

Project Report  
CROP YIELD ESTIMATION

Team ID	PNT2022TMID18532
Project Name	Estimate crop yield using data analytics
Team Leader	Ruffina Perlintina
Team Member 1	Shwetha S
Team Member 2	Venkatakrishna
Team Member 3	Sumesh

**Project Objective:**

Crop production in India is one of the most important sources of income and India is one of the top countries to produce crops. Agriculture is currently the most significant emerging sector in the actual world and the key industry and economic pillar of our nation. The discipline of agricultural information technology has recently undergone significant changes that have made crop yield prediction an interesting research topic. As per this project we will be analyzing some important visualization, creating a dashboard and by going through these we will get most of the insights of Crop production in India.

**Purpose:**

Agriculture is the backbone of Indian economy. However, recently due to harsh and unfavorable climatic conditions, farmers are unable to produce good crop yield. As a result, there has not only been a shortage in supplies, but also an increase in the prices of basic commodities.

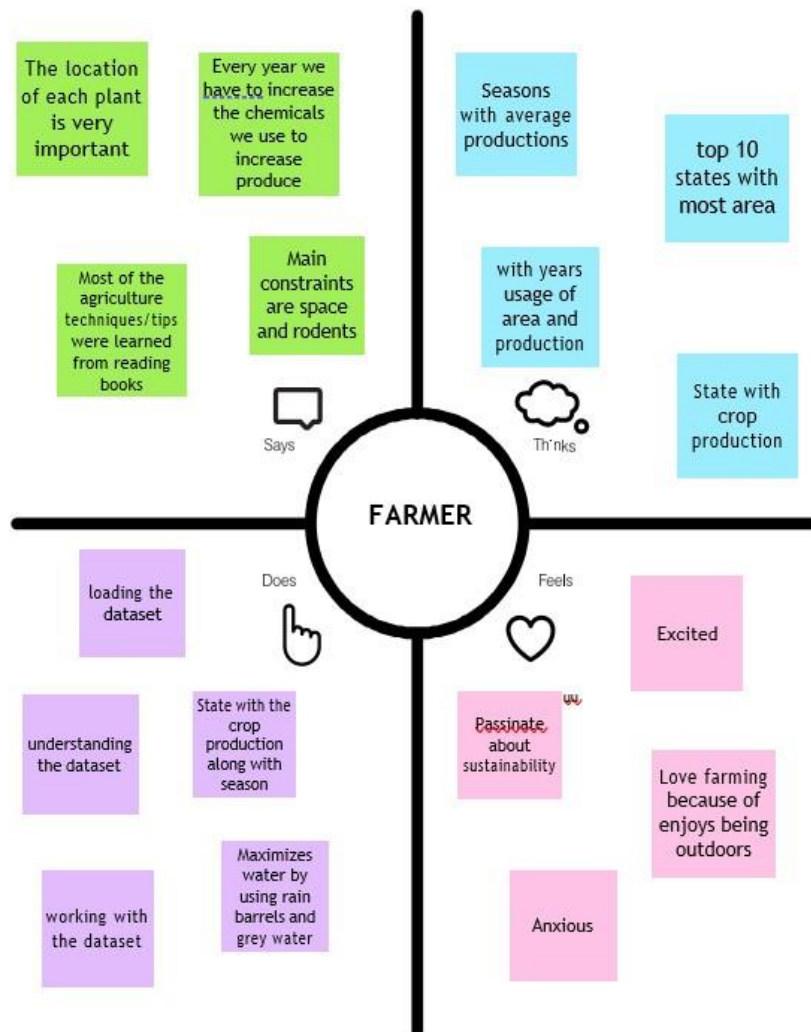
This analysis will enable farmers to pick an appropriate crop for a selective season and cultivate it for better successful yields. Dataset with information's related to crops grown in India over the past decades, the cost of cultivation, production, etc. has been obtained and further interrogated to give satisfying results

## Problem Statement:

Crop production in India is one of the most important sources of income and India is one of the top countries to produce crops. As per this project we will be analyzing some important visualization, creating a dashboard and by going through these we will get most of the insights of Crop production in India.

## Ideation Phase:

### Empathy Map:



Proposed Solution:

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	The goal is to estimate crop yield production using historical data of crop yield. In the agriculture sector farmers are facing difficulties in analyzing the demand in market to achieve high crop yield through technology. The main objective of this project is to predict crop yield that will be extremely useful to farmers to plan for the harvest and sales of harvested grain.
2.	Idea / Solution description	Datasets obtained from various sources containing information related to crop yield over several past decades, their cost of production, cultivation, seasons, types of crops, etc. are uploaded in IBM Cognos Analytics to provide a clear analysis that helps in further decision making. Helping them out to overcome loss in farming and business.
3.	Novelty / Uniqueness	Chances of crop failure can be relatively lowered. Efficient cost management is practiced. With this solution we can analyse, visualize data and give the farmers the option to choose which plant/crop to cultivate in which period of time/season to earn more profit from the crop yield.
4.	Social Impact / Customer Satisfaction	It helps farmers cut down additional unnecessary costs. It enables yield prediction effectively and efficiently. Aims at overall holistic development and practice of agriculture.
5.	Scalability of the Solution	Supports future

		<p>Crop yield production effectively.</p> <p>With the data visual reports, farmers will be able to cultivate crop according to the area, climate, soil and other features that impact the crop yield and hence enhancing the productivity</p>
--	--	---

### Problem Solution Fit:

Define CS, fit into CC	<b>1. CUSTOMER SEGMENT(S)</b> <b>CS</b> <p>Farmers are the customer who wants to yield a crop in field.</p>	<b>6. CUSTOMER CONSTRAINTS</b> <b>CC</b> <p>Less knowledge and development towards the current environmental changes and technologies, they follow ancient methods, which is also worthy but, the climatic changes and new kind pesticides</p>	<b>5. AVAILABLE SOLUTION</b> <b>AS</b> <ul style="list-style-type: none"> <li>Traditional ways of prediction.</li> <li>Precision farming.</li> </ul>	Explore AS, differentiate

Focus on J&P, tap into BE, understand RC	<b>2. JOBS-TO-BE-DONE / PROBLEMS</b> <b>J&amp;P</b> <ul style="list-style-type: none"> <li>Help them understand the usage of prediction and software application for good results in agriculture.</li> <li>Data report should to be created to reduce the loss of the crop and earn more profit in agriculture fields</li> </ul>	<b>9. PROBLEM ROOT CAUSE</b> <b>RC</b> <ul style="list-style-type: none"> <li>Various disease on the plants can lead to reducing the quality of the crops productivity.</li> <li>The insects on the plants can spread the disease.</li> </ul>	<b>7. BEHAVIOUR</b> <b>BE</b> <ul style="list-style-type: none"> <li>Try to get help from agricultural experts.</li> <li>Try to take up non-natural means of cultivation for quicker harvest</li> </ul>	Focus on J&P, tap into BE, understand RC

Identify strong TR & EM	<b>3. TRIGGERS</b> <b>TR</b> <ul style="list-style-type: none"> <li>Seeing their crops are being infected by disease and facing huge loss in quality.</li> </ul>	<b>10. YOUR SOLUTION</b> <b>SL</b> <ul style="list-style-type: none"> <li>The solution for the problem, creating data report using past datasets.</li> <li>Creating IBM Cognos dashboard could make them better understand easily.</li> </ul>	<b>8. CHANNELS of BEHAVIOUR</b> <b>CH</b> <ul style="list-style-type: none"> <li>Trying to use pesticides and fertilizers that increase gain but cause harm.</li> <li>Irrigation channel changes.</li> </ul>
	<b>4. EMOTIONS: BEFORE / AFTER</b> <b>EM</b> <p>Before: Most of the famers in India have Stress, Loosing Self Confidence.</p> <p>After : Gain of Self Confidence.</p>		

Functional Requirements:

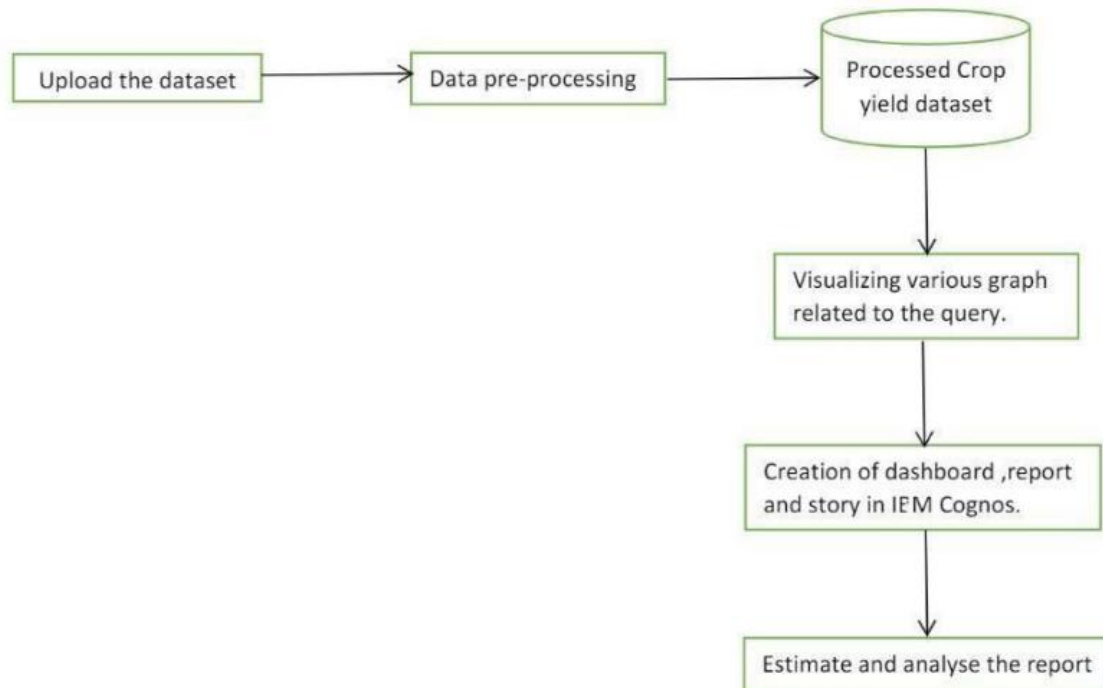
FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Generating Dashboard	View analysis of various crops with corresponding parameters
FR-2	Generating Report	View report of predictive analysis

Non-Functional Requirement:

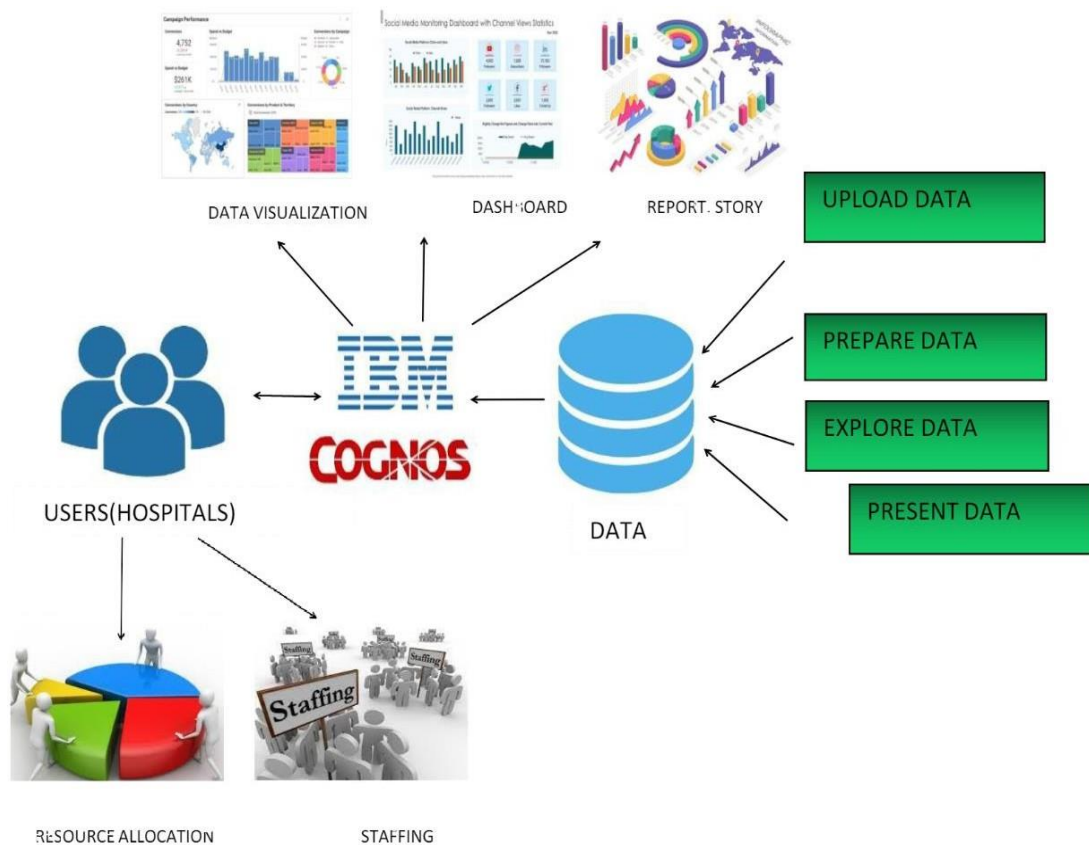
FR No	Non-Functional Requirement	Description
NFR-1	Usability.	This service will have a simple and user-friendly graphical interface. Users will be able to understand and use all the features easily
NFR-2	Reliability	Effective tool that all farmers can use, making it reliable by improving the accuracy of the estimation or prediction. This will bridge the gap between farmers and technology.
NFR-3	Performance	Multiple technologies and services that will improve the usability in agricultural activities.
NFR-4	Availability	Both website and mobile application interface and developed in local language and the content is available in localized language.
NFR-5	Scalability	With the data visual reports, farmers will be able to cultivate crop according to the area, climate, soil and other features that impact the crop yield and hence enhancing the productivity.

Project Design flow:

Data Flow Diagram:



Solution and technical Architecture:



Project Planning Schedule:

**Sprint Planning:**

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Data Collection	USN-1	To collect historic dataset of crops yield in India	20	Medium	Ruffina
Sprint-2	Dashboard	USN-3	Uploading dataset on IBM Cognos for further analysis.	10	Medium	Venkat
Sprint-3	Visualization	USN-5	Data is presented in the dashbard using charts, graphs, etc.	10	High	Ruffina, Shwetha, Venkat, Sumesh
Sprint-4	Prediction	USN-6	Crop yield can be effectively predicted	10	High	Ruffina, Shwetha, Venkat, Sumesh

### Sprint Delivery Schedule:

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date(Actual)
Sprint-1	20	6 Days	01 Nov 2022	07 Nov 2022	20	18 Nov 2022
Sprint-2	20	6 Days	02 Nov 2022	08 Nov 2022	20	18 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	18 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

### Velocity:

Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (points per sprint). Let's calculate the team's average velocity (AV) per iteration unit (story points per day)

$$AV = \frac{\text{sprint duration}}{\text{velocity}} = \frac{20}{10} = 2$$

## CODING

### Crop Yield.html-

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Cropyield</title>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.2.2/dist/css/bootstrap.min.css" rel="stylesheet">
  <script src="https://cdn.jsdelivr.net/npm/bootstrap@5.2.2/dist/js/bootstrap.bundle.min.js"></script>

  <style>
  body{

    background-image: url("jed-owen-ajZibDGpPew-unsplash.jpg");
    background-repeat: no-repeat;
    background-size: 1500px;

  }
</style>
</head>
<body>
```



```
<div class="jumbotron mt-3">
```

```
<h3>ESTIMATION OF CROP YIELD</h3>
```

```
<nav class="navbar navbar-expand-sm bg-dark navbar-dark">
```

```
<div class="container-fluid">
```

```
<ul class="navbar-nav">
```

```
<li class="nav-item">
```

```
<a class="nav-link active" href="#">Home</a>
```

```
</li>
```

```
<li class="nav-item">
```

```
<a class="nav-link" href="CropDashboard.html">Dashboard</a>
```

```
</li>
```

```
<li class="nav-item">
```

```
<a class="nav-link" href="Report.html">Report</a>
```

```
</li>
```

```
<li class="nav-item">
```

```
<a class="nav-link" href="Story.html">Story</a>
```

```
</li>
```

```
</ul>
```

```
</div>
```

```
</nav>
```

```
</div>
```

```
</body>
```

```
</html>
```

## CropDashboard.html

```
<!DOCTYPE html>
```

```
<html lang="en">
```

```
<head>
```

```
<meta charset="UTF-8">
```

```
<meta http-equiv="X-UA-Compatible" content="IE=edge">
```

```
<meta name="viewport" content="width=device-width, initial-scale=1.0">
```

```
<link href="https://cdn.jsdelivr.net/npm/bootstrap@5.2.2/dist/css/bootstrap.min.css" rel="stylesheet">
```

```
<script src="https://cdn.jsdelivr.net/npm/bootstrap@5.2.2/dist/js/bootstrap.bundle.min.js"></script>
```

```
<title>Yield Report</title>
```

```
</head>
```

```
<body>
```

```
<h1>Yield Report</h1>
```

```
<iframe
```

```
src="https://us1.ca.analytics.ibm.com/bi/?perspective=dashboard&pathRef=.my_folders%2FDashboard1&closeWindowOnLastView=true&ui_appbar=false&ui_navbar=false&shareMode=embedded&action=view&mode=dashboard&subView=model00000184a35c4c33_00000001" width="1200" height="900" frameborder="0" gesture="media" allow="encrypted-media" allowfullscreen=""></iframe>
```

```
<iframe
```

```
src="https://us1.ca.analytics.ibm.com/bi/?perspective=dashboard&pathRef=.my_folders%2FDashboard1&closeWindowOnLastView=true&ui_appbar=false&ui_navbar=false&shareMode=embedded&action=view&mode=dashboard&subView=model00000184a534a6b0_00000000" width="1200" height="900" frameborder="0" gesture="media" allow="encrypted-media"
```

```
allowfullscreen=""></iframe>
</body>
</html>
```

## Report.html

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta http-equiv="X-UA-Compatible" content="IE=edge">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.2.2/dist/css/bootstrap.min.css" rel="stylesheet">
  <script src="https://cdn.jsdelivr.net/npm/bootstrap@5.2.2/dist/js/bootstrap.bundle.min.js"></script>
  <title>Yield Report</title>
</head>
<body>
  <h1>Yield Report</h1>
  <iframe
src="https://us1.ca.analytics.ibm.com/bi/?pathRef=.my_folders%2FEstimation%2Breport&closeWindow
OnLastView=true&ui_appbar=false&ui_navbar=false&shareMode=embedded&action=run&prompt=false" width="1400" height="800" frameborder="0" gesture="media" allow="encrypted-
media" allowfullscreen=""></iframe>
  <h1>Cultivation Report</h1>
  <iframe
src="https://us1.ca.analytics.ibm.com/bi/?pathRef=.my_folders%2FNew&closeWindowOnLastView=true
&ui_appbar=false&ui_navbar=false&shareMode=embedded&action=run&prompt=f
alse" width="1400" height="800" frameborder="0" gesture="media" allow="encrypted-media"
allowfullscreen=""></iframe>
</body>
</html>
```

## Story.html

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta http-equiv="X-UA-Compatible" content="IE=edge">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.2.2/dist/css/bootstrap.min.css" rel="stylesheet">
  <script src="https://cdn.jsdelivr.net/npm/bootstrap@5.2.2/dist/js/bootstrap.bundle.min.js"></script>
  <title>Yield Story</title>
</head>
<body>
  <h1>Yield Story</h1>
  <iframe
src="https://us1.ca.analytics.ibm.com/bi/?perspective=story&pathRef=.my_folders%2FNew%2Bstory&a
mp;closeWindowOnLastView=true&ui_appbar=false&ui_navbar=false&shareMode=embedde
d&action=view&sceneId=model00000184a3a575ba_00000002&sceneTime=0" width="1400"
height="700" frameborder="0" gesture="media" allow="encrypted-media" allowfullscreen=""></iframe>
</body>
</html>
```

