

Data for Social Good Hackathon, Government of Telangana and University of Massachusetts



Data Visualization And Analysis
of Factors effecting Current
Agricultural Trends in the State
of Telangana

HELLO!

We are “Team Arrow”

We are here to give u a presentation on
Our selected topic- Zero Hunger

Institute of Aeronautical Engineering (IARE)

Team Members:

- 1) S. Ashwin Kumar
- 2) K. Anirudh Sai
- 3) P .Ankit
- 4) P. Akhil Chary





Zero Hunger

INTRODUCTION

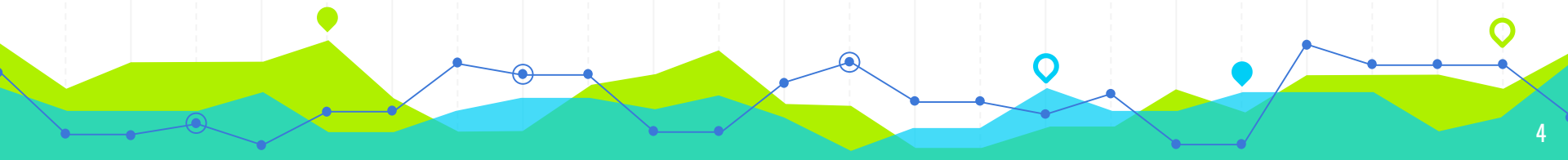
AGRICULTURE

Agriculture plays a pivotal role in the economy of Telangana and the better performance of this sector is vital for inclusive growth.

Agriculture is a way of life, a tradition that has shaped the culture and economic life of the people of Telangana. Therefore, it will continue to be central to all strategies for planned socio-economic development of the State.

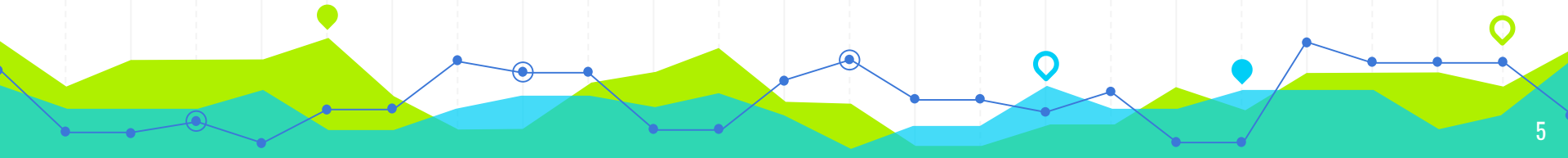
ZERO HUNGER

The category chosen is Zero Hunger and prompt selected for analysis addresses few of the important elements effecting precision farming.



ANALYSIS

Our analysis mainly focuses on the key factors like overall rainfall recorded with respect to each District, overall seasonal yield in selected years, seasonal yield of major crops like Bengal gram, groundnut and maize, and overall yield in two different agricultural seasons: rabi and kharif.

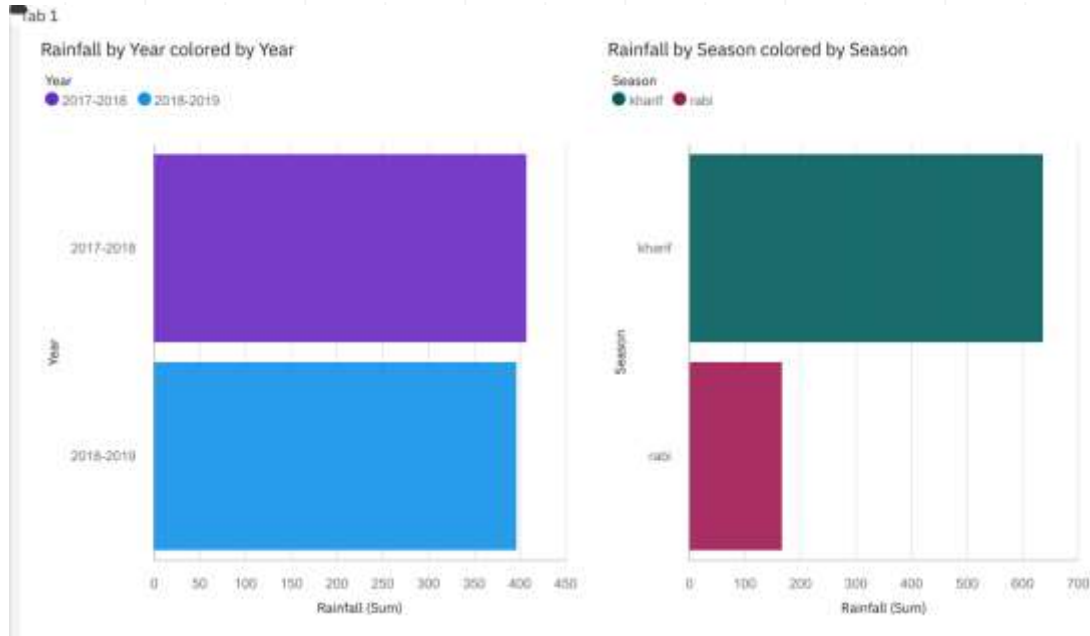


An abstract graphic at the top of the slide features a teal background with a blue line graph. The graph has several data points, some of which are highlighted with green circles. The line graph is overlaid on a series of green and blue wavy shapes that resemble a landscape or data terrain. The overall design is modern and tech-oriented.

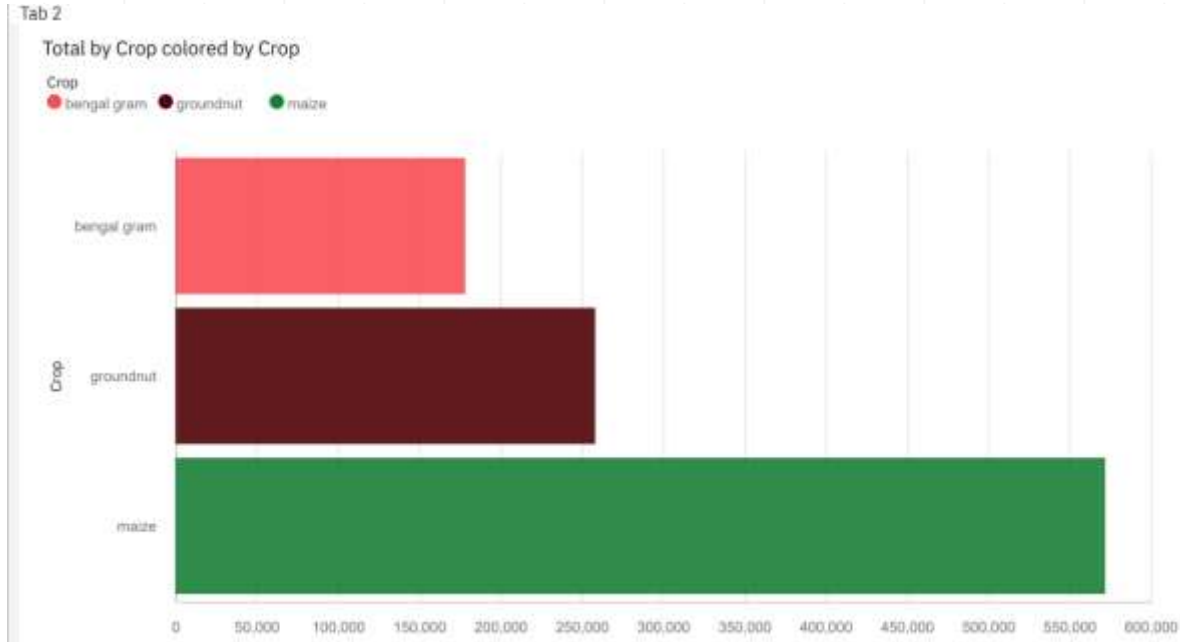
Data Visualization & Analysis

RESULTS

1) Rainfall by year and particular cropping season (rabi and kharif) in Telangana state.

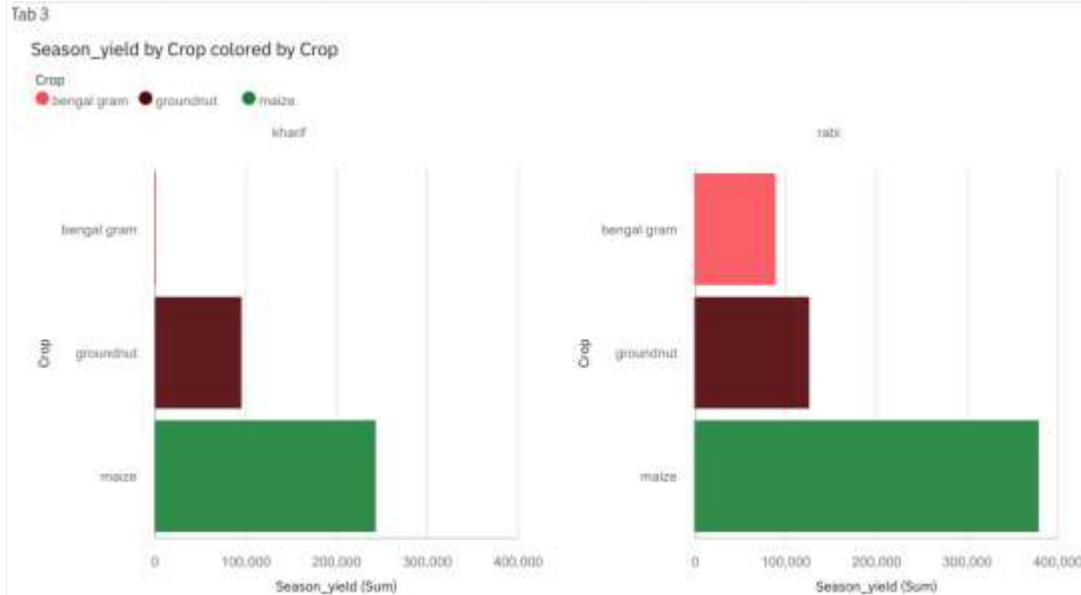


2) Graphical visualization and analysis of seasonal yields with respect to various important crops like Bengal gram, groundnut and maize in Telangana state.



3) This graph represents the comparisons of seasonal yield with respect to various important crops like Bengal gram, groundnut and maize in particular cropping seasons (rabi and kharif) in the state of Telangana.

-Maximum yield was of the crop Maize and Minimum Yield was of the crop Bengal Gram.



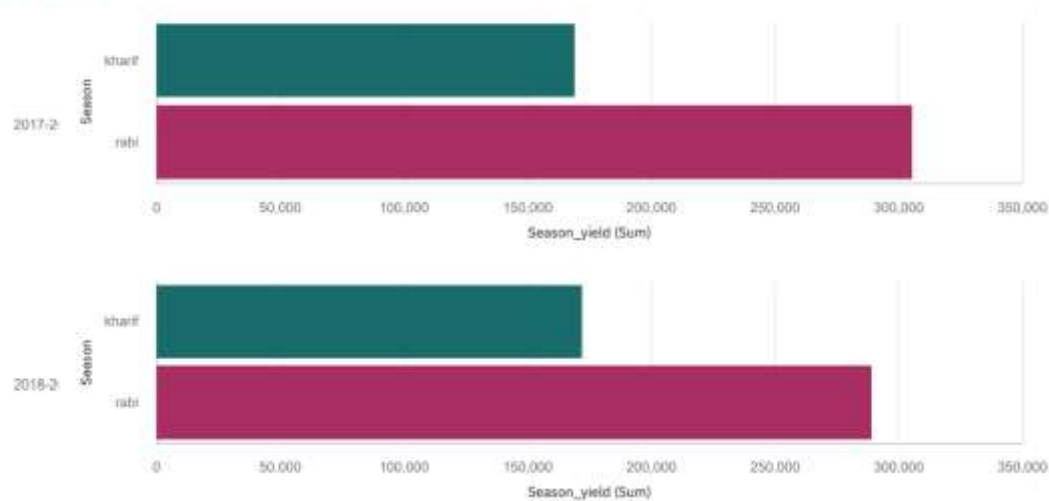
4) This is graphical representation of comparisons between overall seasonal crop yield in two cropping seasons: rabi and kharif in the particular year in Telangana state.

-in all years, maximum production was seen rabi season

Tab 4

Season_yield by Season colored by Season

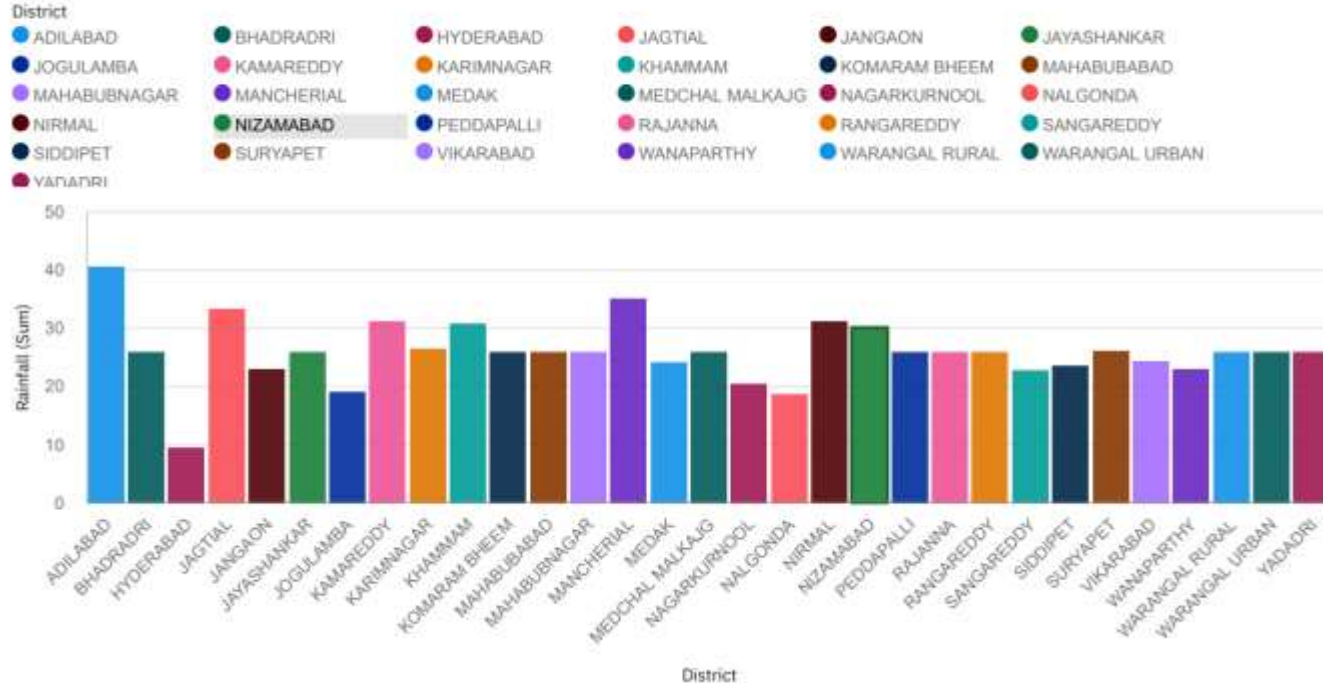
Season
● kharif ● rabi



5)The coloured bar graph represents the average rainfall (in mm) recorded in major districts of Telangana State.

Tab 5

Rainfall by District colored by District



6) Analysis of data based on the seasonal yields of major districts of Telangana state.

-Maximum production is seen Warangal-Rural District.

Tab 6

District colored by District sized by Season_yield



7) Data visualization of rainfall by each district of Telangana state.
Maximum rainfall was recorded in Adilabad District.

Tab 8

District colored by District sized by Rainfall



8) Overall Analysis of total yield by particular variety of crop (Maize, Groundnut and Bengal gram) in the state of Telangana.

Tab 7

District

31

District

Season

2

Season

Crop

3

Crop

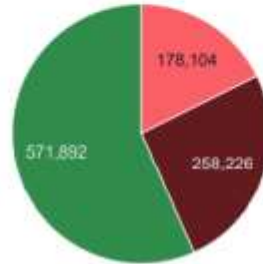
Total

1.01M

Total

Total by Crop

Crop
bengal gram groundnut maize



Crop colored by Crop sized by Total

Total (Sum)
178,104 571,892

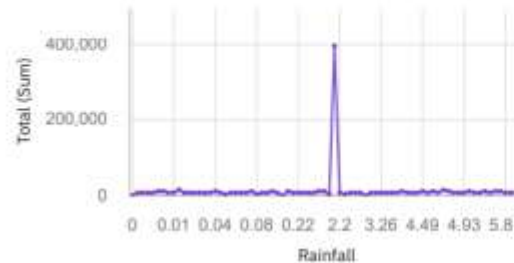
Crop
bengal gram groundnut maize

maize

groundnut

bengal gram

Total by Rainfall





Module Building And Tools Used

● Tools used:

- Python
- IBM cognos
- MS excel



Code analysis:

● Importing dataset:

- Importing yield_data and weather_data using pandas

● Data cleaning:

- Detecting and removing the null values from the data sets.

● Anomaly detection:

- Detecting the outliers using box plotting techniques and removing them.



● Detecting relationship between datasets:

- Forming a relationship between “weather_data and yield_data” using “district, year and crop_season” columns.

● Dataset merging:

- Creating 3 sub datasets from weather data grouped by “year” i.e. 2017,2018,2019.
- Taking average of Rainfall of each District of Telangana for same “crop_season”.
- For every “year,district and crop_season” columns of “yield_data” we assign a rainfall value from the respective sub datasets that are chosen by year and from the chosen dataset “rainfall” data is selected based on “district and crop_season” columns.
- The new dataset created is then saved and used for further analysis.



● Data visualisation:

- The data is visualised using line plots, bar plots, scatter plots to detect the trends in the data and relationships.

● Data transformation:

- Using label encoding we label encode the columns of the dataset that contain string values.

● Fitting the data:

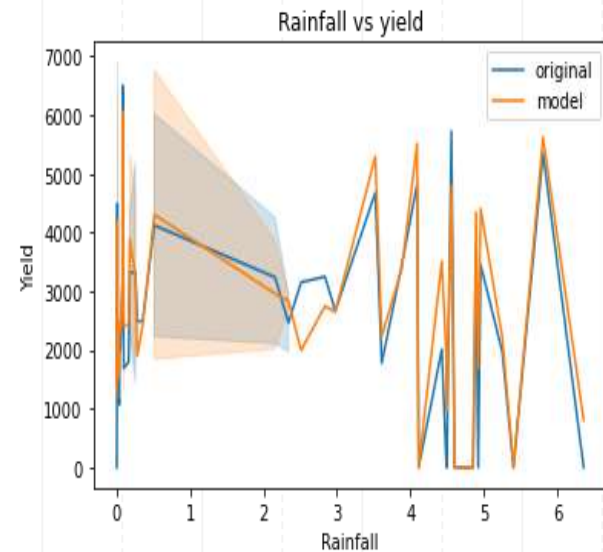
- We use Random forest regressor model based on our findings in the previous sections.
- The data is split into x and y variables to be given to the model for training.
- X contains 'Dist_id', 'Season','Crop','Rainfall' values.
- Y contains 'Season_yield' values.
- The x,y variables are split into x_train,x_test,y_train,y_test variables using a test_size of 20 percent.

● Training and testing:

- The model fitting is done with the `x_train` and `y_train` variables.
- We now test the model by predicting the data based on `x_test` data.
- The predicted data is evaluated with `y_test` data.

● Model evaluation:

- The model is evaluated using `r2_score` and other methods such as plotting and classification reports.
 - We get a `r2_score` of 0.85 approximately.
- **The graph shows the line plot of data predicted by model on data that the model has never seen.**



CONCLUSION

The two policies which we have come up on basis of our data visualization and analysis are:

- The agricultural practices of Organic farming indulged within Telangana can act as a catalyst to increase the gross production of crops and their management. Current practices of Organic farming like- Protecting soil quality by using organic materials and encouraging biological activity. Indirect supply of crop nutrients by using soil microorganisms. Determination of nitrogen in the soil using pulses. Some organic methods like crop rotation, natural predators, and organic fertilizers are used for controlling weeds and pests. Step by step farming involves some substantial discourse- The first is crop selection, which means choosing the right crop according to the season. After that, some important points are land preparation; selecting the right seeds and sowing process, watering, and the addition of natural fertilizers. Other policies of Integrated farming must be introduced in a large scale to help with maximization of yield, Rejuvenation/amelioration of systems productivity and achieve agriculture-ecological equilibrium. Control the built-up of insects-pest, diseases and weeds while reducing the use of chemical fertilizer and other harmful agrochemicals and pesticides. Integrated farming techniques are extremely useful in the mitigation of negative impact of agriculture or livestock on environment.

- Areas need to be emphasized are increasing the focus for small farm economy utilizing market intelligence along with the State Governments involvement in fixing the MSP. Strengthening National Agricultural Research system by allocating budget at least 3% of GSDP will give an impetus to the holistic crop production in the state with an overall ecosystem including various stakeholders and allied sectors. More emphasis for value addition and value chain management. I-Skill development through capacity building and disaster management as mentioned in NDMA may be further strengthened and real time mechanism to be evolved for relief measures through RS & GIS technologies can developed further.

References

- <https://agri.telangana.gov.in/>
- <https://www.agrifarming.in/agriculture-farming-in-telangana-and-schemes>

THANKS!

