

Phase 1: Brainstorming and Ideation – Exploratory Analysis of Rainfall Data in India

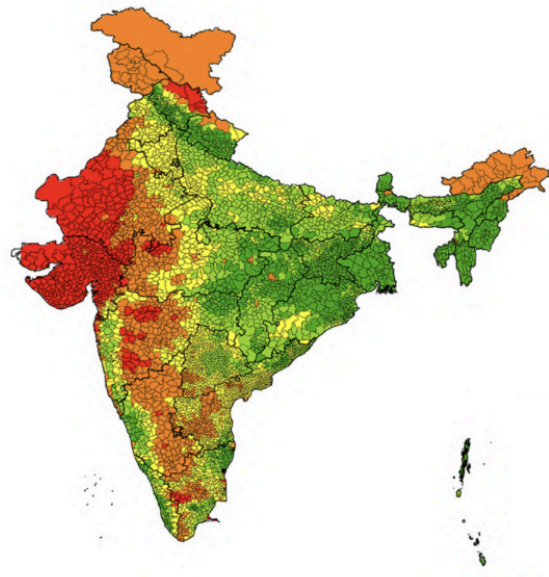
Introduction:

Agriculture plays a vital role in the economy of many countries, especially India, where a large portion of the population depends on farming for their livelihood.

Rainfall is one of the most important factors influencing agricultural productivity.

However, changing climatic conditions and irregular monsoon patterns have made rainfall increasingly unpredictable, leading to crop losses, improper irrigation planning, and financial risks for farmers.

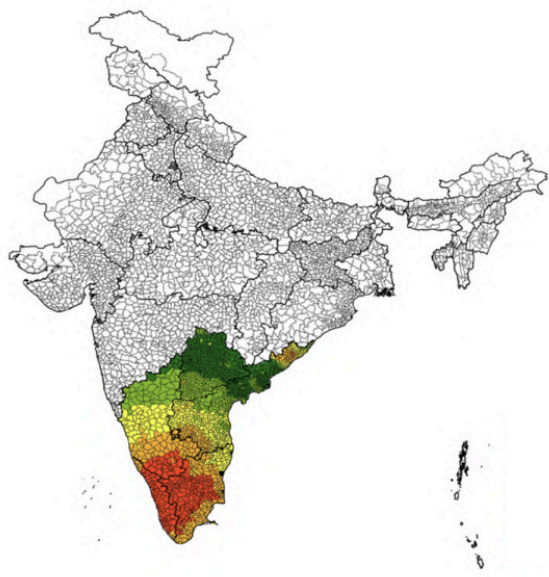
a) Southwest monsoon (JJAS)



Coefficient of variation (%)

<20 21 to 24 25 to 30 31 to 35 >35

b) Northeast monsoon (OND)



Coefficient of variation (%)

<50 50 to 74 75 to 99 100 to 125 >125



To address these challenges, this project focuses on the exploratory analysis of historical rainfall data in India. By using data analysis techniques, visualization methods, and machine learning algorithms, the project aims to identify rainfall patterns, trends, and variability. The insights obtained from this analysis can help farmers, agricultural experts, and policymakers make informed decisions related to crop planning, irrigation management, and agricultural risk reduction.

Objective:

- Analyze historical rainfall data to identify patterns and seasonal trends.
- Provide rainfall insights to assist crop planning and irrigation decisions.
- Apply machine learning techniques for rainfall trend prediction.

Core Idea:

The project focuses on collecting rainfall datasets, performing exploratory data analysis, visualizing rainfall trends, and building machine learning models such as Decision Tree and Random Forest to understand rainfall variability.

Problem Statement:

Farmers face major challenges due to unpredictable rainfall patterns. Lack of analytical tools to interpret rainfall data leads to poor agricultural planning and increased risk of crop loss.

Proposed Solution:

A rainfall analysis and prediction system will be developed using Python technologies including **Pandas, NumPy, Matplotlib**, Scikit-learn, and Flask. The system will analyze rainfall data, predict rainfall trends, and display visual outputs for decision support.

Target Users:

- Farmers
- Agricultural departments
- Researchers
- Policymakers

References:

1. Indian Meteorological Department (IMD) Rainfall Reports
2. Kaggle Rainfall Dataset – Rainfall in India (1901–2015)
3. Scikit-learn Machine Learning Documentation