Project Report

Topic	: Agriculture Data Analytics In Crop Yield Estimation Using IBM Cognos
Category	: Data Analytics
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1. INTRODUCTION

Agriculture is important for human survival because it serves the basic need. A well-known fact that the majority of population (≥55%) in India is into agriculture. Due to variations in climatic conditions, there exist bottlenecks for increasing the crop production in India. It has become challenging task to achieve desired targets in Agri based crop yield. Factors like climate, geographical conditions, economic and political conditions are to be considered which have direct impact on the production, productivity of the crops. Crop yield prediction is one of the important factors in agriculture practices. Farmers need information regarding crop yield before sowing seeds in their fields to achieve enhanced crop yield. The use of technology in agriculture has increased in recent year and data analytics is one such trend that has penetrated into the agriculture field being used for management of crop yield and monitoring crop health. The recent trends in the domain of agriculture have made the people to understand the significance of Big data. The main challenge using big data in agriculture is identification of impact and effectiveness of big data analytics. Efforts are going on to understand how big data analytics can be used to improve the productivity in agricultural practices. The analysis of data related to agriculture helps in crop yield prediction, crop health monitoring and other such related activities. In literature, there exist several studies related to the use of data analytics in the agriculture domain. The present study gives insights on various data analytics methods applied to crop yield prediction. The work also signifies the important lacunae points' in the proposed area of research.

1.1. Overview

Crop production in India is one of the important sources of income and India is one of the top countries to produce crops. As per this project we will be analyzing some important visualization, creating a dashboard and

by going through these we will get most of the insights of crop production in India.

1.2. Objective

The main objective of this project is visualize data pertaining to crop production in India on a dashboard containing plot

2. PROBLEM IDENTIFICATION

2.1. Present Problem

Although the statistics on crop production in India is available, this voluminous data is not used meaningfully to market the agricultural produce.

2.2. Proposed Solution

A graphical representation of which can depict the agricultural produce of the nation.

3. PROJECT FLOW

Users create multiple analysis graphs/charts.

Using the analyzed chart creation of Dashboard is done.

Saving and Visualizing the final dashboard in the IBM Cognos Analytics.

To accomplish this, we have to complete all the activities and tasks listed below

- IBM Cloud Account
- Login to Cognos Analytics

- Working with the Dataset
    - Understand the Dataset
    - Loading the Dataset
- Data visualization charts
    - Seasons with average productions
    - With years usage of Area and Production
    - Top 10 States with most area
    - State with crop production
    - States with the crop production along with season (Text Table)
- Dashboard Creation
- Export the Analytics

IBM Account was created and logged-in through

Link: https://cloud.ibm.com/registration

Create Cognos Analytics Account.

Link: IBM Cognos Account Creation

Understand The Dataset

This project is based on a understanding the crop production of India .Download the dataset from the below link. It has 2,46,092 data points

(rows) and 6 features (columns) describing each crop production related details.

Dataset Link :Dataset

Let's understand the data we're working with and give a brief overview of what each feature represents or should represent

1. State Name - All the Indian State names.

2. District Name -Different District names.

3. Crop Year- contains the crop years.

4. Season – Different seasons for crop production.

5. Area- Total number of areas covered.

6. Production- production of crops.

3.1. Loading The Dataset

Before you can build a view and analyze your data, you must first connect the data to IBM Cognos. Cognos supports connecting to a wide variety of data, stored in a variety of places.

The data might be stored on your computer in a spreadsheet or a text file, or in a big data, relational, or cube (multidimensional) database on a server in your enterprise.

In our case, we will be using a spreadsheet or text file for making our analysis. Click on the link for understanding the connection of dataset in Cognos.

Link :Connection of Dataset

Before plotting the different graphs and charts in Cognos watch a brief

explanation video of the Cognos Interface.
Link : Cognos Analytics Basics

Data Visualization Charts

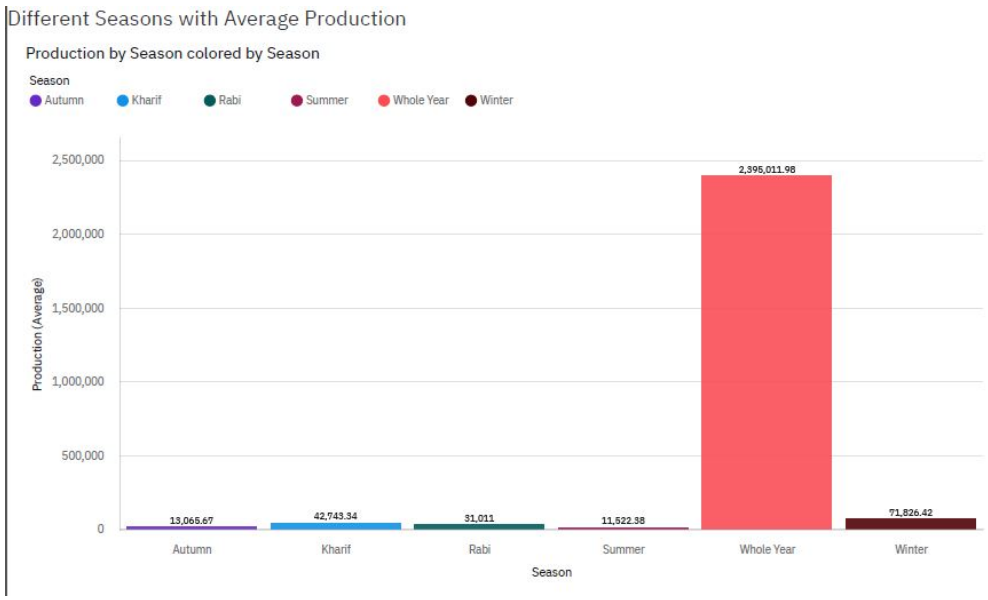
Using the Crop production in Indian dataset, we plan to create various graphs and charts to highlight the insights and visualizations.

Data visualization can be done by dragging and dropping the required chart in to the work space and the presented data can be changed as per the requirement, for example the maximum values can be replaced with the average values, the colour of the chart can be changed and so on. Many such visualizations can be created the same are discussed under.

3.2. Different Seasons with Average Production

As production of crops depends on different seasons, so let's plot the graphs to visualize the average production based on different seasons.

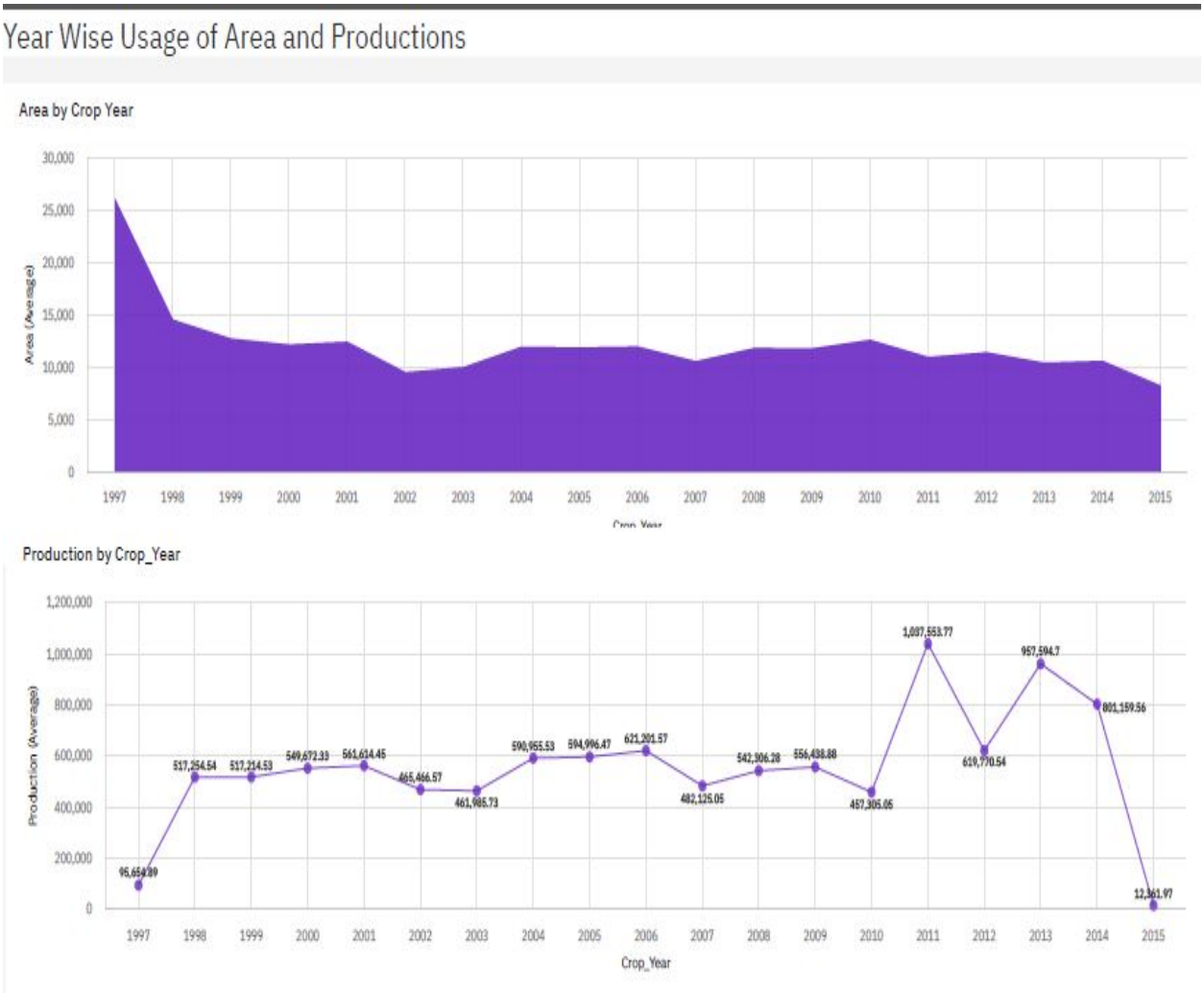
The plot to be made is selected from visualize menu and the axis of the chart is also selected. The extent of the axis can also be changed.



3.3. With Years Usage Of Area And Production

In our dataset we also have a year's columns by which we will plot a line and area graphs to see the change in these both data with respect to increase in years.

The plot to be made is selected from visualize menu and the axis of the chart is also selected. The extent of the axis can also be changed. Now year wise data for area of production can be visualised in the workspace. Similarly year wise chart for production can also be created.



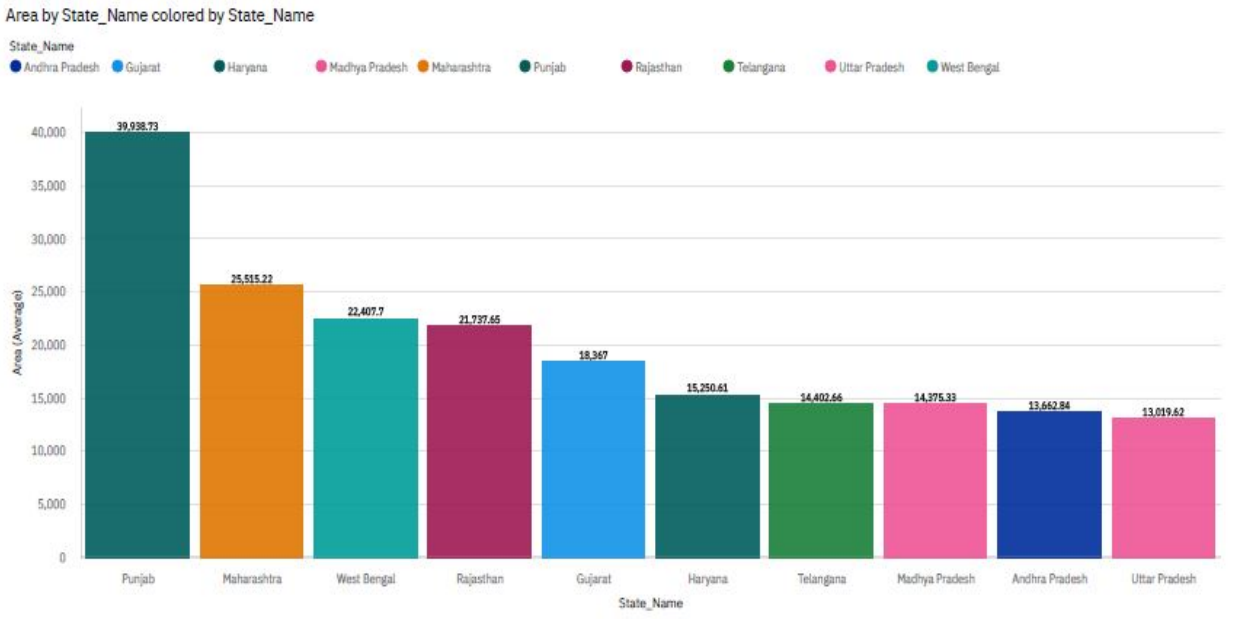
3.4. Top 10 States With Most Area

As we have an area data in our dataset, we will be plotting some graphs to visualize the top 10 Indian states with the most area.

To create an illustration on the top 10 states with most area, a template is to chosen and renamed accordingly. The type of graph, preferably column chart is selected, the chart is resized and the correct metric (sum/average) is opted.

The data for all states will be visible, which is changed by selecting top from the top or bottom option from area menu and number of states can be opted, in our case it is 10.

The colour and representation of the illustration can e changed as per our requirement.

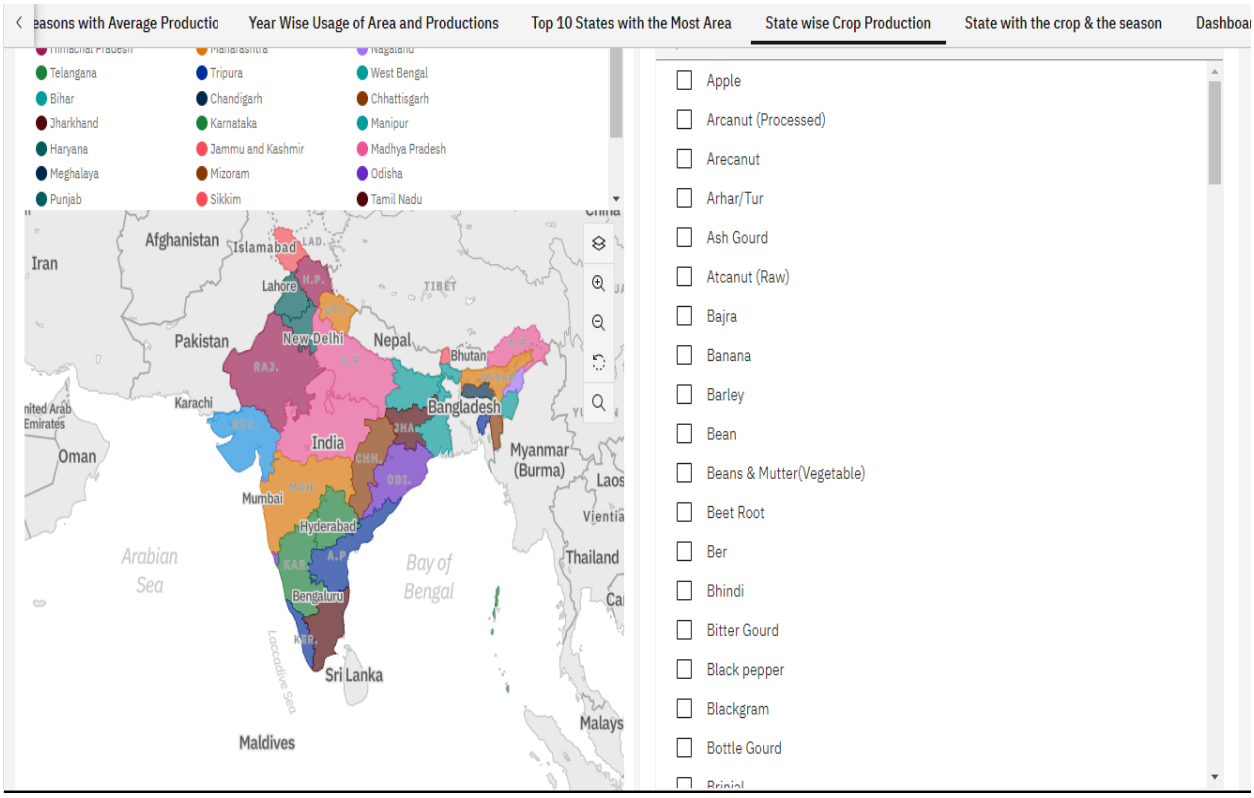


3.5. State With Crop Production

There are so many different crops produced in Indian and most of us don't know which crop is belongs to which state so we will be plotting and highlight the states in map according to different crops.

To create this graphic a new template is renamed and the map visualization is opted, from the data, state name as selected , now the states in India will be visible, which can be colored to our requirement.

From the data 'crop' is dragged and dropped on the filter. From the filter if the name of the crop is selected, the states producing that crop will appear on the screen.

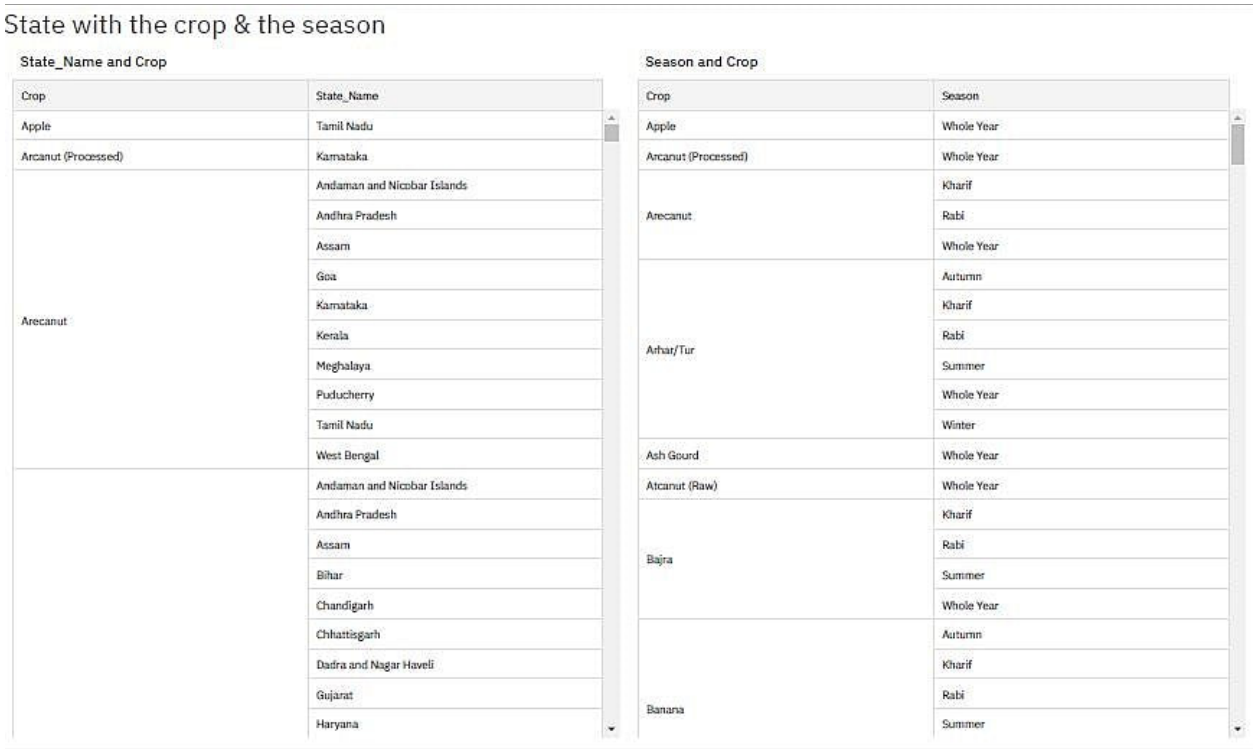


3.6. States With The Crop Production Along With Season (Text Table)

Taking forward the previous plot we will be fetching the state name and showing it in a text table whenever different crops are chosen

This illustration is an extension of the previous graphic, which will show the state wise crop production in tabular form. For which a table is dropped in to the template and state name, crop and seasons has to dragged and dropped from the data.

The same filter as applied to the previous graphic is applied for this illustration also. Now the table will show states with the crop production with seasons.


State with the crop & the season

State_Name and Crop

Crop	State_Name
Apple	Tamil Nadu
Arcanut (Processed)	Karnataka
Arecanut	Andaman and Nicobar Islands
	Andhra Pradesh
	Assam
	Goa
	Karnataka
	Kerala
	Meghalaya
	Puducherry
	Tamil Nadu
	West Bengal
	Andaman and Nicobar Islands
	Andhra Pradesh
	Assam
	Bihar
	Chandigarh
	Chhattisgarh
	Dadra and Nagar Haveli
	Gujarat
	Haryana

Season and Crop

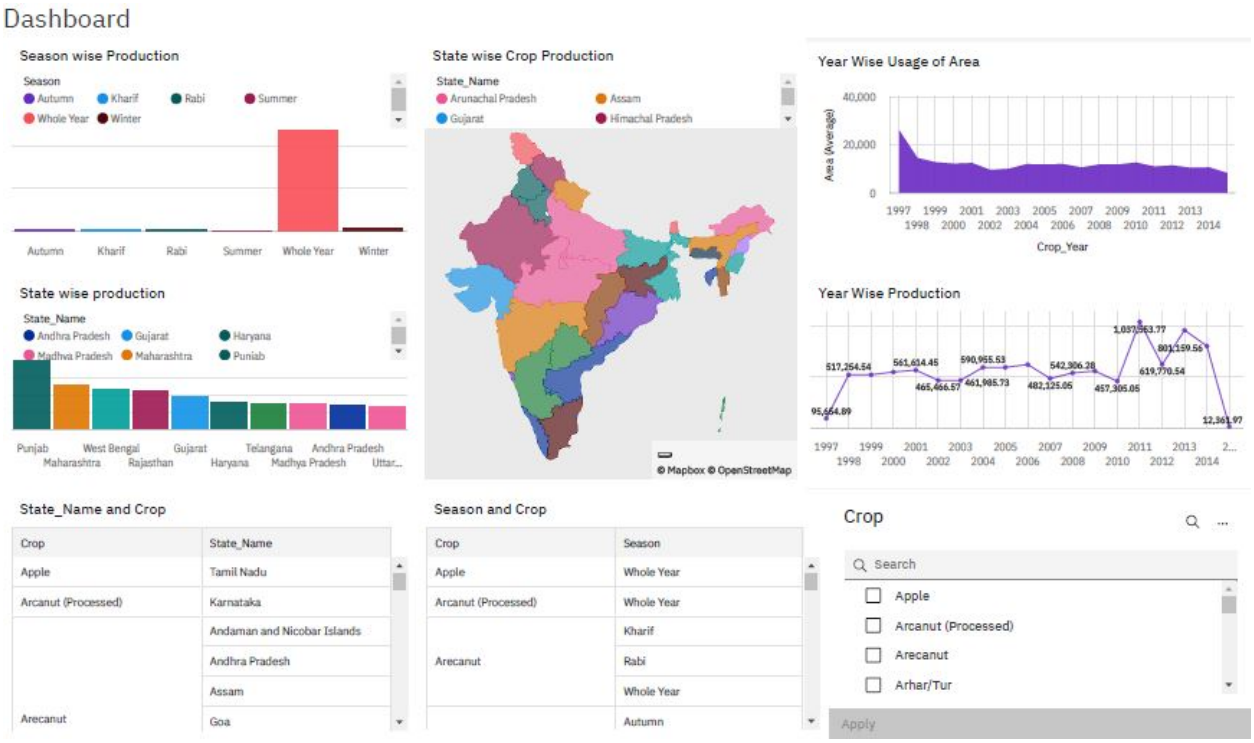
Crop	Season
Apple	Whole Year
Arcanut (Processed)	Whole Year
Arecanut	Kharif
	Rabi
	Whole Year
Arhar/Tur	Autumn
	Kharif
	Rabi
	Summer
	Whole Year
	Winter
Ash Gourd	Whole Year
Atcanut (Raw)	Whole Year
Bajra	Kharif
	Rabi
	Summer
	Whole Year
Banana	Autumn
	Kharif
	Rabi
	Summer

3.7. Creating The Dashboard

Once you've created views on different tabs in Cognos analytics, you can pull them into a dashboard.

To create the dash board a new template is created and all the visualization already created are dropped in to the new template from the tabs above and are rearranged for better presentation.

Any change in the control variable will immediately be applied on the dash board. The dashboard can now be renamed.



3.8. Export The Analytics

Finally, it's to share your work either through email/link/pdf to showcase your works to others.

After completion of the dashboard the same can be shared as email/link to users with IBM account and to any user in PDF format after exporting it to a device.

4. PROS AND CONS

Clearly this data analytics system has more advantages than disadvantages. The disadvantages are just scope for improvement wich are given as suggestions.

4.1.Advantages

- The visualizations are extremely clear and easy to use.
- They are very used friendly

4.2.Suggestions

- The visualizations can be made dynamic with alarms set at critical points.
- While selecting a column an option for sum/average may be introduced instead of changing it from default metric.
- A portion of this application may be made open source.

5. APPLICATIONS

This application can find its place all the fields. As each and every field is represented by data in some form or the other. There cannot be a place where this cannot be applied.

6. CONCLUSION

A dashboard containing viual representation of data in meaningful format is created using IBM Cognos Analystics.

This helps people to understand the data better and make an informed decision while planting different crops.

7. REFERENCES

[1] https://www.youtube.com/channel/UC4pNhG_U0RMWxP31wwz7zBA