PROJECT REPORT

PROJECT 3:
Data Visualization of Bird Strikes between 2000 – 2011

Domain: Transportation and Communication

Mentor:-
Saiprasad Kagne

Presented by:-
- Sahil Pahuja
- Shazmeen Shamsi
- Priya Kumari

INTRODUCTION

- Bird Strike: A collision between a bird and an aircraft (in flight mode/on a take-off/landing roll).
- Is common and can be a significant threat to aircraft safety (several fatal accidents have already been reported).
- Significant damage may be caused to smaller aircraft.
- All aircraft, especially jet-engine ones, are vulnerable to the loss of thrust which can follow the ingestion of birds into engine air intakes.
- Bird strikes may occur during any phase of flight, but are most likely during the take-off, initial climb, approach and landing phases due to the greater numbers of birds in flight at lower levels.

PROBLEM STATEMENT

Birds + planes = 'snarge'

- Transport and communication: Crucial domain in the field of analytics.
- Major Concerns: Environmental impact and Safety.
- Why should we be worried? Bird and other wildlife strikes annually cause over $650 million in damage to U.S. civil and military aviation. They put the lives of aircraft crew members and their passengers at risk.
- Important issue because of the ever-increasing amount of vehicles and people.

The most famous example of a dangerous bird strike was the 2009 "Miracle on the Hudson," in which a US Airways jet was forced to land on the Hudson River after both engines of the aircraft ingested birds and failed

ANALYSIS:

- Our project visually depicts the data collected on Bird Strikes by Federal Aviation Administration (FAA) between 2000-2011.
- Approach:
  - Python: Used for Data Cleaning
  - Tableau: For Visualization.
- Based on the findings, a story was created.
- For better understanding, the results were displayed on 3 dashboards of the story, listed as:
  - Direct/Indirect Impact on Mankind
  - Location, Air Service and Environmental Conditions
  - Study on Birds

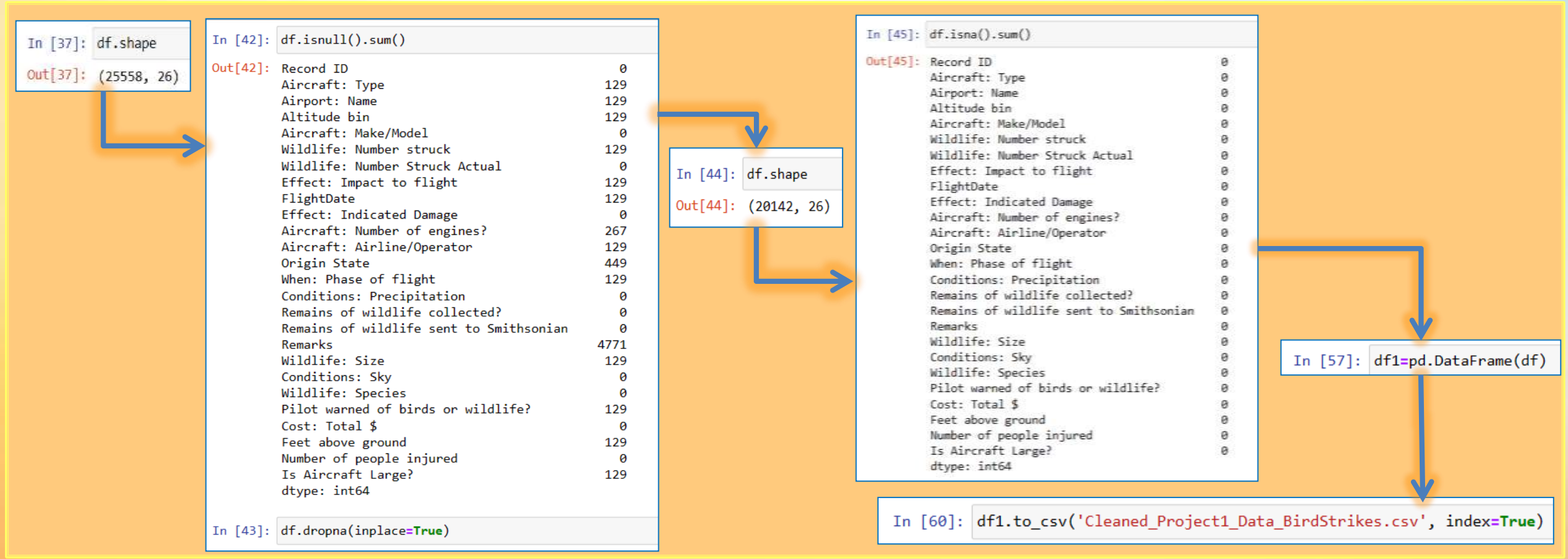
Attributes present in the data

```
Record ID
Aircraft: Type
Airport: Name
Altitude bin
Aircraft: Make/Model
Wildlife: Number struck
Wildlife: Number Struck Actual
Effect: Impact to flight
FlightDate
Effect: Indicated Damage
Aircraft: Number of engines?
Aircraft: Airline/Operator
Origin State
When: Phase of flight
Conditions: Precipitation
Remains of wildlife collected?
Remains of wildlife sent to Smithsonian
Remarks
Wildlife: Size
Conditions: Sky
Wildlife: Species
Pilot warned of birds or wildlife?
Cost: Total $
Feet above ground
Number of people injured
Is Aircraft Large?
```

- Link to Dataset: https://docs.google.com/spreadsheets/d/1PF1PQ4qg4ySrtyOXiF6SFGX7P0Qfl_r/edit?rtpof=true&sd=true#gid=1443108996
- Link to Python Notebook: https://colab.research.google.com/drive/1UUxDYFA0zJPxjnfJqMAudMl_E-0w4ghz
- Link to Tableau: Story:https://public.tableau.com/app/profile/shazmeen.shamsi/viz/DataVisualizationofBirdStrikesbetween20002011/LocationandEnvironmentalConditions?publish=yes

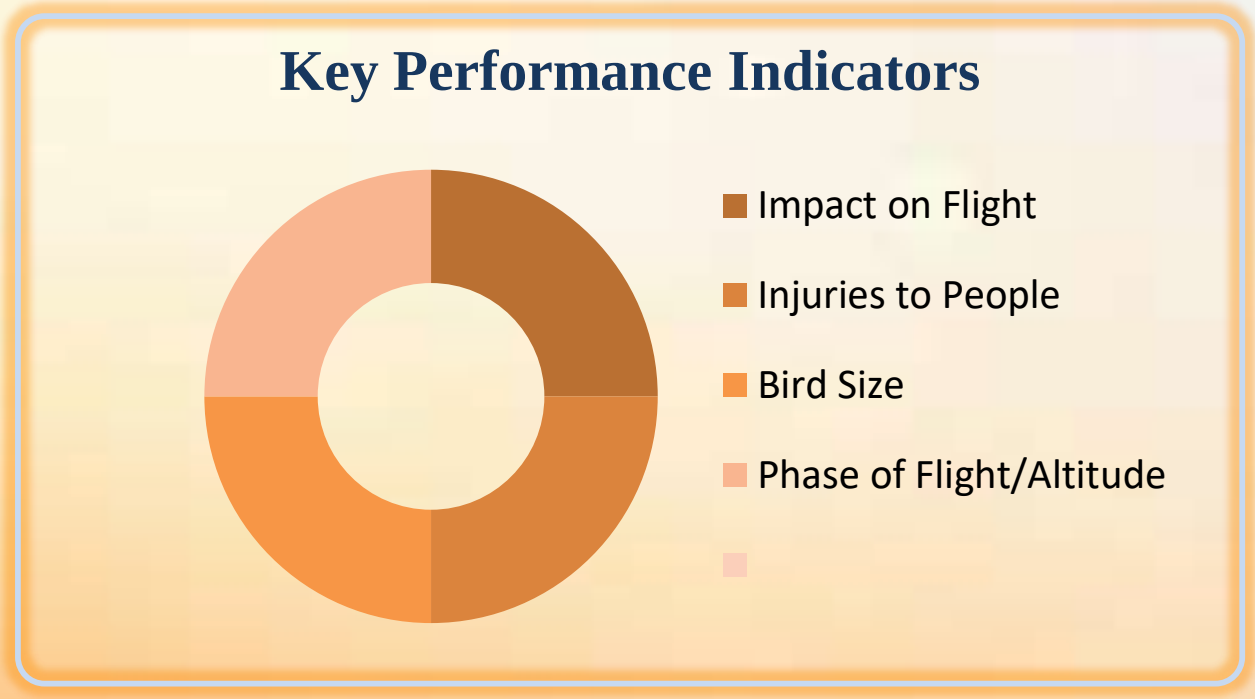
DATA CLEANING

- Dataset was first read.
- Missing and null values were found and removed using dropna( ) method. (5416 null values were removed, there were no duplicate values)
- Cleaned file is downloaded for visual analysis in Tableau.



KEY PERFORMANCE INDICATORS

- Impact/Effect on flight due to variation in altitude and environmental conditions.
- Phase of Flight, which is directly or indirectly proportional to altitude
- Injuries due to fatal accidents: Ultimately, the primary goal of safety above all else is to keep people safe
- Species and Size of Birds.



Data Visualization of Bird Strikes between 2000 – 2011

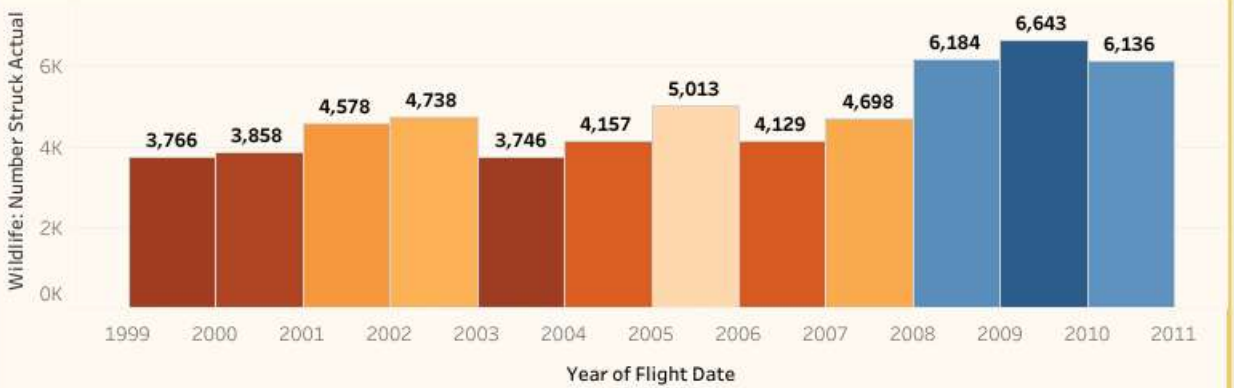
Number of people Injured

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
0	3	3	8	0	0	1	0	3	1	0	2

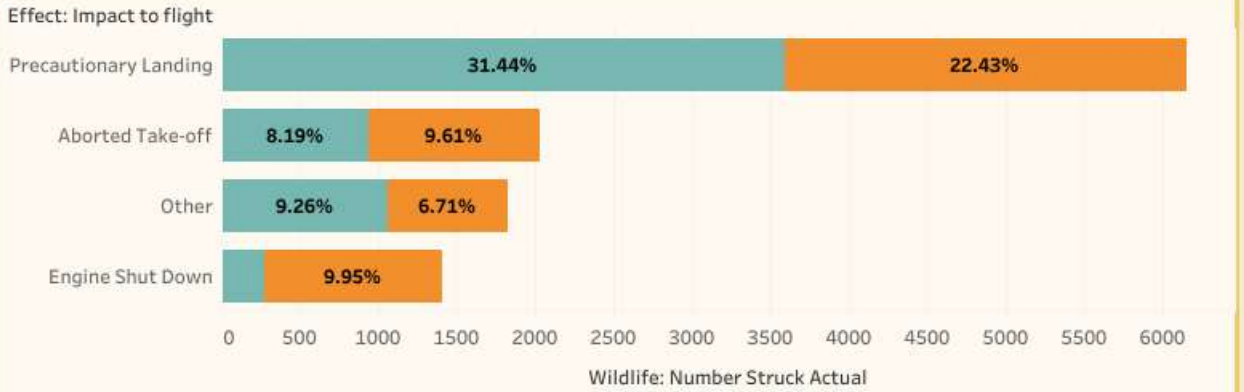
Yearly Cost Incurred

Average Altitude in different Phases at time of Strike

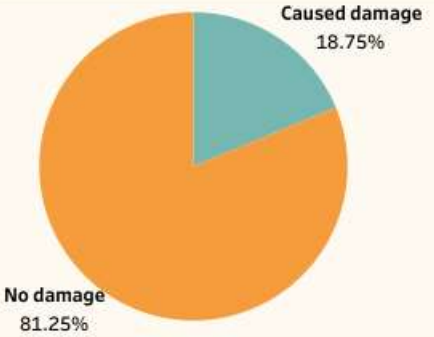
Number of Bird Strikes/year



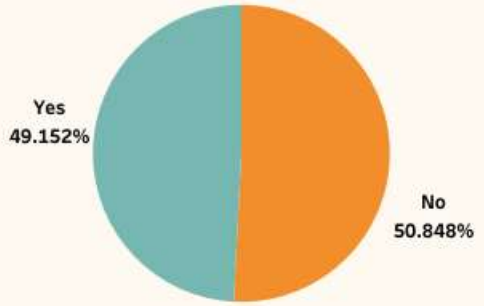
Prior Warning and effect of strike relation



Effect on Flight



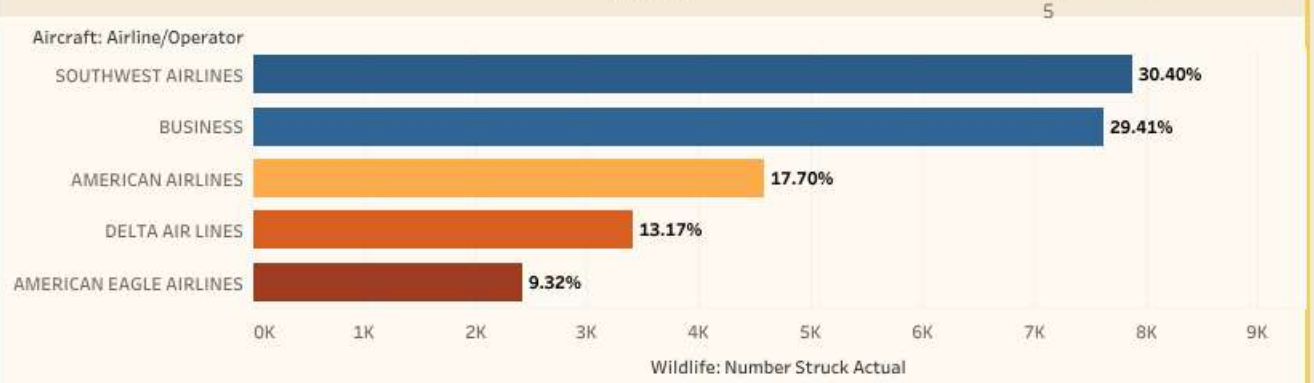
Were Pilots informed?



Map

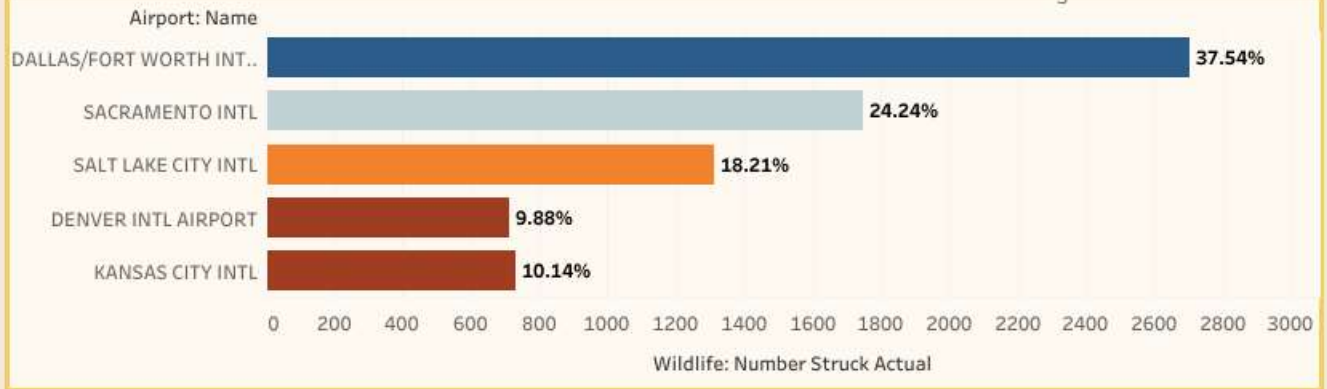
Airline

Top N Airlines
5

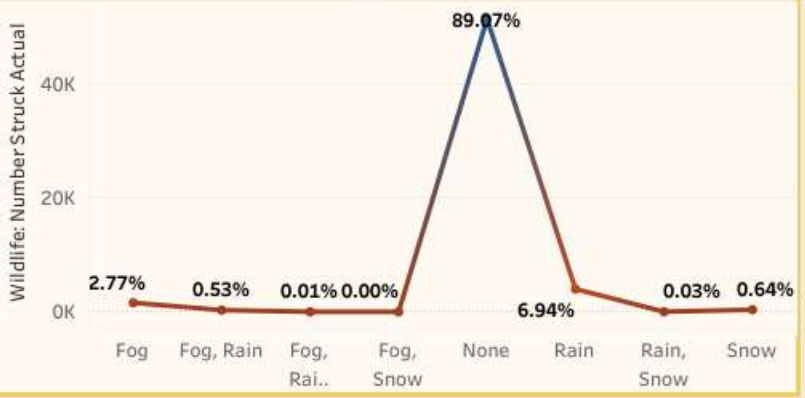


Airport

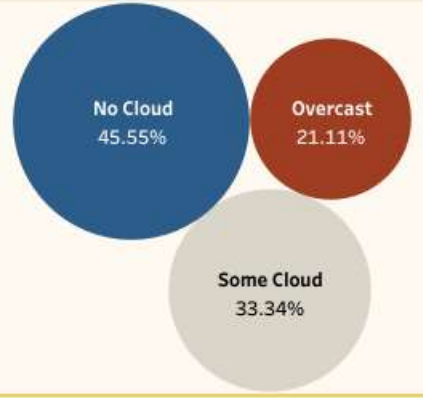
Top N Airports
5



Precipitation



Sky Condition



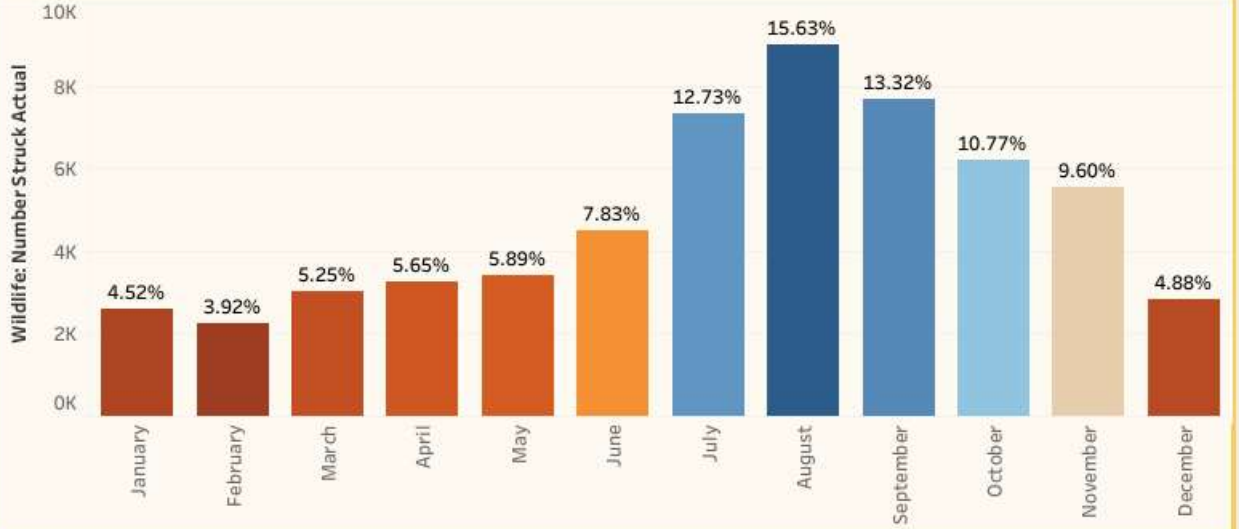
Species

Top Species encountered
5

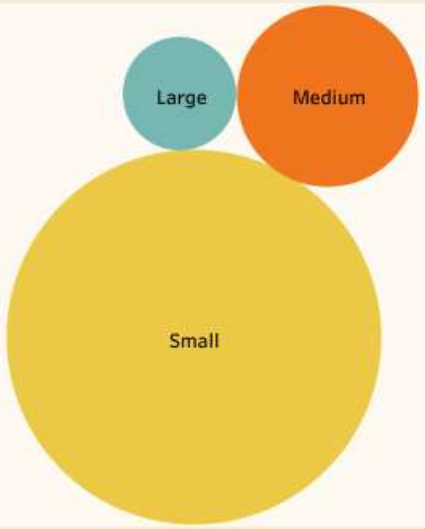
Year of Flight Date

Wildlife: Sp..	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Unknown bird - small	878	1,047	1,145	1,154	1,258	1,297	1,543	1,388	1,169	2,027	1,675	1,531
Unknown bird - medium	1,285	329	444	443	428	636	539	471	454	636	457	611
Mourning dove	122	89	238	198	110	258	317	201	210	246	305	202
European starling	349	584	1,302	1,310	477	328	981	495	1,013	545	676	568
Unknown bird - large	58	58	68	119	66	70	60	81	76	124	82	79

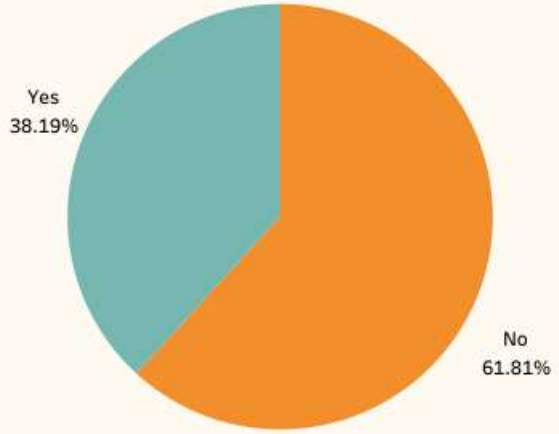
Bird Strike by Month



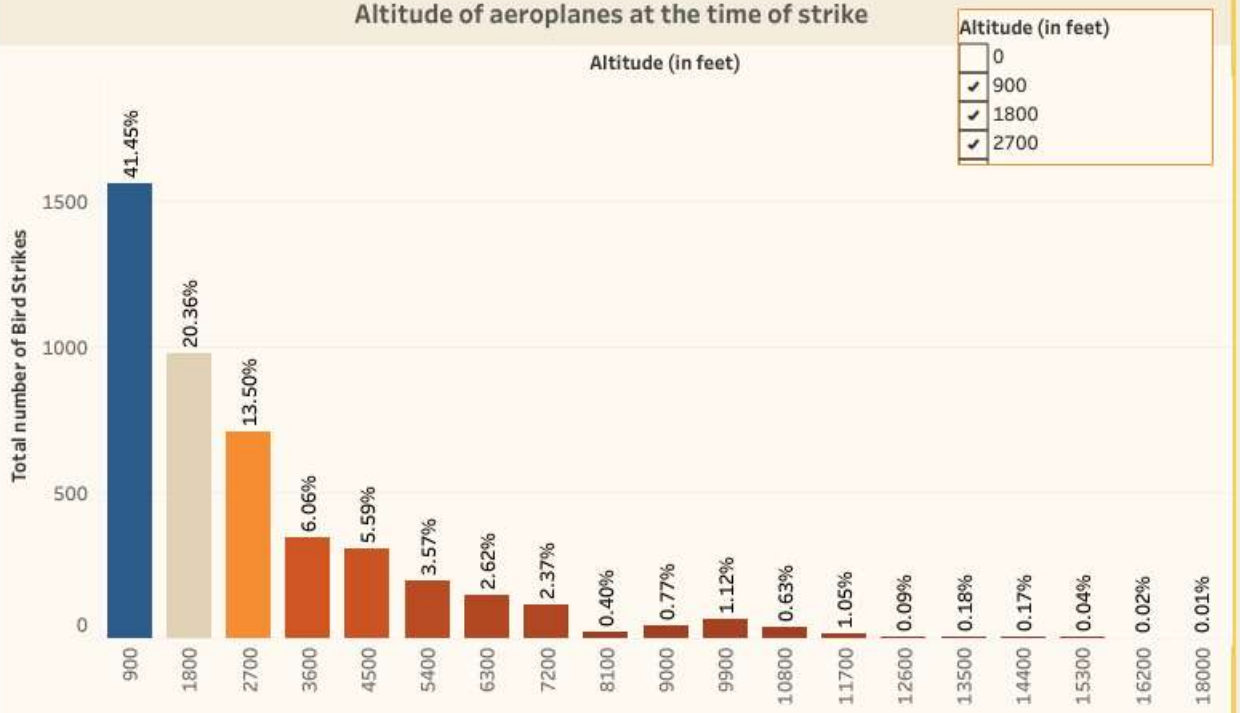
Bird Size



Remains of Bird Collected



Altitude of aeroplanes at the time of strike



SOLUTIONS THAT CAN BE OFFERED

Modifying Habitat

- Remove Seed bearing Plants to eliminate food sources
- Remove Bushes and Trees that serve as attractive nesting sites
- Use insecticides/ Pesticides to eliminate food sources for insect-eating birds

Modifying Bird Behavior

- Use of Noise generators to disrupt Birds
- Use of lasers at dawn and dusk to scare them away
- Use of trained Falcons/ Dogs in the airport area to teach birds that the area has many predators

Modifying Plane Behavior

- Use of radar equipment to track the density and movement of birds.
- Adjust flight times to avoid busiest hours to bird activity as per the location.

DRAWBACKS & SOLUTIONS/FUTURE SCOPE

Drawbacks:

- Habitats of Birds can get affected.
- Predators can sometimes themselves be a risk to the aircraft and cause confusion at the runway.
- It will require a proper infrastructure, that will be a costly affair.
- Restoration of electricity & Broadband might take sometime due to underground cabling

Which one is real and which one a robird?

Solutions/Future Scope:

- Bird Sanctuary can be set up wherein breeding box will also be a priority.
- Bird houses can be built to attract birds
- Bird robots in the form of predators can be used.
- Proper planning through Data Analysis.
- Use of robirds/drones/laser/radar equipment.

THANK YOU!

PROJECT REPORT

PROJECT 7:
CROP PRODUCTION ANALYSIS IN INDIA

Domain: Agriculture

Mentor:-
Saiprasad Kagne

Presented by:-
- Sahil Pahuja
- Shazmeen Shamsi
- Priya Kumari

INTRODUCTION

- Farmers and agribusinesses have to make innumerable decisions every day.
- An essential issue for agricultural planning intention is the accurate yield estimation for the numerous crops involved in the planning.
- Today, India ranks second worldwide in the farm output.
- Agriculture is demographically the broadest economic sector.
- Agriculture is a unique business crop production which is dependent on many climate and economy factors.

- An accurate estimate of crop production and risk helps these companies in planning supply chain decision like production scheduling. Business such as seed, fertilizer, agrochemical and agricultural machinery industries plan production and marketing activities based on crop production estimates.

PROBLEM STATEMENT

- The Agriculture domain- vital part of the overall supply chain.
- Expected to highly evolve in the upcoming years.
- This study presents a novel Business-to-Business collaboration platform from the agri-food sector perspective & aims to facilitate the collaboration of numerous stakeholders belonging to associated business domains.

ANALYSIS

- Dataset provides information on crop production in India ranging from several 1997-2015.
- Based on the Information the ultimate goal would be to predict crop production and find important insights highlighting key indicators and metrics that influence crop production.
- Approach:
  - Python: Used for Data Cleaning
  - Tableau: For Visualization.
- Based on the findings, a story was created.
- For better understanding, the results were displayed on 3 dashboards of the story, listed as:
  - Top-n Analysis
  - State-wise Analysis
  - Yearly Analysis

Attributes present in the data

```
State_Name
District_Name
Crop_Year
Season
Crop
Area
Production
dtype: object
```

- Link to Dataset: https://docs.google.com/spreadsheets/d/1PF1PQ4qg4ySrtyOXiF6SFGX7P0Qfl_r/edit?rtpof=true&sd=true#gid=1443108996
- Link to Python Notebook: https://colab.research.google.com/drive/1PU_S-anhlVvAl0xiU8IIG1XgK6M9crmK
- Link to Tableau: https://public.tableau.com/app/profile/shazmeen.shamsi/viz/CropProductioninIndia_16761878503100/State-wiseData?publish=yes

DATA CLEANING

- Dataset was first read.
- Missing and null values were found and removed using dropna( ) method. (3730 null values were removed, there were no duplicate values)
- Cleaned file is downloaded for visual analysis in Tableau.

```
df.shape
```

```
(246091, 7)
```

```
df.isnull().sum()
```

```
State_Name          0
District_Name       0
Crop_Year           0
Season              0
Crop                0
Area                0
Production       3730
dtype: int64
```

```
df.shape
```

```
(242361, 7)
```

```
df.isna().sum()
```

```
State_Name          0
District_Name       0
Crop_Year           0
Season              0
Crop                0
Area                0
Production          0
dtype: int64
```

```
df1=pd.DataFrame(df)
```

```
df1.to_csv('Cleaned_Crop_production.csv', index=True)
```

Top-n Analysis

Top n
5

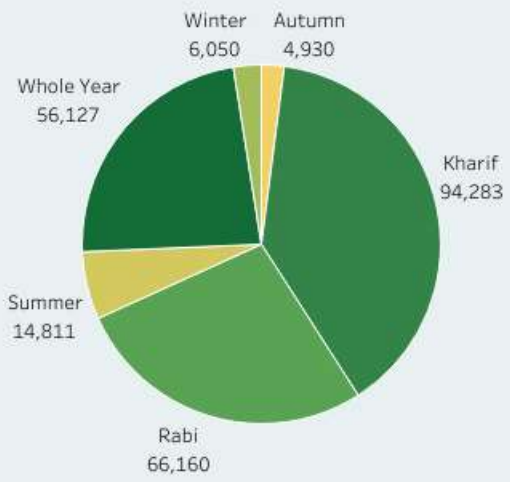
Produce by Area

Crop	
Rice	746,318,616
Wheat	470,713,245
Cotton(lint)	156,557,936
Bajra	140,967,888
Jowar	137,659,285

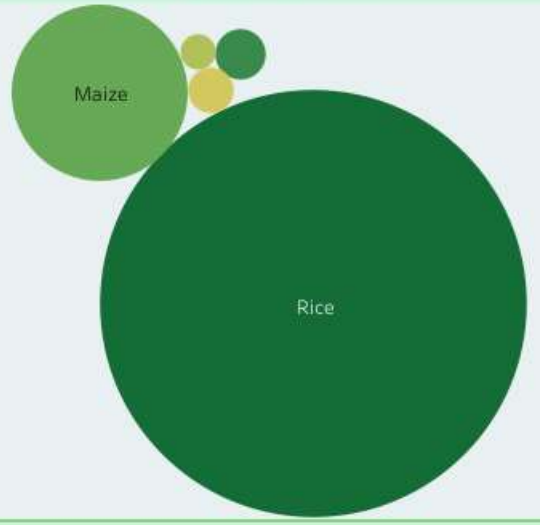
Top produce

Crop	
Rice	1,605,470,383
Maize	273,341,804
Urad	22,410,491
Moong(Green Gram)	18,303,188
Sesamum	11,009,031

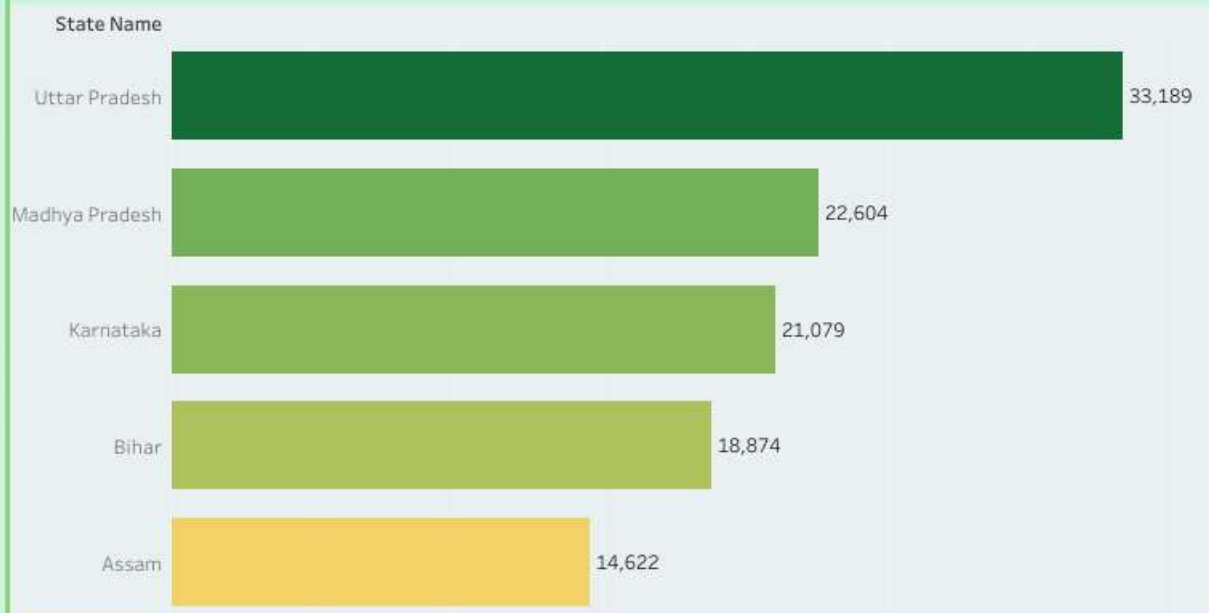
Production by Season



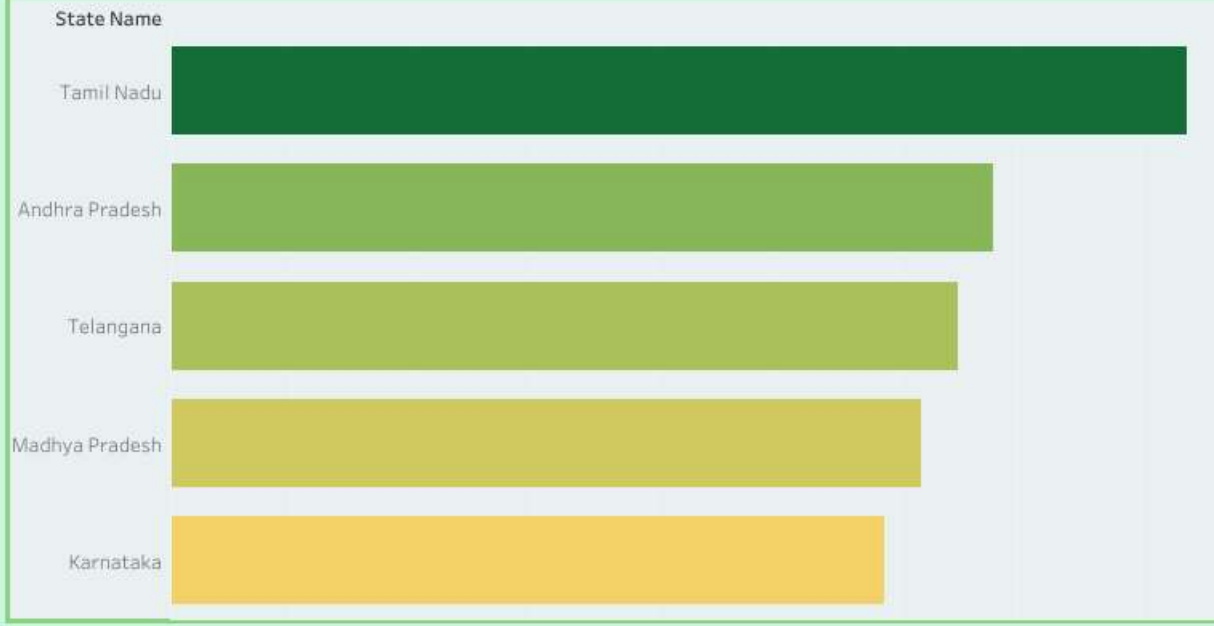
Top Crop Produce



State by Produce



Crop Type Count by State



State-wise Analysis

State Name
Madhya Pradesh

Top n
5

Types of Crops

62

State by Area

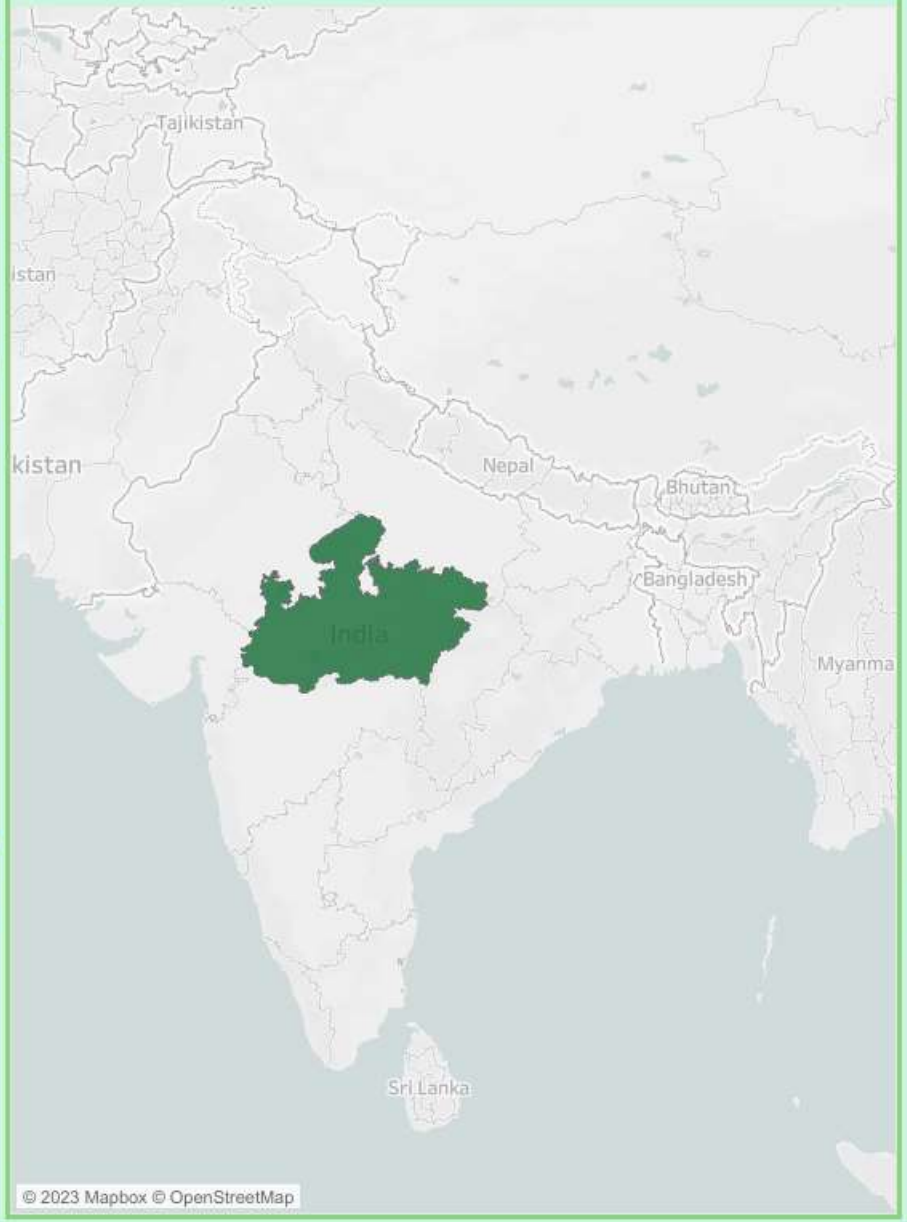
329,791,261 sq.km

Production

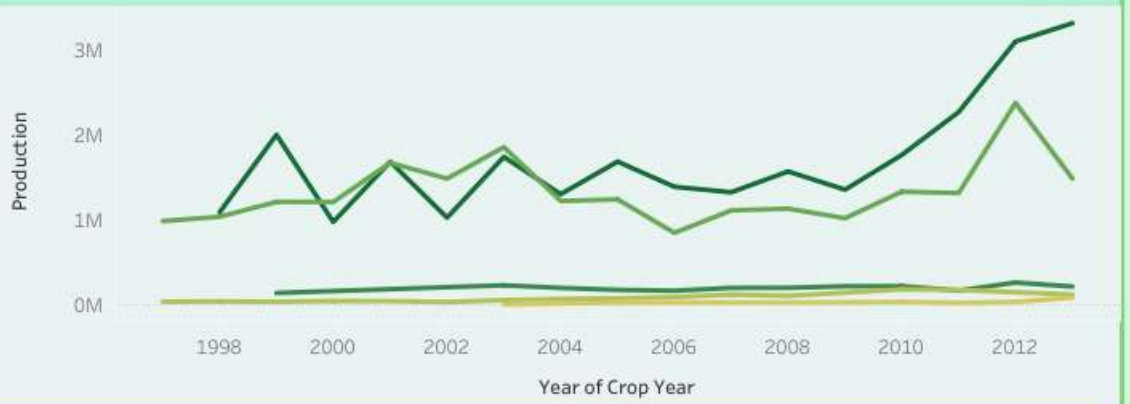
448,840,739 tonnes

Season-wise

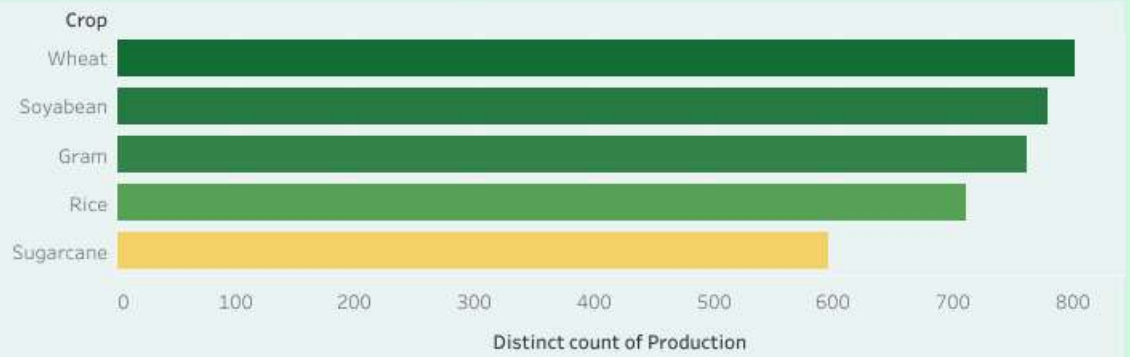
Map by State: Madhya Pradesh



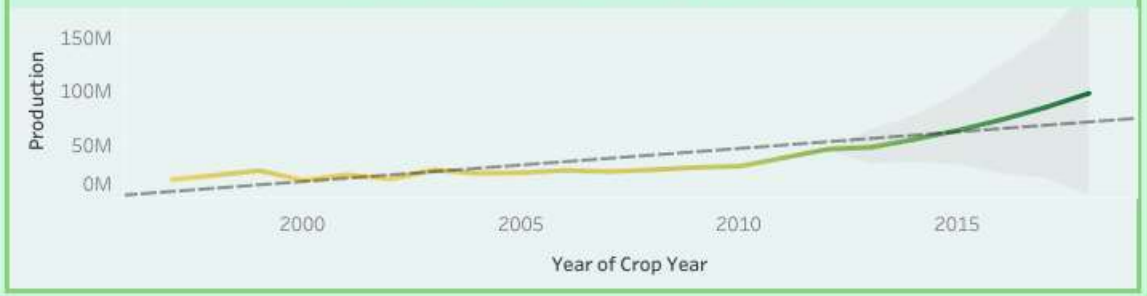
Annual Produce



Top-n Production : 5



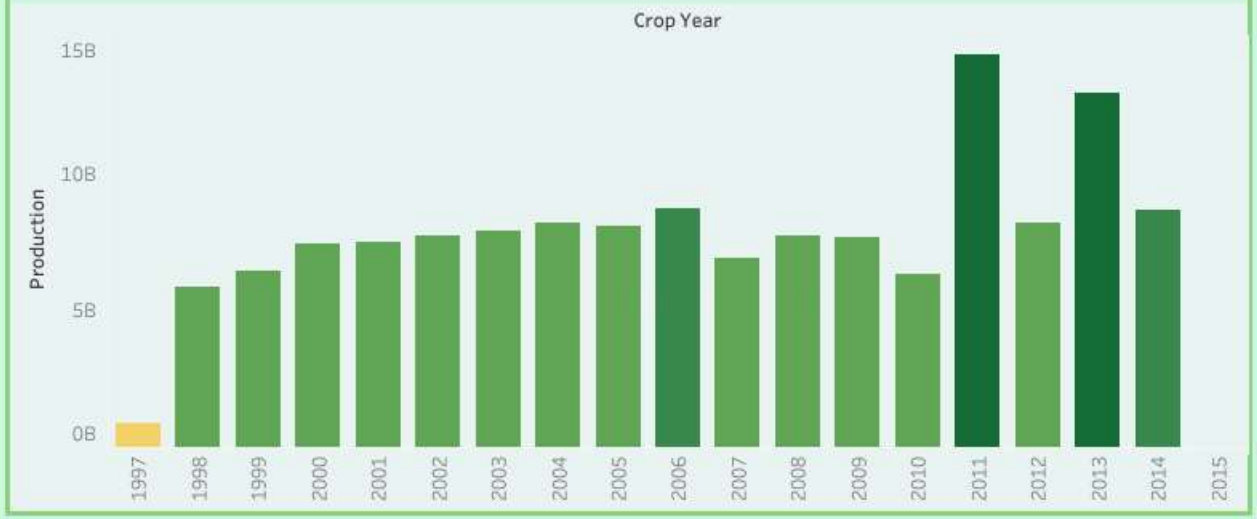
Production Forecast : Madhya Pradesh



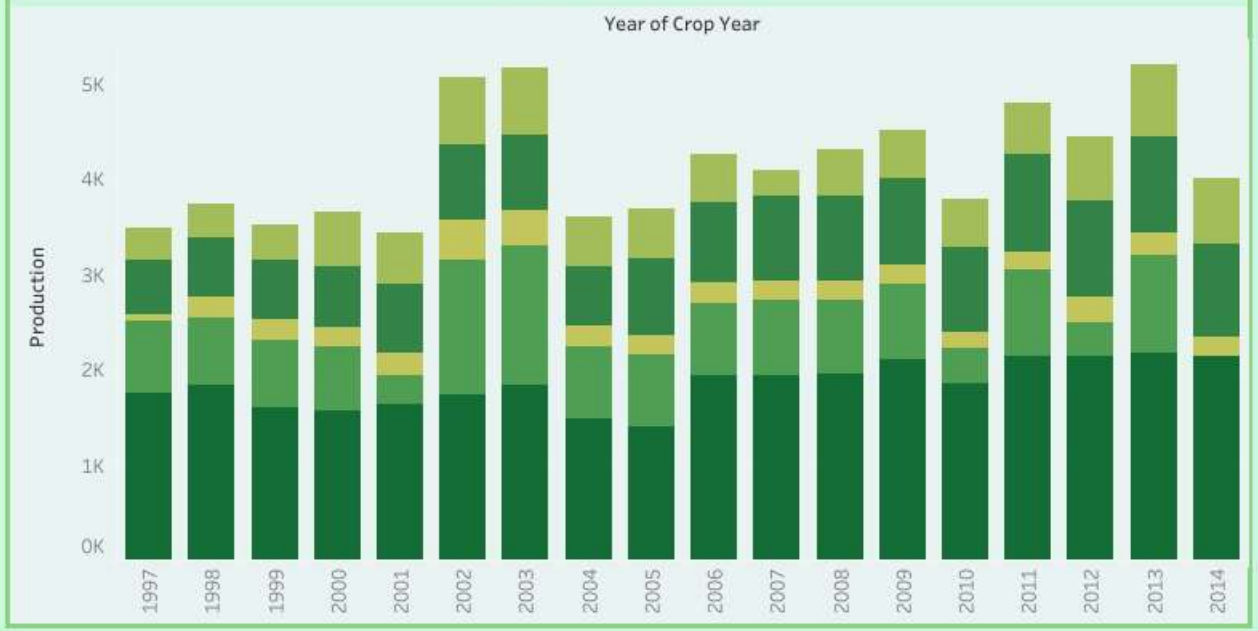
Top n 5

Yearly Analysis

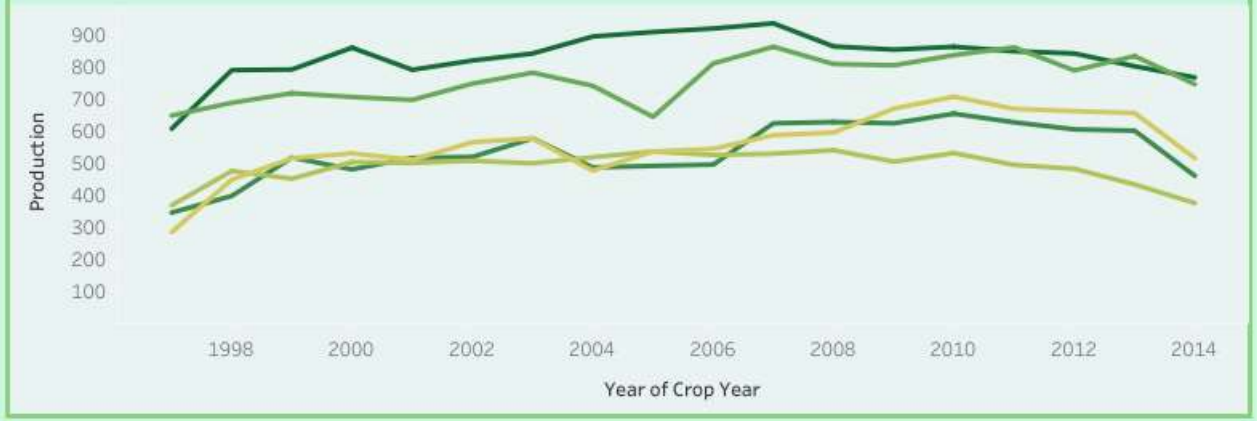
Production by Year



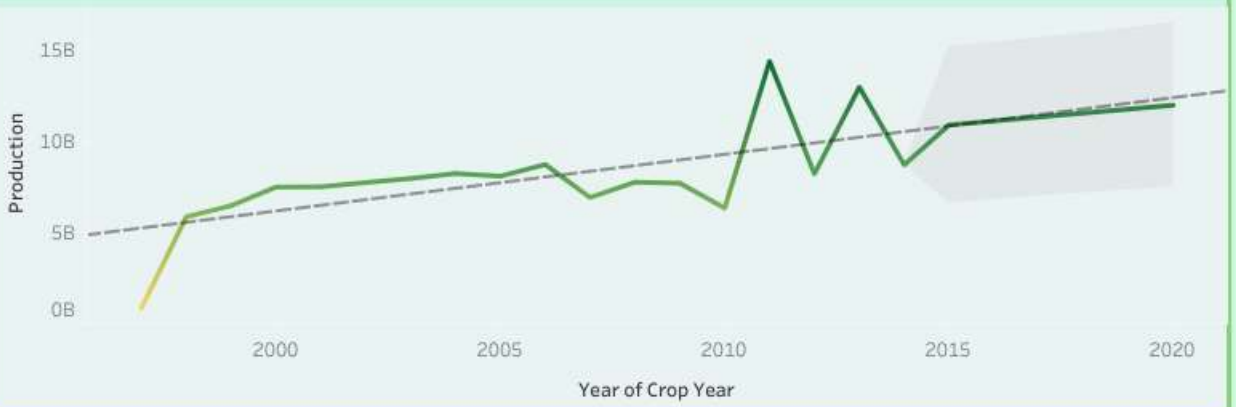
Top Producing States



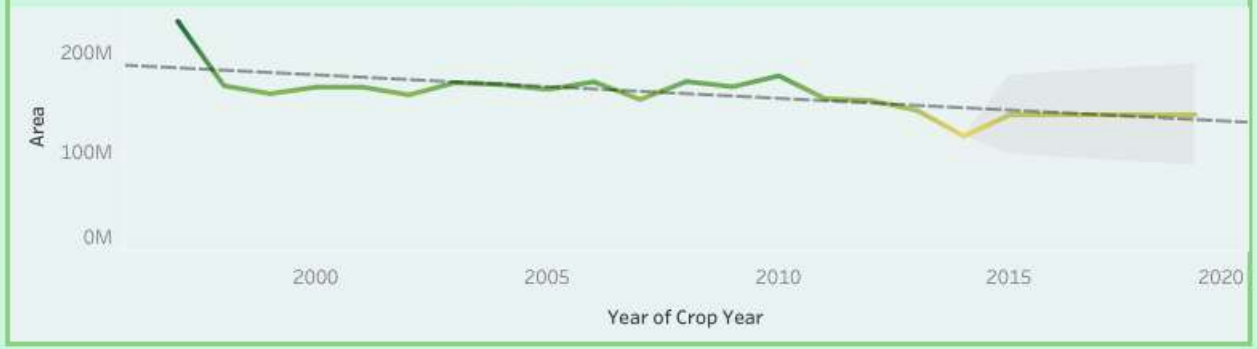
Year by Top produce



Forecast for Production

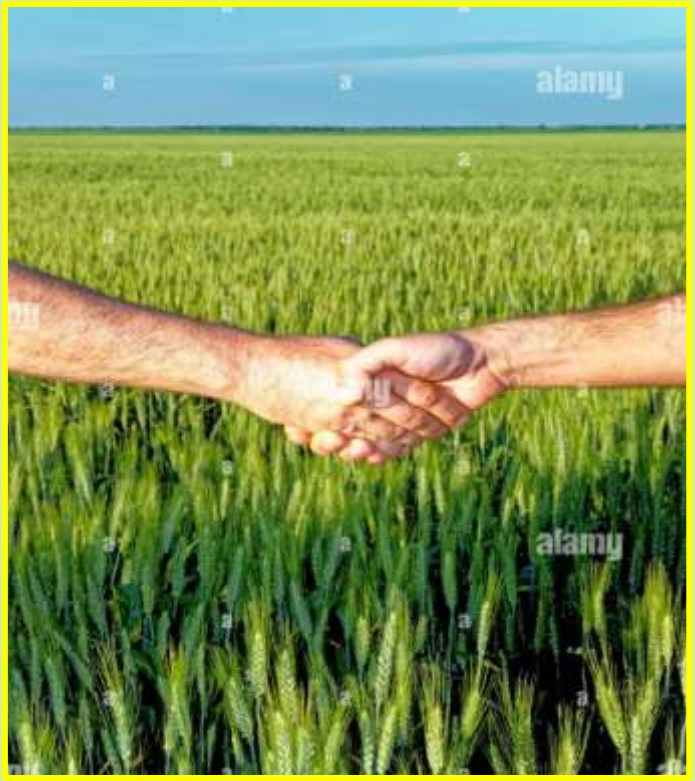


Forecast for Area

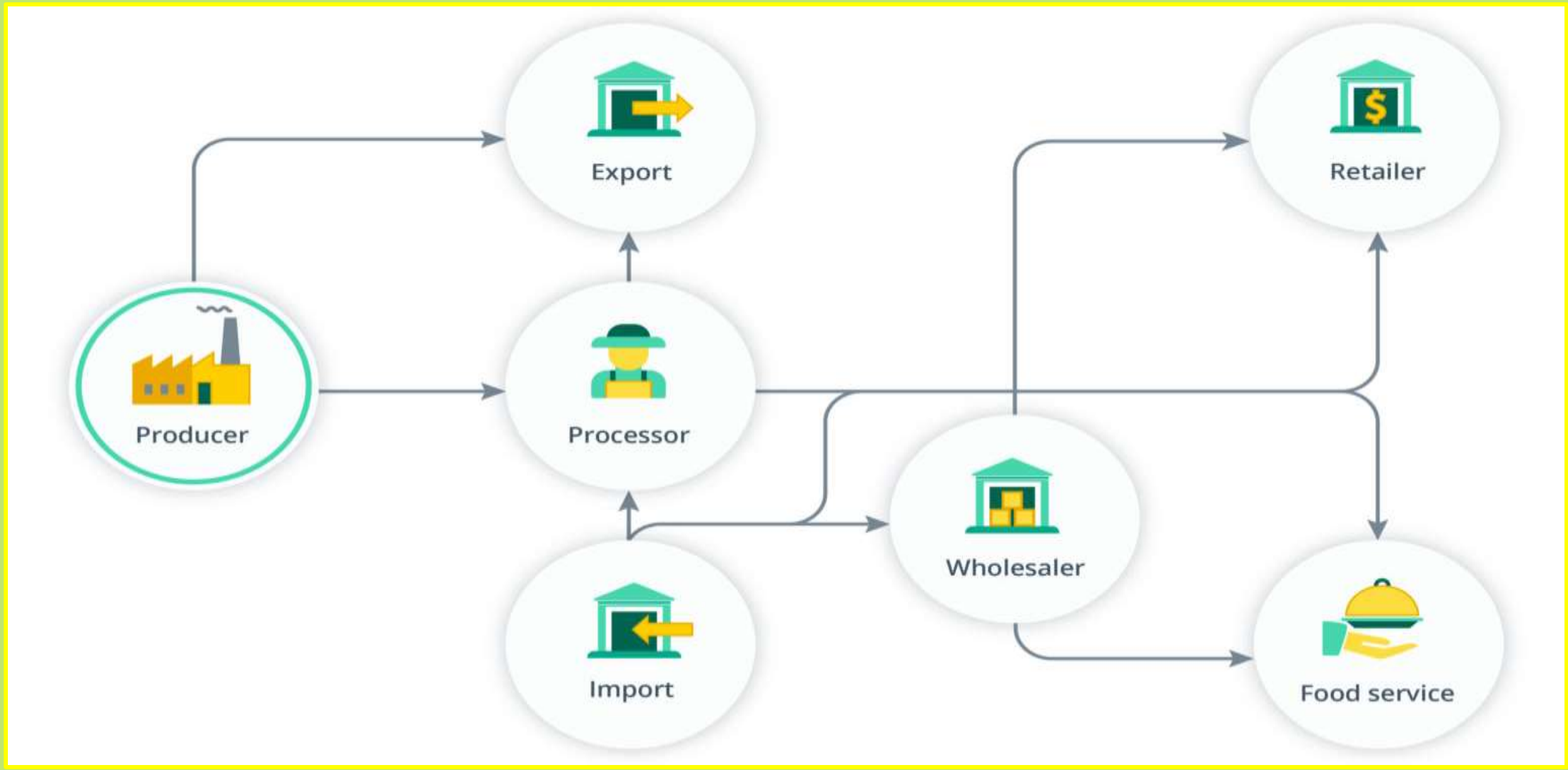


BENEFITS TO OTHER BUSINESSES

- Improve farming productivity and operations- Farmers can analyze weather conditions, temperature, water usage and soil conditions to make informed decisions on business choices -- like determining the most feasible crop choices that year or which hybrid seeds decreased waste.
- In AgriTech- Cooperation between private farmers, big agricultural corporations, communities, and governments. Such cooperation can result in the wider promotion of agriculture and rural development, a reduction in poverty, and food security.
- Stop migration of the labor force.
- Reduce food waste- 20% to 30% of food is wasted today at various stages of the supply chain.



B2B SUPPLY CHAIN




THANK YOU!