INTRODUCTION TO DATA MANAGEMENT PROJECT REPORT

Project Semester August-December 2019

AGRICULTURAL CROPS PRODUCTION IN INDIA

Submitted by

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B.TECH CSE

KMO65

INT217

Under the Guidance of

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Discipline of CSE/IT

Lovely School of Computer Science & Engineering

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CERTIFICATE

This is to certify that Saloni Jain bearing Registration no. 11706739 has completed (INT217) Introduction to Data Management project titled, **"Analysis on Agricultural crops production in India"** under my guidance and supervision. To the best of my knowledge, the present work is the result of his/her original development, effort and study.

Signature and Name of the Supervisor
Designation of the Supervisor
School of Computer Science & Engineering
Lovely Professional University
Phagwara, Punjab.

Date:

DECLARATION

I, Saloni Jain, student of Computer Science and Engineering under CSE/IT Discipline at, Lovely Professional University, Punjab, hereby declare that all the information furnished in this project report is based on my own intensive work and is genuine.

Date: _____ Signature

Registration No.11706739 Saloni Jain

_____

Signature of Faculty

ACKNOWLEDGEMENT

The success and final outcome of this project required a lot of guidance and assistance and I am extremely privileged to have got this all along the completion of my project. All that I have done is only due to such supervision and assistance and I would not forget to thank them. I respect and thank **Maneet Kaur**, for providing me an opportunity to do the project work in **Lovely Professional University**, Punjab and giving me all support and guidance which made me complete the project duly.. Lastly, I am thankful to all those, particularly the various friends, who have been instrumental in creating proper, healthy and conductive environment and including new and fresh innovative ideas for me during the project.

Saloni Jain

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INTRODUCTION

Data analysis is a process of inspecting, cleansing, transforming and modeling data with the goal of discovering useful information, informing conclusion and supporting decision-making. Data analysis has multiple facets and approaches, encompassing diverse techniques under a variety of names, and is used in different business, science, and social science domains. In today's business world, data analysis plays a role in making decisions more scientific and helping businesses operate more effectively.

Analysis refers to breaking a whole into its separate components for individual examination. Data analysis is a process for obtaining raw data and converting it into information useful for decision-making by users. Data are collected and analyzed to answer questions, test hypotheses or disprove theories.

Data requirements

The data are necessary as inputs to the analysis, which is specified based upon the requirements of those directing the analysis or customers. The general type of entity upon which the data will be collected is referred to as an experimental unit.

Data collection

Data are collected from a variety of sources. The requirements may be communicated by analysts to custodians of the data, such as information technology personnel within an organization. The data may also be collected from sensors in the environment, such as traffic cameras, satellites, recording devices, etc. It may also be obtained through interviews, downloads from online sources, or reading documentation.

Data processing

Data initially obtained must be processed or organized for analysis. For instance, these may involve placing data into rows and columns in a table format for further analysis, such as within a spreadsheet or statistical software.

Data cleaning

Once processed and organised, the data may be incomplete, contain duplicates, or contain errors. The need for data cleaning will arise from problems in the way that data are entered and stored. Data cleaning is the process of preventing and correcting these errors.

The analysis on agricultural crops production in India is used to show the analysis about different states in past years so that the major future analysis to be done accordingly that how the crops are produced and what production and yield they give in states of India.

The agriculture and allied sector continues to be pivotal to the sustainable growth and development of the Indian economy. Not only does it meet the food and nutritional requirements of 1.3 billion Indians, it contributes significantly to production, employment and demand generation through various backward and forward linkages. Moreover, the role of the agricultural sector in alleviating poverty and in ensuring the sustainable development of the economy is well established.

The data provides detailed information about the production of crops over India in year 1997 to 2016.

The Agriculture crops database keeps track of the following data fields:

- State_Name : This field has all the name of states of India.
- District_Name : This field has district names according to State_Name.
- Crop_Year: Crop year of that crop from 1997 to 2016.
- Season : This field is of season of production of crops, seasons including Autumn, Summer, Winter, Whole year, Kharif and Rabi.
- Crop : This field has all the crops that produce across India.
- Area : This field gives the area of production of crops in states of India.
- Production : This field gives the total production of crops.
- Yield: This field gives the yield of crops.

	A	B	C	D	E	F	G	H
1	STATE NAME	DISTRICT NAME	CROP YEAR	SEASON	CROP	AREA	PRODUCTION	YIELD
2	Andaman and Nicobar Islands	NICOBARS	2000	Kharif	Arecanut	1254	2000	9.59
3	Andaman and Nicobar Islands	NICOBARS	2000	Kharif	Other Kharif pulses	2	1	61.9
4	Andaman and Nicobar Islands	NICOBARS	2000	Kharif	Rice	102	321	243.8
5	Andaman and Nicobar Islands	NICOBARS	2000	Whole Year	Banana	176	641	17.83
6	Andaman and Nicobar Islands	NICOBARS	2000	Whole Year	Cashewnut	720	165	23.56
7	Andaman and Nicobar Islands	NICOBARS	2000	Whole Year	Coconut	18168	65100000	5.9
8	Andaman and Nicobar Islands	NICOBARS	2000	Whole Year	Dry ginger	36	100	11.61
9	Andaman and Nicobar Islands	NICOBARS	2000	Whole Year	Sugarcane	1	2	200.6
10	Andaman and Nicobar Islands	NICOBARS	2000	Whole Year	Sweet potato	5	15	184.3
11	Andaman and Nicobar Islands	NICOBARS	2000	Whole Year	Tapioca	40	169	135.8
12	Andaman and Nicobar Islands	NICOBARS	2001	Kharif	Arecanut	1254	2061	9.59
13	Andaman and Nicobar Islands	NICOBARS	2001	Kharif	Other Kharif pulses	2	1	61.9
14	Andaman and Nicobar Islands	NICOBARS	2001	Kharif	Rice	83	300	243.8
15	Andaman and Nicobar Islands	NICOBARS	2001	Whole Year	Cashewnut	719	192	23.56
16	Andaman and Nicobar Islands	NICOBARS	2001	Whole Year	Coconut	18190	64430000	5.9
17	Andaman and Nicobar Islands	NICOBARS	2001	Whole Year	Dry ginger	46	100	11.61
18	Andaman and Nicobar Islands	NICOBARS	2001	Whole Year	Sugarcane	1	1	200.6
19	Andaman and Nicobar Islands	NICOBARS	2001	Whole Year	Sweet potato	11	33	184.3
20	Andaman and Nicobar Islands	NICOBARS	2002	Kharif	Rice	189.2	510.84	243.8
21	Andaman and Nicobar Islands	NICOBARS	2002	Whole Year	Arecanut	1258	2083	9.59
22	Andaman and Nicobar Islands	NICOBARS	2002	Whole Year	Banana	213	1278	17.83
23	Andaman and Nicobar Islands	NICOBARS	2002	Whole Year	Black pepper	63	13.5	4.71
24	Andaman and Nicobar Islands	NICOBARS	2002	Whole Year	Cashewnut	719	208	23.56
25	Andaman and Nicobar Islands	NICOBARS	2002	Whole Year	Coconut	18240	67490000	5.9
26	Andaman and Nicobar Islands	NICOBARS	2002	Whole Year	Dry chillies	413	28.8	13.57

OBJECTIVE/ SCOPE OF ANALYSIS

The scope of analysis is that to get all the necessary analysis with this data to find the productions of crops of each state and different analysis.

Following are 15 analysis related to the project:

1. North India crop production analysis
2. South India crop production analysis
3. North-east India crop production analysis
4. East India crop production analysis
5. West India crop production analysis
6. Top 5 crop production across India analysis
7. Top 10 District crop production across India analysis
8. Total area by each state analysis
9. District production of Andhra Pradesh (can take any state using slicer) analysis
10. District production of Punjab year wise (can take any state using slicer) analysis
11. Top 5 crops in Goa district analysis
12. Top 10 crops by Season analysis
13. Top 3 states with huge area of production of crops analysis
14. Top 10 crops by area between a certain range analysis
15. Production of Rice by crop year (can take any crop using slicer) analysis

Using different excel techniques and tools this project has been made.

Use of pivot table is the most to analyse each and every data.

Pivot table: A pivot table is a table of statistics that summarizes the data of a more extensive table (such as from a database, spreadsheet, or business intelligence program). This summary might include sums, averages, or other statistics, which the pivot table groups together in a meaningful way.

Filtering: Filter is used to select specific data required. It is done to make it easier to focus on specific information in a large database or table of data. Filter in Excel gives you the choice on how to arrange your data, whether it be chronological, by fill color or just by a mere text criteria.

Sorting: Column Sorting in Excel allows us to arrange the data to the specific rules i.e we can sort the data in ascending or descending order.

Power pivot: PowerPivot is a free Microsoft Excel tool that increases the capabilities of **Excel**'s pre-existing pivot table tool by allowing users to import data from multiple sources.

Power query: Microsoft Power Query is an Excel add-in that simplifies data discovery, access, and collaboration. It's provided as part of Microsoft Power BI self-service solution.

SOURCE OF THE DATASET

- **Website:**

https://www.kaggle.com/anjali21/agricultural-production-india

The data is taken from Kaggle.com. The dataset contains different fields and it is a huge data having 2,46,092 rows; with state name, district name, crop year, season, area, production & yield.

ETL PROCESS

ETL stands for extraction, transformation and loading. **ETL** is a process that involves the following tasks:

- **extracting** data from source operational or archive systems which are the primary source of data for the data warehouse.
- **transforming** the data - which may involve cleaning, filtering, validating and applying business rules.
- **loading** the data into a data warehouse or any other database or application that houses data.

The ETL process is also very often referred to as Data Integration process and ETL tool as a Data Integration platform. The terms closely related to and managed by ETL processes are: data migration, data management, data cleansing, data synchronization and data consolidation.

The main goal of maintaining an ETL process in an organization is to migrate and transform data from the source OLTP systems to feed a data warehouse and form data marts.

Through the process of ETL, we are going to clean the dataset and bring all the entities to their proper data format.

Step 1: Remove the blank cells from the dataset.

For this, select the whole dataset. Go to Find and Select in the home tab of excel. Select Go to special from the drop down menu and then tick the blank option. All the blank cells will be selected. Then go to Delete option in the home tab again and select Delete rows from the drop down menu. This will remove any rows with blank cells.

A	B	C	D	E	F	G	H
State_Name	District_Name	Crop_Year	Season	Crop	Area	Production	Yield
Andaman and Nicobar Islands	NICOBARS	2000	Kharif	Arecanut	1254	2000	9.59
Andaman and Nicobar Islands	NICOBARS	2000	Kharif	Other Kharif pulses	2	1	61.9
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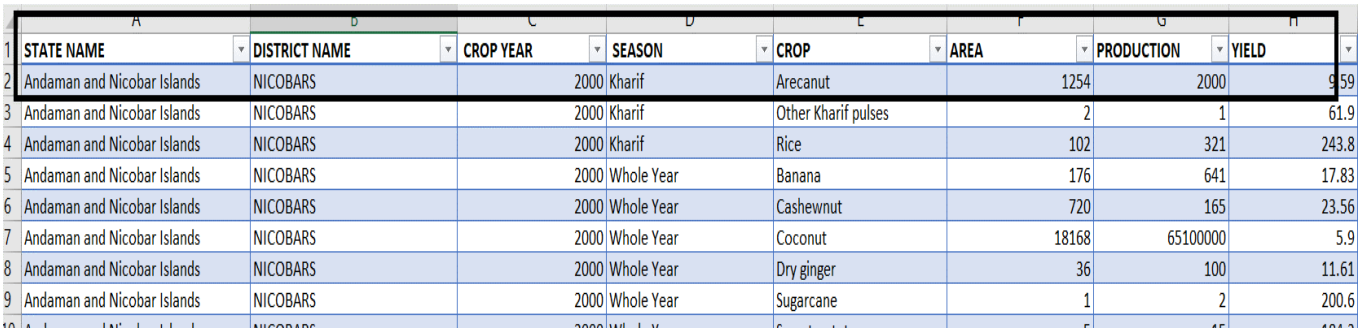
Andaman and Nicobar Islands	NICOBARS	2002	Whole Year	Coconut	18240	67490000	5.9
Andaman and Nicobar Islands	NICOBARS	2002	Whole Year	Dry chillies	413	28.8	13.57
Andaman and Nicobar Islands	NICOBARS	2002	Whole Year	Dry ginger	47.3	133	11.61
Andaman and Nicobar Islands	NICOBARS	2002	Whole Year	Sugarcane	5	40	200.6

Step 2: Giving proper column names.

The datasets does not have proper columns so our next sep would be to giver proper column names to whatever required.



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9	Andaman and Nicobar Islands	NICOBARS	2000	Whole Year	Sugarcane	1	2	200.6

Step 3: Proper Data Formatting.

Without proper data formatting proper analysis will not take place. So we will bring down certain columns to their proper format.

	STATE NAME	DISTRICT NAME	CROP YEAR	SEASON	CROP	AREA	PRODUCTION	YIELD
	Andaman and Nicobar Islands	NICOBARS	2000	Kharif	Arecanut	1254	2000	9.59
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1	Andaman and Nicobar Islands	NICOBARS	2002	Whole Year	Arecanut	1258	2083	9.59
2	Andaman and Nicobar Islands	NICOBARS	2002	Whole Year	Banana	213	1278	17.83

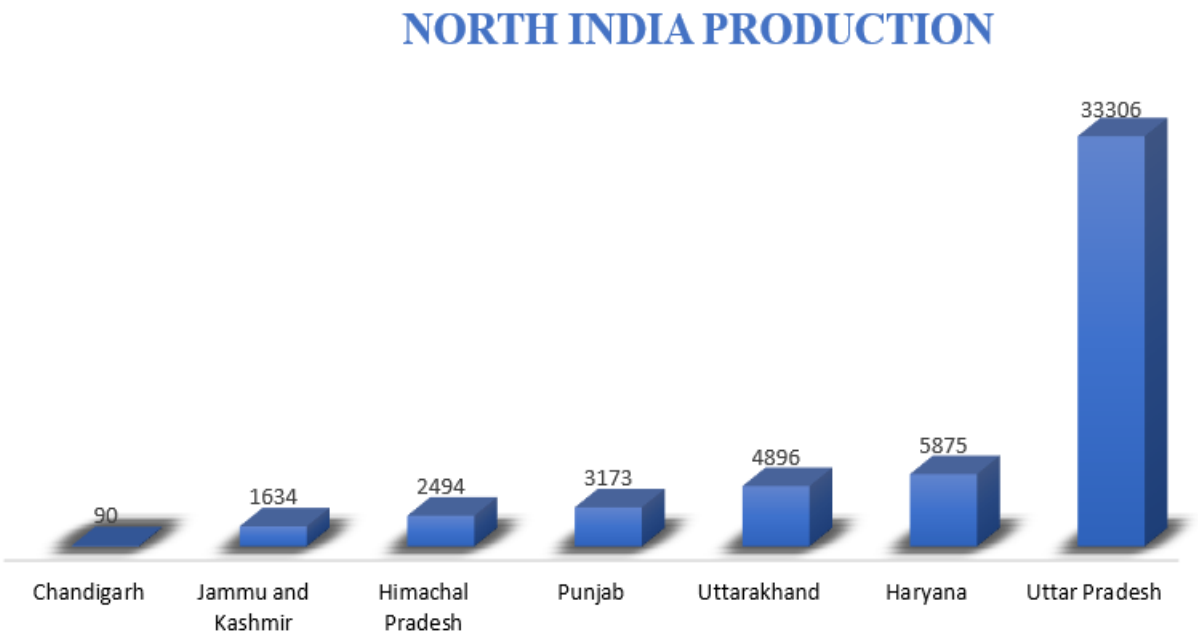
ANALYSIS OF DATASET

There are 15 analysis on this data of agricultural crops production of India.

1. North India production of crops analysis:

This analysis showing the crop production of North Indian states which helps to find which state has highest production of crops. Uttar pradesh has highest and Chandigarh has lowest production of crops.

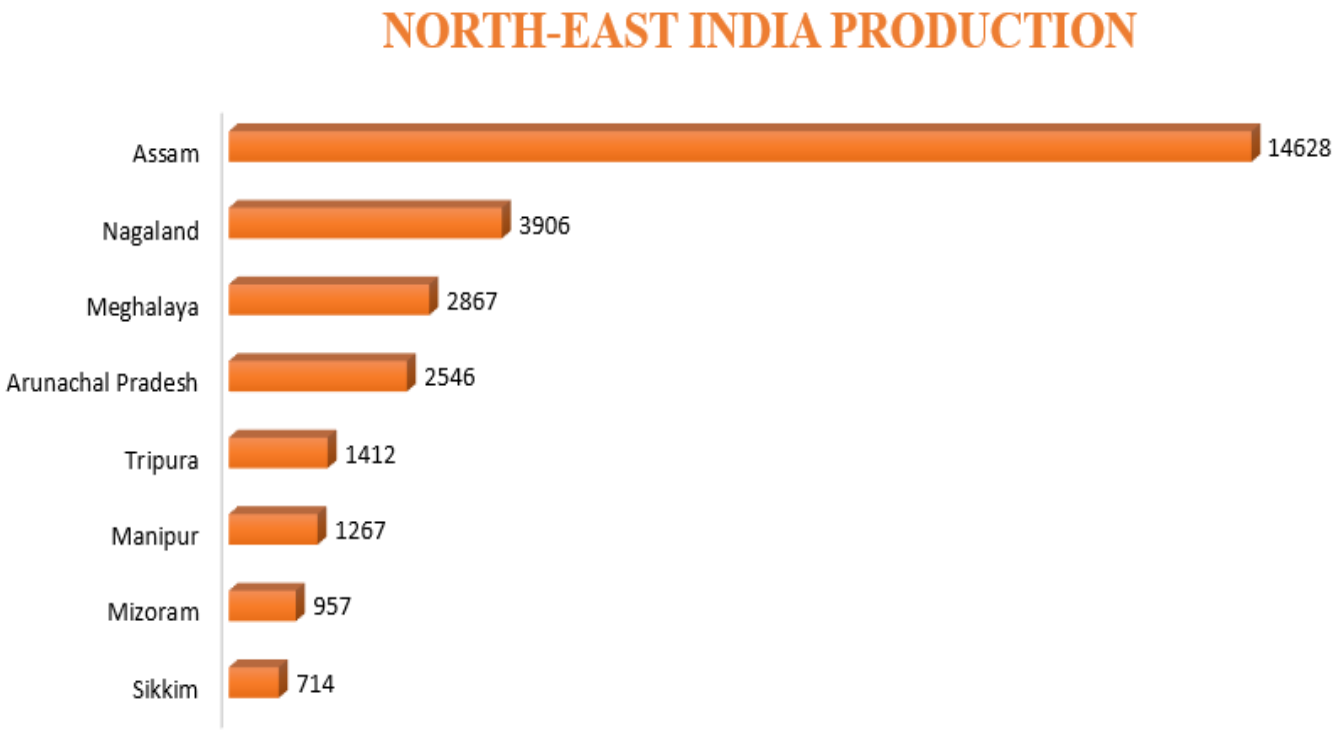
Row Labels	Count of PRODUCTION
Chandigarh	90
Jammu and Kashmir	1634
Himachal Pradesh	2494
Punjab	3173
Uttarakhand	4896
Haryana	5875
Uttar Pradesh	33306
Grand Total	**51468**



2. North-east India Production of crops analysis:

In North-east India Assam has the highest crop production and Sikkim has the lowest crop production.

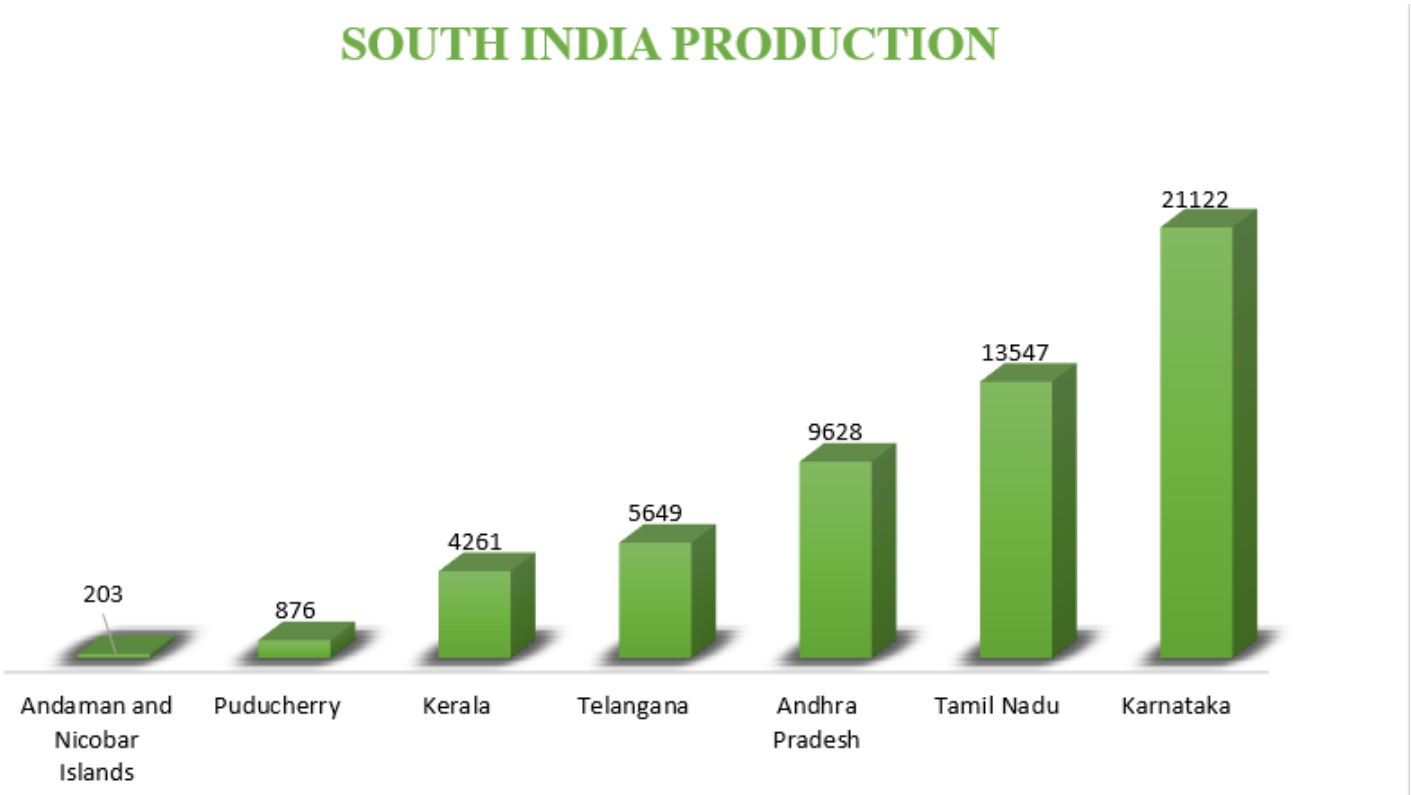
Row Labels	Count of PRODUCTION
Sikkim	714
Mizoram	957
Manipur	1267
Tripura	1412
Arunachal Pradesh	2546
Meghalaya	2867
Nagaland	3906
Assam	14628
Grand Total	**28297**



3. South India Crop production analysis:

In south India Karnataka has the highest crop production and Andaman and Nicobar Islands has the lowest crop production.

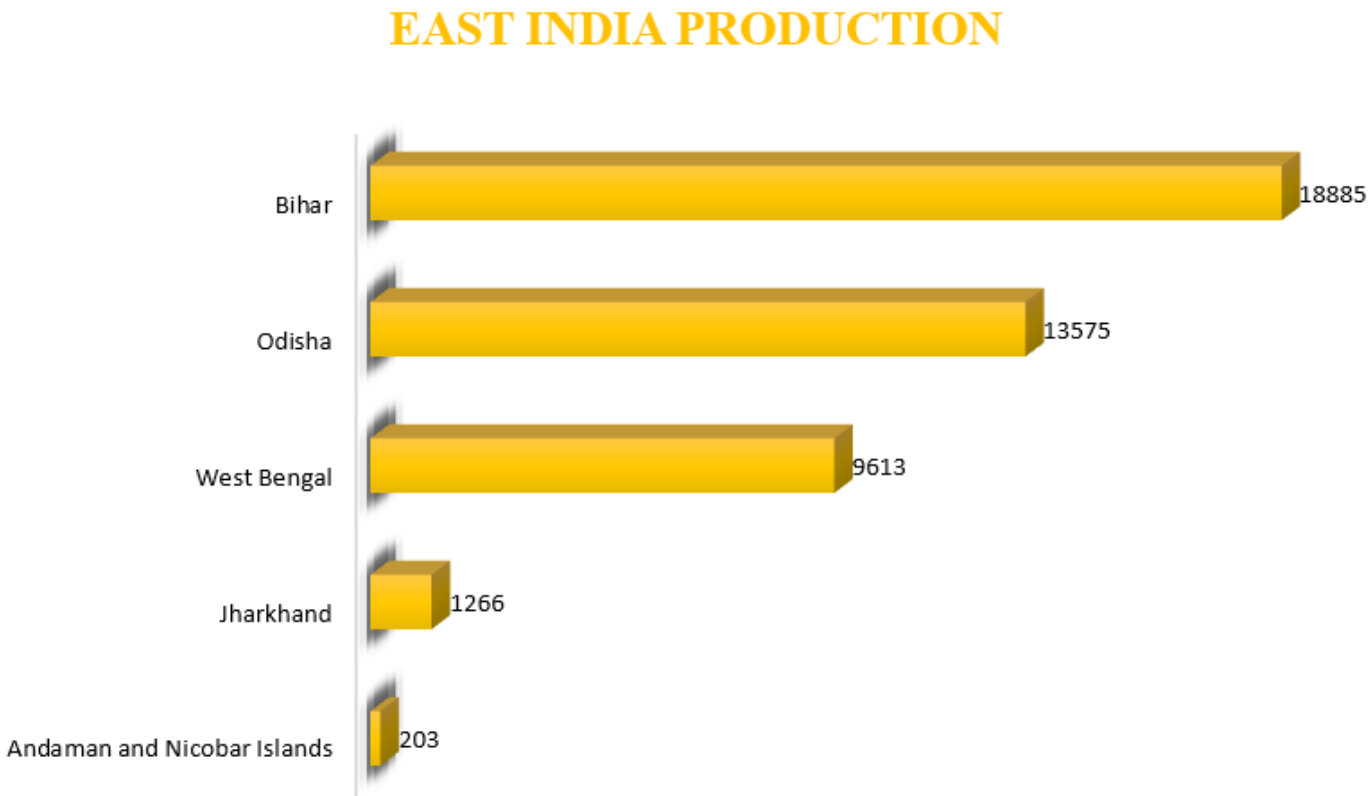
Row Labels	Count of PRODUCTION
Andaman and Nicobar Islands	203
Puducherry	876
Kerala	4261
Telangana	5649
Andhra Pradesh	9628
Tamil Nadu	13547
Karnataka	21122
Grand Total	**55286**



4. East India crop Production analysis:

In East India Bihar has the highest crop production and Andaman and Nicobar Islands has the lowest crop Production.

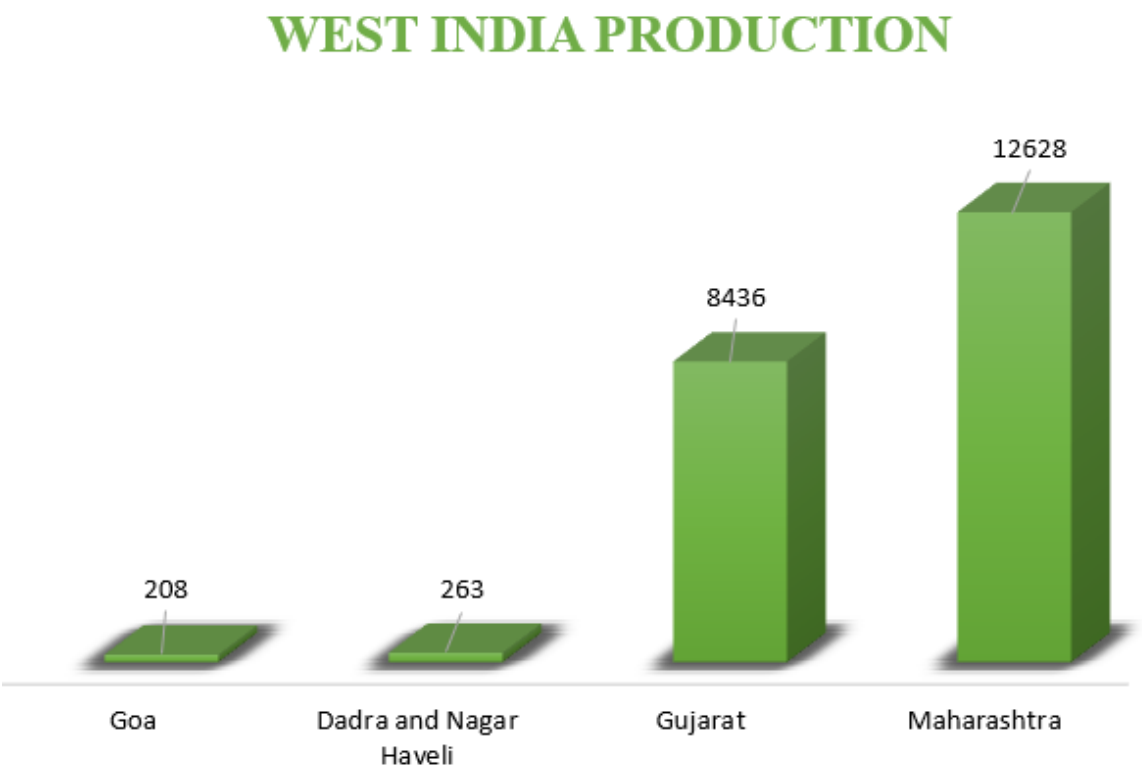
Row Labels	Count of PRODUCTION
Andaman and Nicobar Islands	203
Jharkhand	1266
West Bengal	9613
Odisha	13575
Bihar	18885
Grand Total	**43542**



5. West India crop production analysis:

In west India Maharashtra has the highest crop production and Goa has the lowest crop production .

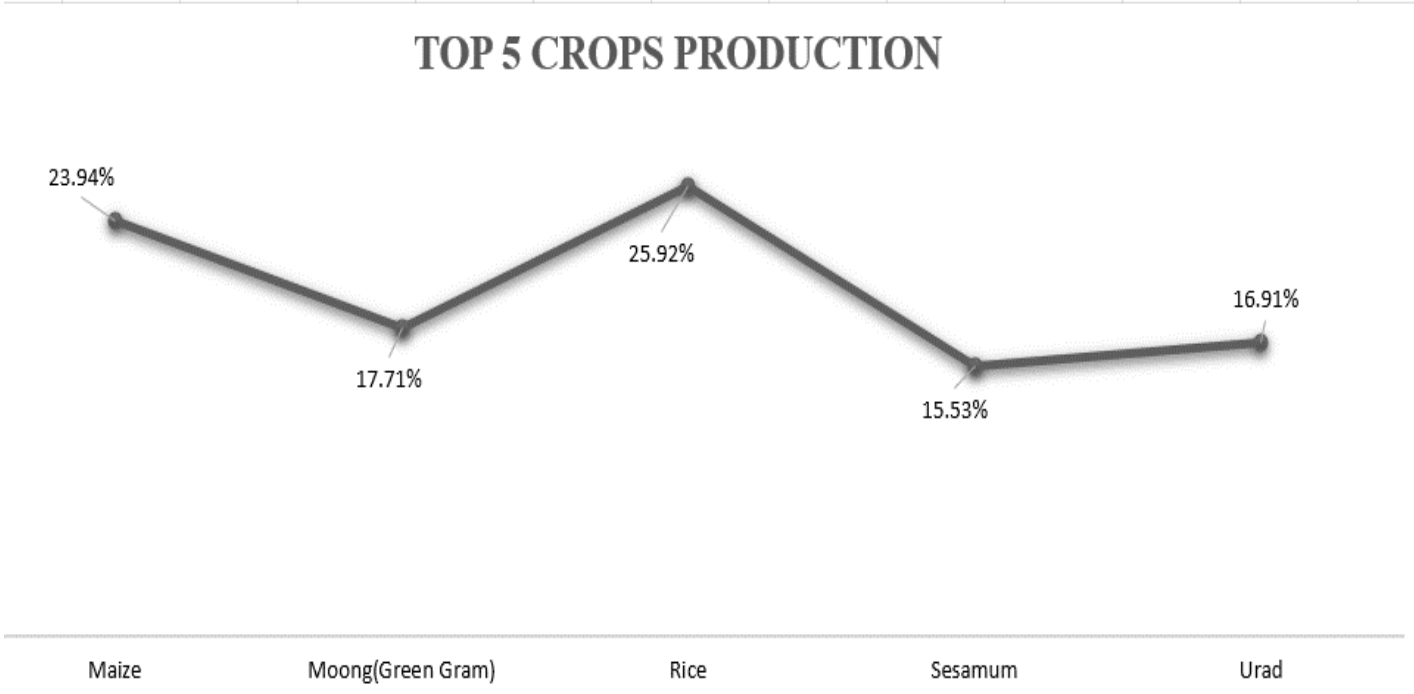
Row Labels	Count of PRODUCTION
Goa	208
Dadra and Nagar Haveli	263
Gujarat	8436
Maharashtra	12628
Grand Total	**21535**



6. Top 5 crop production analysis:

This analysis shows the Top 5 crops production across India & those crops are Maize (23.94%), Moong(Green Gram) (17.71%), Rice (25.92%), Sesamum (15.53%) and Urad (16.91%).

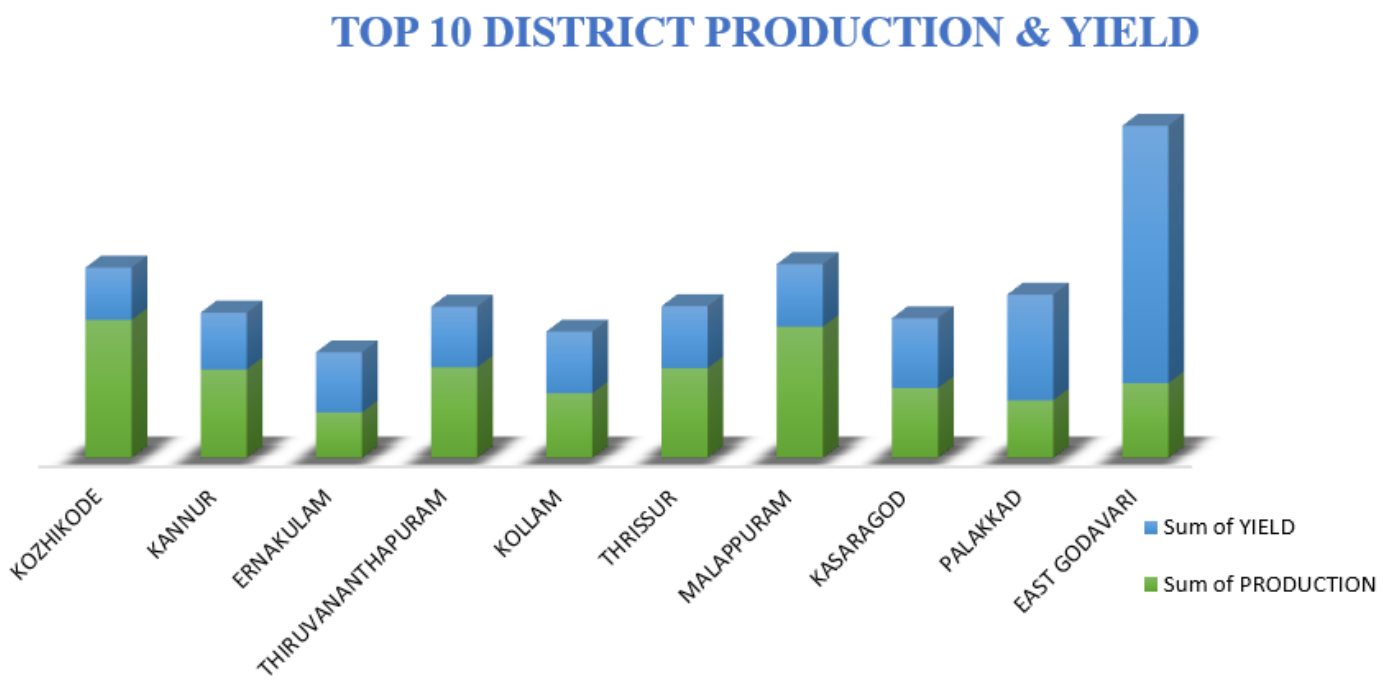
Row Labels	Count of PRODUCTION
Maize	23.94%
Moong(Green Gram)	17.71%
Rice	25.92%
Sesamum	15.53%
Urad	16.91%
Grand Total	**100.00%**



7. Top 10 District crop production across India analysis:

This analysis shows the total production and total yield of top 10 District across India. Top 10 districts are Kozhikode, Kannur, Ernakulam, Thiruvananthapuram, Kollam, Thrissur, Malappuram, Kasaragod, Palakkad and East Godavari.

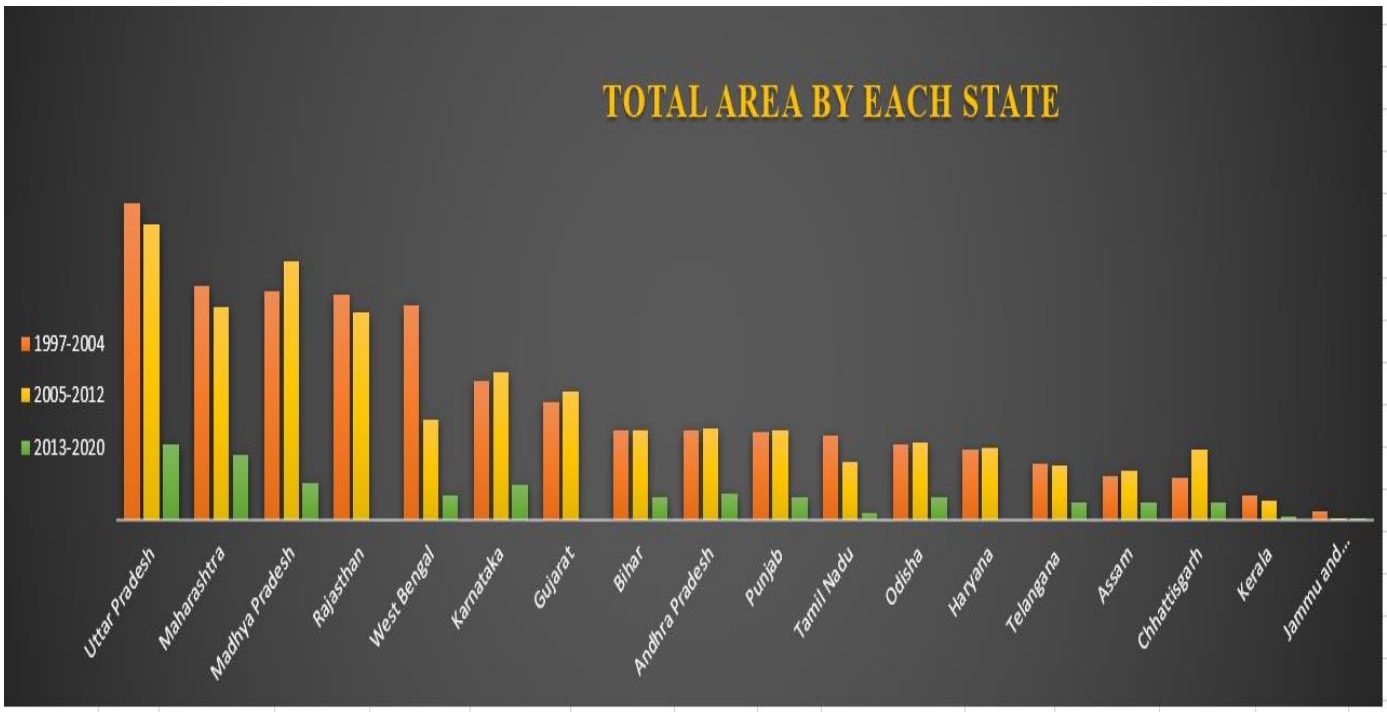
Row Labels	Sum of PRODUCTION	Sum of YIELD
KOZHIKODE	16.24%	6.16%
KANNUR	10.40%	6.70%
ERNAKULAM	5.34%	7.09%
THIRUVANANTHAPURAM	10.65%	7.14%
KOLLAM	7.60%	7.26%
THRISSUR	10.55%	7.30%
MALAPPURAM	15.43%	7.37%
KASARAGOD	8.22%	8.22%
PALAKKAD	6.77%	12.45%
EAST GODAVARI	8.79%	30.32%
Grand Total	**100.00%**	**100.00%**



8. Total area by each state analysis:

This analysis shows the total area of production of crops by each state in India in years 1997-2004, 2005-2012 and 2013-2020.

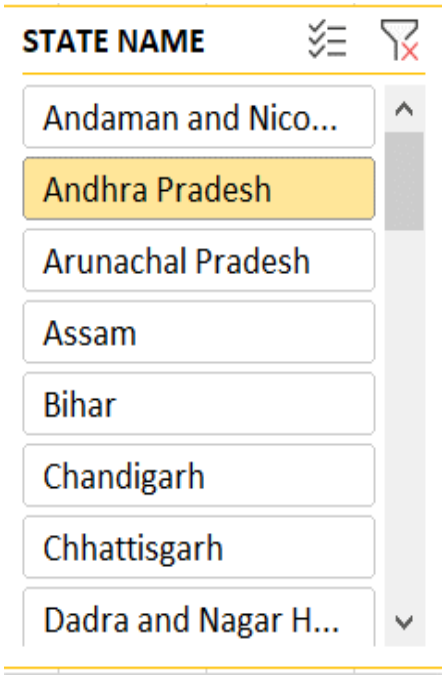
Sum of AREA	Column Labels		
Row Labels	1997-2004	2005-2012	2013-2020
Uttar Pradesh	199484994	185813638	48332998
Maharashtra	147021084	133710053	41475100
Madhya Pradesh	144037764	162465521	23309851
Rajasthan	141713191	130311714	
West Bengal	135471259	63875784	16058205
Karnataka	87712108	92795720	22402295
Gujarat	73908424	81035600	
Bihar	57060343	56990108	14221580
Andhra Pradesh	57041974	57346795	17157075
Punjab	55461800	56662686	14601100
Tamil Nadu	53869230	37008022	5020615
Odisha	47442972	48895219	14195425
Haryana	44057944	45539362	
Telangana	35859489	34558022	10943113
Assam	27523973	31033074	11821711
Chhattisgarh	27233456	44574756	11231452
Kerala	16278524	12691599	2937950
Jammu and Kashmir	6357025	1926210	981388
Grand Total	1357535554		254689858

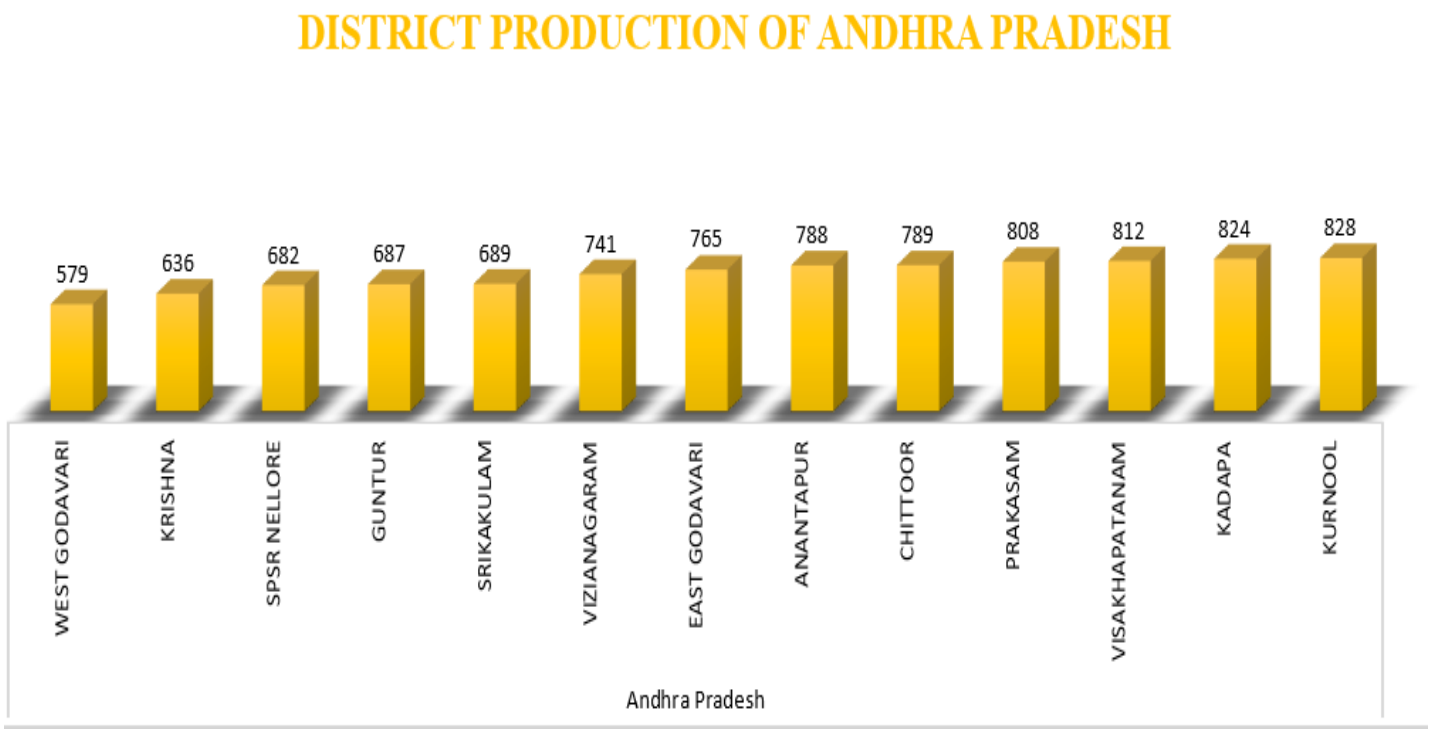


9. District production of Andhra Pradesh (can take any state using slicer) analysis:

This analysis shows the District production of Andhra Pradesh where Kurnool (828) has highest production of crops in A.P and West Godavari (579) has the lowest production of crops in A.P. We can change it by using slicer.

Row Labels	Count of PRODUCTION
Andhra Pradesh	**9628**
WEST GODAVARI	579
KRISHNA	636
SPSR NELLORE	682
GUNTUR	687
SRIKAKULAM	689
VIZIANAGARAM	741
EAST GODAVARI	765
ANANTAPUR	788
CHITTOOR	789
PRAKASAM	808
VISAKHAPATANAM	812
KADAPA	824
KURNOOL	828
Grand Total	**9628**

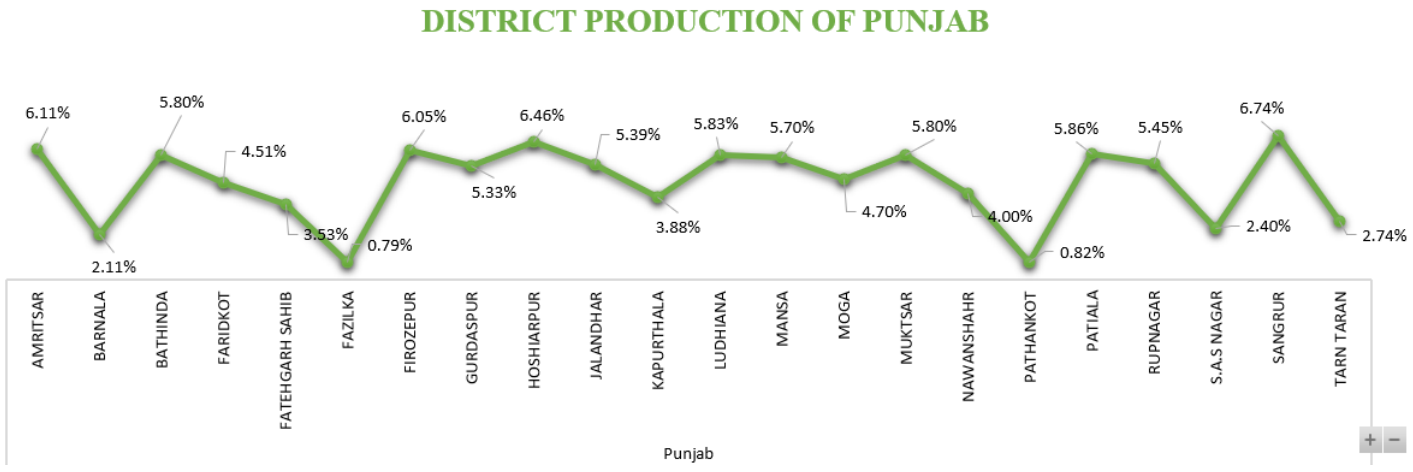




10. District production of Punjab year wise (can take any state using slicer) analysis:

This analysis shows the District population of Punjab, where Amritsar (6.11%) has highest production of crops in Punjab and Fazilka (0.79%) has the lowest production of crops in Punjab.

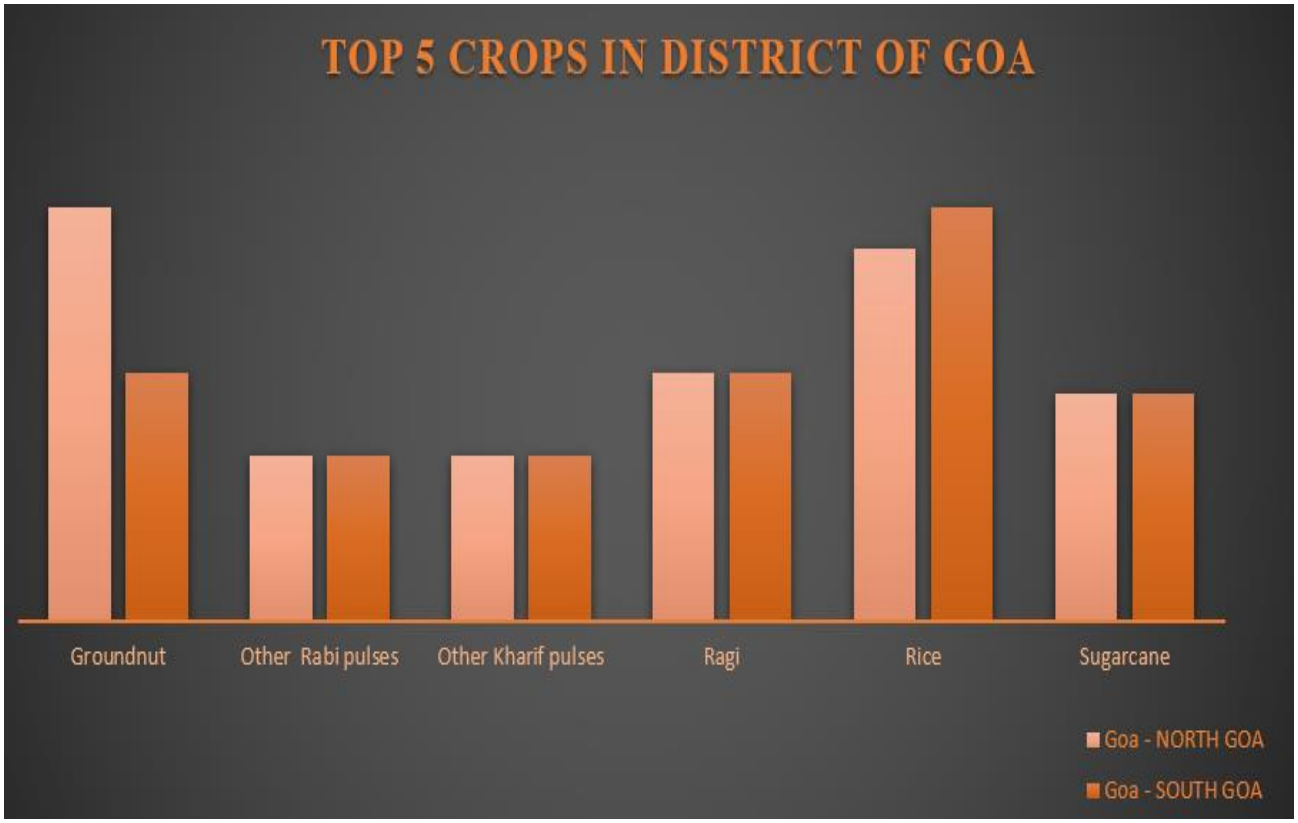
Row Labels	Count of PRODUCTION
Punjab	**100.00%**
AMRITSAR	6.11%
BARNALA	2.11%
BATHINDA	5.80%
FARIDKOT	4.51%
FATEHGARH SAHIB	3.53%
FAZILKA	0.79%
FIROZEPUR	6.05%
GURDASPUR	5.33%
HOSHIARPUR	6.46%
JALANDHAR	5.39%
KAPURTHALA	3.88%
LUDHIANA	5.83%
MANSA	5.70%
MOGA	4.70%
MUKTSAR	5.80%
NAWANSHAHR	4.00%
PATHANKOT	0.82%
PATIALA	5.86%
RUPNAGAR	5.45%
S.A.S NAGAR	2.40%
SANGRUR	6.74%
TARN TARAN	2.74%
Grand Total	**100.00%**



11. Top 5 crops in Goa district analysis:

This analysis shows the Top 5 crops in the District of Goa by its production and those crops are Groundnut, other rabi pulses, other Kharif pulses, Ragi, Rice and Sugarcane.

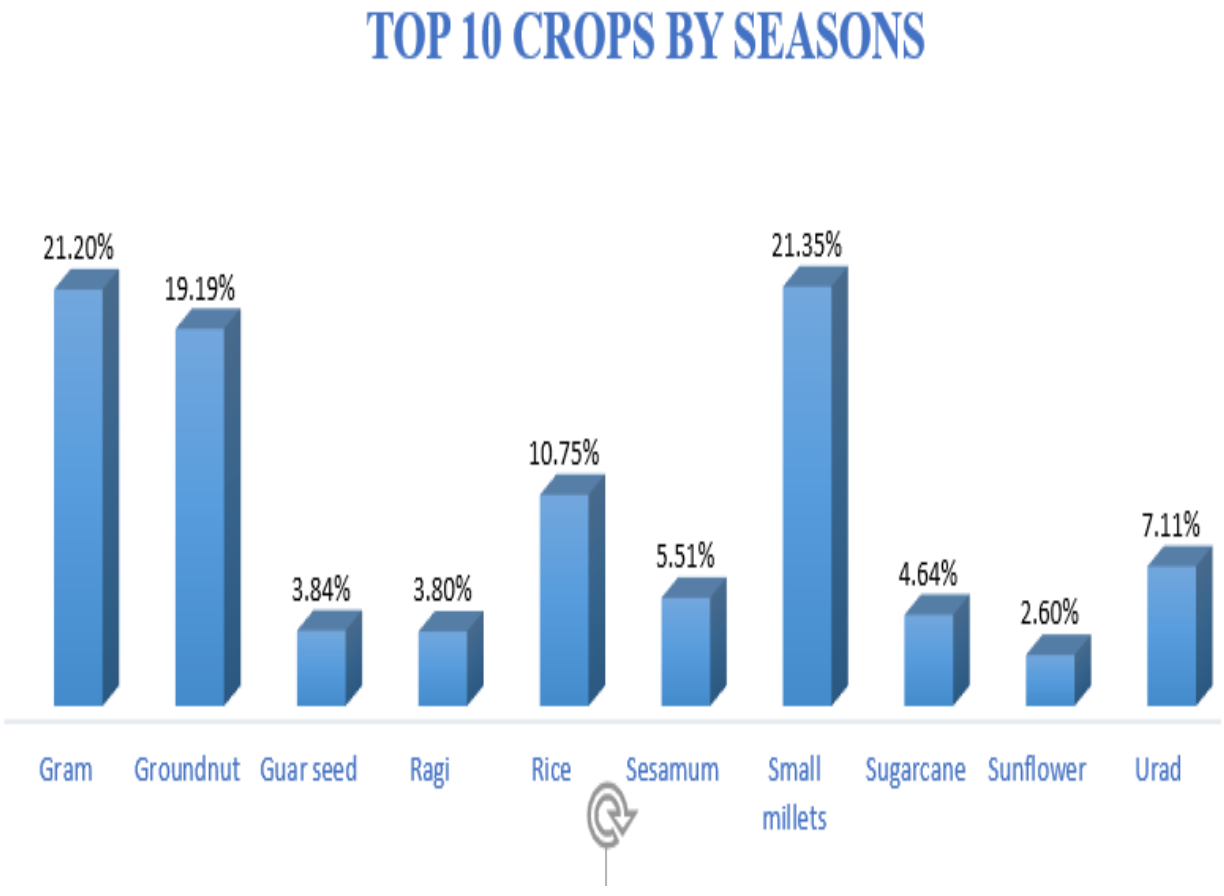
Count of PRODUCTION	Column Labels		
	Goa		Goa Total
Row Labels	NORTH GOA	SOUTH GOA	
Groundnut	20	12	32
Other Rabi pulses	8	8	16
Other Kharif pulses	8	8	16
Ragi	12	12	24
Rice	18	20	38
Sugarcane	11	11	22
Grand Total	**77**	**71**	**148**



12. Top 10 crops by Season analysis:

This analysis shows the Top 10 crops according to seasons like autumn, Kharif, Rabi, Summer, whole year and Winter.

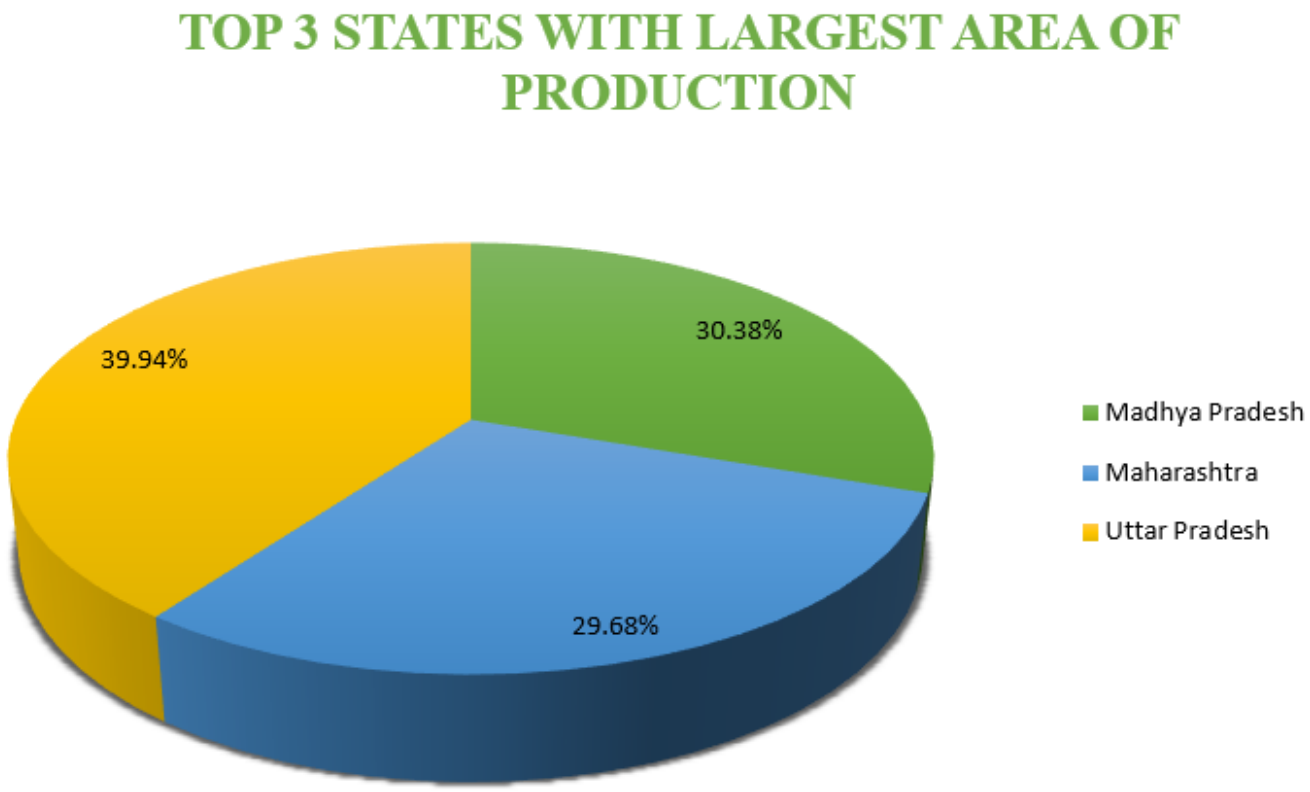
Row Labels	Sum of YIELD
Gram	21.20%
Groundnut	19.19%
Guar seed	3.84%
Ragi	3.80%
Rice	10.75%
Sesamum	5.51%
Small millets	21.35%
Sugarcane	4.64%
Sunflower	2.60%
Urad	7.11%
Grand Total	**100.00%**



13. Top 3 states with huge area of production of crops analysis:

This analysis shows the Top 3 states in India with the Largest Area of production of Crops and those states are Madhya Pradesh, Maharashtra and Uttar Pradesh.

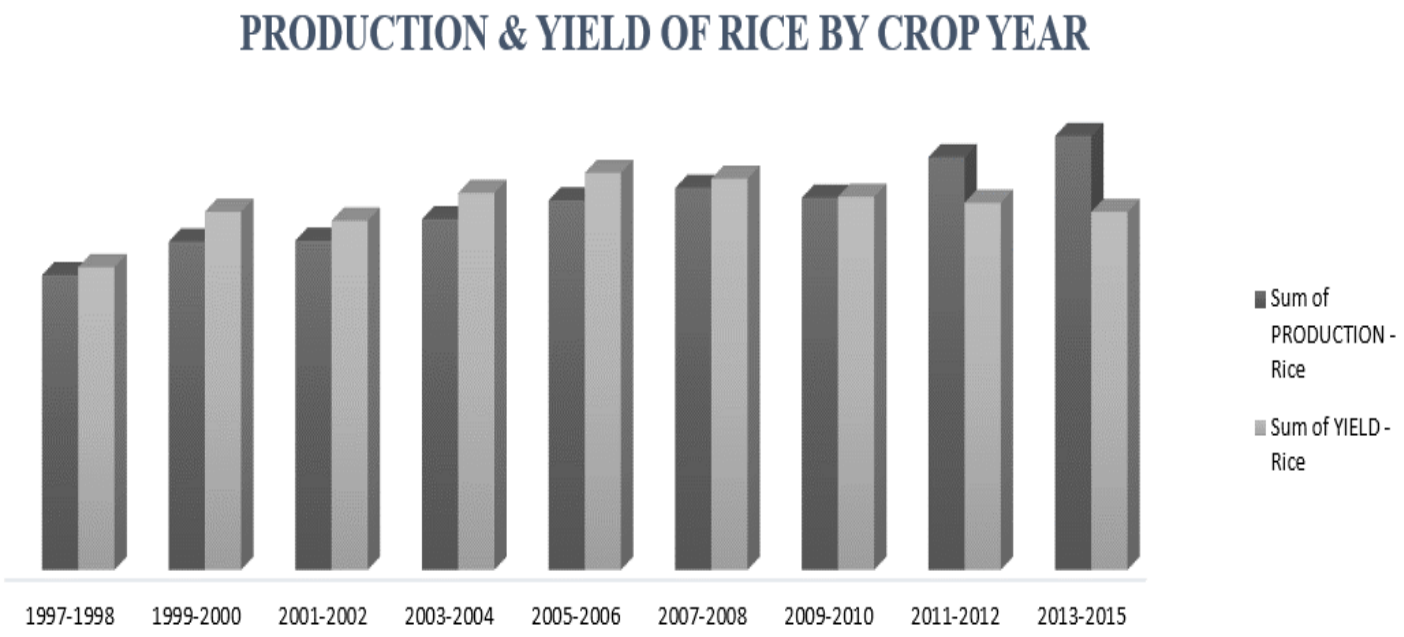
Row Labels	Sum of AREA
Madhya Pradesh	30.38%
Maharashtra	29.68%
Uttar Pradesh	39.94%
Grand Total	**100.00%**



14. Top 10 crops by area between a certain range analysis:

This analysis shows the Production and Yield of Rice by Different Crop years.

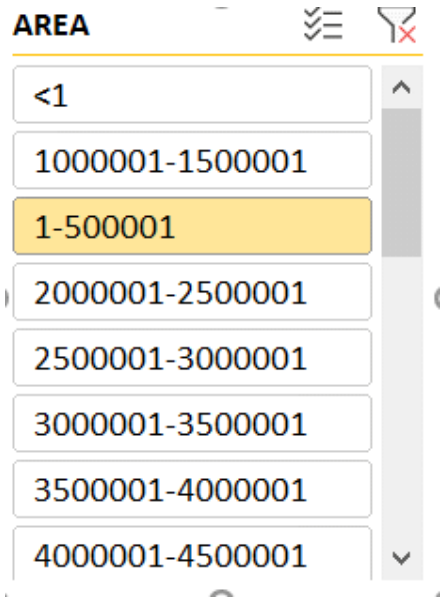
Row Labels	Column Labels Sum of PRODUCTION Rice	Sum of YIELD Rice
1997-1998	9.01%	9.25%
1999-2000	10.03%	10.94%
2001-2002	10.06%	10.67%
2003-2004	10.71%	11.51%
2005-2006	11.29%	12.13%
2007-2008	11.67%	11.95%
2009-2010	11.37%	11.40%
2011-2012	12.61%	11.22%
2013-2015	13.25%	10.93%
Grand Total	**100.00%**	**100.00%**

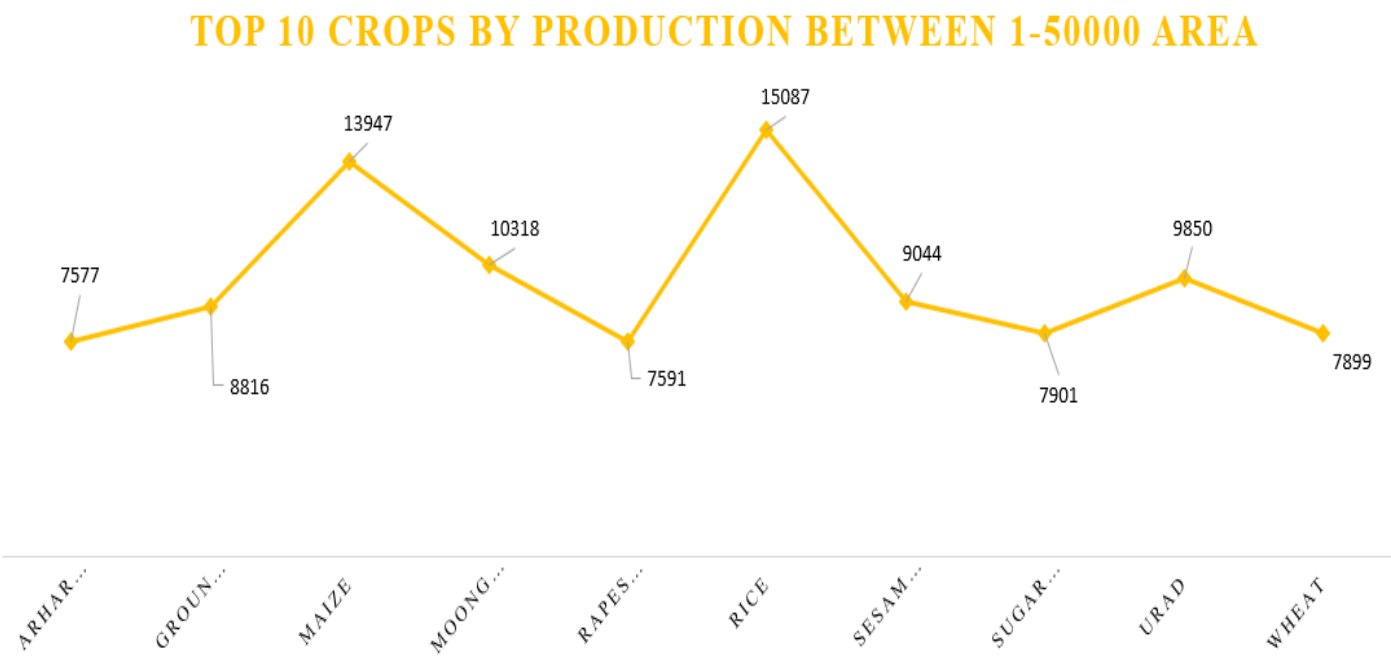


15. Production of Rice by crop year (can take any crop using slicer) analysis:

This analysis shows the Top 10 crops by production between a certain areas.

Count of PRODUCTION	Column Labels
Row Labels	1-500001
Arhar/Tur	7577
Groundnut	8816
Maize	13947
Moong(Green Gram)	10318
Rapeseed &Mustard	7591
Rice	15087
Sesamum	9044
Sugarcane	7901
Urad	9850
Wheat	7899
Grand Total	**98030**



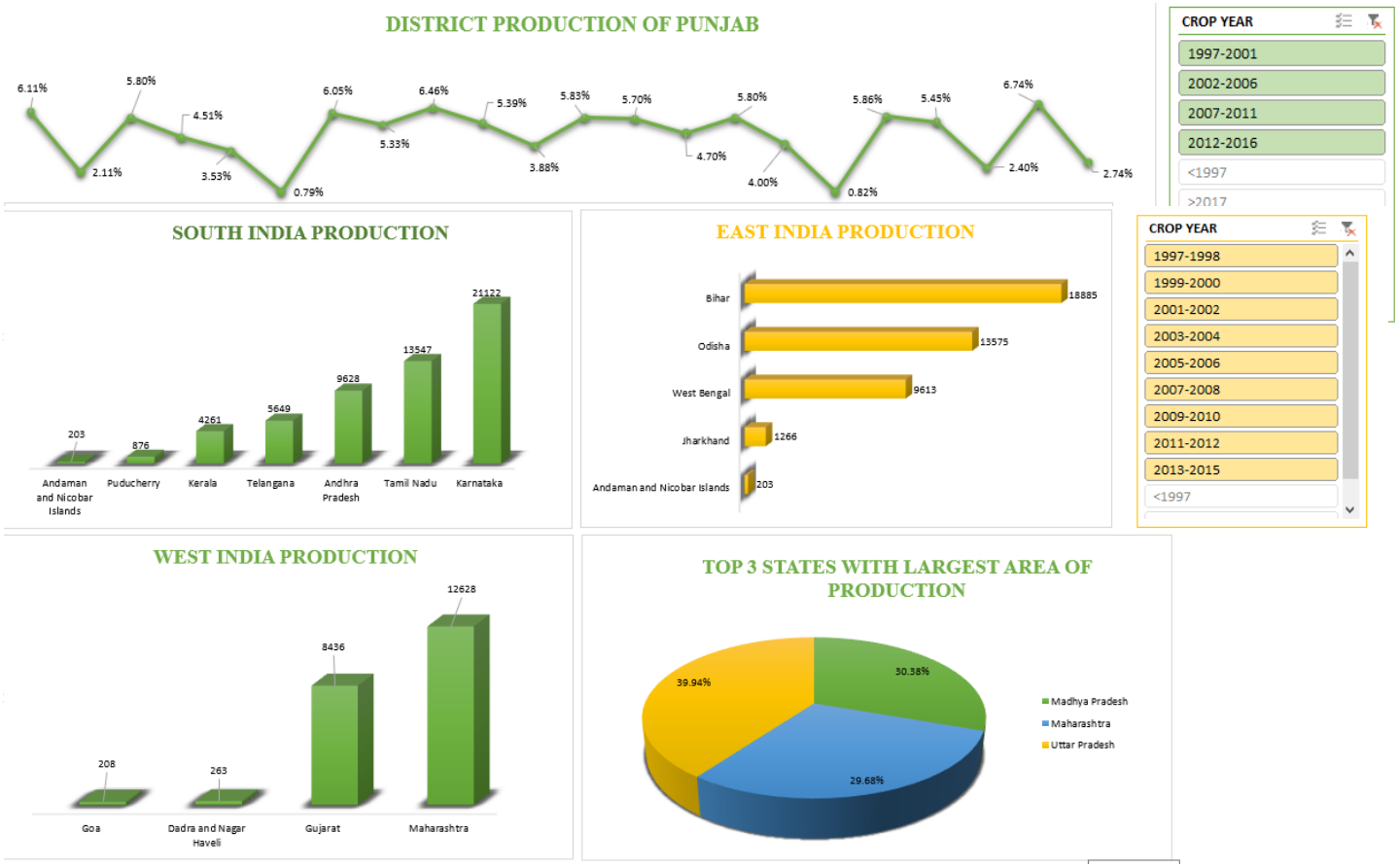


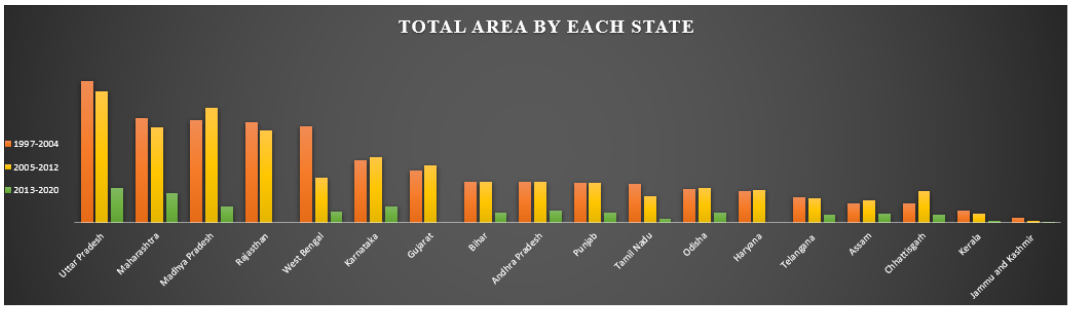
ANALYSIS WITH RESULT

DASHBOARD

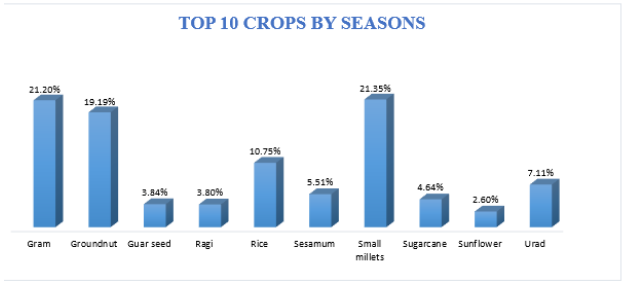
An Excel dashboard is a visual interface and will provide views into measures that are relevant to a business process. They're commonly used in marketing or sales, production, and human resources. Because dashboards are usually designed with a specific goal, they contain preexisting conclusions that relieve the user from performing their own analysis.

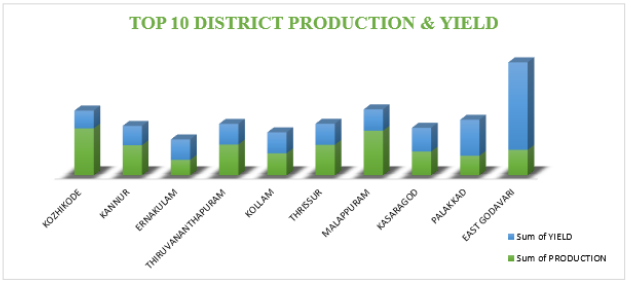
They also can display only the data that the user deems relevant for the dashboard, abolishing any unnecessary attributes. It's quite common to mix up a dashboard with an Excel report, which is the most common application used since it can be a data table or even a subtotaled view with interactive drilling.

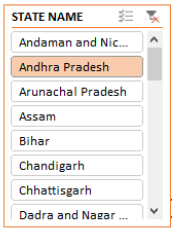


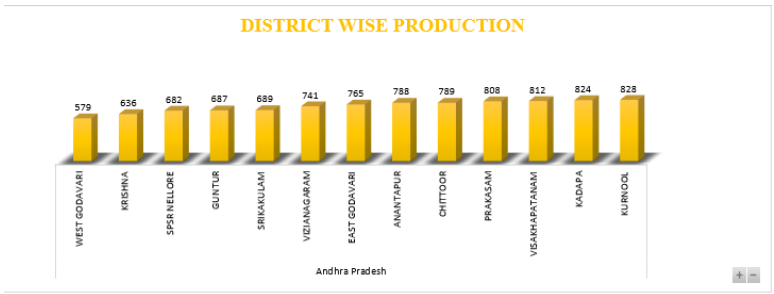

TOTAL AREA BY EACH STATE
1997-2004
2005-2012
2013-2020
Uttar Pradesh
Maharashtra
Madhya Pradesh
Rajasthan
West Bengal
Karnataka
Gujarat
Bihar
Andhra Pradesh
Punjab
Tamil Nadu
Odisha
Haryana
Telangana
Assam
Chhattisgarh
Kerala
Jammu and Kashmir

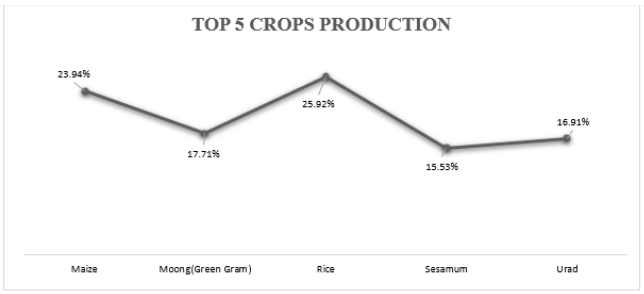

SEASON
-
Autumn
Kharif
Rabi
Summer
Whole Year
Winter

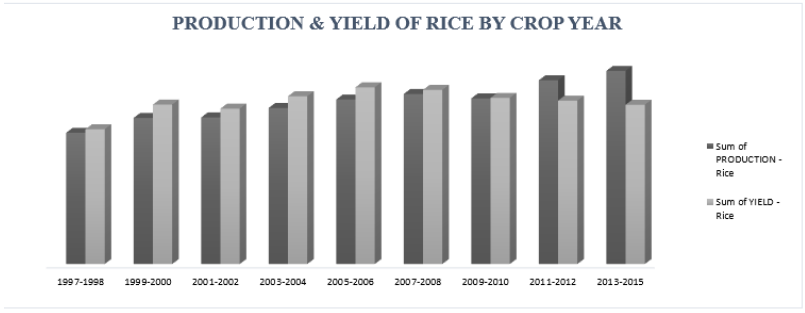

TOP 10 CROPS BY SEASONS
21.20%
19.19%
3.84%
3.80%
10.75%
5.51%
21.35%
4.64%
2.60%
7.11%
Gram
Groundnut
Guar seed
Ragi
Rice
Sesamum
Small millets
Sugarcane
Sunflower
Urad

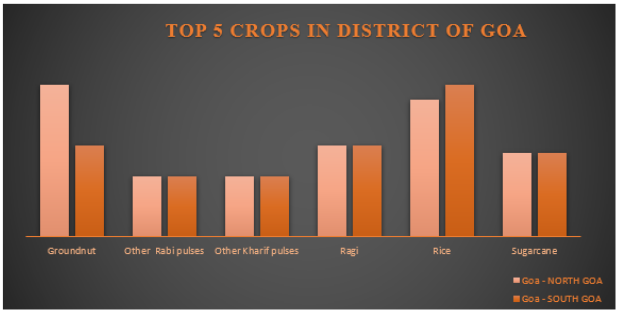

TOP 10 DISTRICT PRODUCTION & YIELD
KOZHIKODE
KANNUR
ERNAKULAM
THIRUVANANTHAPURAM
KOLLAM
THRISSUR
MALAPPURAM
KASARAGOD
PALAKKAD
EAST GODAVARI
Sum of YIELD
Sum of PRODUCTION

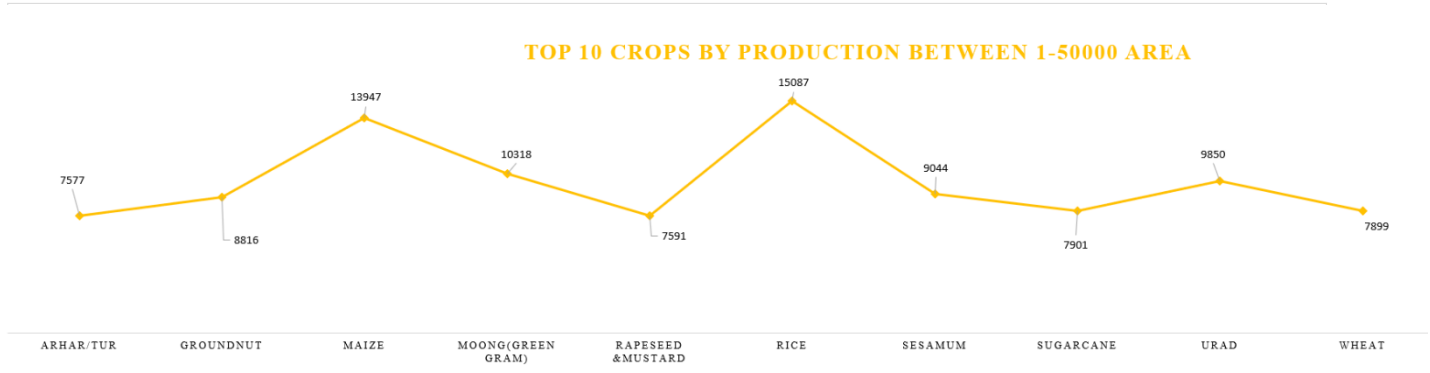

STATE NAME
Andaman and Nic...
Andhra Pradesh
Arunachal Pradesh
Assam
Bihar
Chandigarh
Chhattisgarh
Dadra and Nagar ...


DISTRICT WISE PRODUCTION
579
636
682
687
689
741
765
788
789
808
812
824
828
WEST GODAVARI
KRISHNA
SPSR NELLORE
GUNTUR
SRIKAKULAM
VIZIANAGARAM
EAST GODAVARI
ANANTAPUR
CHITTOOR
PRAKASAM
VISAKHAPATANAM
KADAPA
KURNOOL
Andhra Pradesh


TOP 5 CROPS PRODUCTION
23.94%
17.71%
25.92%
15.53%
16.91%
Maize
Moong(Green Gram)
Rice
Sesamum
Urad

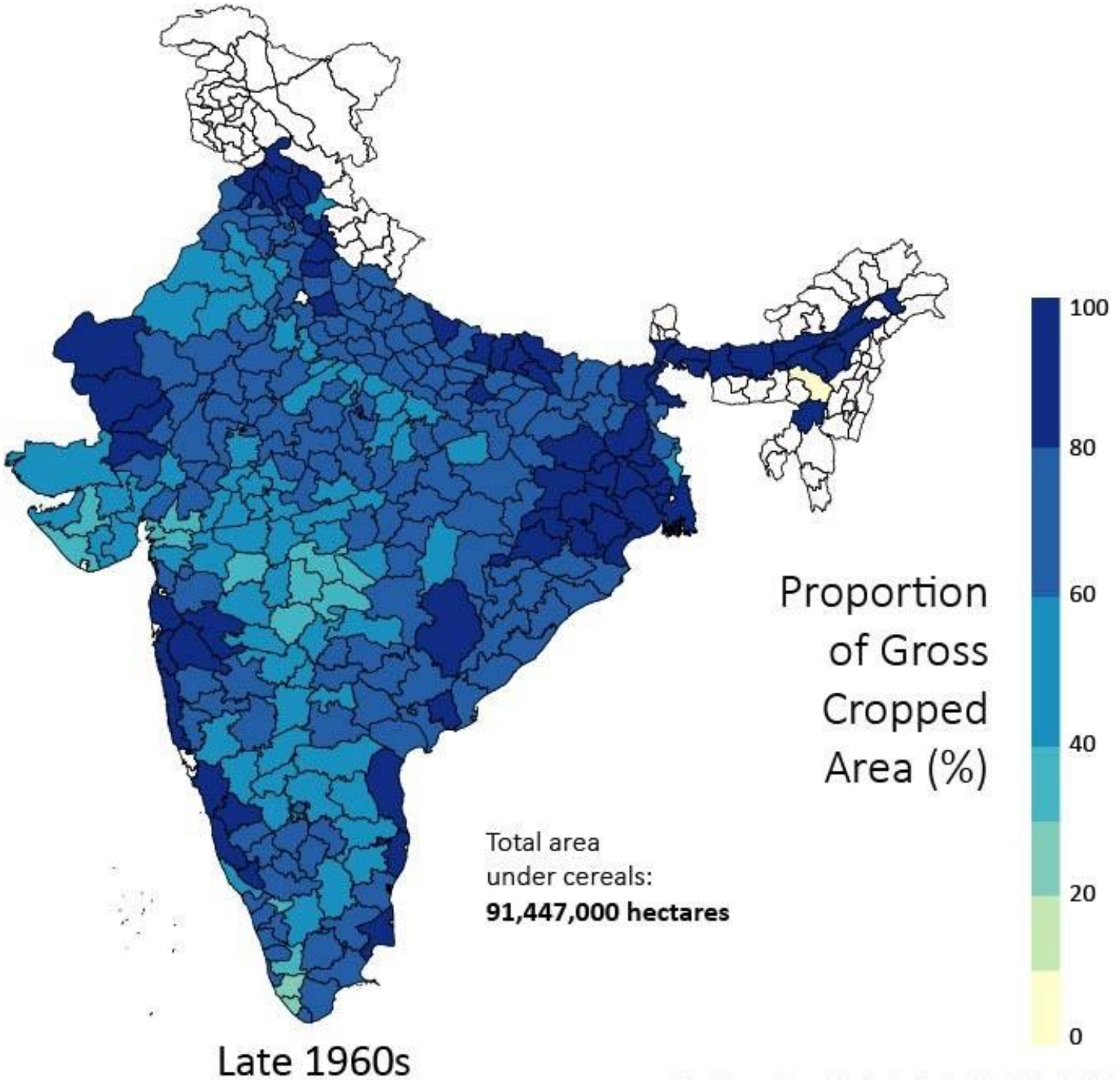

PRODUCTION & YIELD OF RICE BY CROP YEAR
1997-1998
1999-2000
2001-2002
2003-2004
2005-2006
2007-2008
2009-2010
2011-2012
2013-2015
Sum of PRODUCTION - Rice
Sum of YIELD - Rice


TOP 5 CROPS IN DISTRICT OF GOA
Groundnut
Other Rabi pulses
Other Kharif pulses
Ragi
Rice
Sugarcane
Goa - NORTH GOA
Goa - SOUTH GOA

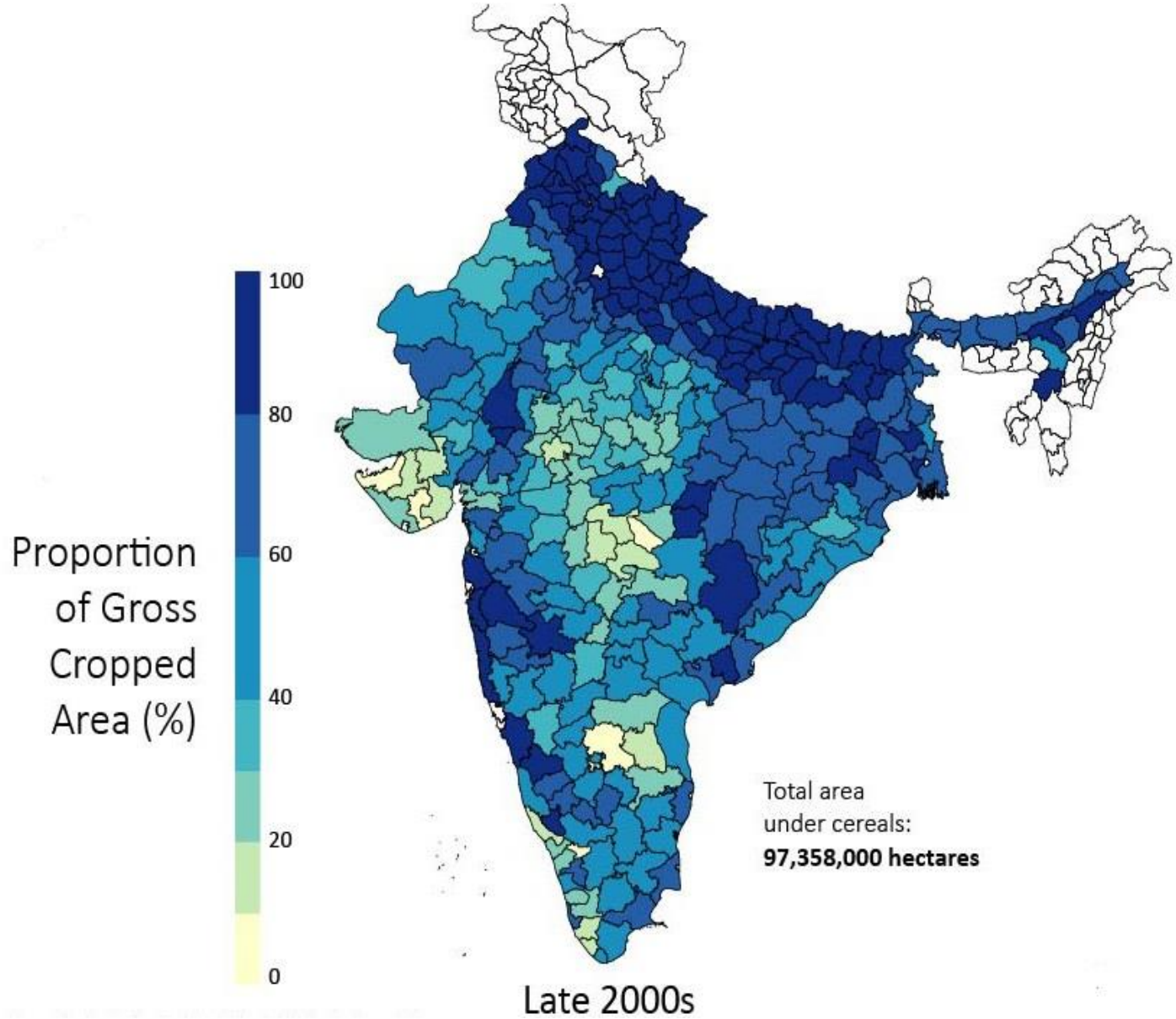

TOP 10 CROPS BY PRODUCTION BETWEEN 1-50000 AREA
7577
8816
13947
10318
7591
15087
9044
7901
9850
7899
ARHAR/TUR
GROUNDNUT
MAIZE
MOONG(GREEN GRAM)
RAPESEED &MUSTARD
RICE
SESAMUM
SUGARCANE
URAD
WHEAT

AGRICULTURAL PRODUCTION IN INDIA

LATE 1960s



LATE 2000s


Proportion of Gross Cropped Area (%)
100
80
60
40
20
0
Total area under cereals:
97,358,000 hectares
Late 2000s

BIBLIOGRAPHY

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- www.wikipedia.com
- https://exceljet.in
- Excel Bible book (2016)