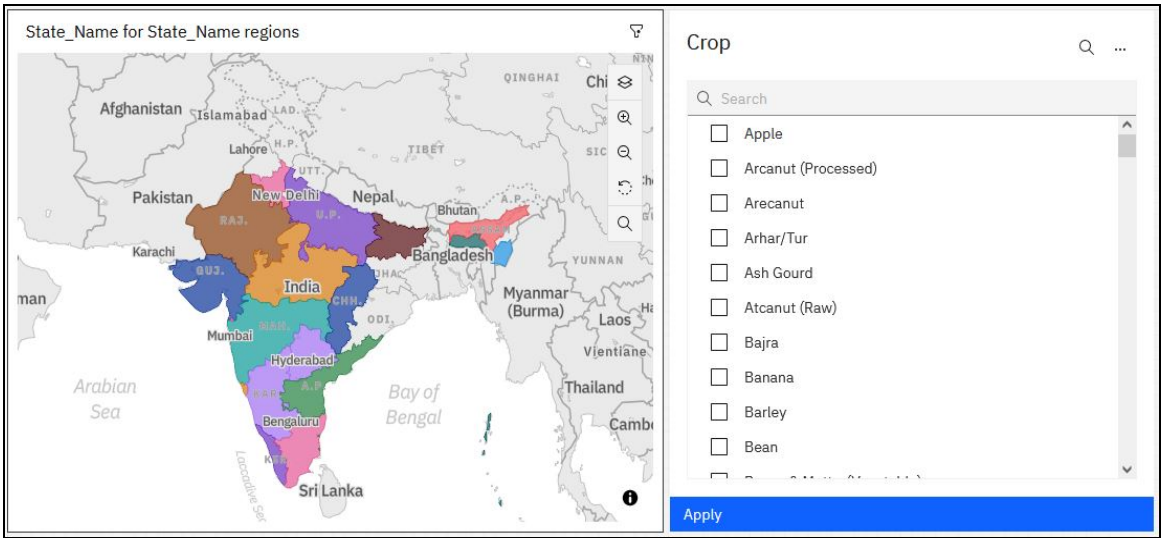
- Average production for was highest in the year 2011



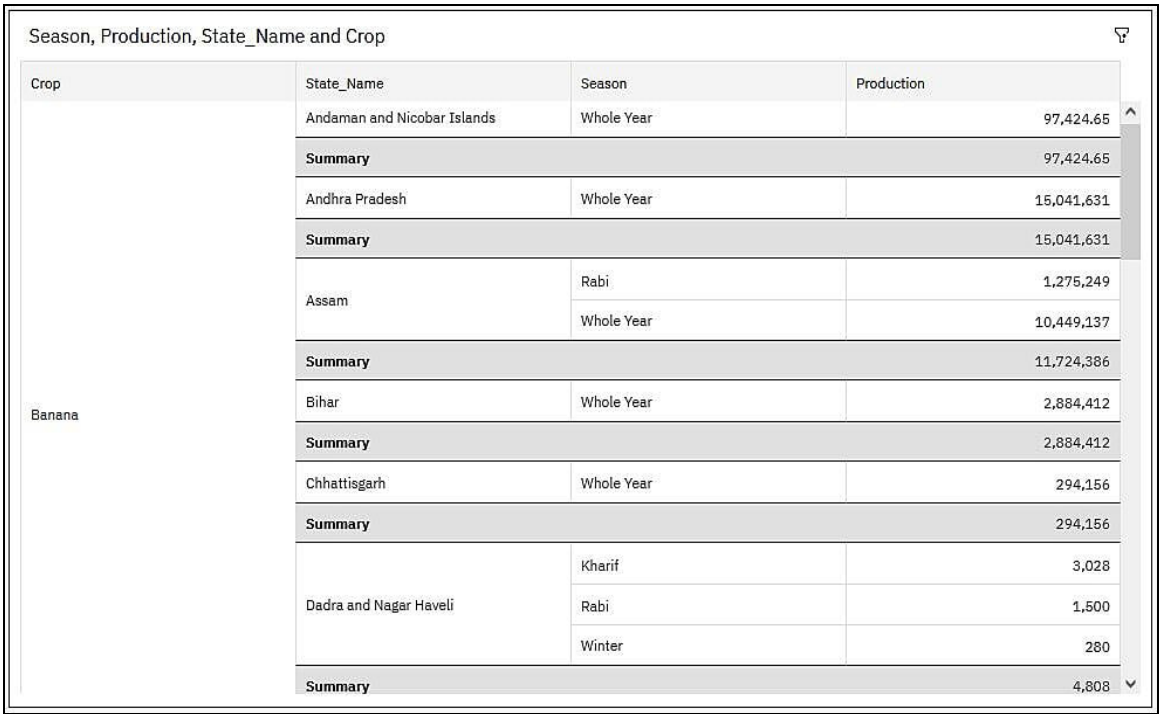
- Top 10 state based on average area of production looks like below



- Details of Crops grown according to State wise distribution can be seen (here reference crop is taken as “Banana”)



- Summarized details of Crop grown state wise and season wise (here again the reference crop is taken as “Banana”)



Season, Production, State_Name and Crop

Crop	State_Name	Season	Production
Banana	Andaman and Nicobar Islands	Whole Year	97,424.65
	Summary		97,424.65
	Andhra Pradesh	Whole Year	15,041,631
	Summary		15,041,631
	Assam	Rabi	1,275,249
		Whole Year	10,449,137
	Summary		11,724,386
	Bihar	Whole Year	2,884,412
	Summary		2,884,412
	Chhattisgarh	Whole Year	294,156
	Summary		294,156
	Dadra and Nagar Haveli	Kharif	3,028
		Rabi	1,500
		Winter	280
	Summary		4,808

- Full dashboard looks like

ADVANTAGES AND LIMITATIONS

6.1 *Advantages:*

1. Visualisation can help better understanding of patterns underling which will be never be possible by looking at raw data.
2. Visualisation makes sharing of information which is more meaningful and easier to understand by non-technical persons also.
3. Comparing and finding relations in data is easy by use of visualisation.
4. IBM Cognos Analytics makes dynamic visualisation which helps modifying them quite easy which adds to more meaningful and better interpretation with adding much efforts to user.

6.2 *Disadvantages:*

1. If proper form and /or scale in Visualisation is not selected the data can be totally mis-interpreted.
2. Different people may interpret same visualisation differently according to level/understanding.

APPLICATION

These visualisations help in understanding the agriculture and its patterns in India. Which crops are grown according to season and geographic region can be easily be understood. How various states have contributed in form of agriculture produce in monetary term and their comparison become easy.

FUTURE SCOPE

The visualisation is based on data that is available from 1997 to 2015. If we include contemporary data these interpretations may change.

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