ESTIMATE THE CROP YIELD USING DATA ANALYTICS

1. INTRODUCTION:

Weather plays an important role in agriculture production. Thus there is no aspect of crop culture that is immune to impact of weather. Weather factor contribute to optimal crop growth, development and yield. For rainfall variability needs to be expressed in terms of percentage so that minimum assured rainfall amounts at a certain level of probability. For optimal productivity at a given location crops must be such that their weather requirements match the temporal match of relevant weather elements.. In India, majority of thepopulation i.e., above 55% is dependent on agriculture as per the recent information. Agriculture is the fieldthat enables the farmers to grow ideal crops in accordance with the environmental balance. In India, wheatand rice are the major grown crops along with sugarcane, potatoes, oil seeds etc. Farmers also grow non-fooditems like rubber, cotton, jute etc. More than 70% of the household in the rural area depend on agriculture.. In the farm output, India ranks second considering the world wide scenario.. The estimation of production of crop helps these companies in planning supply chain decision like production scheduling. The industries such as fertilizers, seed, agrochemicals and agricultural machinery plan production and activities like marketing based on the estimates of crop yield . Farmers experience was the only way for prediction of crop yield in the past days. Technology penetration into agriculture field has led to automation of the activities

like yield estimation, crop health monitoring etc. Crop yield prediction has generated a lot interest in the research community and also This is helpful to government in framing policies related to crops such as crop insurance policies, supply chain operation policies. .Agriculture sector is struggling to increase the productivity of crop in India. Monsoon rainfall is the main source of water for more than 60 percent of the crops

1.1 Project Overview:

Agriculture, since its invention and inception, be the prime and pre-eminent activity of every culture and civilization throughout the history of mankind. It is not only an enormous aspect of the growing economy, but it's essential for us to survive. It's also a crucial sector for Indian economy and also human future. It also contributes an outsized portion of employment. Because the time passes the requirement for production has been increased exponentially. So as to produce in mass quantity people are using technology in an exceedingly wrong way. New sorts of hybrid varieties are produced day by day. However, these varieties don't provide the essential contents as naturally produced crop. These unnatural techniques spoil the soil. It all ends up in further environmental harm. Most of these unnatural techniques are wont to avoid losses. Most devices nowadays are facilitated by models being analysed before deployment. The main concept is to increase the throughput of the agriculture sector with the Machine Learning models. Another factor that also affects the prediction is the amount of knowledge that's being given within the training period, as the number of parameters was higher comparatively.

1.2 Purpose:

Data mining is the computing process of discovering patterns in large data sets involving methods at the intersection of machine learning, statistics, and database systems. It is an interdisciplinary subfield of computer science. The overall goal of the data mining process is to extract information from a data set and transform it into an understandable structure for further use. Data mining is the analysis step of the "knowledge discovery in databases" process, or KDD. Data mining (the analysis step of the "Knowledge Discovery in Databases" process, or KDD), a field at the intersection of computer science and statistics, is the process that attempts to discover patterns in large data sets. It utilizes methods at the intersection of artificial intelligence, machine learning, statistics, and systems. The overall goal of the data mining process is to extract information from a data set and transform it into an understandable structure for further.

2. LITERATURE SURVEY:

	TITTLE OF THE PAPER	AUTHORS/YEAR OF PUBLICATION	OBSERVATION
1.	Rice Crop Yield Prediction using Data Mining Techniques: An Overview	Dashain Patil,Dr. M .S, Shirdhonkar/ 2017	Discussed various data mining techniques utilized for prediction of rice crop yield for the state of Maharashtra, India. WEKA tool was applied in dataset processing
2.	Survey on Crop ield Prediction based n Agricultural Data	hivya B H, Manjula , Siva Bharathi S, adhumathi R/ 2017	esented a survey on the different gorithms applied in the assessment and ediction of crop yield iscussed about the mechanism of nowledge the discovery in Agricultural ta mining
3	A Study on Various Data Mining Techniques for Crop Yield Prediction	Yogesh Gandge, Sandhya/ 2017	Discussed various data mining techniques employed for predicting the crop yield and signifies the importance of accurate data extraction methods of big data analytics.

4.	Big Data for weed control and crop protection	F K Van Evert, S Fountas, D Jakovetic, V Crnojevic, I Travlos & C Kempenaar/ 2017	Critically discussed about the challenges faced and the profound opportunities lies in the Big Data analytics in agriculture: Outlined Big Data analytics models with numerical algorithms applied Represent the importance of reforming the mined data in the form of understandable information to the farmers.
5.	The Impact of Data Analytics in Crop Management based on Weather Conditions	Swarupa Rani A/ 2017	uzzy logic designs in optimization of the crop yield, artificial neural networks in validation studies, genetic algorithms designs in accessing the fitness of the model applied, decision trees, and support vector machines to study soil, climate conditions and water regimes related to crop growth and pest management in agriculture.
6.	A Study on Crop Yield Forecasting Using Classification Techniques	R.Sujatha, Dr.P.Isakki Devi/ 2016	Discuss the importance of comparing previous agricultural data with present to identify optimum condition favour enhanced crop yield.

2.1 Existing Problem:

The environmental factors affecting crop yields can be classified into abiotic vertebrate pests) and anthropogenic evolution. References: [1] Dhivya B H, Manjula R, Siva Bharathi S, Madhumathi R. A Survey on Crop Yield Prediction based on Agricultural Data, International Journal of Innovative Research in Science, Engineering and Technology. 2017. [2] Jharna Majumdar, Sneha Naraseeyappa, Shilpa Ankalaki. Analysis of agriculture data using datamining techniques: application of big data. Journal of Big data. 2017. and biotic constraints. Actually, these factors are more intensified with global warming which leads to climate change. Abiotic stresses adversely affect growth, productivity and trigger a series of morphological, physiological, biochemical and molecular changes in plants. The abiotic constraints include soil properties (soil components, pH, physicochemical and biological properties), and climatic stresses (drought, cold, flood, heat stress, etc.). On the other hand, biotic factors include beneficial organisms (pollinators, decomposers and natural enemies), pests (arthropods, pathogens, weeds vertebrate pests) and anthropogenic evolution.

2.2 References:

1. K.H. Anantha , Impact of best management practices on sustainable crop production and climate resilience in smallholder farming systems of South Asia,2021.
2. Kodimalar Palanivel, an approach for prediction of crop Yield using machine learning and big Data techniques,2020.
3. Subhadra Mishra, Adaptive boosting of weak regressors for forecasting of crop production considering climatic variability: An empirical assessment,2020.

4. Tanha Talaviya, Implementation of artificial intelligence in agriculture for optimisation irrigation and application of pesticides and herbicides,2020.

5. Vaishali Pandith, Performance Evaluation of Machine Learning Techniques for Mustard Crop Yield Prediction from Soil Analysis,2020.

6. F K Van Evert, S Fountas, D Jakovetic, V Crnojevic, I Travlos, C Kempenaar. Big Data for weed control and crop protection. John Wiley & Sons Ltd on behalf of European Weed Research Society, 2017.

7. Wu Fan, Chen Chong, Guo Xiaoling, Yu Hua. Prediction of crop yield using Big Data. 8th International Symposium on Computational Intelligence and Design. 2015.

8. Dakshayini Patil, M .S, Shirdhonkar. Rice Crop Yield Prediction using Data Mining Techniques: An Overview. International Journal of Advanced Research in Computer Science and Software Engineering, 2017.

9. Dhivya B H, Manjula R, Siva Bharathi S, Madhumathi R. A Survey on Crop Yield Prediction based on Agricultural Data, International Journal of Innovative Research in Science, Engineering and Technology. 2017.

10. Yield Prediction, International Conference on Electrical, Communication, Computer and Optimization Techniques, IEEE, 2017

11. R. Sujatha, P.Isakki Devi. A Study on Crop Yield Forecasting Using Classification Techniques, IEEE, 2016.

12. V. Sellam and E. Poovammal. Prediction of Crop Yield using Regression Analysis Indian journalofScienceandTechnology,2016.

13. Patricio Grassinia, Lenny G.J. van Bussel, Justin Van Warta, Joost Wolf, Lieven Claessens, d, Haishun Yanga, Hendrik Boogaarde, Hugo de Groote, Martin K. van Ittersumb, Kenneth G. Cassman. How good is good enough,Data requirements for reliable crop yield simulations and yield-gap analysis. Field Crops Research. 2015;.

14. David B. Lobell, The use of satellite data for crop yield gap analysis, Field Crops Research-143, 2013.
15. Martin K. van Ittersuma, Kenneth G. Cassmanb, Patricio Grassinib, Joost Wolfa, Pablo Tittonell, Zvi Hochmand. Yield gap analysis with local to global relevance.

2.3 Problem Statement Definition :

Agriculture is the backbone of Indian Economy. In India, majorty of the farmers are not getting the expected crop yield due to several reasons. The agricultural yield is primarily depends on weather conditions. Rainfall conditions also influences the rice cultivation. In this context, the farmers necessarily requires a timely advice to predict the future crop productivity and an analysis is to be made in order to help the farmers to maximize the crop production in their crops. People of India are practicing Agriculture for years but the results are never satisfying due to various factors that affect the crop yield. To fulfill the needs of around 1.2 billion people, it is very important to have a good yield of crop. Due to factors like soil type, precipitation, seed quality, lack of technical facilities etc the crop yield is directly influenced. Agricultural researches determine their subject of research without knowing the exact problems of farmers, thus the results of research do not have their clients. extension people do not have a good connection to the results of research that has been conducted.

3.1 Empathy Map Canvas:

Extensive personal experience is essential for estimating yields at early stages of growth. As crops near maturity, it becomes easier to estimate yields with greater accuracy. Accurate, early estimations of grain yield and crop loss are important skills in grain production.

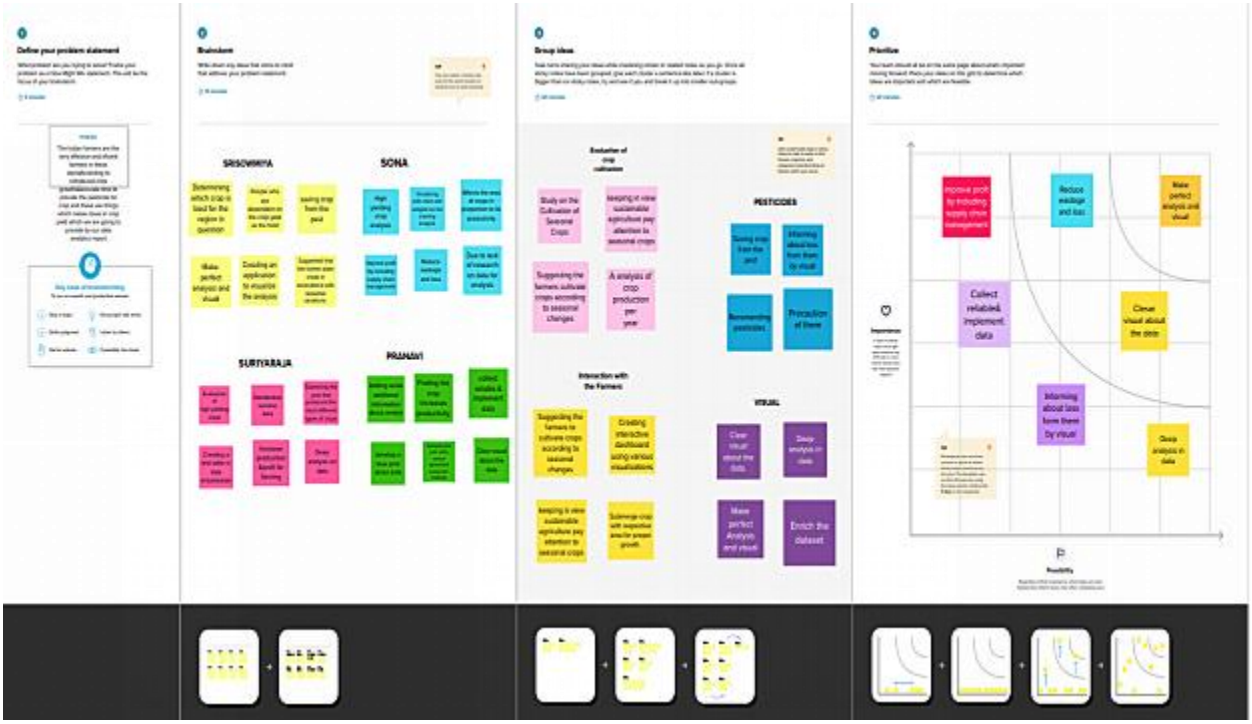
Farmers require accurate estimates for:

- crop insurance purposes
- forward marketing and delivery planning
- planning harvest and storage requirements
- cash-flow budgeting

3.2 Ideation & Brainstorming:

Brainstorming is a group creativity technique by which efforts are made to find a conclusion for a specific problem by gathering a list of ideas spontaneously contributed by its members.

In other words, brainstorming is a situation where a group of people meet to generate new ideas and solutions around a specific domain of interest by removing inhibitions.People are able to think more freely and they suggest as many spontaneous new ideas as possible.All the ideas are noted down without criticism and after the brainstorming session the ideas evaluated.



In this each 4 members in the team gave their ideas as each 4 idea and the best 4 idea's among those ideas is selected and taken as the idea to be implemented in the project.

3.3 Proposed Solution:

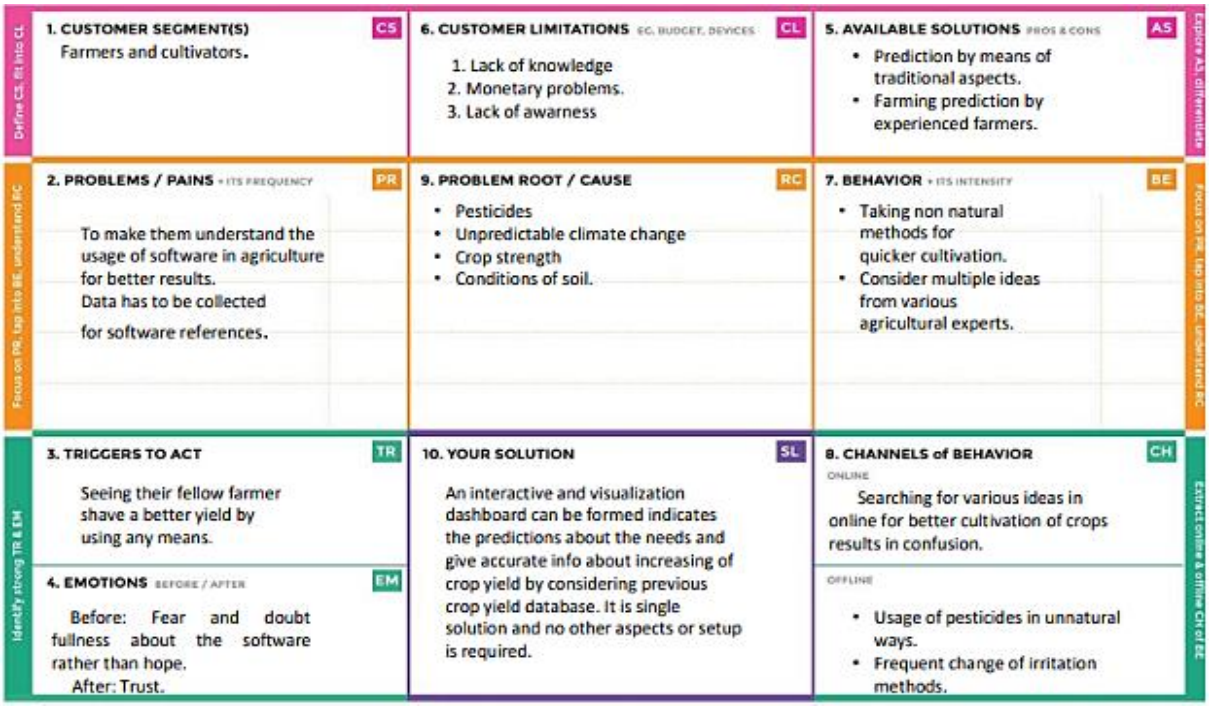
S.NO	PROBLEM	SOLUTION

1	**Problem Statement (problem to be solved)**	A farmer should predict climatic conditions, decide what to grow & when to grow,should know the overall crop yield inspite of environmental & other parameters
2	**Idea/solution description**	Data analytics are the better choices for this purpose. Different Data techniques are used and evaluated in agriculture for estimating the future year's crop production.
3	**Novelty/Uniqueness**	Improve operational efficiency and increase productivity and profitability. Draw analytical insights on expenses, inventory and crop growth

4	**Social Impact/Customer Satisfaction**	It has to be available to all the farmers who need help that can be solved from this application and it has to be simple and understandable by the end user.
5	**Business Model (Revenue Model)**	This agriculture software for field and crop monitoring are dedicated to provide professional growers, food producers and agro consultants with precise field data using data analytics.

3.4 Problem Solution fit

The Problem-Solution Fit simply means that you have found a problem with your customer and that the solution you have realized for it actually solves the customer's problem.



4 .REQUIREMENT ANALYSIS

4.1 Functional requirement

No.	Functional Requirement (Epic)	Sub Requirement (Sub-Task)
	User Registration	Registration through forms Registration through Gmail Registration through IBM Cognos
2	**User Confirmation**	Confirmation via Email Confirmation via OTP through SMS. Confirmation via

3	**User Profile**	User Details Farm Details
4	**Required Data**	The past crop yield data and data of the Farmer to analyze their yield.
5	**Analysis**	Analyze the data by means of set of past data of the multiple users which is farmers.
6	**Estimation**	Creating the perfect data module, visuals using IBM Cognos to increase the estimation of the crop yield

4.2 Non-Functional requirement:

FR No.	**Non-Functional Requirement**	**Description**

1	**Usability**	The data report is created according to the past data yield. By considering these recommendation the sowing of crops will be decided.
2	**Security**	IBM Cognos have a high-secure user information.
3	**Reliability**	The interactive data visuals of the dashboard can make easy to understand by the farmers.
4	**Performance**	Interaction makes better performance between all user and the visuals through visualization.
5	**Availability**	Actively available to all source like smart phones, laptops, systems etc.

6	**Scalability**	The flexibility to implement the proposed solution is very easy that results in increasing of the estimation of crop yield compared to farms for different user.

5. PROJECT DESIGN

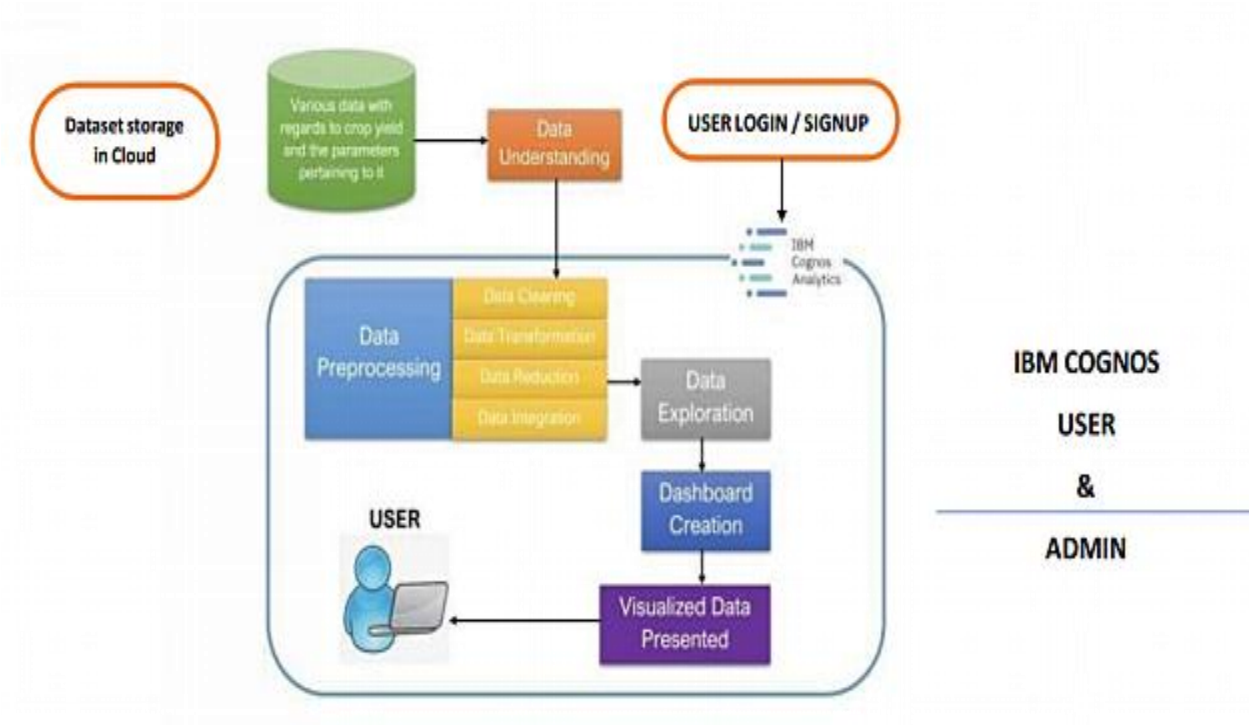
5.1 Data Flow Diagrams

A data flow diagram shows the way information flows through a process or system. It includes data inputs and outputs, data stores, and the various subprocesses the data moves through. DFDs are built using standardized symbols and notation to describe various entities and their relationships. Data flow diagrams are used to graphically represent the flow of data in a business information system. DFD describes the processes that are involved in a system to transfer data from the input to the file storage and reports generation

5.2 Solution & Technical Architecture

Technical Architecture (TA) is a form of IT architecture that is used to design computer systems. It involves the development of a technical blueprint with regard to the

arrangement, interaction, and interdependence of all elements so that system-relevant requirements



5.3 User Stories

Farmers must meet the changing needs of our planet and the expectations of regulators, consumers, and food processors and retailers. There are increasing pressures from climate change, soil erosion and biodiversity loss and from consumers' changing tastes in food and concerns about how it is produced. And the natural world that farming works with – plants, pests and diseases – continue to pose their own challenge

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user and Laptop users)	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
		USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint-1
		USN-3	As a user, I can register for the application through Face book	I can register & access the dashboard with Face book Login	Low	Sprint-2
		USN-4	As a user, I can register for the application through Gmail		Medium	Sprint-1
	Login	USN-5	As a user, I can log into the application by entering email & password		High	Sprint-1
	Dashboard	USN-6	Can use the methods provided in the dashboard		Medium	Sprint-1
	Invest	USN-7	With help of desired results obtained from application, making profit or loss	Gain or Loss	High	Sprint-2
Administrator	Updating data		Collecting the data and storing it	Checking and updating dataset	High	Sprint-1
Customer (Web User)	Accessing the resources	USN-8	Using my own credentials for accessing the data	These resources cannot be accessed by others but only me	High	Sprint-1
	Satellite Visioning	USN-9	Having a view with geographic data		Medium	Sprint-2
Customer tools	Tools	USN-10	Analysis is performed by tools like cognos analytics	Ease of accessing the tools	High	Sprint 2

6.PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

Sprint	Functional Requiremet (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint1	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	2	High	Srisowmiya, Sona

Sprint-1		USN-2	As a user, I will receive confirmation email once I have registered for the application	1	High	Pranavi, Suriyaraja
Sprint-2		USN-3	As a user, I can register for the application through Google	2	Low	Srisowmiya, Suriyaraja
Sprint-1		USN-4	As a user, I can register for the application through Gmail	2	Low	Sona, Pranavi
Sprint-1	Login	USN-5	As a user, I can log into the application by entering email & password	1	High	Srisowmiya,Pranavi
Sprint- 3	Dashboard	USN-6	As a user, I can freely use my	2	High	Sona, Pranavi

			dashboard and explore the features			
Sprint- 2		USN-7	As a user, I can use the credentials to access the resources of my application	2	High	Srisowmiya, Sona
Sprint- 3		USN-8	Performance of Data manipulations on the application	1	High	Pranavi, Suriyaraja
Sprint- 3	Visualizations	USN-9	I can create dashboards with particular datasets	2	High	Srisowmiya, Pranavi
Sprint- 4		USN-10	Predictive analysis can be done	1	High	Suriyaraja, Srisowmiya

Sprint- 3		USN-11	I can create stories with particular datasets	2	High	Pranavi, Sona
Sprint- 4		USN-12	I can deliver and export reports according to the dashboards and stories created	2	High	Pranavi, Sona

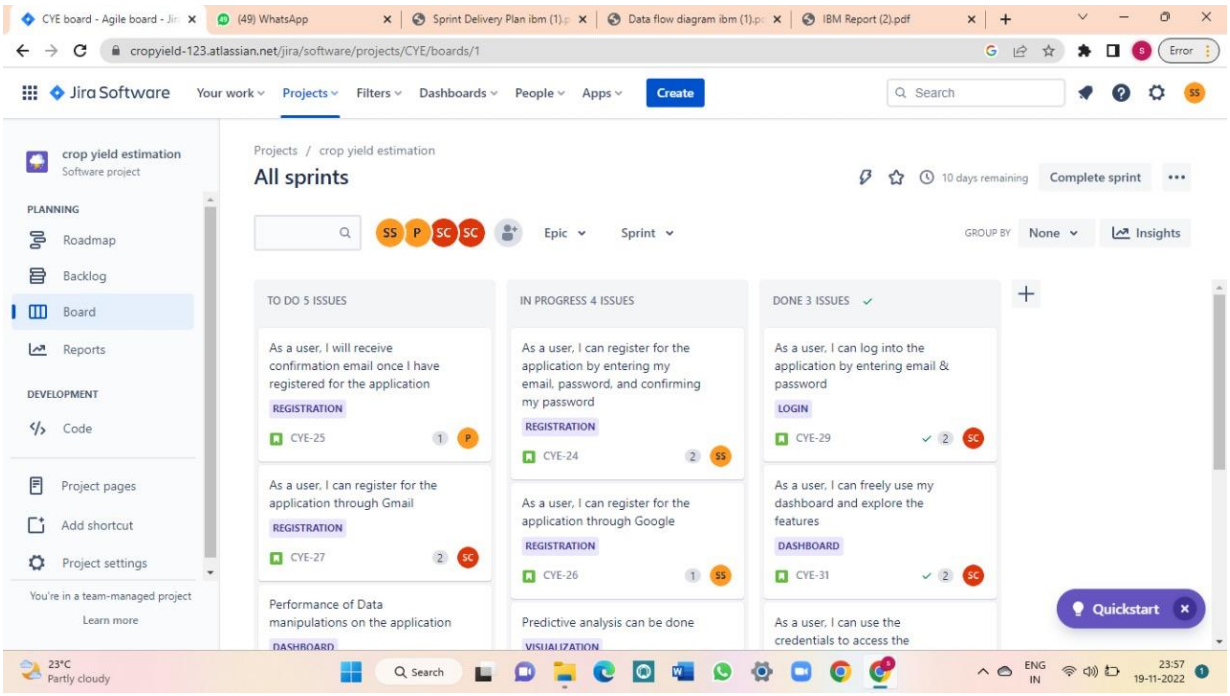
6.2 Sprint Delivery Schedule:

Sprint	**Total Story Points**	**Duration**	**Sprint Start Date**	**Sprint End Date (Planned)**	**Story Points Completed (as on Planned End Date)**	**Sprint Release Date (Actual)**

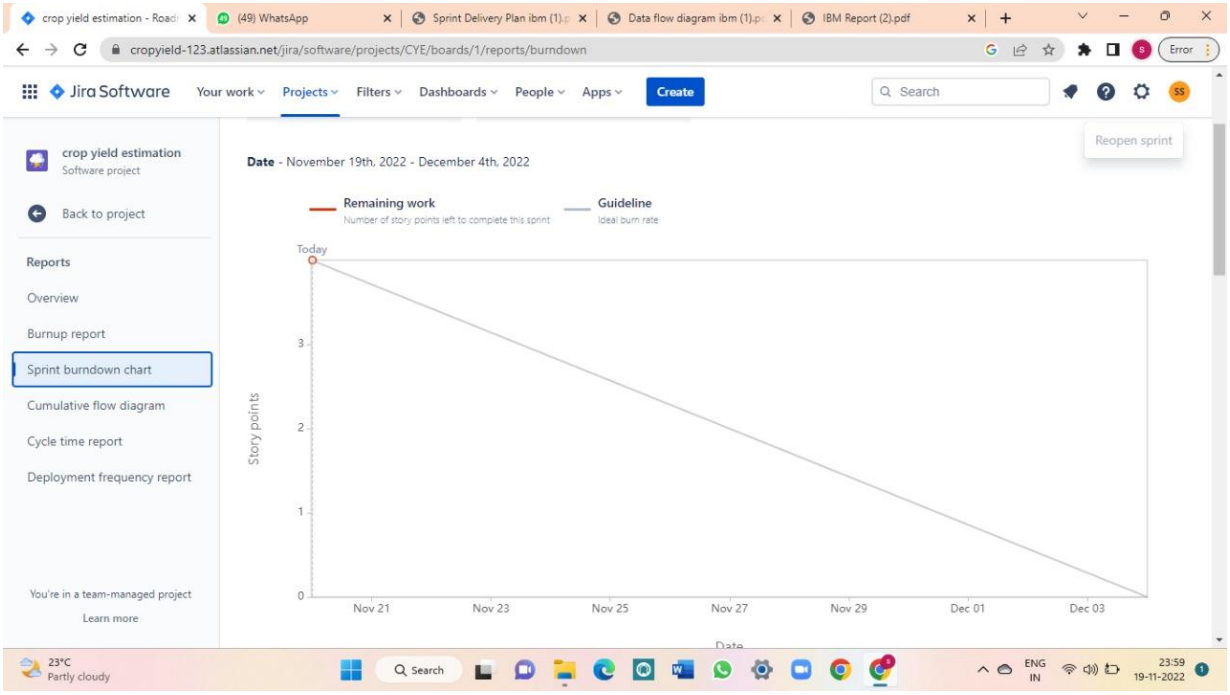
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

6.3 Report from JIRA:

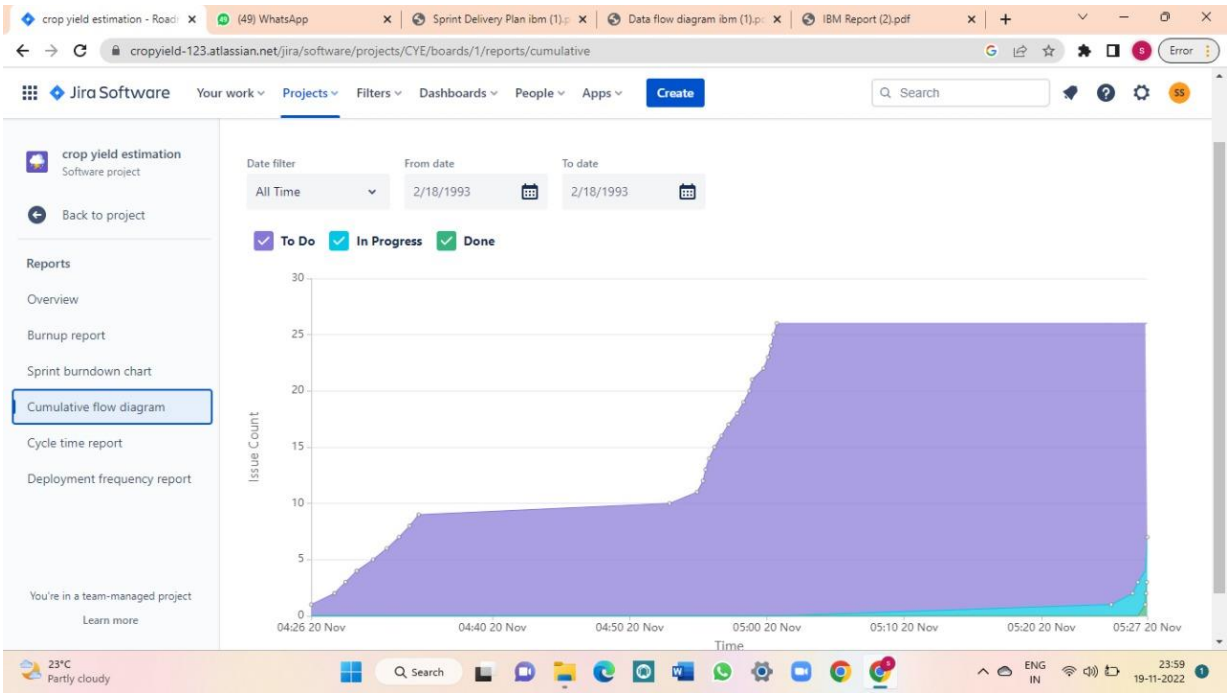
All sprints:



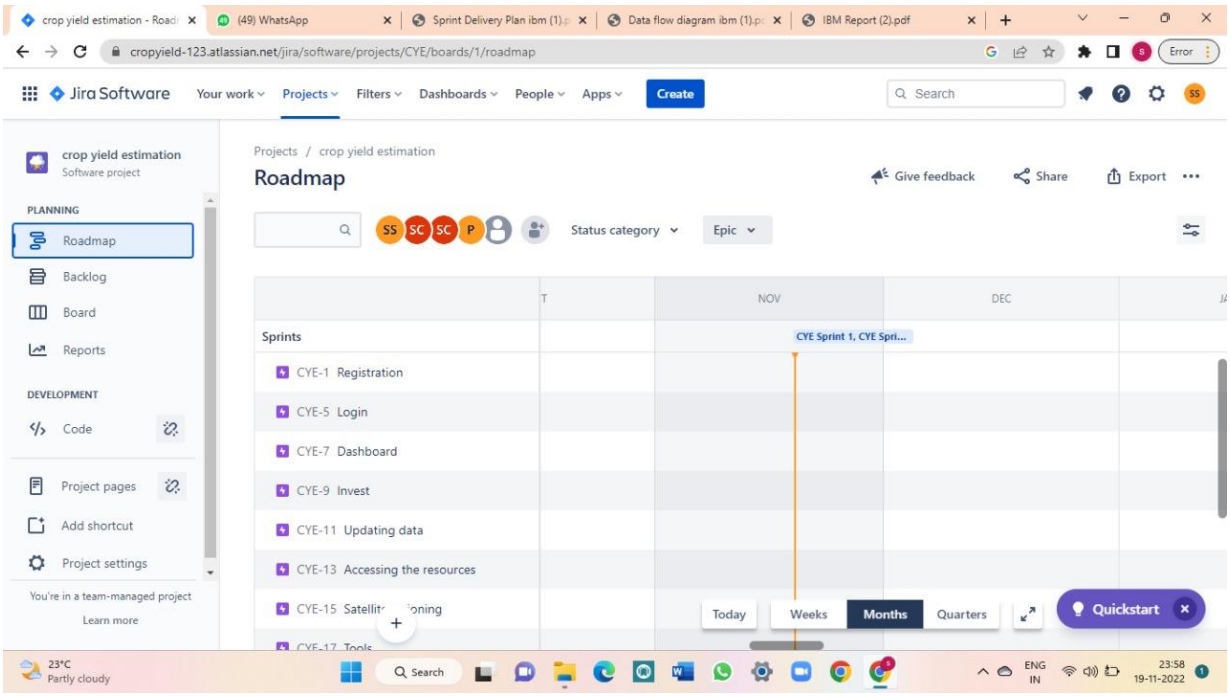
Burnup report:



Cumulative flow diagram:

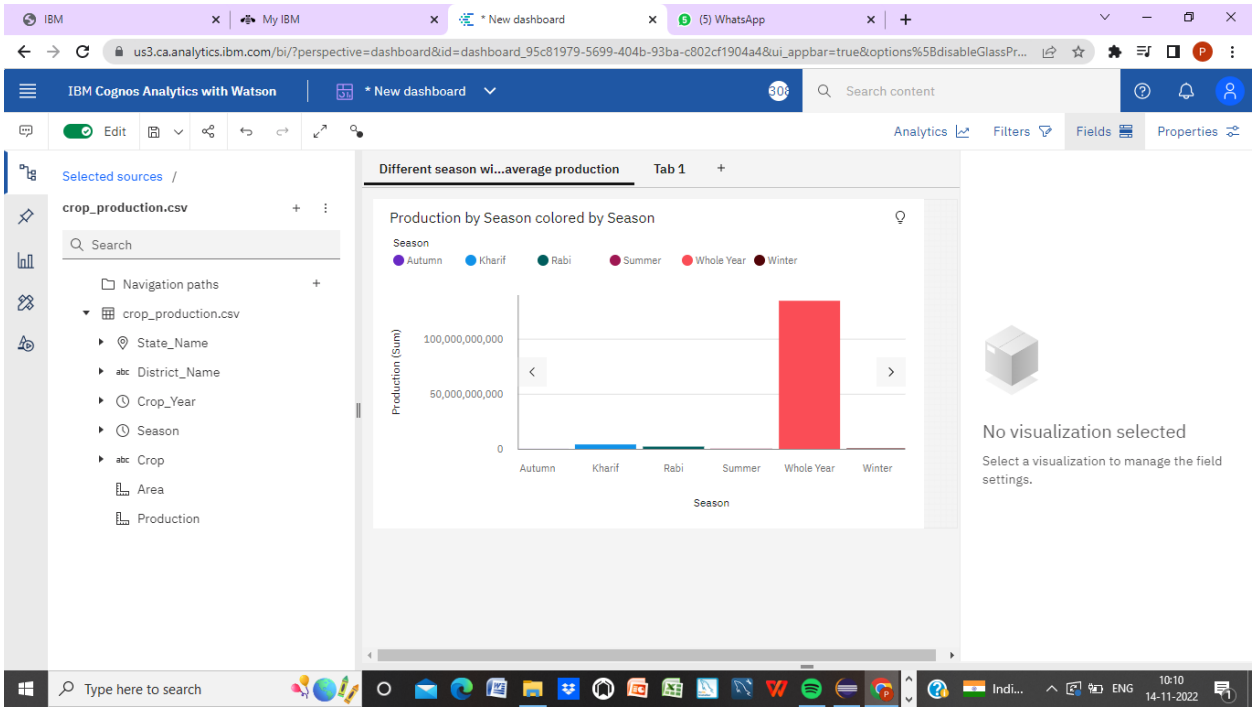


Road Map:



7.CODING & SOLUTIONING (Explain the features added in the project along with code)

7.1 Feature 1: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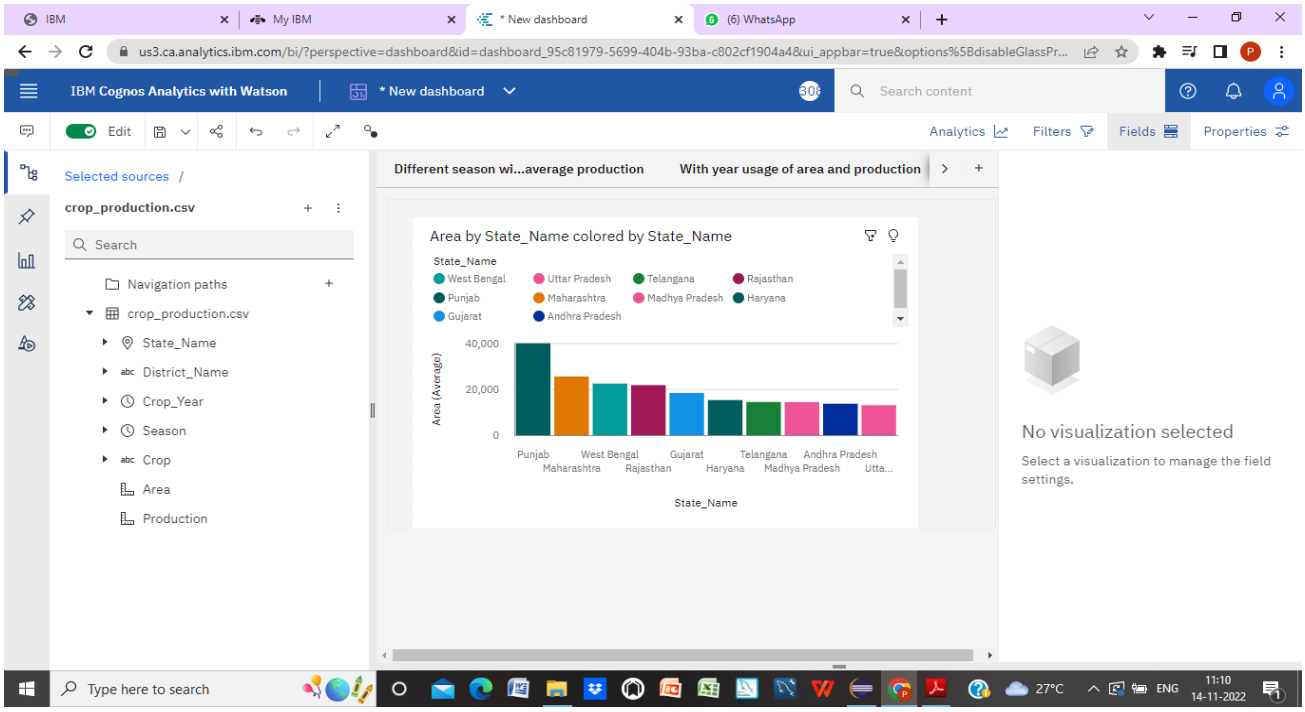
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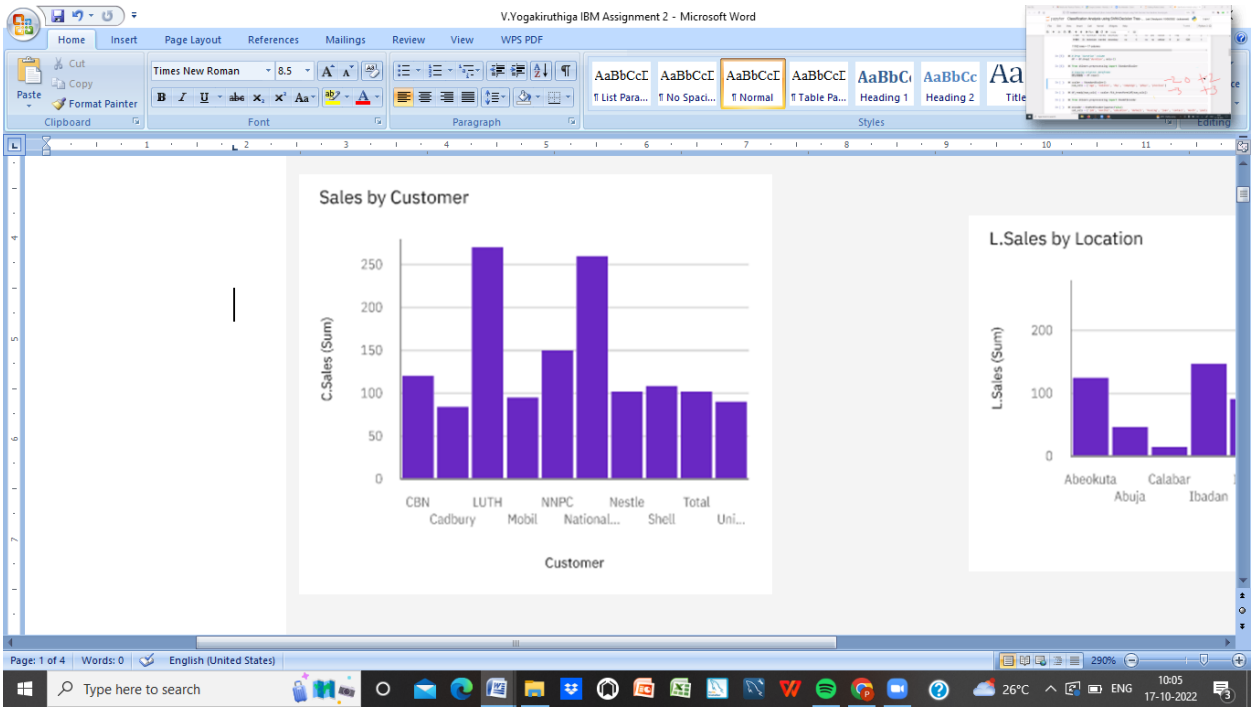
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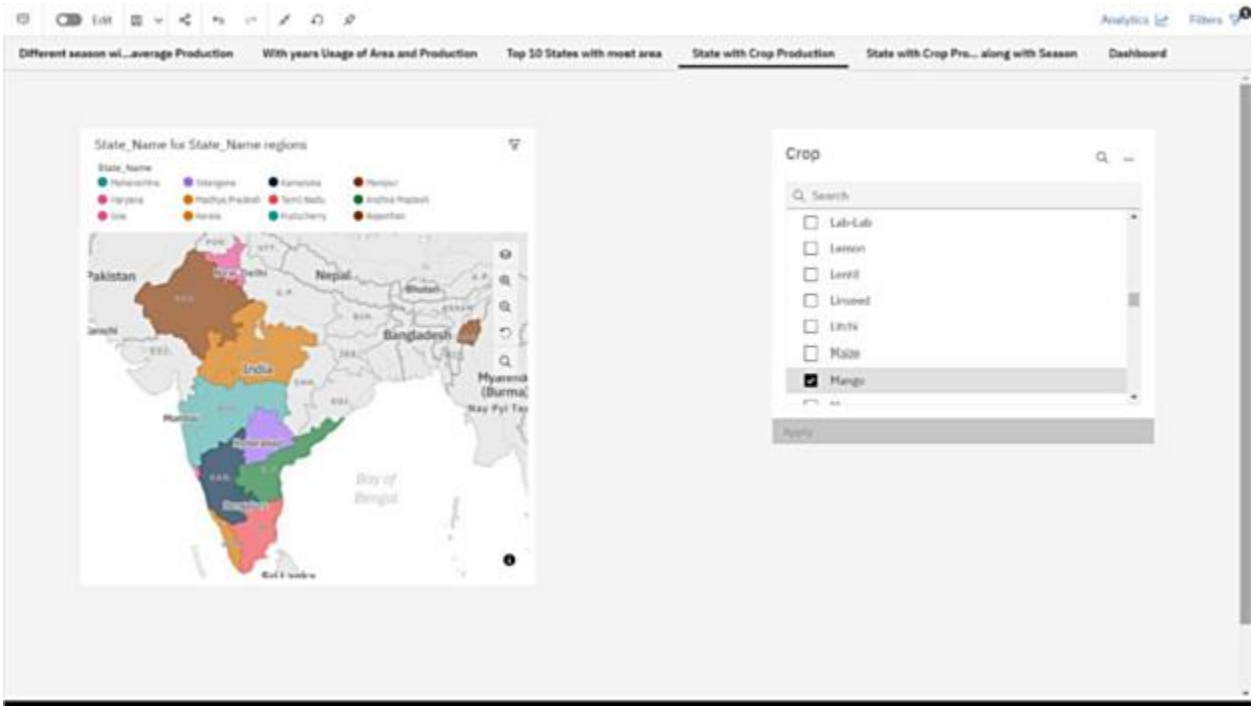
7.2.Feature 2: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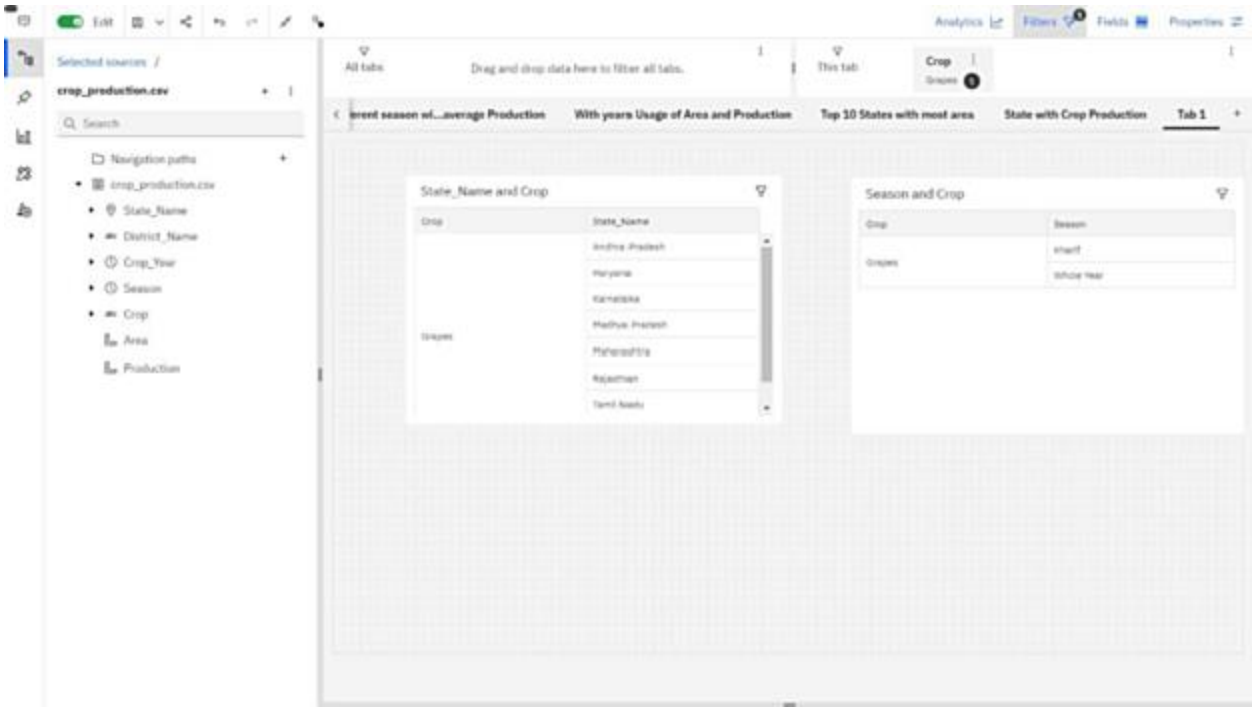
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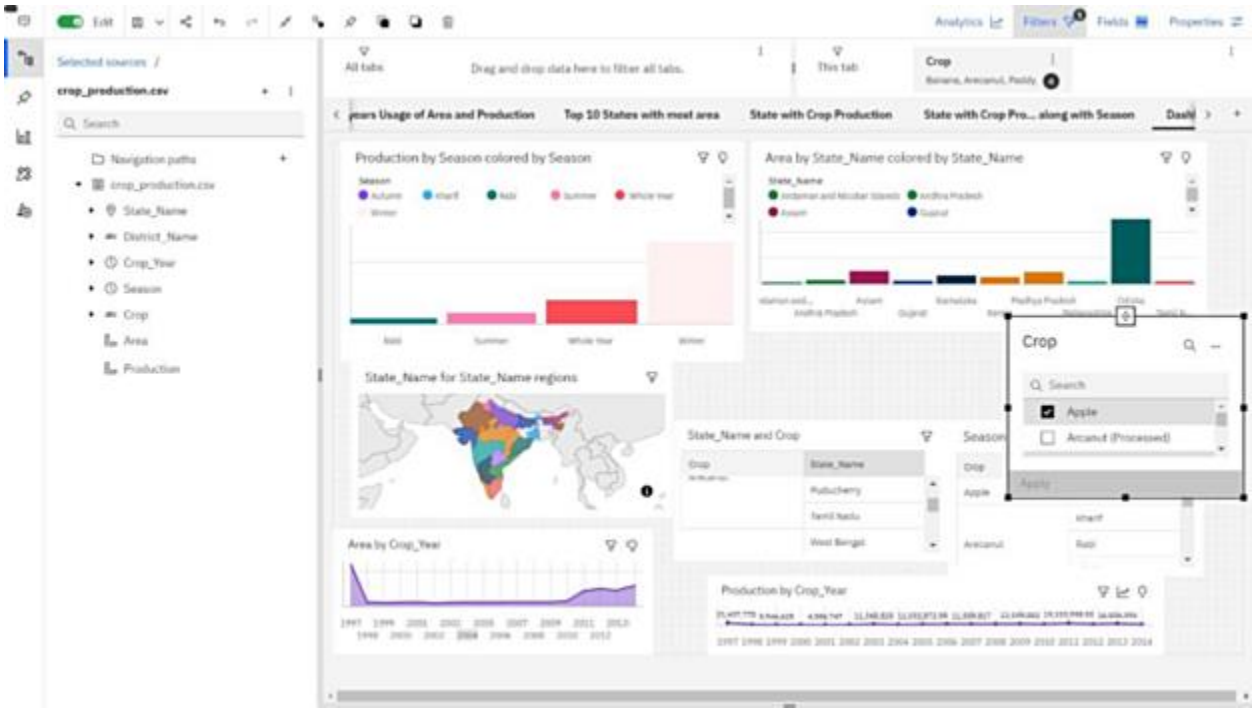
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Rabi
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Whole Year
Winter
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Assam
Gujarat
State_Name for State_Name regions
State_Name and Crop
Crop
State_Name
Puducherry
Tamil Nadu
West Bengal
Season
Crop
Apple
Arecanut
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Rabi
Crop
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Apple
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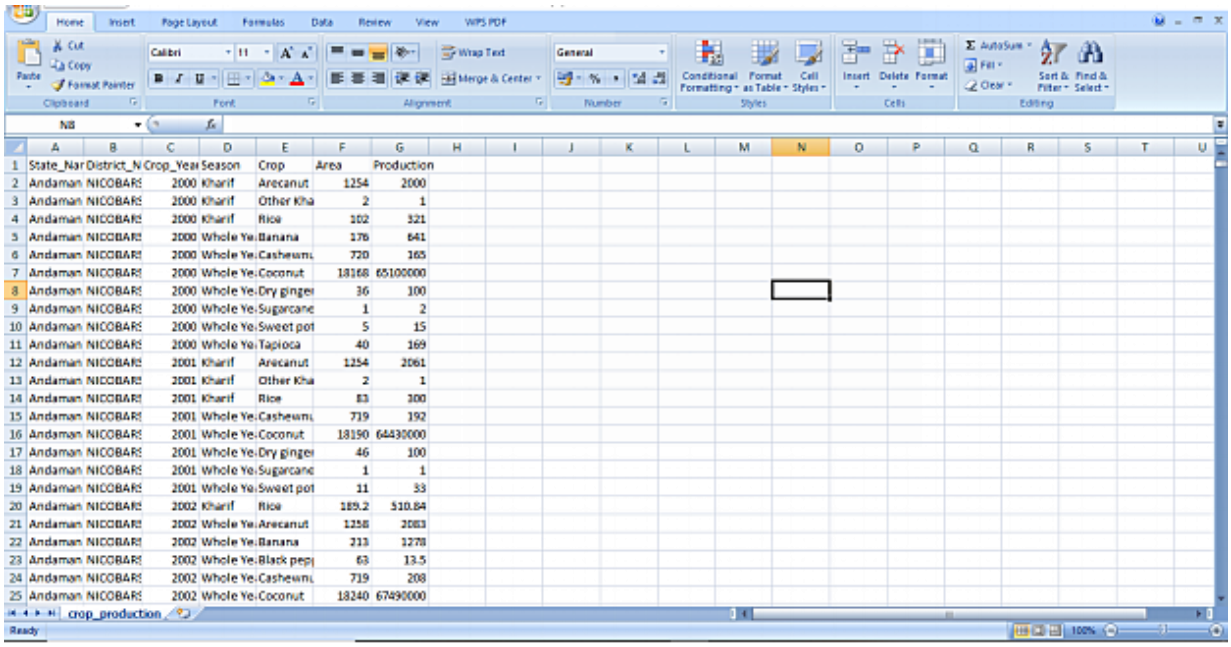
Production by Crop_Year

7.3 Database Schema



State_Nar	District_N	Crop_Year	Season	Crop	Area	Production
Andaman	NICOBARS	2000	Kharif	Arecanut	1254	2000
Andaman	NICOBARS	2000	Kharif	Other Kha	2	1
Andaman	NICOBARS	2000	Kharif	Rice	102	321
Andaman	NICOBARS	2000	Whole Ye	Banana	176	641
Andaman	NICOBARS	2000	Whole Ye	Cashewnu	720	165
Andaman	NICOBARS	2000	Whole Ye	Coconut	18168	65100000
Andaman	NICOBARS	2000	Whole Ye	Dry ginger	36	100
Andaman	NICOBARS	2000	Whole Ye	Sugarcane	1	2
Andaman	NICOBARS	2000	Whole Ye	Sweet pot	5	15
Andaman	NICOBARS	2000	Whole Ye	Tapioca	40	169
Andaman	NICOBARS	2001	Kharif	Arecanut	1254	2061
Andaman	NICOBARS	2001	Kharif	Other Kha	2	1
Andaman	NICOBARS	2001	Kharif	Rice	83	300
Andaman	NICOBARS	2001	Whole Ye	Cashewnu	719	192
Andaman	NICOBARS	2001	Whole Ye	Coconut	18190	64430000
Andaman	NICOBARS	2001	Whole Ye	Dry ginger	46	100
Andaman	NICOBARS	2001	Whole Ye	Sugarcane	1	1
Andaman	NICOBARS	2001	Whole Ye	Sweet pot	11	33
Andaman	NICOBARS	2002	Kharif	Rice	189.2	510.84
Andaman	NICOBARS	2002	Whole Ye	Arecanut	1258	2083
Andaman	NICOBARS	2002	Whole Ye	Banana	213	1278
Andaman	NICOBARS	2002	Whole Ye	Black pep	63	13.5
Andaman	NICOBARS	2002	Whole Ye	Cashewnu	719	208
Andaman	NICOBARS	2002	Whole Ye	Coconut	18240	67490000

8. WORKING WITH THE DATASET & DATA VISUALISATION

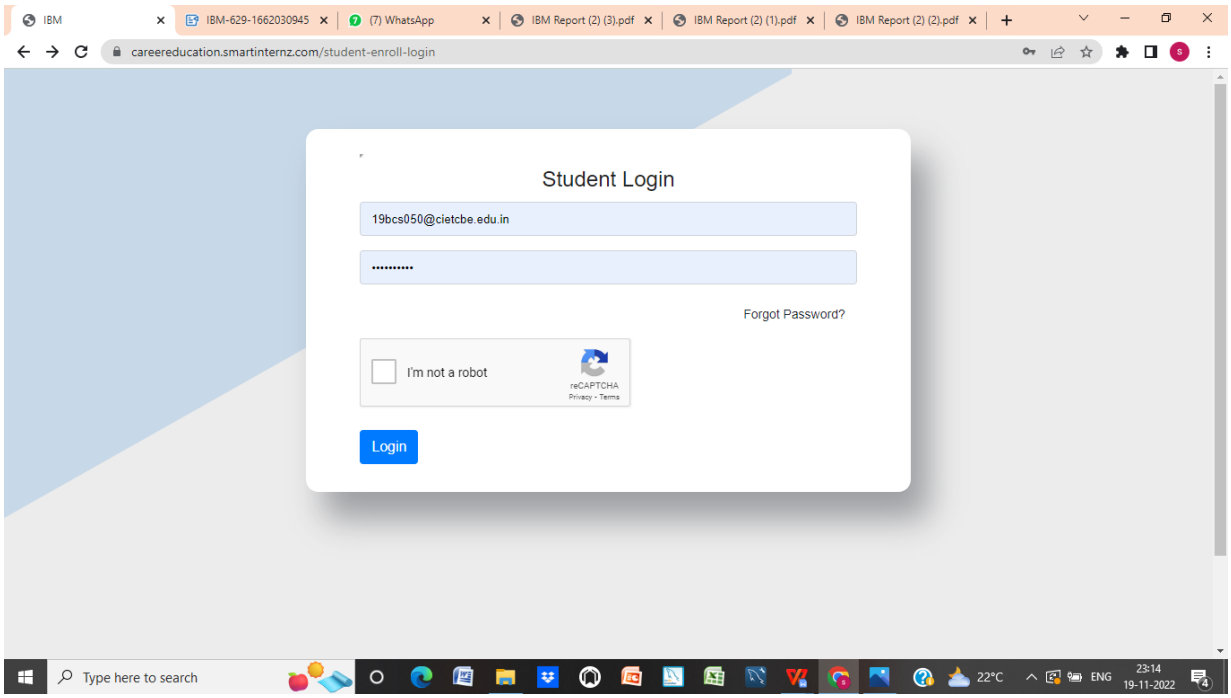
Registration:

- The registration to the IBM cogons analytics web page for the student user.
- Register with validly Email ID.
- Enter the user name and password through the register pages.
- Enter Next button.
- Enter the Additional Information through the IBM cogons analytics.
- Finally verify the Email.
- Thus the IBM cogons account is registered.

Login page:

- After complete the registration process and click login page.
- Enter the registration email ID on the login page and then click continue.

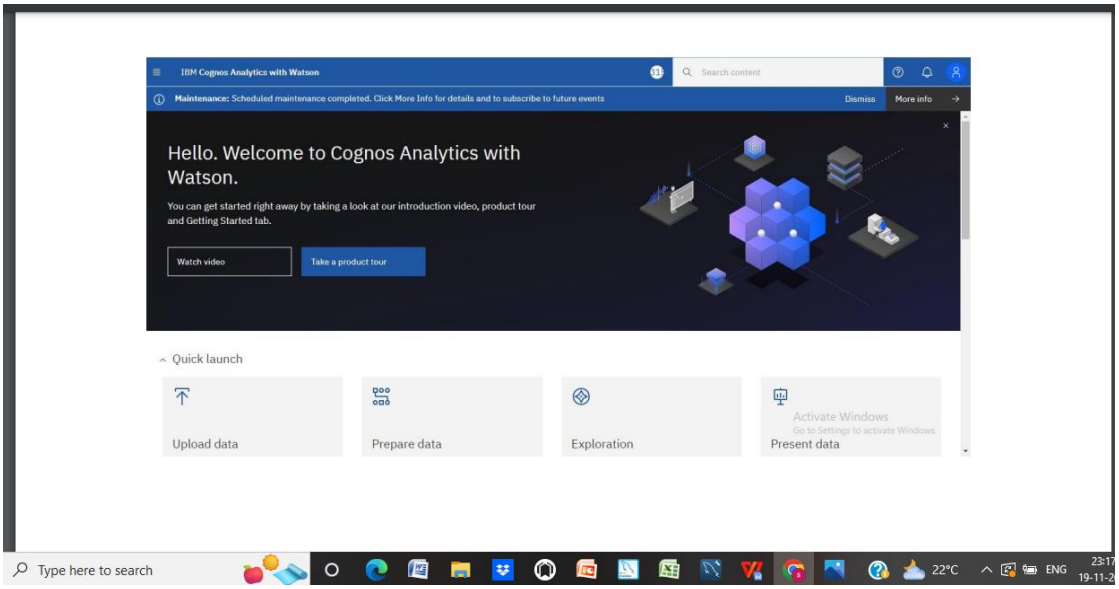
- Enter the password and click continue.



Home page:

- After complete and then click launch button.Then the particular page

will be display.



Working with 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.

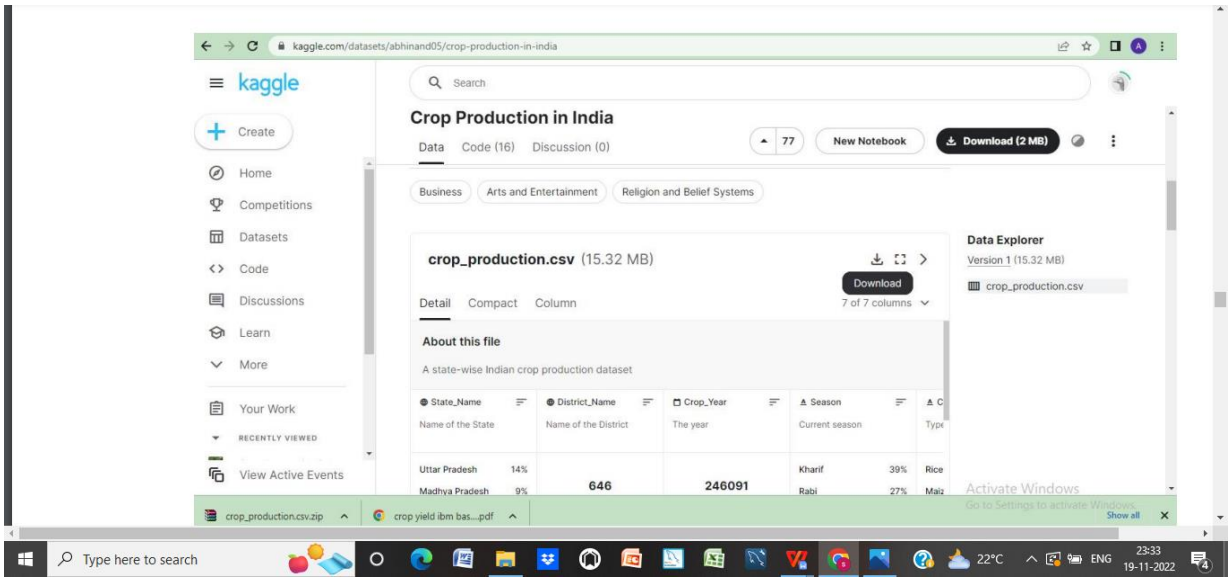
Dataset Link :Dataset

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

- State Name - All the Indian State names.
- District Name -Different District names.
- Crop Year- contains the crop years.
- Season – Different seasons for crop production.
- Area- Total number of areas covered.
- Production- production of crops.

Downloading the dataset:

- Click on the given dataset.
- Thus opens the below dataset window.
- Scroll on the bottom of the window and click on the download option provided.

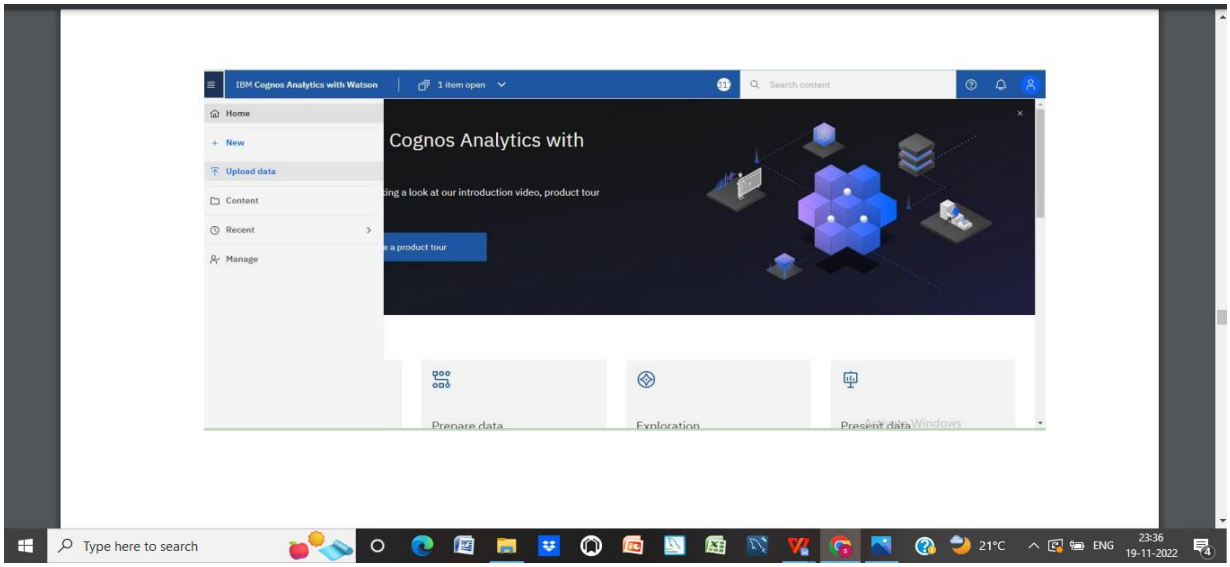


- Thus the dataset is downloaded.

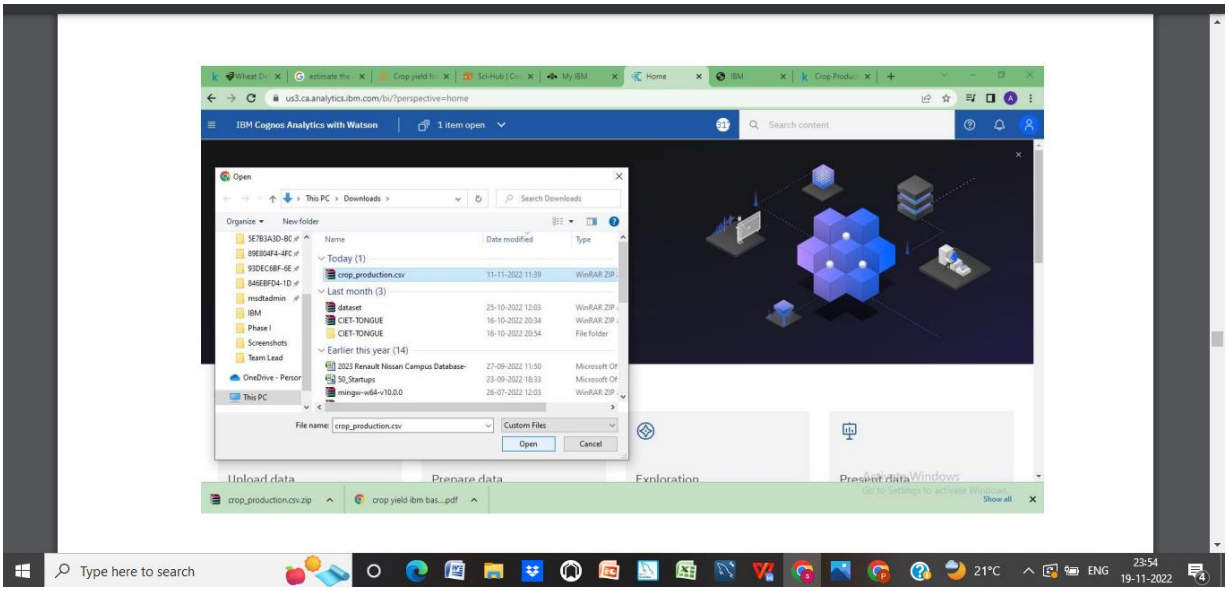
Loading the Dataset:

Before we can build a view and analyze our data, we 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 our computer in a spreadsheet or a text file, or in a big data, relational, or cube (multidimensional) database on a server in our enterprise.

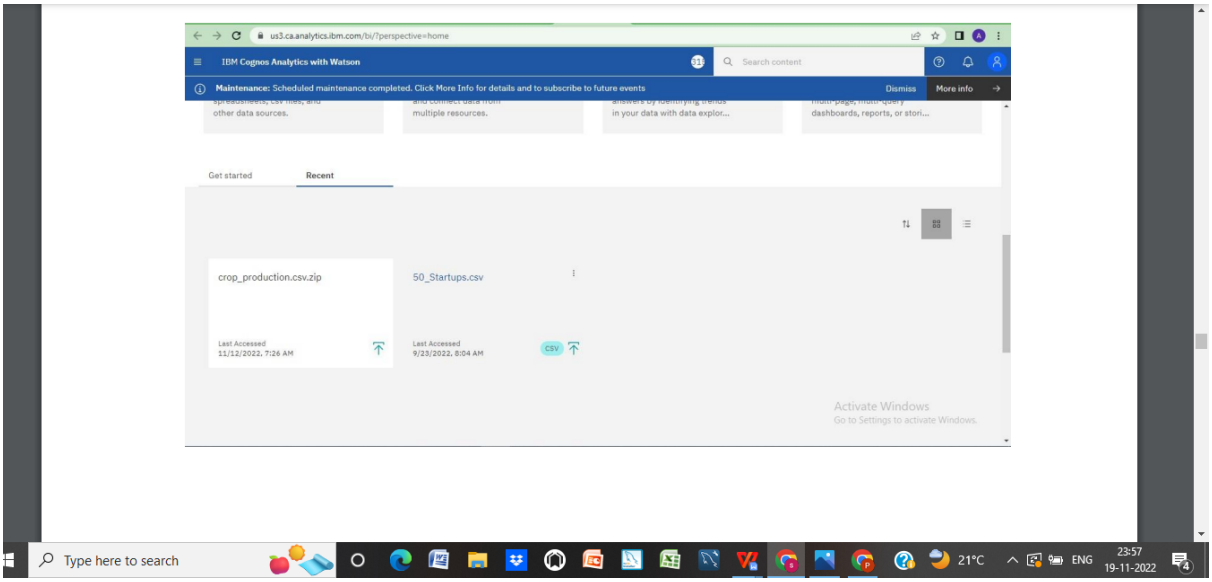
- Click on the menu icon in the left corner of the window.
- Therefore opens the menu.
- Click on the upload option from the menu.



- Upload the dataset from the file

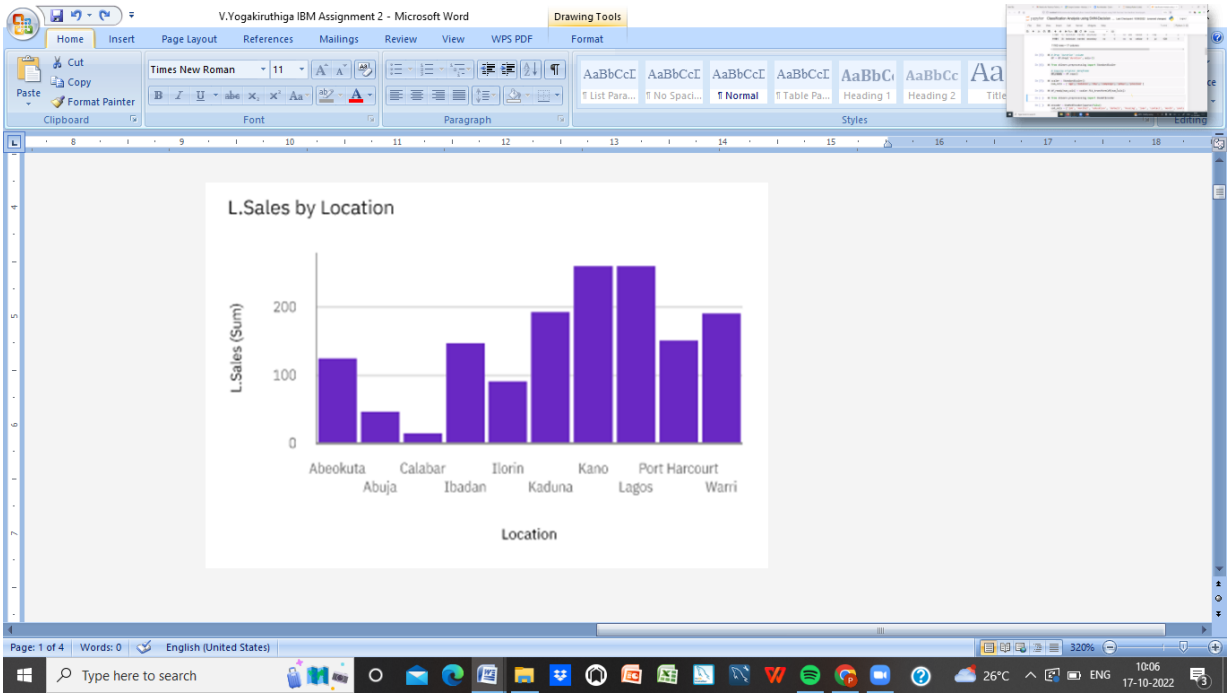


- Thus the dataset inialized to uploaded. After initialization completed the dataset is uploaded successfully.



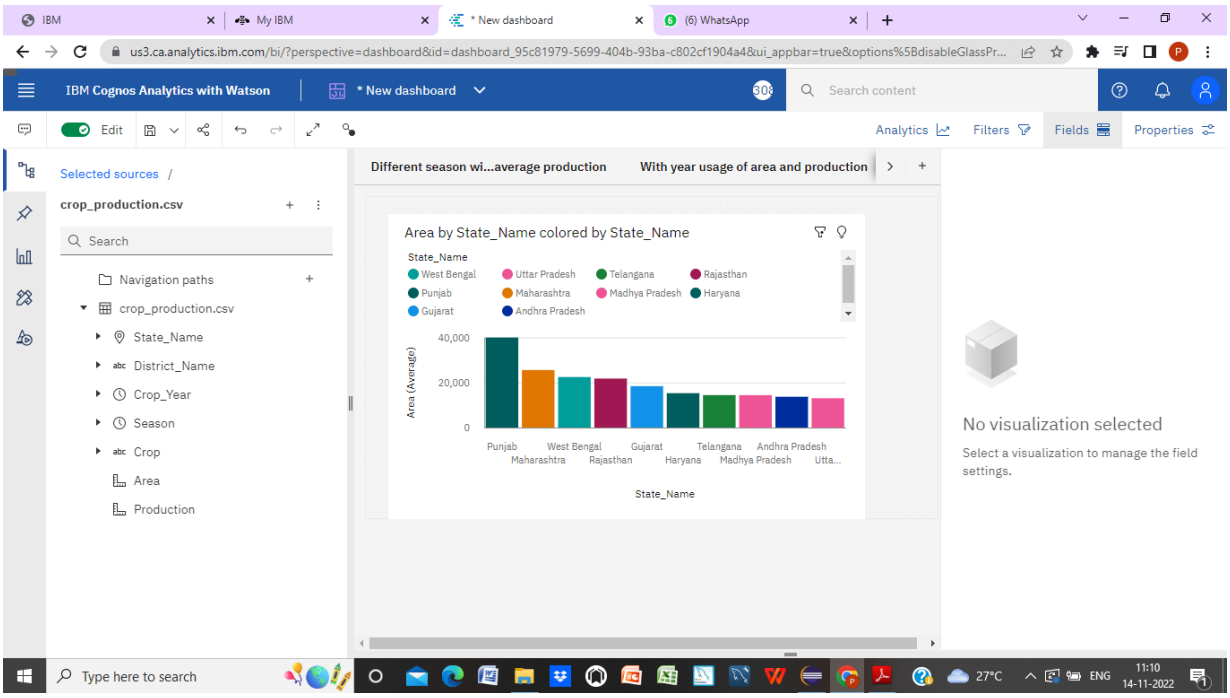
Data Visualization:

- Using the Crop production in Indian dataset, create various graphs and chartsto highlight the insights and visualizations.
- Build a Visualization to showcase . Login to IBM Cognos then in open click
- Select a template for our dashboard and click create.
- Then select the dataset crop_production.csv dataset under my content tab and click add In Add a source.
- Rename the tab title with suitable name.
- Select the visualizations chart whatever we want.
- Average Crop Production by Season: We can select the bar chart for visualization the average crop production by season.
- Place the season in bar.
- Place the production in length.
- In color we place the seasons.



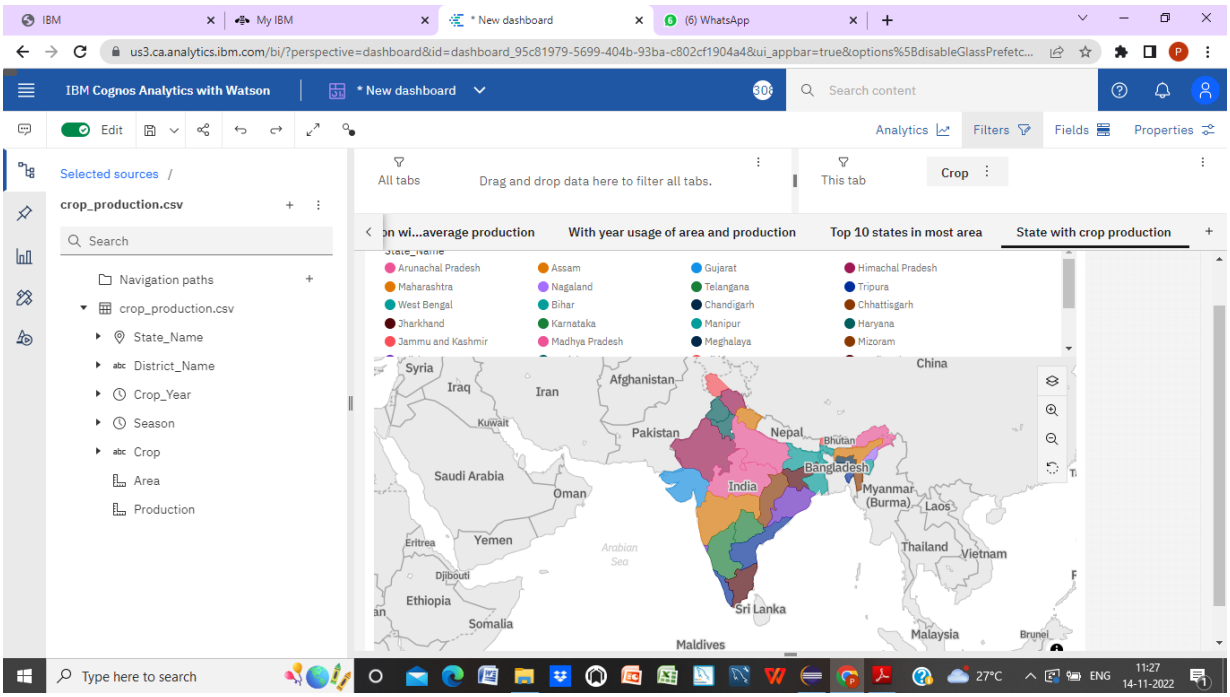
Year usage of Area in Crop Production:

- First we can create the area by production.
- We can choose the line and column chart for visualization.
- In x-axis we put crop_year.
- In y-axis we put area.
- Second we can create the production by crop_year.
- We can choose the line chart for visualization.
- In x-axis we put crop_year.
- In y-axis we put production.



State with crop production:

- We choose the map chart visualization.
- In location we place the state_name.
- In color we place the state_name.
- We place crop production in filters.
- It will be able to see the production of India.



State with the crop production along with season:

- We choose the table chart In column we place the state_name.
- We use filters Then create another table for the season.
- Place season in column.

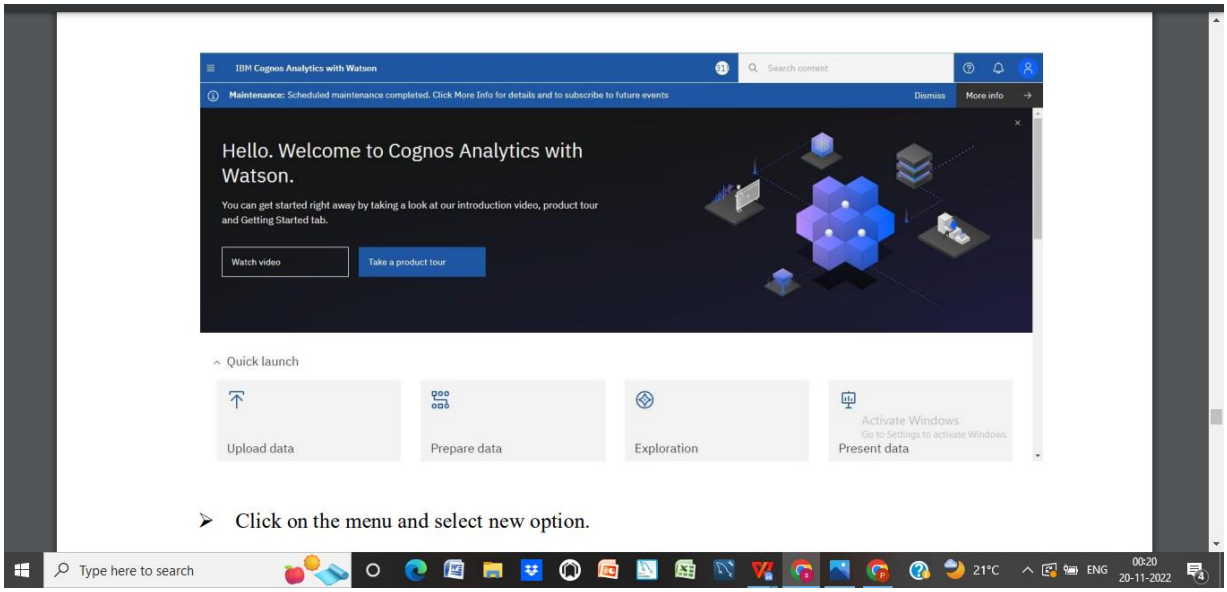
9. Creating Dashboard and visualization:

Creating Dashboard:

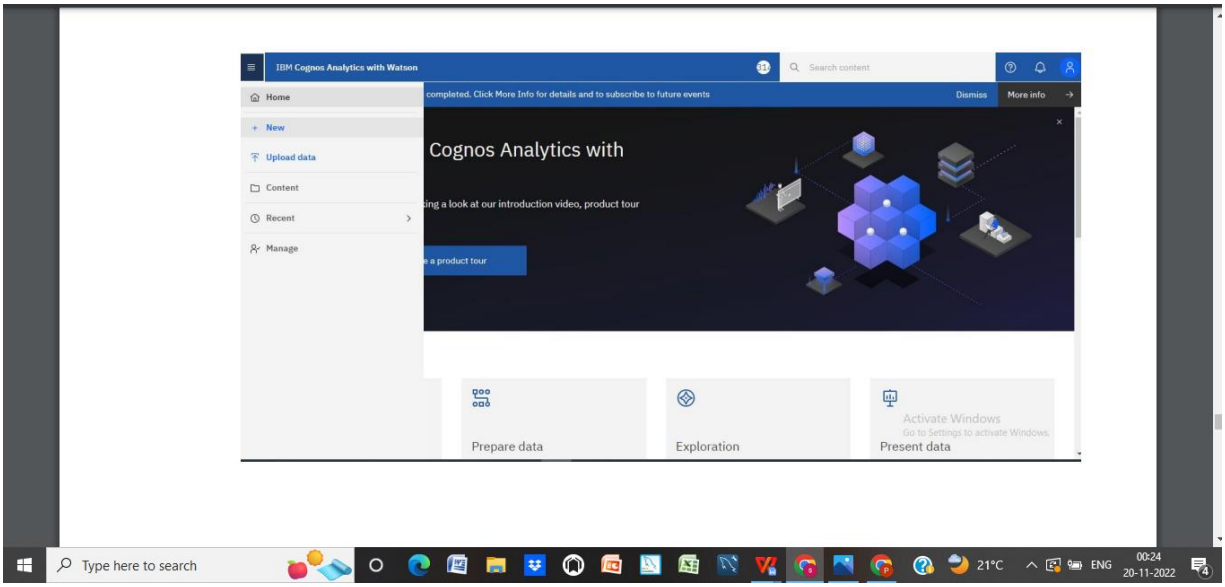
- A dashboard is a way of displaying various types of visual data in one place.

Usually, a dashboard is intended to convey different, but related information in an easy-to-digest form.

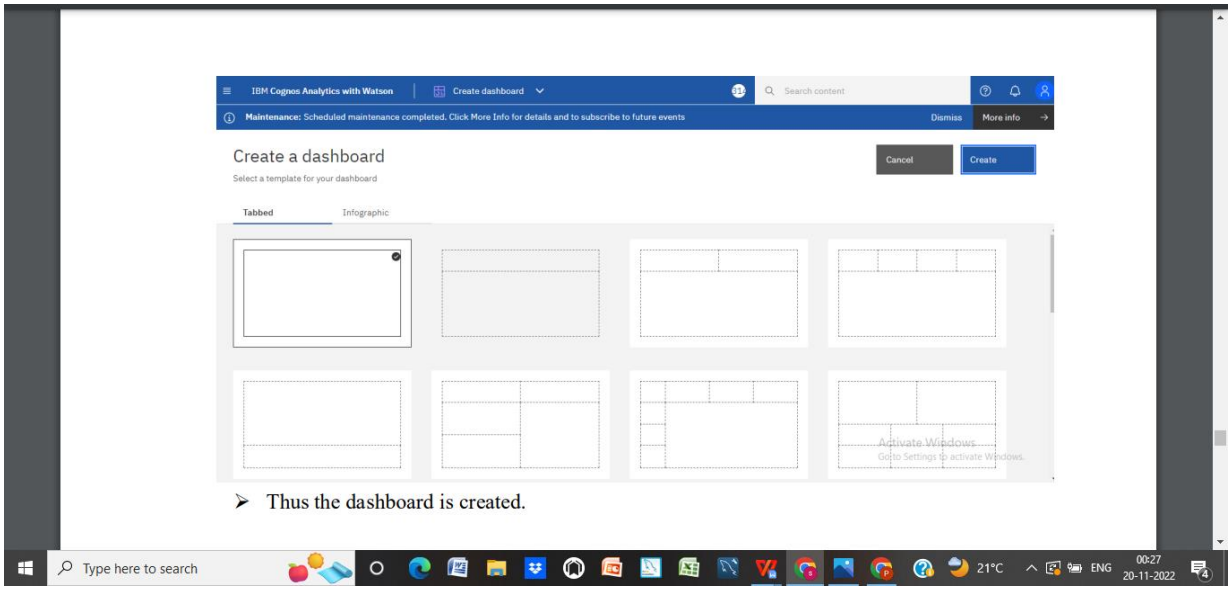
- Login to IBM Cognos.
- Open to IBM cognos account.



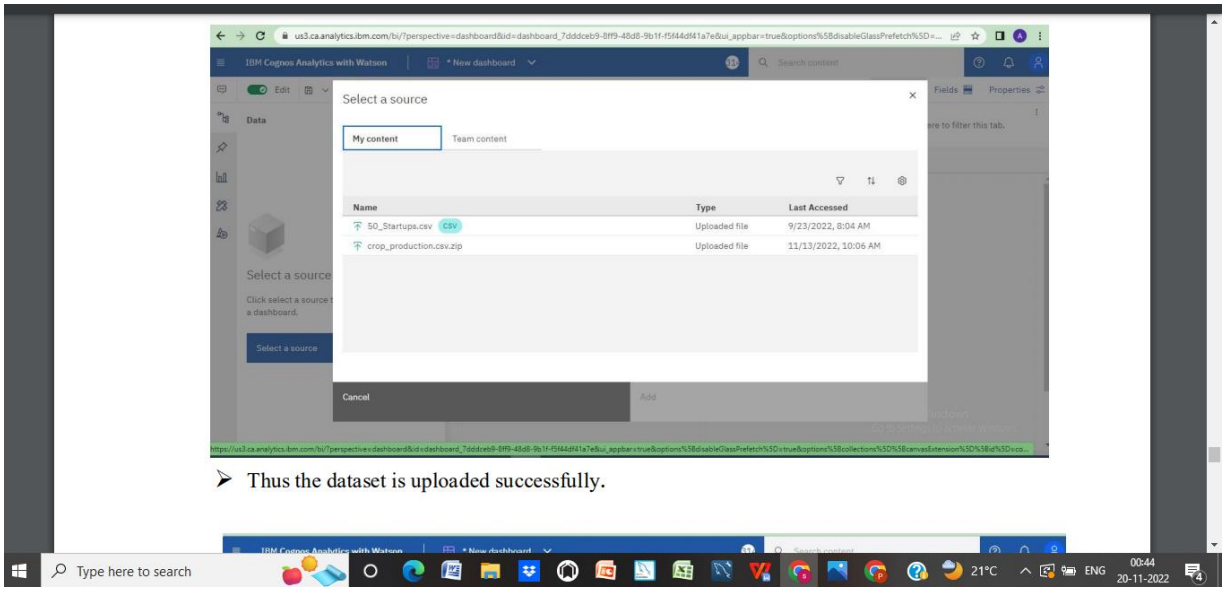
- Click on the menu and select new option.



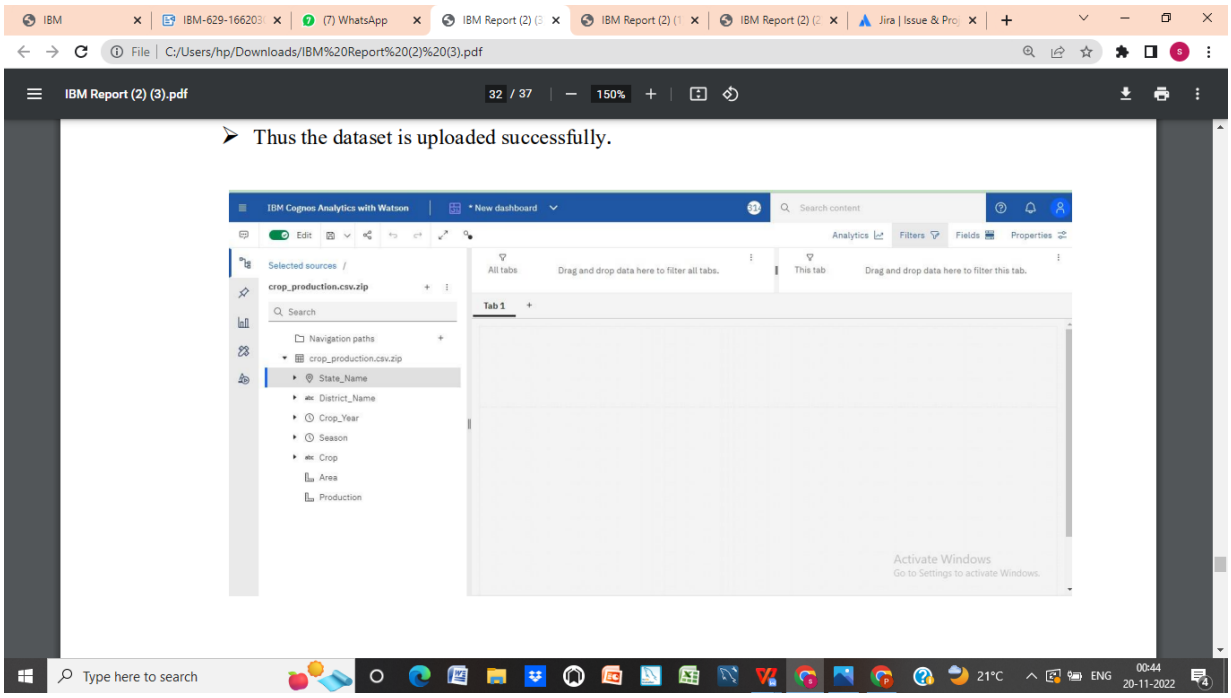
- Select Dashboard option



- Thus the dashboard is created.
- Click on the select source option.



- Select the content option and select the dataset



- Thus the dataset is uploaded successfully.

10. ADVANTAGES & DISADVANTAGES:

Advantages:

- One can easily analyse and understand trends in croppping pattern, seasonal behaviour of land in various areas with the created dashboard.
- With no prior skills and knowledge about the tools that we use for analysis,anyone (literate or illiterate)can easily infer the knowlegde that we represent in various charts or graphs or maps.
- So that it would be helpful to farmers to make appropriate decisions in the future.

Disadvantages:

- Not all factors influencing the crop yield are being considered for the analyis as we have only taken visible factors into account for the analysis.

11. CONCLUSION:

The productivity of agriculture has slightly increased as a result of technology's introduction. New ideas like digital agriculture, smart farming, precision agriculture, etc. have been made possible by the innovations. From the analysis dashboard, it has been noted that analyses of agricultural productivity and the detection of hidden patterns utilising data sets related to seasons and crop yields have been conducted.Using IBM Cognos, we have observed and conducted analysis on various crops grown, area, and productions in various states and districts, including Seasons with average productions. We learn from these analytics which seasons have higher average production and which have lower production. Production split up per crop year. We learn from this study which years have high and low production. District-based production. With the help of these analytics, we may identify the states and districts that farm the chosen crops. Production by area.This will allow us to estimate the yield and determine how much land needs to be planted. After creating the dashboard, study was done to determine which state, which year, and how much crop area will be produced.

12. FUTURE SCOPE:

Farming is the means of survival as humans require food that is obtained only through farming directly or indirectly With the growing human population, it is critcal to analyse the production in farming every year. So, that we can know the right time,right place and right crop to be cultivated considering all the factors that influence the crop production. It can be

concluded that the research in the field of agriculture with reference to using IT trends like data analytics is in its infancy. As the food is the basic need of humans, the requirement of getting the maximum yields using optimal resource will become the necessity in near future as a result of growing population. The survey outcomes indicate the need for improved techniques in crop yield analytics. There exists a lot of research scope in this research area

13. APPENDIX:

Cognos link :

https://us1.ca.analytics.ibm.com/bi/?perspective=dashboard&pathRef=.my_folders%2FNew%2Bdashboard1&action=view&mode=dashboard&subView=model0000018468661750_00000003

Project Demo link:

https://drive.google.com/file/d/1u_Ppd9YVRLJ4gi_A2Jr6RDZLI1uizPR4/view?usp=drivesdk

Git hub link:IBM-EPBL / IBM-Project-629-1658311816