

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

CHALLENGE THEME: ZERO HUNGER

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

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Introduction:

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. Maximum production is seen Warangal-Rural District.

The category chosen is Zero Hunger and prompt selected for analysis addresses few of the important elements effecting precision farming. Our analysis mainly focuses on the key factors like overall rainfall recorded with respect to each Mandal, 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.

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.

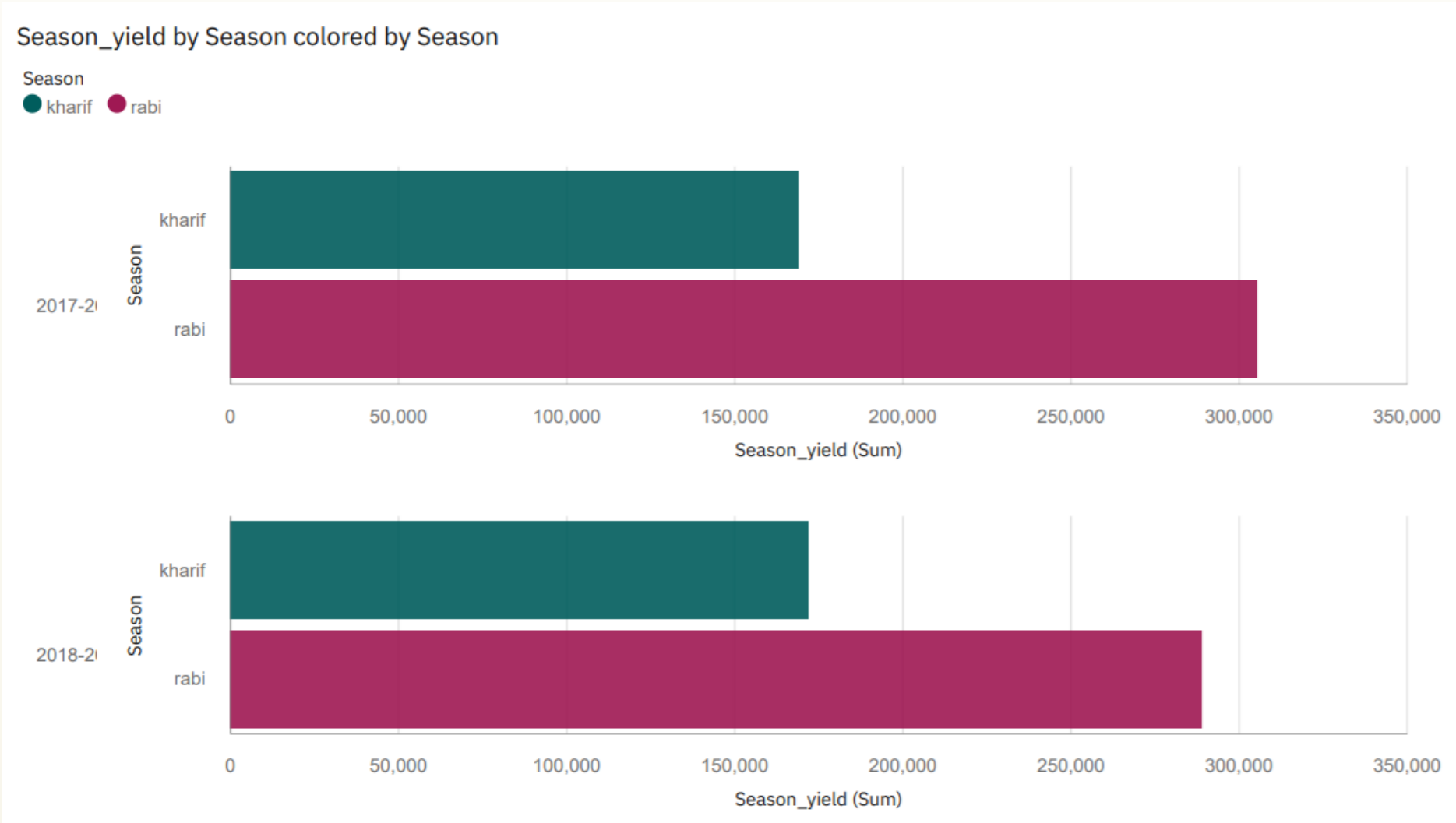
Dataset merging

- 1) Creating 3 sub datasets from weather data grouped by “year” i.e. 2017,2018,2019.
- 2) Taking average of Rainfall of each District of Telangana for same “crop_season”.
- 3) 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.
- 4) The new dataset created is then saved and used for further analysis.

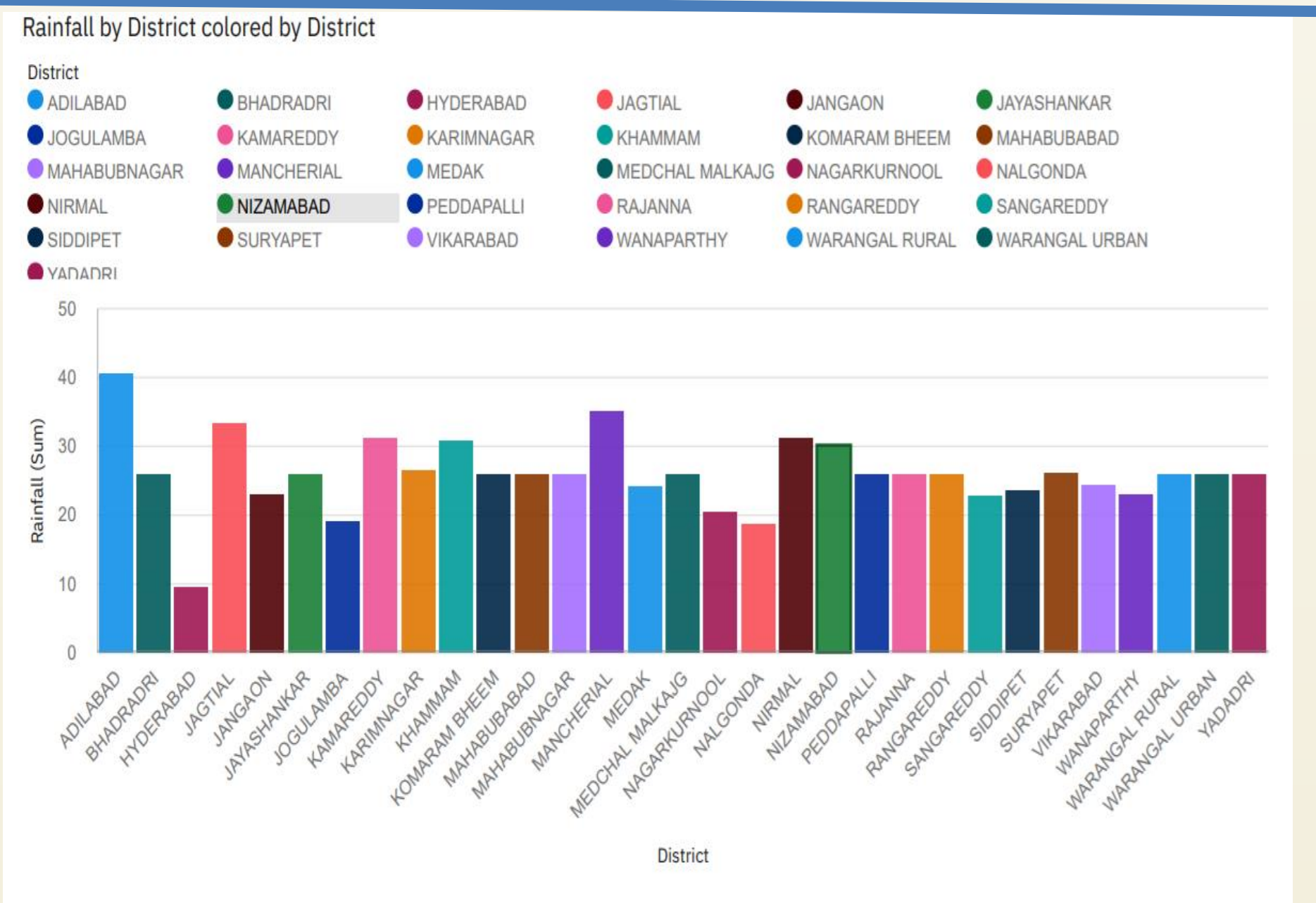
Model evaluation:

An r2_score of 0.85 was observed and the graph plotted with original and predicted values shows us that the model predicts the yield optimally.

Results:

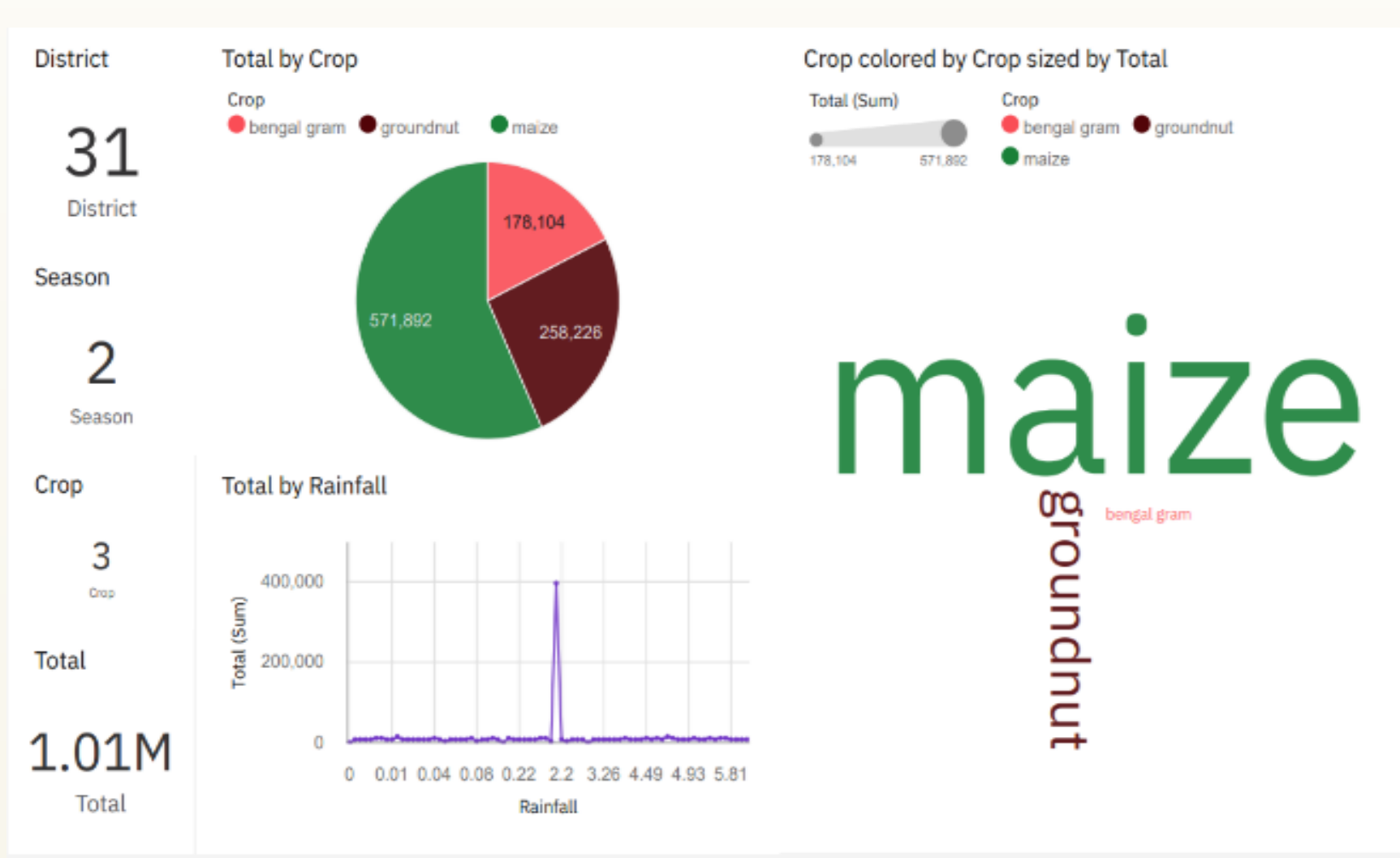


This is graphical representation of comparisons between overall seasonal crop yield in two cropping seasons: rabi and kharif in the particular year (in all years, maximum production was seen rabi season)

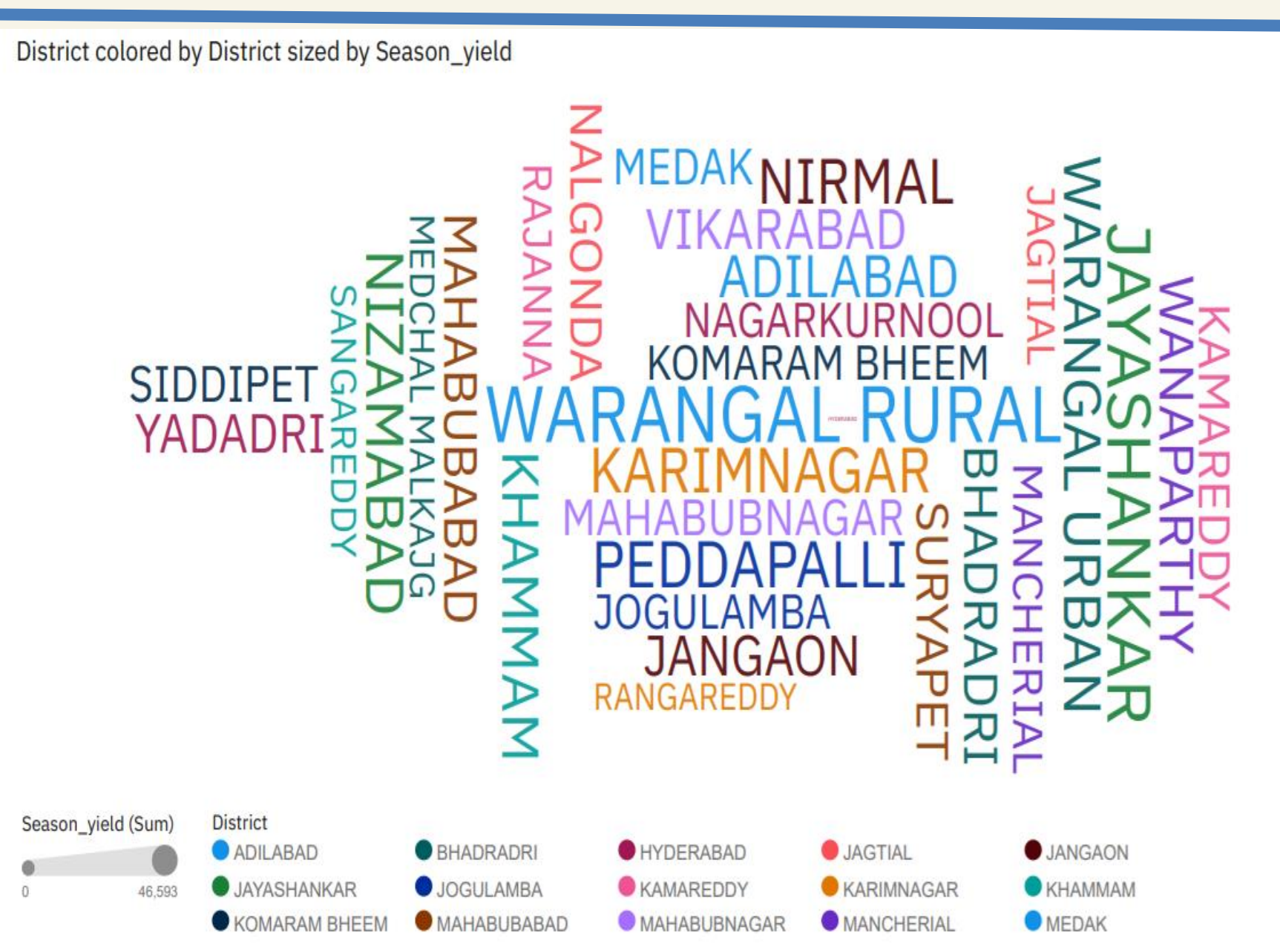


This is a coloured bar graph representation of rainfall (in mm) recorded in each district.

-The height rainfall was recorded in Adilabad District



Graphical represents the comparisons of seasonal yield with respect to various important crops like Bengal gram, groundnut and maize .(Maximum yield was of the crop Maize and Minimum Yield was of the crop Bengal Gram)



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

-Maximum production is seen Warangal-Rural District.

Conclusion:

After the data visualization and analysis, the findings which we have observed are, there was an increase in trend of overall seasonal yield from 2016-17 to 2017-18, but a significant fall was seen in coming years (2018-19). When it comes to the overall production of major crops in two different cropping seasons kharif and rabi, the highest yield was seen of the crops of maize and the least yield was seen for the crop of Bengal gram. The analysis of seasonal yield over selected years proves that maximum seasonal yield can be seen in rabi season. The highest rainfall was observed and recorded in northern regions of the Telangana State, Jainad Mandal in Adilabad district, topping the charts, providing the evidence of higher prospects of greater yield of productions in those nearby regions.

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>