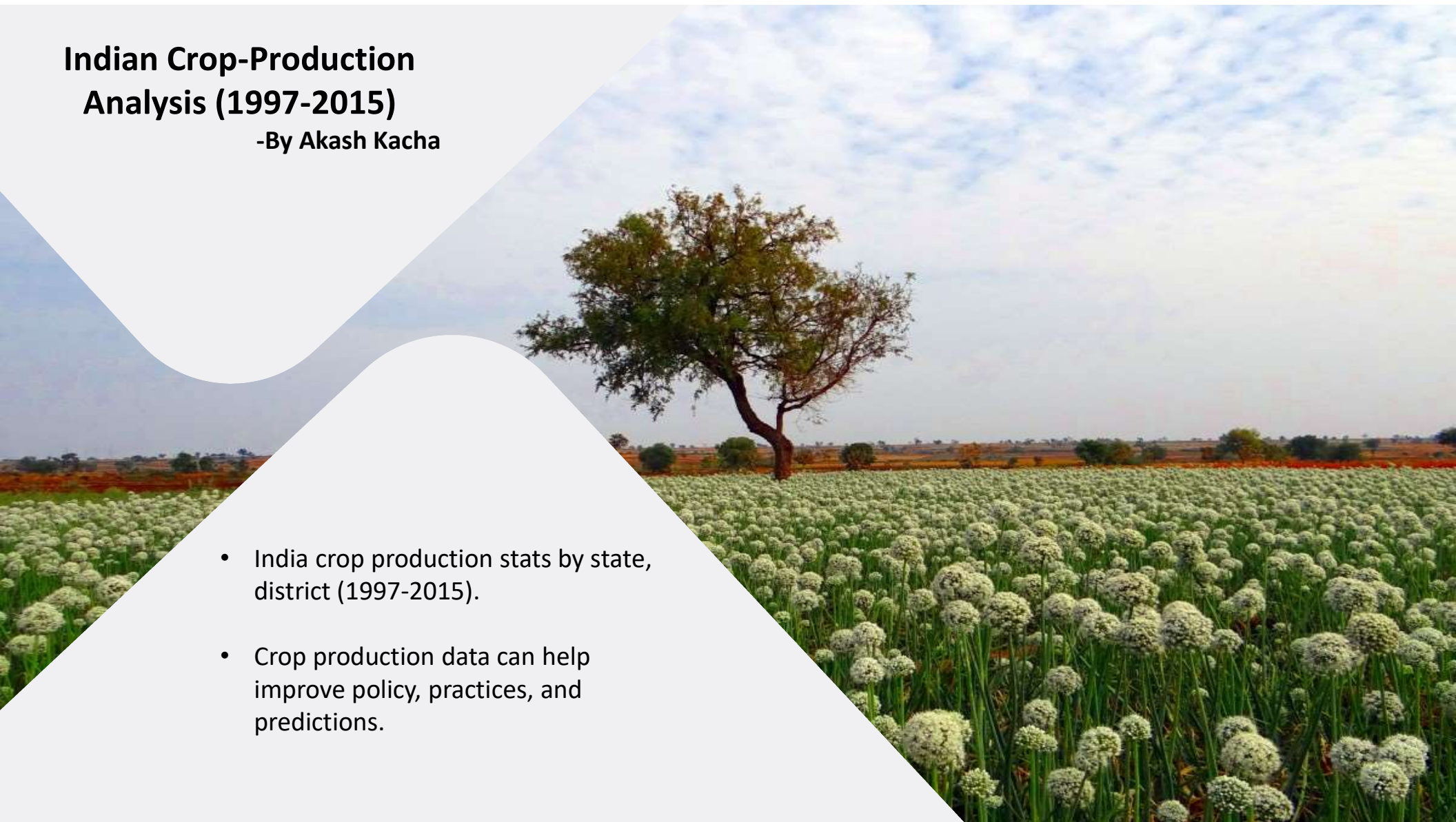


Indian Crop-Production Analysis (1997-2015)

-By Akash Kacha

- India crop production stats by state, district (1997-2015).
- Crop production data can help improve policy, practices, and predictions.



01

About Dataset



02

**Research
Questions**



03

Methodology



04

Insights



About Dataset

- This dataset offers detailed crop production statistics for India from 1997 to 2015
- It provides state and district-wise data on annual crop production and yield.
- The size of dataset is (242361, 11)
- This information is valuable for researchers, policymakers, and farmers to understand crop patterns, identify yield factors, and make informed decisions for agricultural improvement and sustainability.

Relevant columns used for this research:

State Name

District Name

Crop Year

Season

Crop

Area(Hectares)

Production(Tonnes)

Zone

Yield(Tonnes/Hectare)

Id

Crop category

Research Questions

1. How has crop production changed over the past 18 years (1997-2015) in different regions of India? Are there any upward or downward trends?
2. How does crop production vary across the all seasons (kharif, rabi, summer, Winter and autumn) in different regions?
3. Which crops have the highest yields in different regions? Can farmers be encouraged to grow more high-yield crops?
4. Which States have the highest production in different crop category?

Methodology

Descriptive Statistics:

Summarize key characteristics of the data

Data Visualization:

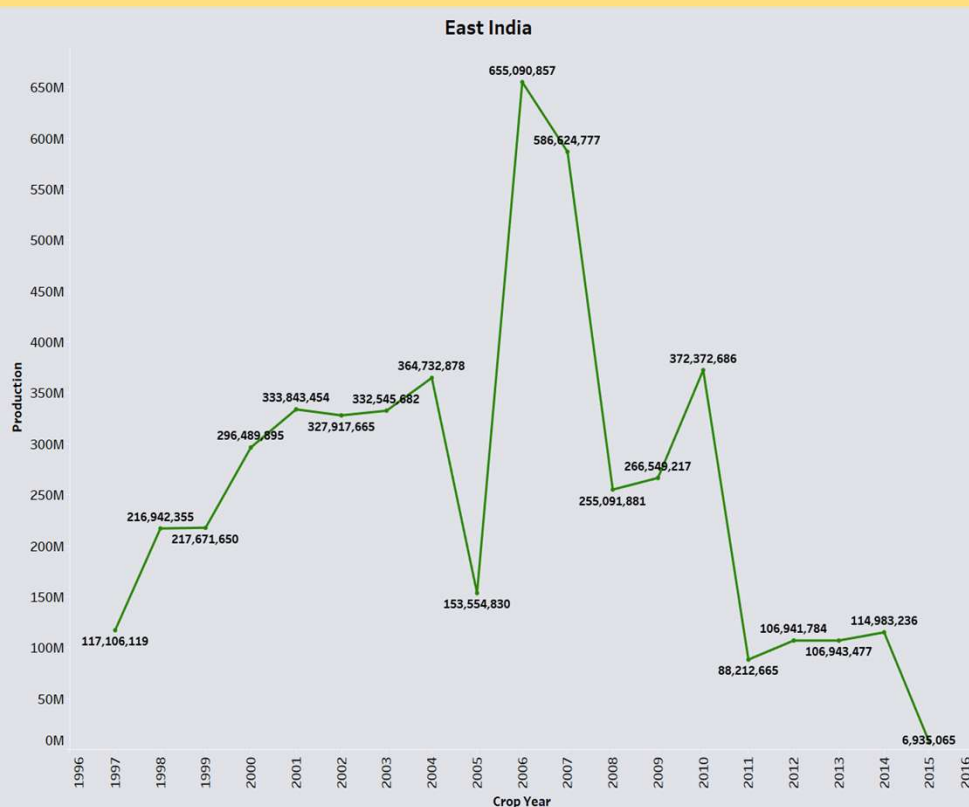
Present visual representations of data

Data Exploration:

Discuss initial findings and insights from the EDA process.

How has crop production changed over the past 23 years (1997-2015) in different regions of India? Are there any upward or downward trends?

East India



1. Initial Growth (1996-2003):

- Production in 1996 was 117.1 Million Tons.
- There was a steady increase in production until 2003, peaking at 364.7 Million Tons.

2. Significant Fluctuations (2004-2010):

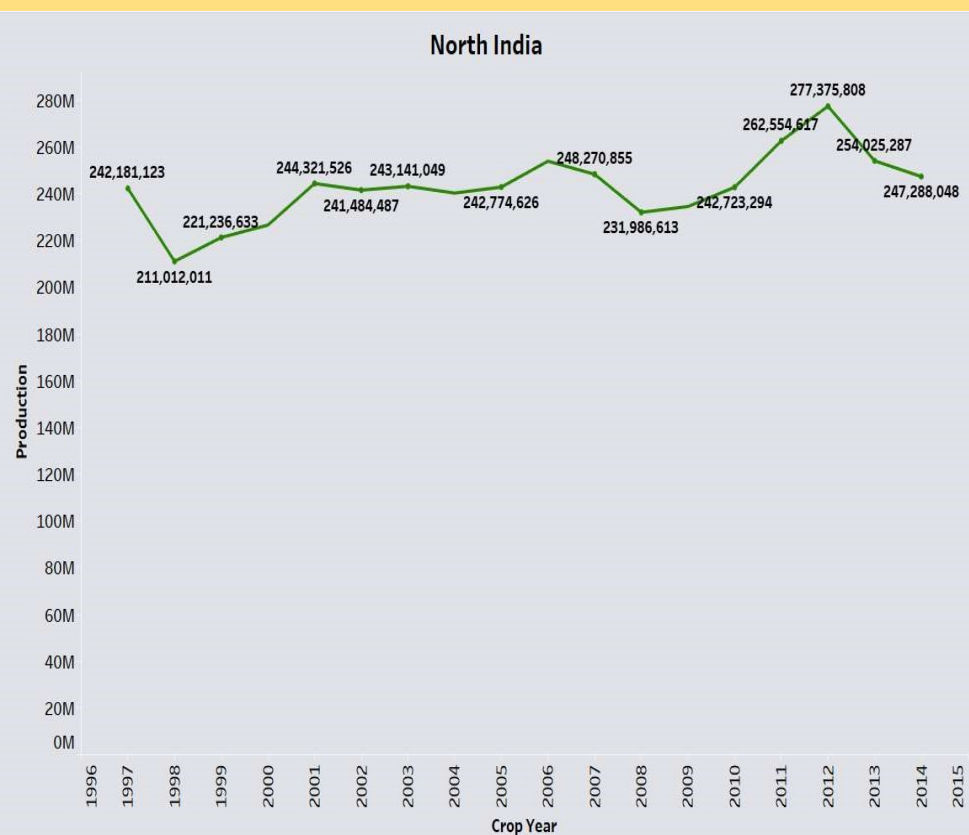
- A sharp decline in production in 2004 to 153.6 Million Tons.
- A rapid increase in 2005 to 655.1 Million Tons, the highest in the given period.
- Another decline in the following years, reaching 255.1 Million Tons in 2009.
- A brief increase in 2010 to 372.4 Million Tons.

3. Overall Decline (2011-2015):

- A general trend of decline in crop production from 2011 onwards.
- Notable drops to 88.2 Million Tons in 2011 and further down to 6.9 Million by 2015.

How has crop production changed over the past 23 years (1997-2015) in different regions of India? Are there any upward or downward trends?

North India



1. Initial Fluctuations (1996-2000):

- Production started at 242.2 Million tons in 1996.
- There was a decrease to 211.0 Million tons in 1997.
- Slight recovery to 221.2 Million tons in 1998 and then an increase to 244.3 Million tons in 1999.

2. Stable Period (2000-2011):

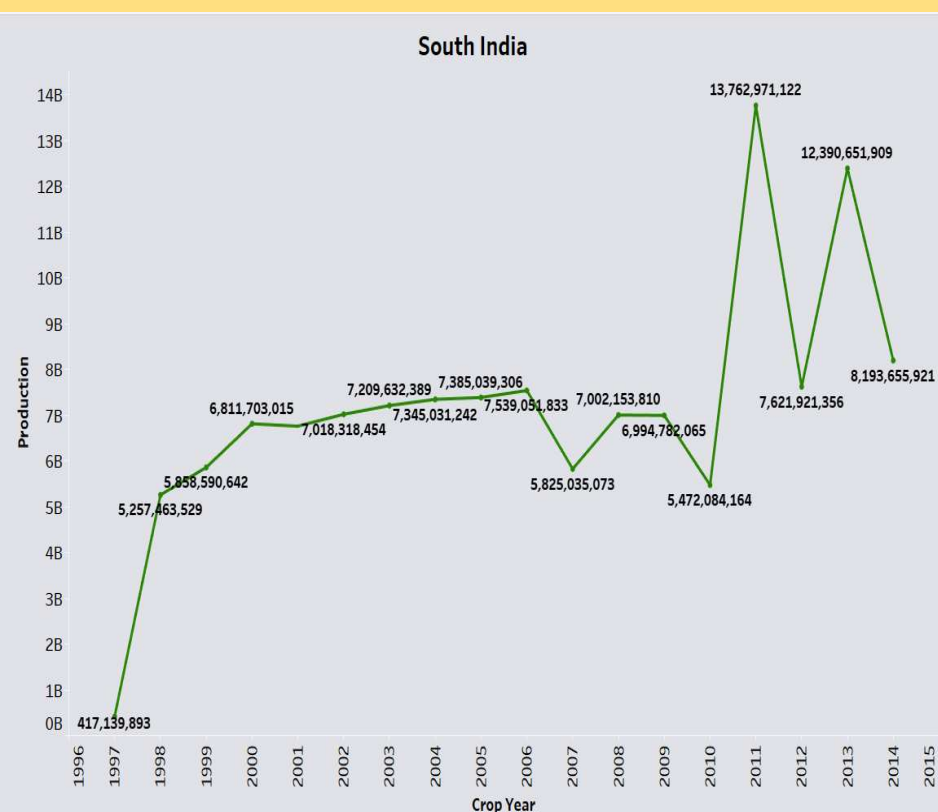
- From 2000 to 2011, the production remained relatively stable, fluctuating between 241.5 Million tons and 248.3 Million tons.
- The highest production in this period was 248.3 Million tons in 2005.
- The lowest production in this period was 231.0 Million tons in 2009.

3. Increase and Decline (2011-2015):

- A significant increase to 262.6 Million tons in 2012.
- Peaking at 277.4 Million tons in 2013.
- Followed by a decline to 247.3 Million tons in 2015.

How has crop production changed over the past 23 years (1997-2015) in different regions of India? Are there any upward or downward trends?

South India



1.Initial Growth (1996-2001):

- Production started at 417.1 Million tons in 1996.
- There was a steady increase to 5,858.6 Million tons by 1999.
- A slight increase to 6,811.7 Million tons in 2000.

2.Stable Period (2002-2006):

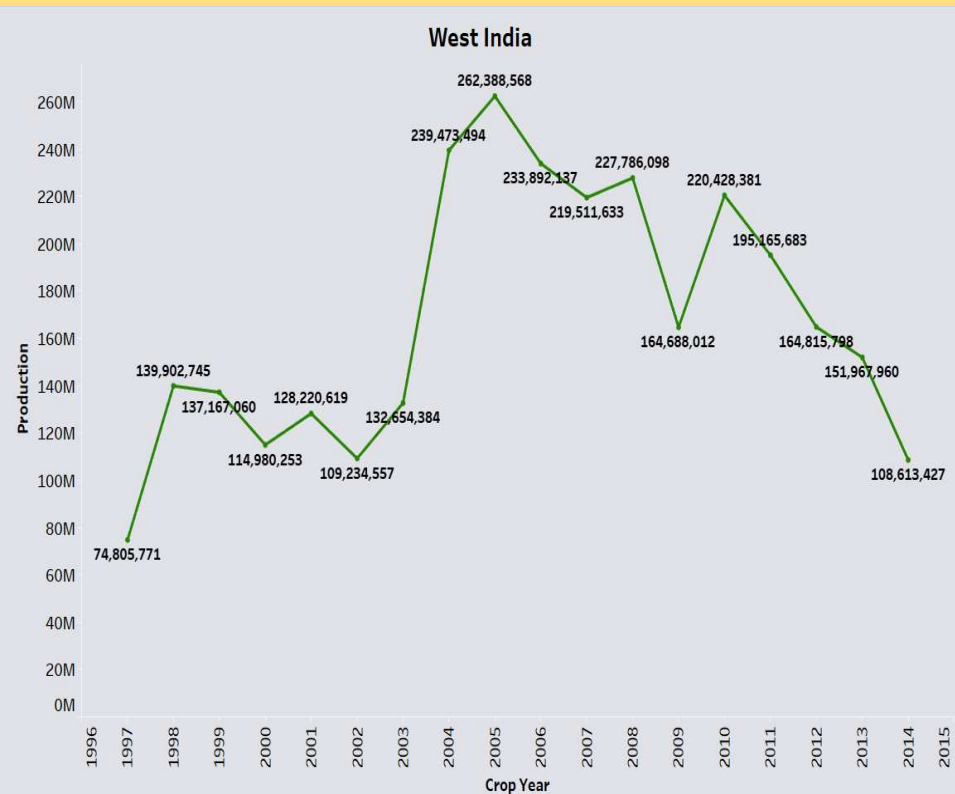
- Production remained relatively stable between 7,018.3 Million tons and 7,539.1 Million tons.
- The highest production in this period was 7,539.1 Million tons in 2005.

3.Fluctuations and Peaks (2007-2015):

- A notable drop to 5,825.0 Million tons in 2007.
- A significant increase to 13,763.0 Million tons in 2010, the highest in the given period.
- Another peak at 12,390.7 Million tons in 2012, followed by a drop to 7,621.9 Million tons in 2013.
- Production in 2015 was 8,193.7 Million tons.

How has crop production changed over the past 23 years (1997-2015) in different regions of India? Are there any upward or downward trends?

West India



1. Initial Growth (1996-1997):

- Production in 1996 was 74.8 Million Tons.
- There was a steady increase in production in 1997, peaking at 139.9 Million Tons.

2. Significant Fluctuations (1998-2010):

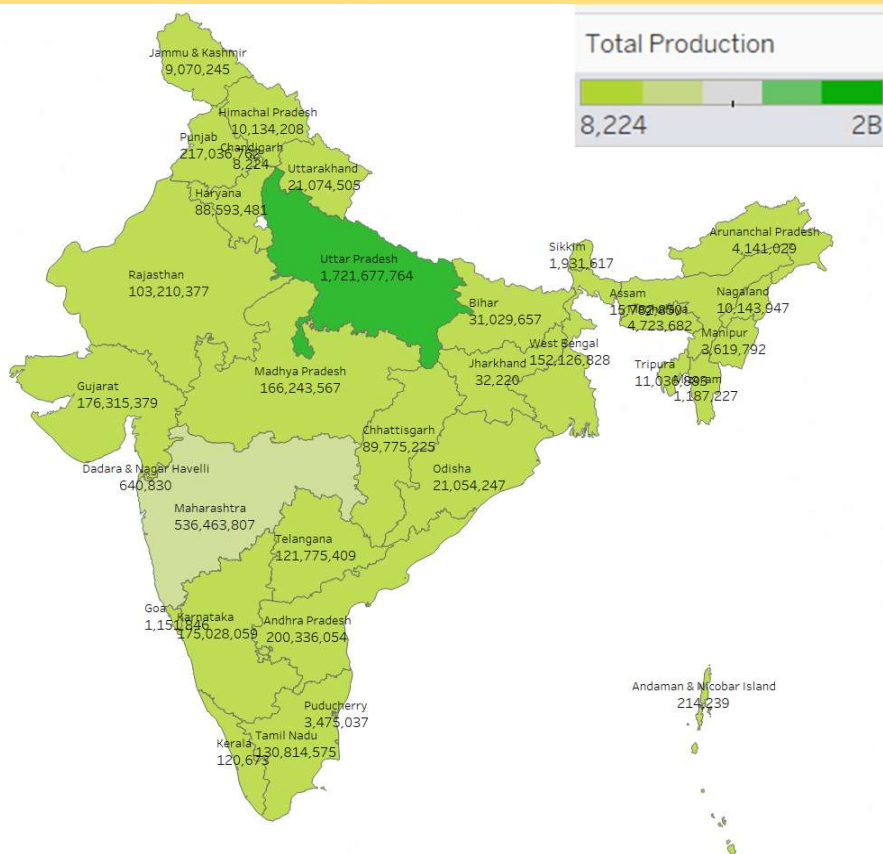
- A sharp decline in production till 2002 to 109.2 Million Tons.
- A rapid increase in 2003-2005 to 262.3 Million Tons, the highest in the given period.
- Another decline in the following years, reaching 164.8 Million Tons in 2009.
- A brief increase in 2010 to 220.4 Million Tons.

3. Overall Decline (2011-2015):

- A general trend of decline in crop production from 2011 onwards.
- Notable drops to 195.1 Million Tons in 2011 and further down to 108.6 Million by 2015.

How does crop production vary across the all seasons (kharif, rabi, summer, Winter and autumn) in different regions?

Kharif



Top 5 State With Highest Crop Production:

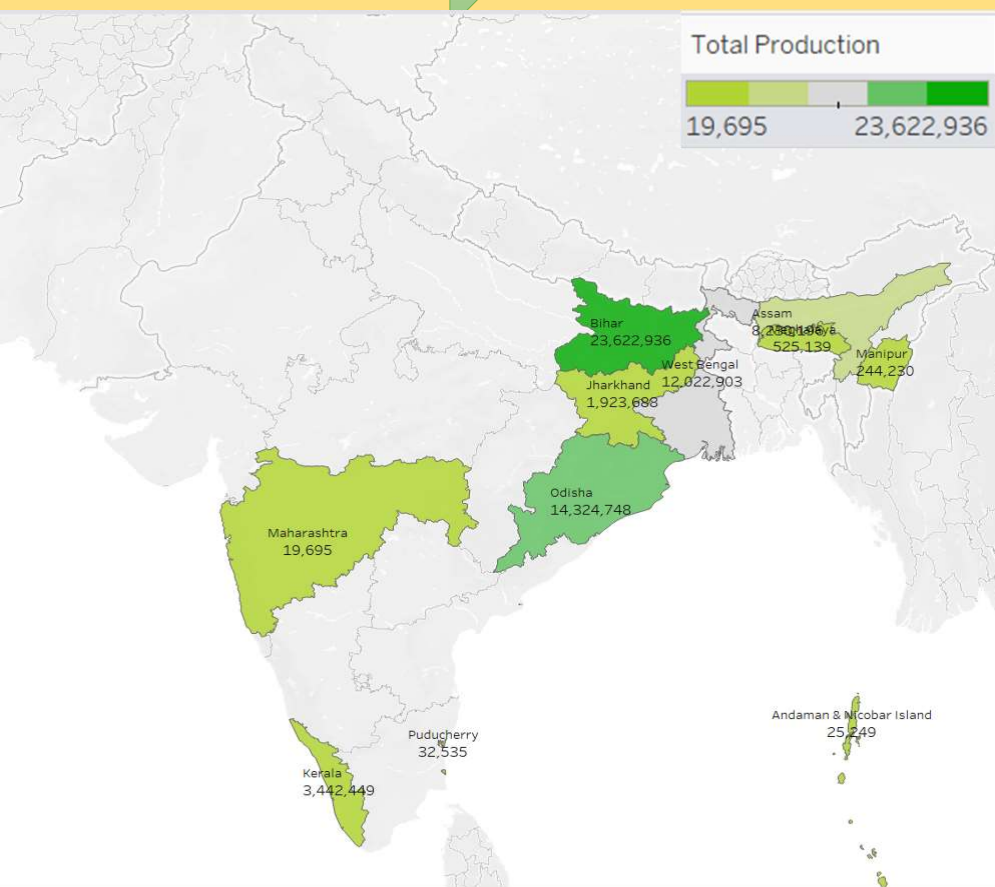
1. Uttar Pradesh: 1721.6 Million Tons
2. Maharashtra: 536.4 Million Tons
3. Punjab: 217 Million Tons
4. Andhra Pradesh: 200.3 Million Tons
5. Gujarat: 176 Million Tons

Bottom 5 State Or UT With Lowest Crop Production:

1. Chandigarh : 0.0082 Million Tons
2. Jharkhand:0.0322 Million Tons
3. Kerela:0.1206 Million Tons
4. Andaman & Nicobar Island:0.2142 Million Tons
5. Dadara & Nagar Haveli:0.6408 Million Tons

How does crop production vary across the all seasons (kharif, rabi, summer, Winter and autumn) in different regions?

Autumn



- Only a few states are having Autumn crops. Here are top 3 and bottom 3 states or UT total production wise in Autumn Season

- Top 3:

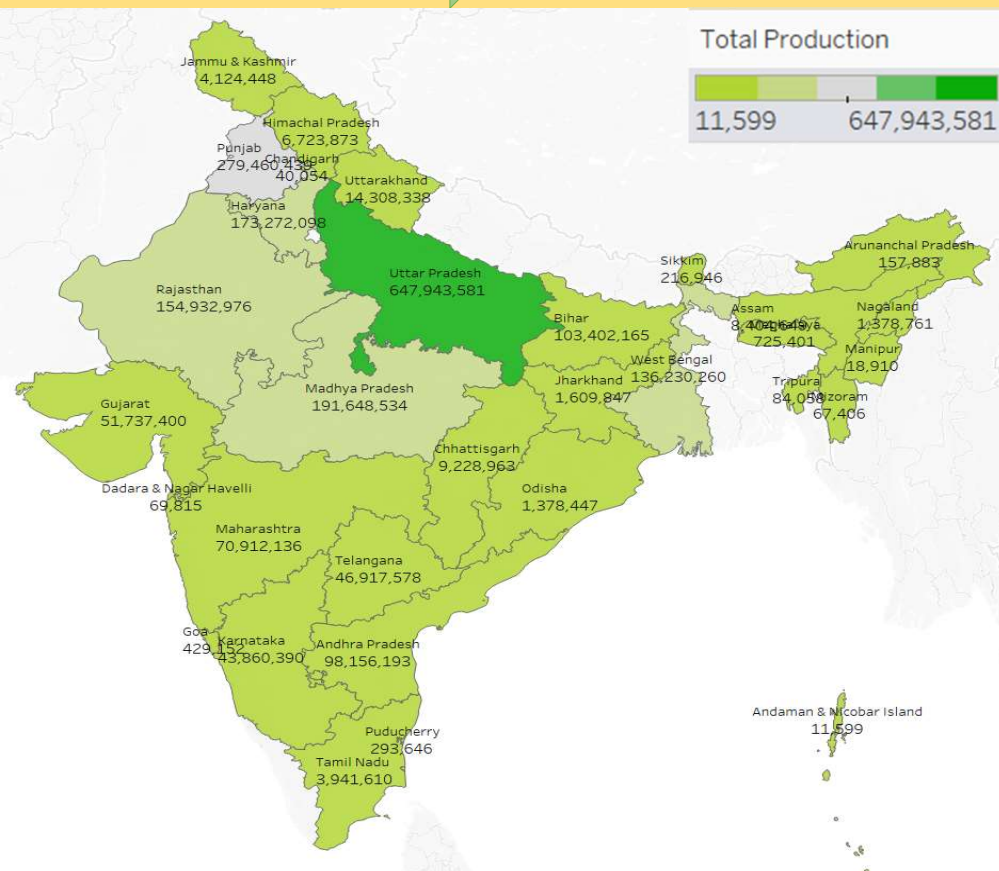
1. Bihar: 23.6 Million Tons
2. Odisha: 14.3 Million Tons
3. West Bengal: 12 Million Tons

- Bottom 3:

1. Maharashtra: 0.0196 Million Tons
2. Andaman & Nicobar Island: 0.0252 Million Tons
3. Puducherry: 0.0325 Million Tons

How does crop production vary across the all seasons (kharif, rabi, summer, Winter and autumn) in different regions?

Rabi



• Top 5 State With Highest Crop Production:

1. Uttar Pradesh: 647.94 Million Tons
2. Punjab: 279.46 Million Tons
3. Madhya Pradesh: 191.65 Million Tons
4. Haryana: 173.27 Million Tons
5. Rajasthan: 154.93 Million Tons

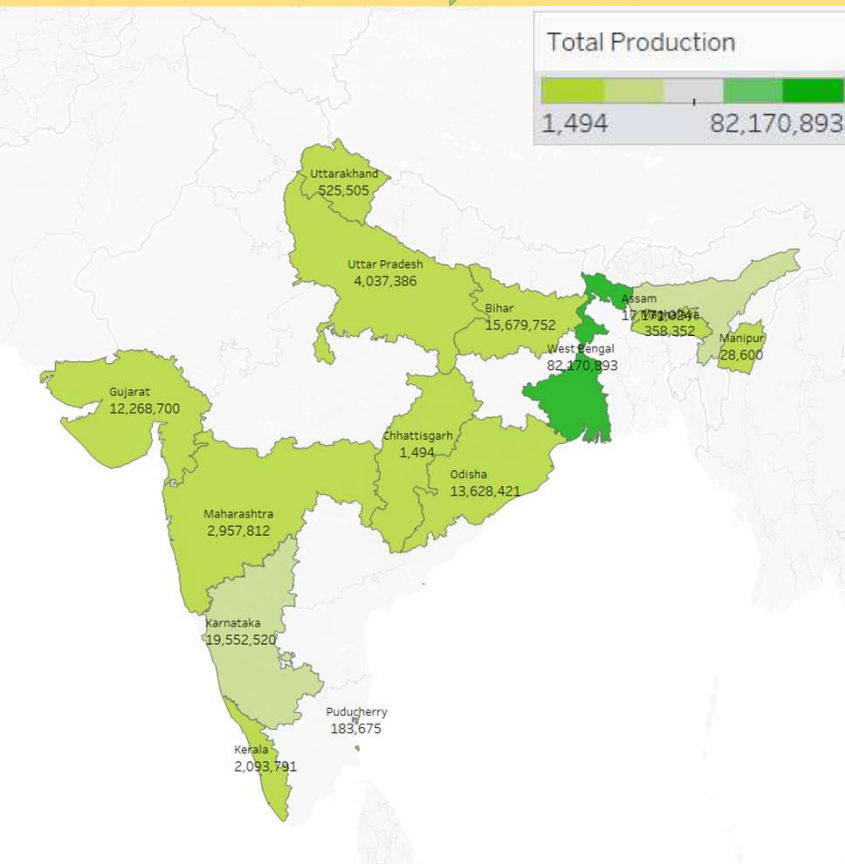
• Bottom 5 State Or UT With Lowest Crop Production:

1. Andaman & Nicobar Island : 0.6981 Million Tons
2. Manipur:0.0674 Million Tons
3. Chandigarh:0.0400 Million Tons
4. Mizoram:0.02142 Million Tons
5. Dadara & Nagar Haveli:0.6408 Million Tons

- Kerela don't have any crop production in Rabi season

How does crop production vary across the all seasons (kharif, rabi, summer, Winter and autumn) in different regions?

Summer



- Only half states are having Summer crops. Here are top 3 and bottom 3 states or UT total production wise in Summer Season

• Top 3:

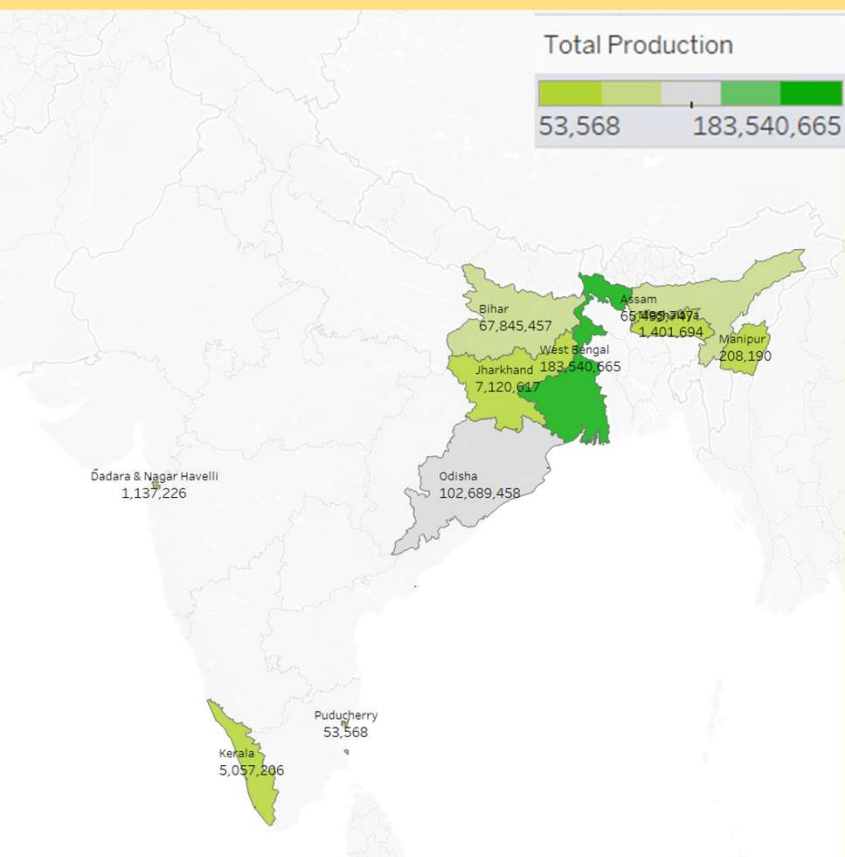
1. Bihar: 23.6 Million Tons
2. Odisha: 14.3 Million Tons
3. West Bengal: 12 Million Tons

• Bottom 3:

1. Chhattisgarh: 0.0014 Million Tons
2. Manipur: 0.0286 Million Tons
3. Puducherry: 0.183 Million Tons

How does crop production vary across the all seasons (kharif, rabi, summer, Winter and autumn) in different regions?

Winter



- Only a few states are having Winter crops. Here are top 3 and bottom 3 states or UT total production wise in Winter Season

- Top 3:

1. West Bengal: 183.5 Million Tons
2. Odisha: 14.3 Million Tons
3. Bihar: 67.8 Million Tons

- Bottom 3:

1. Puducherry : 0.0535 Million Tons
2. Manipur : 0.2082 Million Tons
3. Dadara & Nagar Haveli: 1.1372 Million Tons

Which crops have the highest yields in different regions? Can farmers be encouraged to grow more high-yield crops?

East India

Andaman & Nicobar Island

Crop	Yield
Coconut	3796.02
Sugarcane	13.41
Banana	8.90
Tapioca	7.42
Sweet potato	5.76

Arunachala Pradesh

Crop	Yield
Sugarcane	17.81
Potato	7.19
Dry ginger	6.21
Turmeric	4.41
Dry chillies	1.99

Assam

Crop	Yield
Coconut	5295.17
Sugarcane	37.71
Papaya	18.41
Pineapple	15.69
Banana	14.27

Bihar

Crop	Yield
Sugarcane	44.55
Banana	18.23
Sweet potato	13.01
Onion	9.15
Jute	8.95

Chhattisgarh

Crop	Yield
Papaya	37.83
Banana	37.35
Onion	6.28
Potato	5.99
Sweet potato	5.57

Jharkhand

Crop	Yield
Sugarcane	34.76
Potato	7.80
Onion	6.93
Arhar/Tur	1.44
Maize	1.31

Manipur

Crop	Yield
Sugarcane	31.86
Cabbage	12.18
Banana	11.88
Redish	8.76
Cauliflower	8.48

Meghalaya

Crop	Yield
Banana	10.61
Pineapple	8.90
Potato	7.53
Jute	7.43
Dry ginger	7.03

Which crops have the highest yields in different regions? Can farmers be encouraged to grow more high-yield crops?

East India

Mizoram

Crop	Yield
Sugarcane	10.19
Tapioca	6.75
Potato	4.52
Coconut	2.60
Cotton(lint)	1.83

Nagaland

Crop	Yield
Sugarcane	41.90
Tapioca	20.52
Potato	10.75
Colocasia	9.51
Ginger	9.12

Odisha

Crop	Yield
Sugarcane	57.38
Potato	9.93
Onion	8.30
Sweet potato	8.23
Jute	6.08

Sikkim

Crop	Yield
Potato	4.78
Other Vegetables	4.48
Rice	2.14
Maize	1.96
Wheat	1.16

Tripura

Crop	Yield
Sugarcane	50.44
Potato	17.73
Jute	8.22
Jute & mesta	8.11
Mesta	7.87

West Bengal

Crop	Yield
Coconut	2147.19
Sugarcane	84.00
Potato	22.35
Jute	14.78
Garlic	10.54

Which crops have the highest yields in different regions? Can farmers be encouraged to grow more high-yield crops?

North India

Chandigarh

Crop	Yield
Potato	21.11
Onion	18.63
Rice	4.70
Wheat	4.52
Sunflower	2.80

Haryana

Crop	Yield
Sugarcane	52.53
Onion	30.44
Potato	21.26
Sweet potato	15.60
Other Vegetables	8.01

Himachal Pradesh

Crop	Yield
Sugarcane	52.53
Onion	30.44
Potato	21.26
Sweet potato	15.60
Other Vegetables	8.01

Jammu & Kashmir

Crop	Yield
Potato	9.65
Sugarcane	2.48
Onion	1.84
Rice	1.53
Redish	1.51

Punjab

Crop	Yield
Sugarcane	5003.06
Wheat	4.42
Rice	3.71
Barley	3.38
Maize	3.19

Uttar Pradesh

Crop	Yield
Sugarcane	52.43
Banana	41.02
Potato	20.90
Onion	14.38
Sweet potato	12.87

Uttarakhand

Crop	Yield
Sugarcane	59.99
Potato	12.77
Ginger	10.15
Dry ginger	9.28
Onion	7.04

Which crops have the highest yields in different regions? Can farmers be encouraged to grow more high-yield crops?

South India

Andhra Pradesh

Crop	Yield
Coconut	10689.47
Papaya	98.35
Sugarcane	81.48
Banana	26.14
Pome Fruit	22.94

Karnataka

Crop	Yield
Sugarcane	89.21
Grapes	28.95
Banana	19.70
Dry ginger	16.98
Citrus Fruit	14.59

Puducherry

Crop	Yield
Coconut	11563.11
Sugarcane	96.62
Banana	23.94
Tapioca	21.74
Brinjal	15.39

Tamil Nadu

Crop	Yield
Coconut	2445.18
Sugarcane	164.01
Cabbage	60.29
Banana	41.33
Tapioca	37.20

Telangana

Crop	Yield
Coconut	10366.80
Papaya	112.14
Sugarcane	78.64
Banana	26.34
Onion	20.24

Which crops have the highest yields in different regions? Can farmers be encouraged to grow more high-yield crops?

West India

Dadara & Nagar Havelli

Crop	Yield
Sugarcane	77.50
Coconut	71.22
Banana	14.38
Rice	1.98
Wheat	1.93

Goa

Crop	Yield
Coconut	3304.84
Sugarcane	51.42
Pineapple	16.59
Other Vegetables	11.41
Banana	11.30

Gujarat

Crop	Yield
Sugarcane	66.53
Banana	62.48
Onion	26.69
Potato	22.09
Garlic	5.55

Madhya Pradesh

Crop	Yield
Banana	30.53
Sugarcane	30.34
Papaya	26.80
Onion	14.39
Potato	12.31

Maharashtra

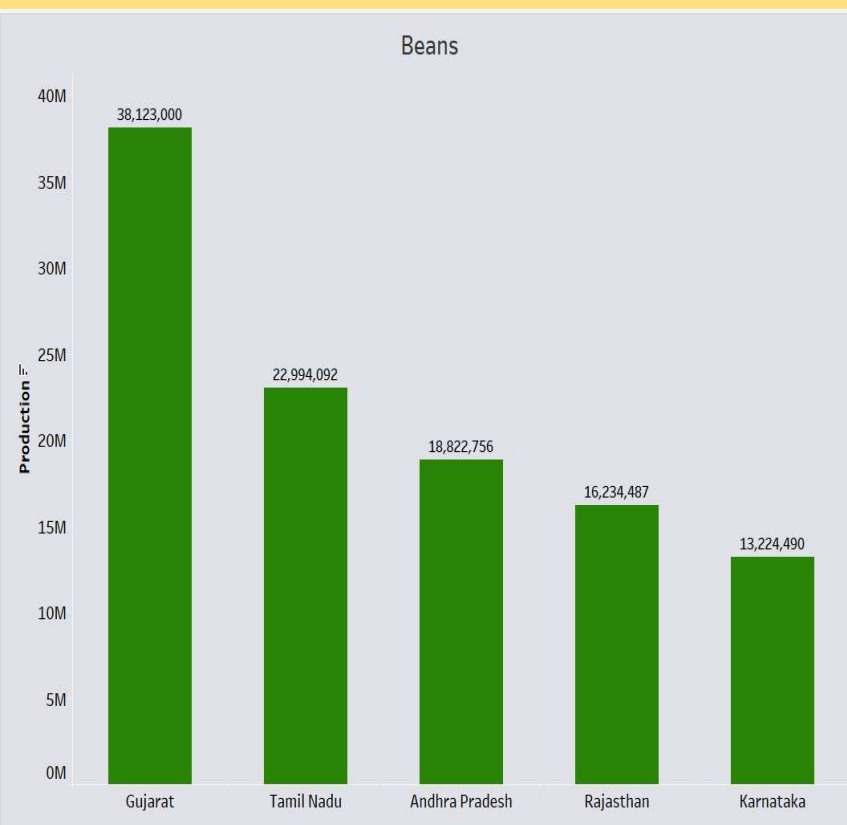
Crop	Yield
Sugarcane	71.07
Banana	57.57
Grapes	23.88
Onion	12.45
Maize	8.32

Rajasthan

Crop	Yield
Sugarcane	53.88
Potato	5.89
Onion	4.98
Turmeric	2.82
Dry ginger	2.77

Which States have the highest production in different crop category?

Beans



- **Gujarat Dominance:** Gujarat is the leading producer of beans, with a production of 38.123 million tons.
- **Tamil Nadu and Andhra Pradesh Follow:** Tamil Nadu and Andhra Pradesh are the second and third largest producers, respectively, with production figures of 22.994 million tons and 18.823 million tons.
- **Rajasthan and Karnataka:** Rajasthan and Karnataka have relatively similar production levels, with 16.234 million tons and 13.224 million tons, respectively.

Which States have the highest production in different crop category?

Cereal



- **Uttar Pradesh Dominance:** Uttar Pradesh is the leading cereal producer with a substantial production of 779.276 million tons.
- **Punjab as a Strong Contender:** Punjab follows closely behind Uttar Pradesh, producing 466.025 million tons of cereal.
- **Significant Production in West Bengal:** West Bengal occupies the third position with a production of 278.996 million tons.
- **Haryana and Madhya Pradesh:** Haryana and Madhya Pradesh have similar production levels, with 224.279 million tons and 216.423 million tons respectively.
- **Production Gap:** There's a noticeable gap in production between the top two states (Uttar Pradesh and Punjab) and the remaining three.

Which States have the highest production in different crop category?

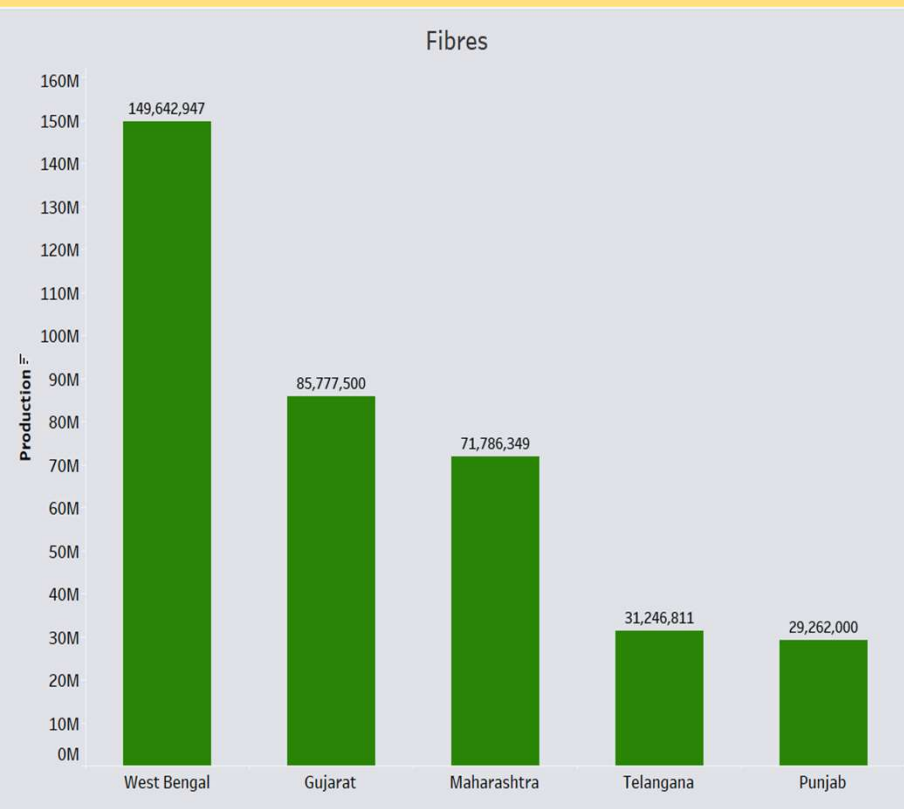
Commercial



- **Uttar Pradesh Dominance:** Uttar Pradesh is the leading state in commercial production with a substantial output of 2,205.005 million tons.
- **Maharashtra as a Strong Contender:** Maharashtra holds the second position with a production of 938.489 million tons, indicating significant commercial activity.
- **Tamil Nadu and Karnataka Follow:** Tamil Nadu and Karnataka occupy the third and fourth positions, respectively, with production figures of 847.701 million tons and 533.634 million tons.
- **Andhra Pradesh at the Bottom:** Andhra Pradesh has the lowest commercial production among the five states at 230.429 million tons.

Which States have the highest production in different crop category?

Fibers



- **West Bengal Dominance:** West Bengal is the leading fibers producer with a substantial output of 149.643 million tons.

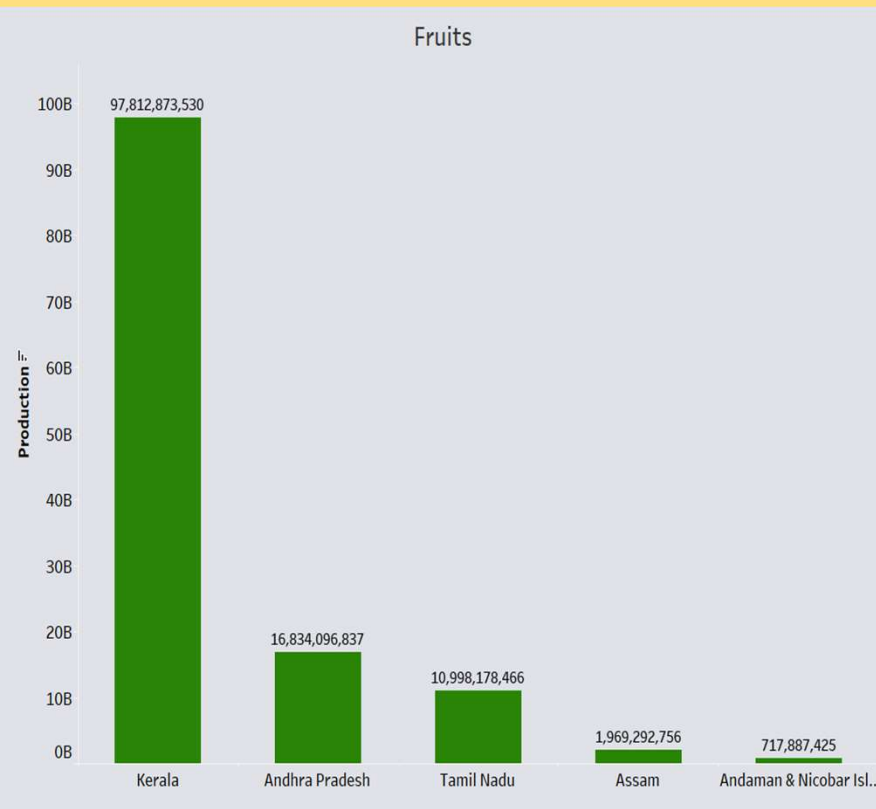
- **Gujarat Follows Closely:** Gujarat holds the second position with a production of 85.777 million tons, indicating significant fibers production.

- **Maharashtra in Third Place:** Maharashtra occupies the third position with a production of 71.786 million tons.

- **Telangana and Punjab:** Telangana and Punjab have relatively lower fibers production compared to the top three states, with 31.246 million tons and 29.262 million tons, respectively.

Which States have the highest production in different crop category?

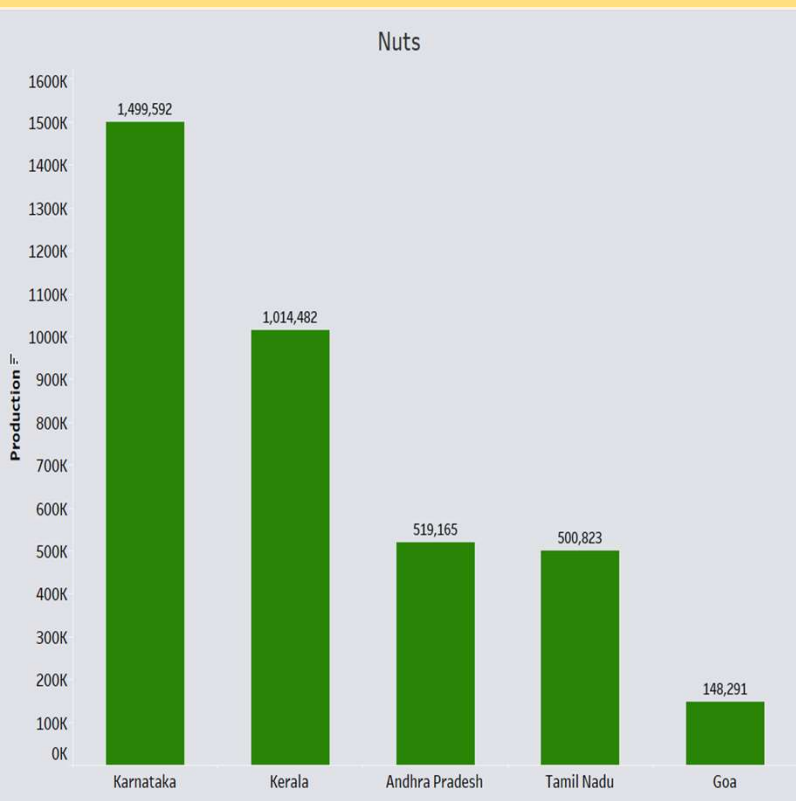
Fruits



- **Kerala Dominance:** Kerala is the leading fruit producer with an overwhelming production of 978.128 billion tons.
- **Andhra Pradesh in Second Place:** Andhra Pradesh holds the second position with a production of 168.340 billion tons, indicating significant fruit production.
- **Tamil Nadu Follows:** Tamil Nadu occupies the third position with a production of 109.981 billion tons.
- **Assam and Andaman & Nicobar Islands:** Assam and Andaman & Nicobar Islands have considerably lower fruit production compared to the top three states, with 19.692 billion tons and 7.178 billion tons, respectively.

Which States have the highest production in different crop category?

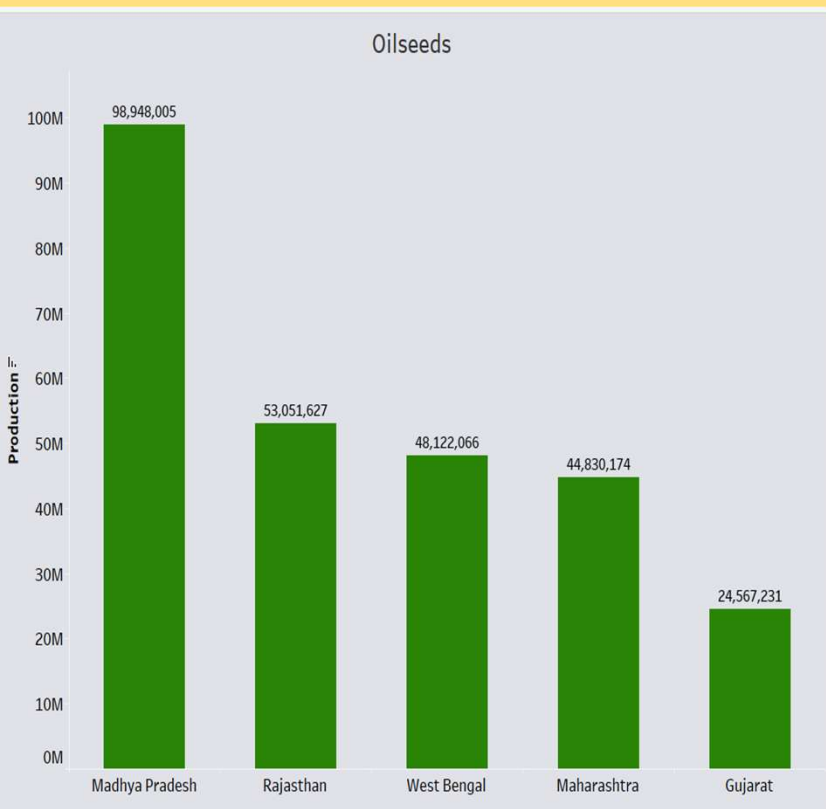
Nuts



- **Karnataka Dominance:** Karnataka is the leading nut producer among the five states with an overwhelming production of 1.499 million tons.
- **Kerala Follows:** Kerala holds the second position with a production of 1.014 million tons, indicating significant nut production.
- **Andhra Pradesh in Third Place:** Andhra Pradesh occupies the third position with a production of 0.5191 million tons.
- **Tamil Nadu and Goa:** Tamil Nadu and Goa have considerably lower nut production compared to the top three states, with 0.5008 million tons and 0.1482 million tons, respectively.

Which States have the highest production in different crop category?

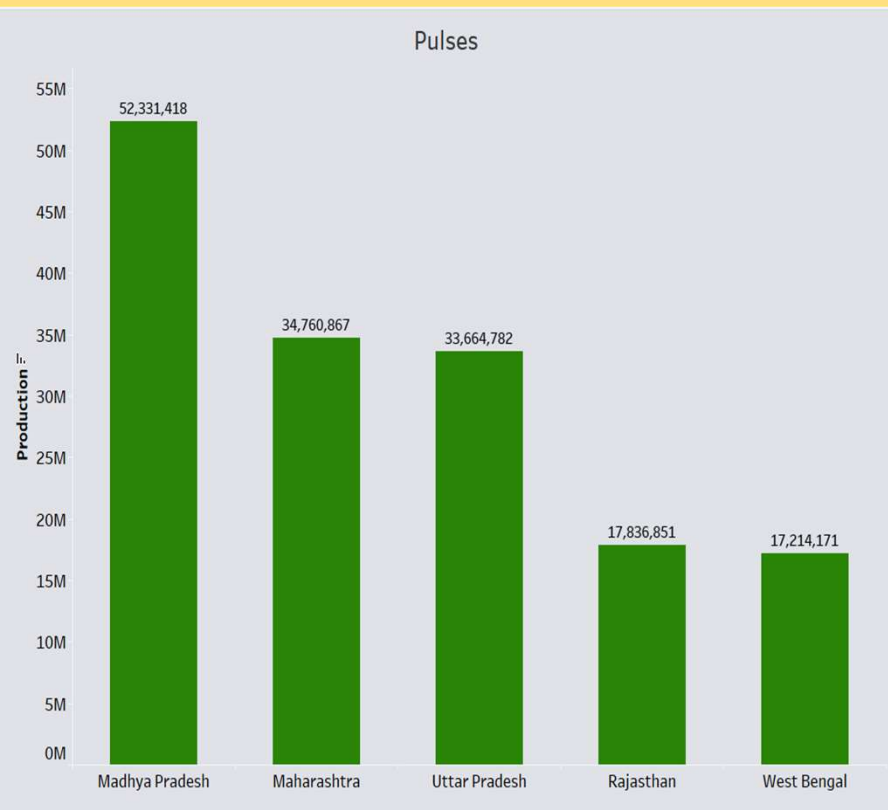
Oil Seeds



- **Madhya Pradesh Dominance:** Madhya Pradesh is the leading oilseed producer with a substantial output of 98.9 million tons.
- **Rajasthan Follows:** Rajasthan holds the second position with a production of 53 million tons, indicating significant oilseed production.
- **West Bengal in Third Place:** West Bengal occupies the third position with a production of 48.1 million tons.
- **Maharashtra and Gujarat:** Maharashtra and Gujarat have lower oilseed production compared to the top three states, with 44.8 million tons and 24.5 million tons, respectively.

Which States have the highest production in different crop category?

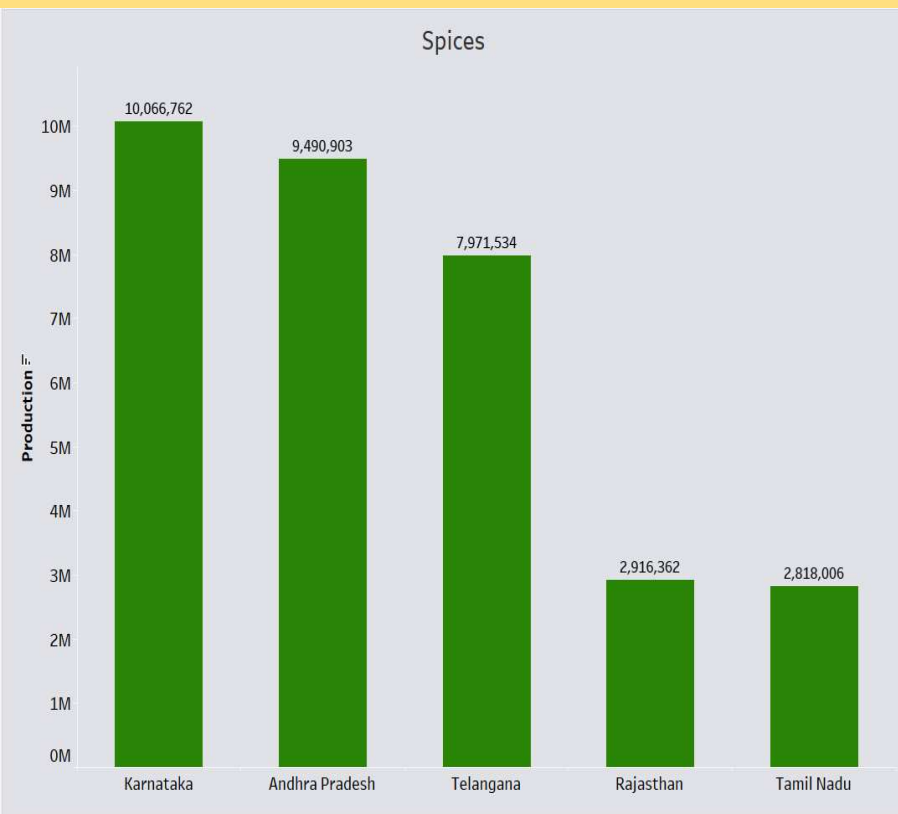
Pulses



- **Madhya Pradesh Dominance:** Madhya Pradesh is the leading pulse producer with a substantial output of 52.331 million tons.
- **Maharashtra and Uttar Pradesh Follow:** Maharashtra and Uttar Pradesh hold the second and third positions respectively, with production figures of 34.760 million tons and 33.664 million tons.
- **Rajasthan and West Bengal:** Rajasthan and West Bengal have lower pulse production compared to the top three states, with 17.836 million tons and 17.214 million tons, respectively.

Which States have the highest production in different crop category?

Spices



•**Karnataka Dominance:** Karnataka is the leading spice producer with a substantial output of 10.067 million tons.

•**Andhra Pradesh Follows:** Andhra Pradesh holds the second position with a production of 9.490 million tons, indicating significant spice production.

•**Telangana in Third Place:** Telangana occupies the third position with a production of 7.971 million tons.

•**Rajasthan and Tamil Nadu:** Rajasthan and Tamil Nadu have lower spice production compared to the top three states, with 2.916 million tons and 2.818 million tons, respectively.

Which States have the highest production in different crop category?

Vegetables



- **Uttar Pradesh Dominance:** Uttar Pradesh is the leading vegetable producer with a substantial output of 200.829 million tons.
- **West Bengal Follows:** West Bengal holds the second position with a production of 155.010 million tons, indicating significant vegetable production.
- **Tamil Nadu in Third Place:** Tamil Nadu occupies the third position with a production of 61.972 million tons.
- **Kerala and Gujarat:** Kerala and Gujarat have lower vegetable production compared to the top three states, with 46.456 million tons and 38.485 million tons, respectively.

Suggestions:

Specific Suggestions

•Based on Question 1:

- Identify regions with declining production and analyze the underlying causes (e.g., climate change, policy changes, pests).
- Promote crops suitable for changing climatic conditions in affected regions.

•Based on Question 2:

- Analyze the reasons for seasonal variations in production (e.g., water availability, weather patterns).
- Develop crop calendars tailored to different regions and seasons.

•Based on Question 3:

- Promote the cultivation of high-yielding crops through extension services, subsidies, and technology transfer.
- Develop seed and fertilizer distribution networks for high-yielding varieties.

•Based on Question 4:

- Identify best practices from top-producing states and replicate them in other regions.
- Facilitate knowledge sharing among states to improve overall production.

**Thank you for your time
and attention**

**"What did you like best about the presentation?"
or "What could be improved?"
Please share your thoughts by emailing at
[\[akashkacha04@gmail.com\]](mailto:akashkacha04@gmail.com)**

