



**POLITECNICO**  
**MILANO 1863**

# **DREAM**

Data-driven Predictive Farming in Telengana

# **RASD**

Requirement Analysis and Specification Document

Version 1.0 - 29/11/2021

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# 1. Introduction

## 1.1. Purpose

One of the most important sectors in each countries' economy is agriculture. Thus, the governments should keep it alive. On the other hand, many issues such as global warming, population increase and COVID-19 pandemic may have negative impacts on this vital sector. Scientists have predicted a significant loss in food supply by the end of century.

It was like a warning to the Telengana's government to come up with the idea of "DREAM". This idea is about designing and implementing a system which can prevent the mentioned disaster with the help of stakeholders, policy makers, farmers, market analysts, agronomists and even normal citizens.

First, in order to achieve the goals of the system, some specific data about Telengana's state have been collected. For example, meteorological forecasts, humidity of the soil, amount of water which use for irrigation, type of products and amount of products which produced by farmers. Then, with respect to this data, the DREAM system should allow policy makers to identify farmers with good performance and poor performance. Also the system should allow farmers to access to collected data and use them to improve their performance. The farmers should be allowed to share their problems with others and request for help.

This document focuses on **Requirements Analysis and Specification Document (RASD)** of the system and describes the main goals, the domain assumptions, the scenarios which may happen, the uses cases, the list of functional and non-functional requirements which system should fulfill and finally the diagrams to visualize the interactions between components and performance of the system.

### 1.1.1. Goals

Goals	Description
G1	Allow policy makers to identify farmers who are performing well.
G2	Allow policy makers to identify farmers who need help.
G3	Allow policy makers to see the result of the steering initiatives.
G4	Allow farmers to see weather forecast.
G5	Allow farmers to see humidity of soil.
G6	Allow farmers to see suggestions relating to specific crop to plan or specific fertilizer to use.
G7	Allow farmers to insert their type of products and produced amount per product.
G8	Allow farmers to insert their problems.
G9	Allow farmers to request for help and suggestion.
G10	Allow farmers to create discussion forums.

## 1.2. Scope

To manage farmers and help them this application provided and contains 3 main parts:

- Farmers login in the application and then insert their information such as location, amount of production, type of production, and so on. By inserting this information, they could get guides from governments and other farmers for improving the quality of the product.
- Policy makers use this application to identify the good and bad farmers by their performance, then they help farmers by giving solutions and guides.
- Accessing information collected by sensors, water irrigation systems, and governmental agronomists and allowing the farmers to use this information.

Farmers use information collected to improve their product quality and then they insert their information such as the amount of production, quality of production, problems, and solutions. Then policy makers could identify the farmers that worked well or worse and send some solutions and guides to them to improve their production. As well as, farmers get a chance to create forums and discuss problems and get solutions.

### 1.2.1. World Phenomena

World Phenomena	Description
WP1	Farmer plans crops.
WP2	Farmer irrigates crops.
WP3	Farmer uses fertilizers.
WP4	Sensors measure the humidity of soil.
WP5	Irrigation system measures the amount of water used by each farmer.
WP6	Meteorological adverse events such as flood, storm, lightening fire, etc. happen.
WP7	Farmer faces problems.

### 1.2.2. Shared Phenomena

Shared Phenomena	Description	Control
SP1	Farmer selects to see weather forecast.	World
SP2	System shows weather forecast to farmer.	System
SP3	Farmer selects to see humidity of soil.	World
SP4	System shows humidity of soil to farmer.	System
SP5	Farmers selects to see suggestions relating to specific crop to plan or specific fertilizer to use.	World

SP6	System shows suggestions relating to specific crop to plan or specific fertilizer to use.	System
SP7	Farmer inserts his/her type of products.	World
SP8	Farmer inserts his/her produced amount per product.	World
SP9	Policy maker selects to see a farmer's detailed info.	World
SP10	System shows farmer's detailed info to policy maker.	System
SP11	Policy maker identifies that the performance of farmer is good or not, based on produced amount, humidity of soil, water consumption.	World
SP12	Farmer inserts his/her problem.	World
SP13	Farmer requests for help or suggestion.	World
SP14	Farmer creates discussion forum.	World
SP15	Policy maker selects to see the result of the steering initiatives.	World
SP16	System shows the result of the steering initiatives.	System

### 1.3. Definitions, Acronyms and Abbreviations

#### 1.3.1. Definitions

Definition	Description

#### 1.3.2. Acronyms

Acronyms	Description
DREAM	Data-driven Predictive Farming in Telengana
RASD	Requirement Analysis and Specification Document

#### 1.3.3. Abbreviations

Abbreviations	Description
G	Goal
WP	World Phenomena
SP	Shared Phenomena
D	Domain Assumption
R	Requirement

#### 1.4. Revision history

Version	Date	Modification
1.0	29/11/2021	First version

#### 1.5. Reference Documents

- Specification Document: "01. Assignment RDD AY 2021-2022.pdf"
- Course slides
- IEEE/ISO/IEC 29148-2018 - ISO/IEC/IEEE International Standard - Systems and software engineering - Life cycle processes - Requirements engineering

#### 1.6. Document Structure

- **Section1**

Overview of the purpose of the project and defining the scope of the system. Describe the specifications such as the definitions, acronyms, abbreviations, revision history, and references. As well as introducing the goals, world and share phenomena of the software.

- **Section2**

Defining the main scenarios and then explaining the main features in software by class diagram and statechart. In user characteristics, the types of actors that use the application are explained. The product function subsection defined the functionalities of the application. In the end, the domain assumptions are defined.

- **Section3**

The main part of the project which introduces interface requirements such as user interface, hardware interface, software interface, and communication interfaces. Presenting the functional requirements that are shown by use case diagrams and sequence diagrams. Then the activity diagram is defined and requirements are mapped to use cases.

- **Section4**

Using Alloy language for analyzing the system and brief comments for clarifying the Alloy codes.

- **Section 5**

Shows how much time spent by each member of group.

- **Section 6**

Contains the references.