Software Requirements Specification

Designing, Developing and Establishing LRI Data Centre, LRI Portal and LRI Decision Support System in Karnataka State, India

Version 2.2

Prepared by

Ceinsys Tech Limited

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Prepared for

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1. INTRODUCTION

1.1 PURPOSE

The purpose of this SRS is to systematically document all the requirements needed to Design, develop, and establish LRI Data Center, LRI Portal, and LRI Decision Support System for Karnataka Watershed Development Department (WDD). The details of the Hardware, software modules are discussed in this document. This document is based on the User Needs Assessment document submitted to WDD describing functional requirements of the overall solution. It also describes non-functional Requirements, design constraints and other factors necessary to provide a description of the requirements of the system.

As per the Notification of the Award No WDD/ED/KWDP-II/DL/ADH/9/2017-18, this document will be the basis for the Solution/ System Design document comprising

- Real World Object Catalogue
- Conceptual Data Model
- Hardware Architecture
- Low Level Design Document

1.2 INTENDED AUDIENCE

This document is intended for following readers

1. WDD Officials
2. Technical Advisory Committee
3. Project managers, Developers and the Technical staff of Ceinsys Tech Ltd.

1.3 PROJECT SCOPE

The Project Scope is broadly grouped under the following categories

- **Requirement Analysis:** This is the preliminary step required to document User Need for LRI Data Center, LRI geo-portal, LRI clearing house, LRI DSS applications, and LRI mobile app. This includes identification of the user/user groups already associated or to be potentially associated with the use of geo-spatial data in the context of Local Level Planning. The deliverable of this task is a Needs Assessment Report which includes findings dealing with potential applications, necessary data (Data Inventory), required resources and site plan preparation. This document will be the basis for SRS.

- **Preparation of Solution/System Design Document:** This document is the basis for Development of LRI data center, Geo Portal, Decision Support System which includes the following
    - **Real World Object Catalogue:** Creation of detailed Real World Object Catalogue for the features which are relevant for Sujala-III project.
    - **Conceptual Data Model:** Creation of conceptual Data model compatible to RDBMS in Unified Modeling Language (UML).
    - **Hardware Architecture:** This document provides the proposed hardware architecture for implementation of the proposed solution for WDD. The document presents a configuration based on tender requirements, further discussions held with WDD and Karnataka State Data Center.
    - **Low Level Design Document:** Low-level design (LLD) is a component-level design document providing data structures, required software architecture, actual logic for each and every component of the system and Class diagrams.
- **Installation and Commissioning of GIS Infrastructure at LRI partners and PMU location:** As a part of this contract, GIS systems are being provided as per the details provided in Hardware SRS submitted.
- **Operationalization of LRI portal:** This includes implementation of Geo-portal, Decision Support System, Metadata as per OGC standard, and Real World Object Catalogue at Karnataka State Data Center (KSDC), Center for e-Governance e-Enabling Government. Following are the major components of LRI portal
    - **LRI Centralized Database:** Centralized LRI Digital Library containing (raster & vector), attribute or socio-economic/statistical data sets and metadata sets from various data providers / consortium partners / agencies. The centralized Database should have facility to remotely update the Database and metadata from LRI partners, Sujala-III consortium partners, WDD and other line departments of GOK dealing with land and farmers of Karnataka state.
    - **Publishing metadata:** Creation of a web-based service for publication/ upload/ updating of metadata at the Geo-portal / clearinghouse.
    - **Creation of LRI Geo-Portal:** The LRI Geo-Portal will be web enabled integrated GIS and MIS system with OGC services. This system enables users to search and

access metadata, GIS and MIS data. In addition to this authorized users by WDD will be able upload or download the data through clearing house, use Decision Support Systems and analyze the information using various geographic services and LRI datasets of watersheds/villages for scientific management of watershed planning. Following are the OGC compliant web services which will be part of Geo-portal.

- Catalogue Service on Web (CSW)

CSW is one part (or "profile") of the OGC Catalog Service, which defines common interfaces to discover, browse, and query metadata about data, services, and other potential resources.

Operations defined by the CSW standard include:

- `GetCapabilities`: "allows CSW clients to retrieve service metadata from a server"
- `DescribeRecord`: "allows a client to discover elements of the information model supported by the target catalogue service. The operation allows some or all of the information model to be described".
- `GetRecords`: search for records, returning record IDs
- `GetRecordById`: "retrieves the default representation of catalogue records using their identifier"
- `GetDomain` (optional): "used to obtain runtime information about the range of values of a metadata record element or request parameter"
- `Harvest` (optional): create/update metadata by asking the server to 'pull' metadata from somewhere
- `Transaction` (optional): create/edit metadata by 'pushing' the metadata to the server

Requests can encode the parameters in three different ways:

- GET with URL parameters
- POST with form-encoded payload
- POST with XML payload

- Web Map Service (WMS)

Web Map Service Interface Standard (WMS) provides a simple HTTP interface for requesting geo-registered map images from one or more distributed geospatial databases. A WMS request defines the geographic layer(s) and area of interest to be processed. The response to the request is one or more geo-registered map images (returned as JPEG, PNG, etc) that can be displayed in a browser application. The interface also supports the ability to specify whether the returned images should be transparent so that layers from multiple servers can be combined or not.

- Web Feature Service (WFS/GML)

  The Open Geospatial Consortium Web Feature Service (WFS) Interface Standard provides an interface allowing requests for geographical features across the web using platform-independent calls. This can be considered as source code behind the map.

- Web Registry Service (WRS)

  The **Web Registry Service** is a software component that supports the run-time discovery and evaluation of resources such as services, datasets, and application schemes.

- Web Coverage Service (WCS)

  A WCS provides access to coverage data in forms that are useful for client-side rendering, as input into scientific models, and for other clients.

- **Development of Decision Support Systems(DSS):** There are two categories of DSS needs to be developed to serve management, operations and planning related to Sujala-III implementing agencies and other stake holders.

  - **Group -1**

    - Soil & Water conservation plan-to identify the type of structures, their design and estimate, for both arable and non-arable lands/areas
    - Crop selection (Based on physical suitability and cost benefit ratio
    - Delineating prime farm lands/arable and non-arable lands based on Land Capability Classification
    - Crop based nutrient management and soil health

  - **Group-2**

    - Estimating surface runoff at farm/MWS/SWS levels
    - Designing the size and location of Farm ponds based on runoff model
    - Estimating the crop water requirement at MWS/SWS levels based on the existing land use or crops that are planned to be taken up for cultivation at MWS or higher levels

- Estimating water balance at MWS or higher levels, taking into account the RF, crop requirement, Runoff, evaporation and other losses, soil moisture and ground water.
- Water budgeting taking into consideration the needs of various uses/users at MWS/ Village level- crop needs, human needs, livestock needs etc.

  - **Development of Mobile Application:** This application is intended for all the registered mobile users with WDD to access LRI data and the Decision Support Systems.

- **Training:** Providing Hands-on training to users from WDD, and its Sujala-III consortium partners.
- **System Maintenance:** Operation and Maintenance of the system for a period of three (3) years after the comprehensive warranty period of two (2) years.
- **Overall Capacity Building and Training:** Building the capacities of different stakeholders by providing trainings at various levels.

1.4 References

- User Needs Assessment Report Submitted on 05-09-2018.
- **Tender Document**: International Competitive Bids For Designing, Developing, And Establishing LRI Data Center, LRI Portal, And LRI Decision Support System In Karnataka State, India (WDD/ED/KWDP-II/DL/ADH/9/2017-18)
  - Pre-bid Response Document
  - FRS Document
  - Annexure-1
- Agreement Document

1.5 Abbreviations

Abbreviations	
2D	Two Dimensional
3D	Three Dimensional
API	Application Programming Interface
ATMA	Agricultural Technology Management Agency
B-C Ratio	Benefit-Cost Ratio
CRAC	Computer Room Air Conditioners
CSV	Comma Separated Values
DC	Data Centre

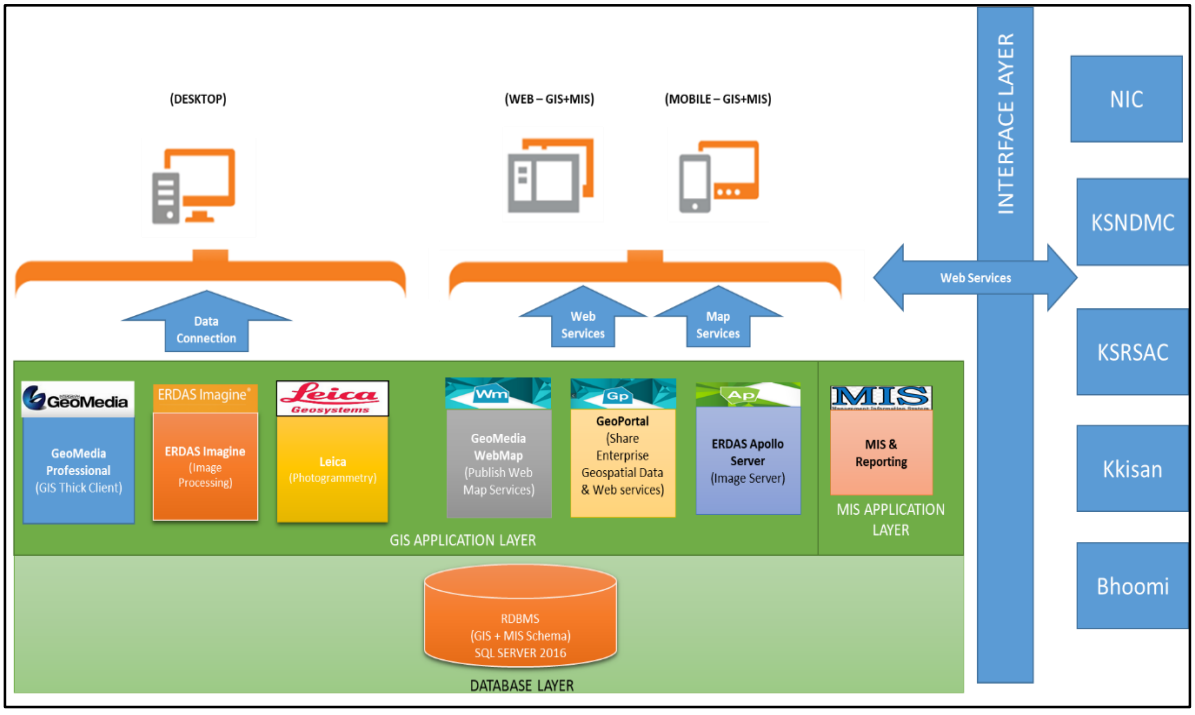
DL	Digital Library
DO	Designated Officer
DMZ	Demilitarized Zone
DR	Disaster Recovery
DRC	Disaster Recovery Centre
DSS	Decision Support System
e-Gov	e-Governance
FRS	Functional Requirement Specifications
GAP	Good Agricultural Practices
G-DSS	GIS based Decision Support System
GIS	Geographic Information System
GoK	Government of Karnataka
GP	Geo Portal
GUI	Graphic User Interface
HOPCOMS	Horticultural Producers Cooperative Marketing Society
HVAC	Heating, ventilation and air conditioning
ICT	Information & Communication Technologies
IP	Internet Protocol
IUFR	Interim Unaudited Financial Report
IVRS	Interactive Voice Response System
IWMP	Integrated Watershed Management Programme
KCC	Kisan Call Centres
KGIS	Karnataka Geographic Information System
KML	Keyhole Markup Language
KSK	Krishi Vigyan Kendras
KSNDMC	Karnataka State Natural Disaster Monitoring Centre
LRI	Land Resource Inventory
MIS	Management Information System
MZ	Militarized Zone
NSDI	National Spatial Data Infrastructure
OGC	Open Geospatial Consortium
PDF	Portable Document Format
PIN	Personal Identification Number
PoP	Package of Practices
PSU	Public Sector Undertaking
RDBMS	Relational Database Management System
RSK	Raitha Samparka Kendras
SAC-SMA	Sacramento Soil Moisture Accounting
SAN	Storage Area Network
SCC	State Call Centres
SDK	Software Development Kit
SMS	Short Message Service
SRS	Software Requirement Specifications
SWS	Sub Watershed
UPS	Uninterruptible power sources
URL	Uniform Resource Locator
URN	Unique Reference Number / Unique Registration Number

USB	Universal Serial Bus
WDD	Watershed Development Department
MWS	Micro Watershed

2. Overall Description

2.1 Project Perspective

The Proposed Solution comprises end to end solution having data creator suite and infrastructure required to share, collaborate and publish agriculture related/ Watershed data through web portal. The data creator suite is being provided to all the LRI partners which includes desktop GIS, Leica Photogrammetry system to create 3D data and advance imaging solution for image processing. The proposed database server is MS SQL Server 2016 to store both MIS and Spatial data being provided by LRI partners (NBSS&LUP and Agriculture Universities) and data generating agencies (KSRSAC, KSNDMC etc.). Infrastructure for publishing the data over the web comprises of Intergraph Geo-spatial Suite and Customized Web portal with a decision support systems which are built upon using the Knowledge base shared by various stake holders and Knowledge partners such Indian Institute of Science, Agriculture Universities, the detailed Functional Requirements Study document of WDD and further feedbacks provided by WDD.



2.2 FUNCTIONAL OVERVIEW

The overall solution infrastructure required for effective usage of information communication technology for science based integrated Watershed program includes the following components.

(i) LRI digital library

(ii) LRI geo portal

(iii) MIS Portal

(iv) LRI Mobile Apps

(v) LRI Decision Support System

(vi) LRI data center

2.2.1 LRI DIGITAL LIBRARY (LRI DL):

LRI digital Library will stores both primary & secondary spatial data. It comprises data from KSRSAC, KSNDMC, NBSS & LUP, including LRI partners. Following are the details of the input data.

Table 2-1 LRI Digital Library Database

(The geo-referenced data with the projection system and attributes will be as per the KGIS standard. The scale of the map is dependent on respective data sources.)

Sl No	Data	Description	Geometry	Source of Data
Base Maps				
1.	State wide Administrative Boundaries,	1.1. Administrative Boundaries with the following hierarchy		KSRSAC and attributes as per KGIS standard
		1.2. State Boundary	Polygon	
		1.3. District Boundaries	Polygon	
		1.4. Division/Taluka Boundaries	Polygon	
		1.5. Hobli Boundaries	Polygon	
		1.6. Panchayat Boundaries	Polygon	
		1.7. Village Boundaries	Polygon	KSRSAC and attributes as per KGIS standard. Following attributes from WDD. Census particulars, literacy level, population growth,

Sl No	Data	Description	Geometry	Source of Data
				sex ratio, Land holdings-small, medium and large, Land ownership details, Migration to other areas, Cost of cultivation for major crops, Status of Educational development-literacy rate-male/female and children, Schools, colleges, Technical & Vocational Education School Going Children, Health Center/Medical Facilities available, etc. Also details about the farmer's interest groups, self-help groups, Commodity interest groups, food security groups.
2.	Forest Boundaries	2.1. Forest Circle	Polygon	KSRSAC and attributes as per KGIS standard
		2.2. Forest Division	Polygon	
		2.3. Forest Sub – Division	Polygon	
		2.4. Forest Range	Polygon	
		2.5. Forest Section	Polygon	
3.	SOI data	3.1. SOI topo sheets (at different scale 1:250000, 1:50000, 1:25000)	Image	KSRSAC
4.	Satellite imagery	4.1. Cartosat /Quick bird imageries available at different resolutions	Image	KSRSAC
Cadastral Maps				
5.	Parcel Maps	5.1. Parcel Map showing parcel boundaries and corresponding attributes as per BHOOMI	Polygon	KSRSAC and attributes as per KGIS standard. And farmers details through Bhoomi and K-Kisan portal through web service.
		5.2. LU/LC Attribute Based as per LRI Data	Polygon	Attributes from LRI Partners
Watershed				
6.	Watershed Boundary	6.1. Watershed - Region	Polygon	KSRSAC and attributes as per KGIS standard
		6.2. Watershed - Basin	Polygon	
		6.3. Watershed – Catchment	Polygon	

Sl No	Data	Description	Geometry	Source of Data
		6.4. Watershed – Sub catchment	Polygon	
		6.5. Watershed – Watershed	Polygon	
		6.6. Watershed – Sub watershed	Polygon	
		6.7. Watershed – Mini watershed	Polygon	
		6.8. Watershed – Micro watershed	Polygon	KSRSAC and attributes as per KGIS standard and summary of the attributes based on LRI Socio-Economic Survey data as per Annexure –5
Thematic Maps				
7.	Grid Data	7.1. LRI Grid	Point	LRI Partners
		7.2. Agriculture Grid for Soil Health Card	Polygon	Agriculture Department/ KSRSAC / NIC
8.	Land Use / Land Cover	8.1. Land Use And Land Cover		KSRSAC and attributes as per KGIS standard
9.	Soil Map	9.1. Soil Depth	Polygon	LRI Partner
		9.2. Soil type	Polygon	LRI Partner
		9.3. Surface Soil Texture	Polygon	LRI Partner
		9.4. Soil Gravelliness	Polygon	LRI Partner
		9.5. Slope	Polygon	LRI Partner
		9.6. Soil Erosion		LRI Partner
		9.7. Land Capability Classification	Polygon	LRI Partner
		9.8. Soil & Water Conservation Plan	Polygon	LRI Partner
		9.9. Land Management Units	Polygon	LRI Partner
10.	Land Suitability for Major Crops	10.1. Land Suitability for Major Crops	Polygon	LRI Partner
11.	Soil Fertility Status	11.1. Soil Reaction (pH)	Polygon	LRI Partner
		11.2. Salinity (EC)	Polygon	LRI Partner
		11.3. Organic Carbon	Polygon	LRI Partner
		11.4. Available Nitrogen	Polygon	LRI Partner
		11.5. Available Phosphorous	Polygon	LRI Partner
		11.6. Available Potassium	Polygon	LRI Partner
		11.7. Available Sulphur	Polygon	LRI Partner
		11.8. Available Copper	Polygon	LRI Partner

Sl No	Data	Description	Geometry	Source of Data
		11.9. Available Manganese	Polygon	LRI Partner
		11.10. Available Iron	Polygon	LRI Partner
		11.11. Available Zinc	Polygon	LRI Partner
12.	Geology Map	12.1. Rock types	Polygon	KSRSAC and attributes as per KGIS standard
13.	Hydro geomorphology Map	13.1. Lineaments	Line	KSRSAC and attributes as per KGIS standard
		13.2. Depth To Weathered Zone	Polygon	
		13.3. Landforms	Polygon	
		13.4. Physiography	Polygon	
		13.5. Elevation	Point	
		13.6. Contour	Line	
14.	Water Bodies	14.1. Drainage/Stream	Line	KSRSAC as per KGIS Standard
		14.2. Rivers	Polygon	
		14.3. Water Bodies/ Ponds/ Tank	Polygon	
		14.4. Canal	Line	
15.	Elevation maps	15.1. Digital Elevation Model (DEM) for the project area and for the entire state.		KSRSAC as per KGIS Standard
16.	Transport Services:	16.1. Road Centerline	Line	KSRSAC as per KGIS Standard
		16.2. Road	Polygon	
		16.3. Rail	Line	
17.	Agro Climatic Zones	17.1. Agro Climatic Zones	Polygon	WDD/ Agriculture Department
Geo tag Details				
18.	Observation Well Data	18.1. State Ground Water Board (Attributes include water Quality, depth to ground water levels in feet)	Point	KSRSAC and Attributes details as per KGIS standard.
		18.2. Central Ground Water Board (Attributes include water Quality, depth to ground water levels in feet)	Point	KSRSAC and Attributes details as per KGIS standard
19.	Existing Water conservation measures	19.1. Conservation Measures built under MGNERGA	Point	Through NIC portal as web service through RDPR
20.	Climate/ Weather Data	20.1. Rain Gauge Stations	Point	KSNDMC (5700) and attributes as per KSNDMC at 15 Minutes interval and Historical Data.

Sl No	Data	Description	Geometry	Source of Data
		20.2. Weather stations	Point	KSNDMC (750), IMD (370), Water Resources Development Organ- GOI(170), State Agricultural Universities and Research Stations (100) Attributes at daily time scale for following Temperature, Humidity, Wind speed and direction, Solar radiation, Relative Humidity Sunshine Evapo-transpiration
21.	Marketing and infrastructural facilities	21.1. Whole sellers	Point	WDD. Attributes include Physical Structures and Facilities available
		21.2. Retailers	Point	
		21.3. Mandi	Point	
		21.4. Cooperative Self-Help-Group	Point	
		21.5. APMC (Agricultural produce market committee)	Point	
		21.6. FPO (Farmer Producer Organizations	Point	
		21.7. Processors	Pont	
		21.8. Exporters	Point	
		21.9. NAFED (National Agricultural Cooperative Marketing Federation of India Ltd.)	Point	
		21.10. FCI (Food Corporation of India)	Point	
		21.11. TRIFED (The Tribal Cooperative Marketing Development Federation of India)	Point	
		21.12. State Marketing Federations (SMF)	Point	
		21.13. Cooperative marketing agencies	Point	
		21.14. HOPCOMS (Horticultural Producers' Cooperative Marketing and Processing Society)	Point	

Sl No	Data	Description	Geometry	Source of Data
22.	R & D Institutions	22.1. Agriculture and Horticulture Universities	Point	WDD. Attributes include Physical Structures, address details and Facilities available
		22.2. Krishi Vigyan Kendra (KVK)	Point	
		22.3. Raitha Samparka Kendra(RSK)	Point	
		22.4. Central Food Technological Research Institute (CFTRI)	Point	
		22.5. Defence Food Research Laboratory (DFRL)	Point	
		22.6. Indian Institute of Horticultural Research (IIHR)	Point	
23.	Horticulture Stakeholders	23.1. Farm Input suppliers (includes Seeds, Fertilizers, Pesticides suppliers)	Point	Horticulture Department. Attributes include Physical Structures, address details and Facilities available
		23.2. Farm Equipment suppliers	Point	
		23.3. Horticulture Product and Service Providers	Point	
		23.4. Financial Institutions	Point	
		23.5. Insurance Companies	Point	

The database used for storing the LRI data will be Microsoft SQL Server 2016 Enterprise Edition.

The LRI digital Library will provide access to populate and publish data and metadata, discover / explore metadata through catalogue service.

2.2.2 LRI GEOPORTAL

The LRI Geoportal will be a centralized system for organizing, storing and retrieving LRI GIS & MIS data. It will have the Geoportal and Clearing house functionalities. It will provide role based access to the users to populate, publish the data, metadata. It will provide single window access mechanism to metadata / spatial data sources for watershed development in the state. It will be OGC compliant and conform to current standards in use by Karnataka government (KGIS, KSNDMC etc.). The Geoportal will have capabilities/tools such as User Management, Viewer, Data upload & download, Measurement tools, Decision Support Systems. The Geoportal will support multi-lingual interface English & Kannada.

2.2.3 LRI MIS PORTAL

The LRI MIS portal will serve as one-stop-shop for services related to land or farm based activities offered from government to farmers. MIS portal will have two levels of users, citizen and departmental. The LRI MIS portal will have User Dashboard, Data entry forms, Reports.

2.2.4 LRI Mobile Apps

LRI Mobile application will be developed to view information of Sujala-III project for different users including public, farmers. It will support English and Kannada Language. The user will have controlled access to the LRI application.

2.2.5 LRI Decision Support System

- DSS for Soil & Water conservation plan-to identify the type of structures, their design and estimate, for both arable and non-arable lands/areas.
- DSS for crop selection (Based on physical suitability and cost benefit ratio.
- DSS for delineating prime farm lands/arable and non-arable lands based on Land Capability Classification.
- DSS on crop based nutrient management and soil health.
- DSS for estimating surface runoff at farm/MWS/SWS levels.
- DSS for designing the size and location of Farm ponds based on runoff model.
- DSS for estimating the crop water requirement at MWS/SWS levels based on the existing land use or crops that are planned to be taken up for cultivation at MWS or higher levels
- DSS for estimating water balance at MWS or higher levels, taking into account the RF, crop requirement, Runoff, evaporation and other losses, soil moisture and ground water.
- DSS for water budgeting taking into consideration the needs of various uses/users at MWS/ Village level- crop needs, human needs, livestock needs etc.

2.2.6 LRI Data Center (LRI DC)

- LRI Data Center will be established in State Data center. In SDC Core Software application infrastructure including Database and geo portal will be hosted.
- The PMU will have GIS desktop Application, image processing software, Photogrammetry Software, Helpdesk solution. The connectivity between SDC and PMU will be provided by WDD.

- At each LRI partner will have one server, one Photogrammetry and GIS workstation. The 20 Mbps leased line connectivity will be established between SDC and each LRI Partner by Ceinsys.
- Details of IT infrastructure to be provided is mentioned in the Hardware interface and software interface sections of this document.

2.3 User Classes and Characteristics

The Proposed system expected to have following users / user groups across the state

State level:

- Nation National Bureau of Soil Survey and Land Use Planning (NBSS&LUP), Bengaluru (Lead Institute for the Project)
- Indian Institute of Science (IISc), Bengaluru
- International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Hyderabad
- University of Agricultural Sciences (UAS), Bengaluru
- University of Agricultural Sciences (UAS), Dharwad
- University of Agricultural Sciences (UAS), Raichur
- University of Horticultural Sciences (UHS), Bagalkote
- University of Agriculture and Horticultural Sciences (UAHS), Shivamogga
- Karnataka Veterinary, Animal and Fishery Sciences University (KVAFSU), Bidar
- Karnataka State Remote Sensing Applications Centre (KSRSAC), Bengaluru
- Karnataka State Natural Disaster Management Center (KSNDMC), Bengaluru

District level:

- Collector
- Project director, District Rural Development Agencies
- Sub-Collector
- District Agriculture Officer
- Deputy Director, Horticulture
- Soil conservation Officer
- Block Development Officers / ABDOs
- Marketing Inspectors (Civil Supply)
- Statistical Field Officers
- Village Agriculture Worker

Taluk level:

- Assistant Director (Agriculture)
- Staff of Raitha Samparka Kendras
- Agricultural Officer
- Citizen:
- Farmer

- Community

Others

- Business
- Research Organizations
- Academic Institutions
- INGOs / NGOs / Civil Societies
- Federations / Cooperatives / Societies
- Development Consultants

The above stake holders can be grouped under following groups.

A. **Project Monitoring users :** Project Monitoring users are the primary users of MIS component and will have access to Executive Dash boards highlighting the progress of the projects based on the credentials provided to individual users and also the activities performed / to be performed by the users in the system. They will be able to view and analyses plan and progress of watershed and other programs.

B. **LRI data generating agencies / partners:** Following are the LRI data generating agencies and partners to ensure successful execution of this project.

   i. Karnataka State Remote Sensing Application Center / KGIS: Data Provider.
   ii. National Bureau of Soil Survey and Land Use Planning (NBSSLUP), Bengaluru; Data provider and Lead Agency for Consortium of Institutions of Service Providers. They are also responsible to provide support for Establishing Digital Lab and Decision Support Systems.
   iii. Karnataka State Agricultural University (UAS), Bengaluru; Data Generating Agency
   iv. Karnataka State Agricultural University (UAS), Dharwad; Data Generating Agency
   v. Karnataka State Agricultural University (UAS), Raichur; Data Generating Agency
   vi. Karnataka State University of Horticultural Sciences (UHS), Bagalkote Data Generating Agency
   vii. Karnataka State UAHS, Shivamogga. Data Generating Agency

All the data generating agencies are the primary users of both MIS and GIS based Decision support systems to update the data, analyze the information and preparation of resource Atlases. This user group can also be Knowledge partner who would conduct Research and provide inputs to Decision Support Systems.

C. **Watershed implementing agencies:** These are the users primarily District and Taluk Watershed Development officers, responsible for implementation of the Integrated Watershed Program. Will have access to both MIS and GIS based Decision Support Systems.

D. **Knowledge partners:** Knowledge partners are the advanced users like Indian Institute of Science (IISc.), who would conduct Hydrological studies and provide input for Hydrology in DSS and implementing agencies like Agriculture universities, Horticulture departments etc.

E. **Farmers / Citizens and others:** These are the users of both Mobile and Geoportal to apply online applications for various schemes, seek advice for crop selection, Pest Control, fertilizers and download the data as required.

The proposed system should be designed in such a way that WDD / PMU will have provision to configure privileges / define access rules for the above user groups.

2.4 Operating Environment

The software will operate with the following software components and applications:

The software being developed will be running under Microsoft Windows 2016 Server operating system. The hardware that will be running these programs is being used for this specific project, and will follow the specifications that appear in this document in section of Hardwar interface. User interface with Windows 8-10, and Mobile Interface will be Android, IOS.

2.5 Design and Implementation Constraints

The proposed solution and its functionalities are dependent on the availability and quality of the data which is being provided by LRI partners, data generating agencies and web services from KSNDMC, KSRSAC, BHOOMI, Kkisan, NIC, Krishimaratavahini etc. If any of the data specified in the present document is not available, the dependent application/functionalities cannot be made operational. Any delays in providing the details of the web services by the concerned agencies and access to the web services will have, the direct impact on the design and implementation schedule.

2.6 User Documentation

After Go-live of the system User documentations will be provided in the electronic form.

2.7 Assumptions and Dependencies

- Connectivity between the State Data Center and PMU will be provided by the WDD. Servers at Data Center will be up and running.
- The communication infrastructure in the form of email Gateway and SMS gateways/Base Modem required for dissemination of information will be provided by WDD.

- It is assumed that prior to the installation of proposed applications, the required IT infrastructure as mentioned in the Hardware SRS document is readily available at State Data Center.
- All LRI data and spatial data as required will be made available in industry standard GIS formats such as ESRI .shp file which is one off the Standard Exchange format or Geo database . Other Assumptions and dependencies will be as per the GCC clause 9 and10.

2.8 Technology Stack

Following are the details of Framework, tools, programming languages to be used

- .Net 4.5.2 framework
- MVC-5 framework for application development. By default ASP.Net MVC supports ASPX and the Razor View Engine. The Razor View Engine is slower than the ASPX View Engine which may have impact on the overall performance of application. However the Razor View Engine is an advanced view engine, available with MVC 3.0 onwards and the same has been recommended by the IT consultant of WDD Sujala. Hence Razor view will be used with Entity Frame work. HTML5, CSS3, Bootstrap framework, JavaScript, ASP.net, C#
- Xamarin for Mobile application development
- Database: Microsoft SQL Server 2016 Enterprise edition
- Reporting: RDLC

3. External Interface Requirements

3.1 User Interfaces

The User interfaces will be developed around the proposed COTS Product (Hexagon's ERDAS Imagine Apollo, Geo Portal, and GeoMedia Web MAP) based on the functional requirements defined in the Functional Requirement Specification Document and User Needs Study Report. Following is the sample GUI the details of which is described in the "System Feature" section.

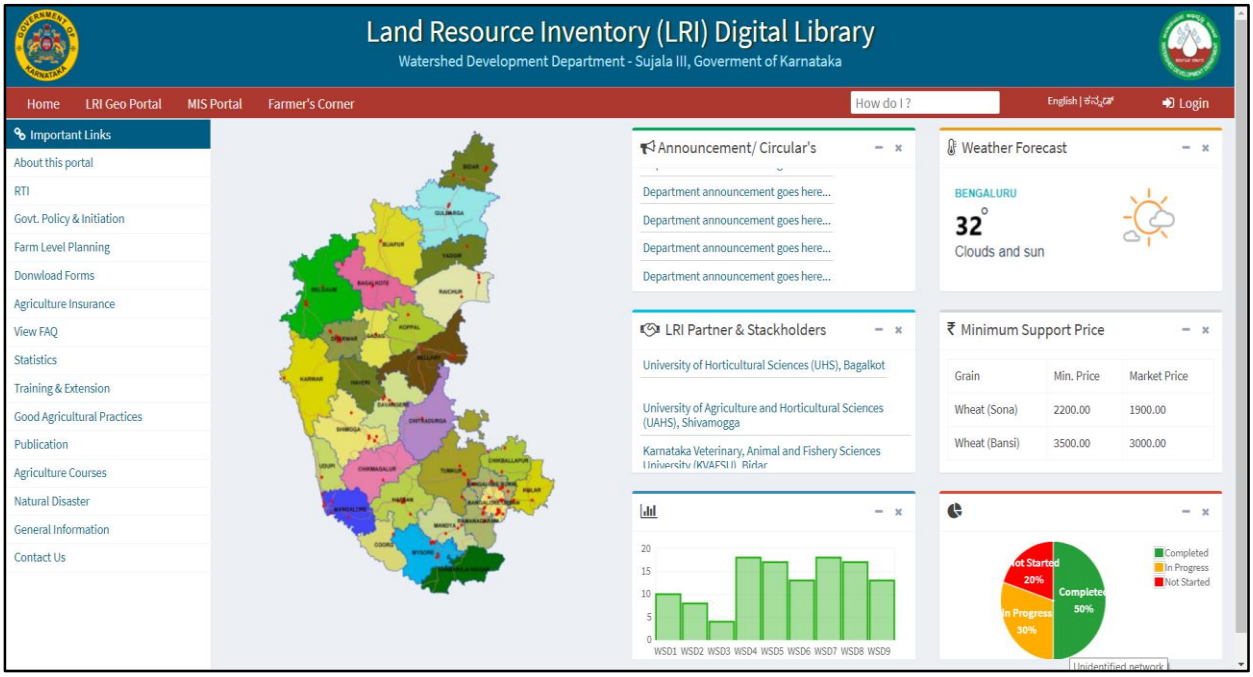


Figure 3-1 Sample Landing Page

3.2 Hardware and Software Interfaces

Hardware and Software interfaces are as mentioned in the Hardware SRS submitted.

4. System Features/ Functionalities

The details of the functionalities have been already described in the Functional Requirement Specification (FRS) document as a part of the tender. The Deviations/changes to the FRS is enclosed as Annexure-I from overall Solution perspective, following are the components wise system Features/Functionalities which will be implemented. The RESPONSE SEQUENCE/ACCEPTANCE CRITERIAs of features/ functionalities mentioned in FRS are presented in the following sections. These are based on the interaction held with two consecutive User needs workshops and one to one meetings conducted during August and September 2018.

4.1 LRI Digital Library

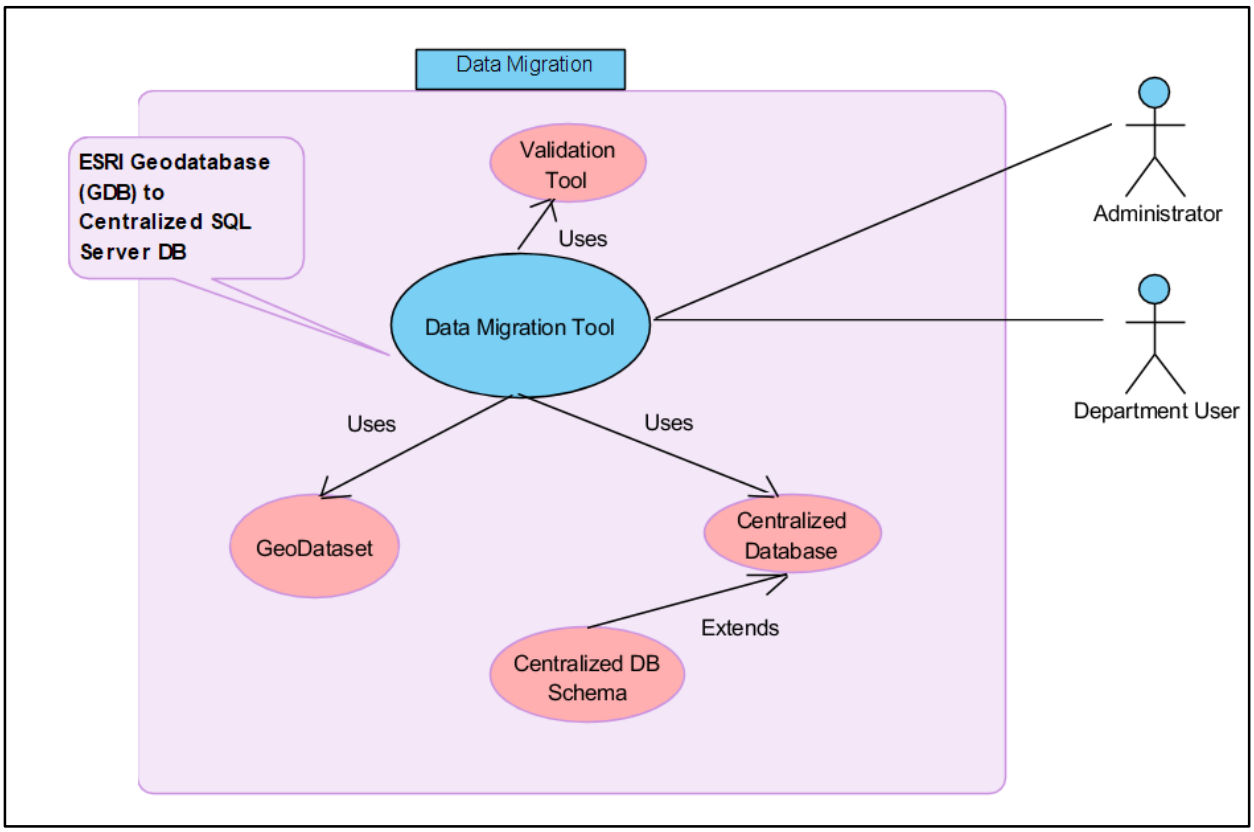
LRI Digital Library is centralized database on MS SQL Server consisting of both spatial and corresponding non-spatial data as provided by the LRI Partners, Data generating Agencies such as KSRSAC and Historic weather and rainfall data from KSNDMC (data as per the "*Table 2-1 LRI Digital Library Database"*).

The dynamic data as required will be accessed through web services from the following departments/Application.

- KSNDMC
    - Weather Data on daily scale basis: Minimum Temperature, Maximum Temperature, Minimum Humidity, Maximum Humidity, Minimum Wind Speed, Maximum Wind Speed, Solar Radiation , Sunshine, Evapo-Transpiration
    - Rainfall data on 15 minutes interval scale
- BHOOMI: Information about the selected parcel Number such as Owner name, Area of parcel, village, Taluk, district, contact number etc.
- K-Kisan
    - Link for registration / License certification
    - List of registered dealers
    - Stock and Price information for Seed, Fertilizer and Pesticides
    - Agriculture price commission , Agriculture marketing departing , Martha vahini
- NIC:
    - Conservation Measures built under MGNERGA
    - Grid wise fertility data
- Krishimaratavahini
    - Minimum Price for crops
    - Warehouses

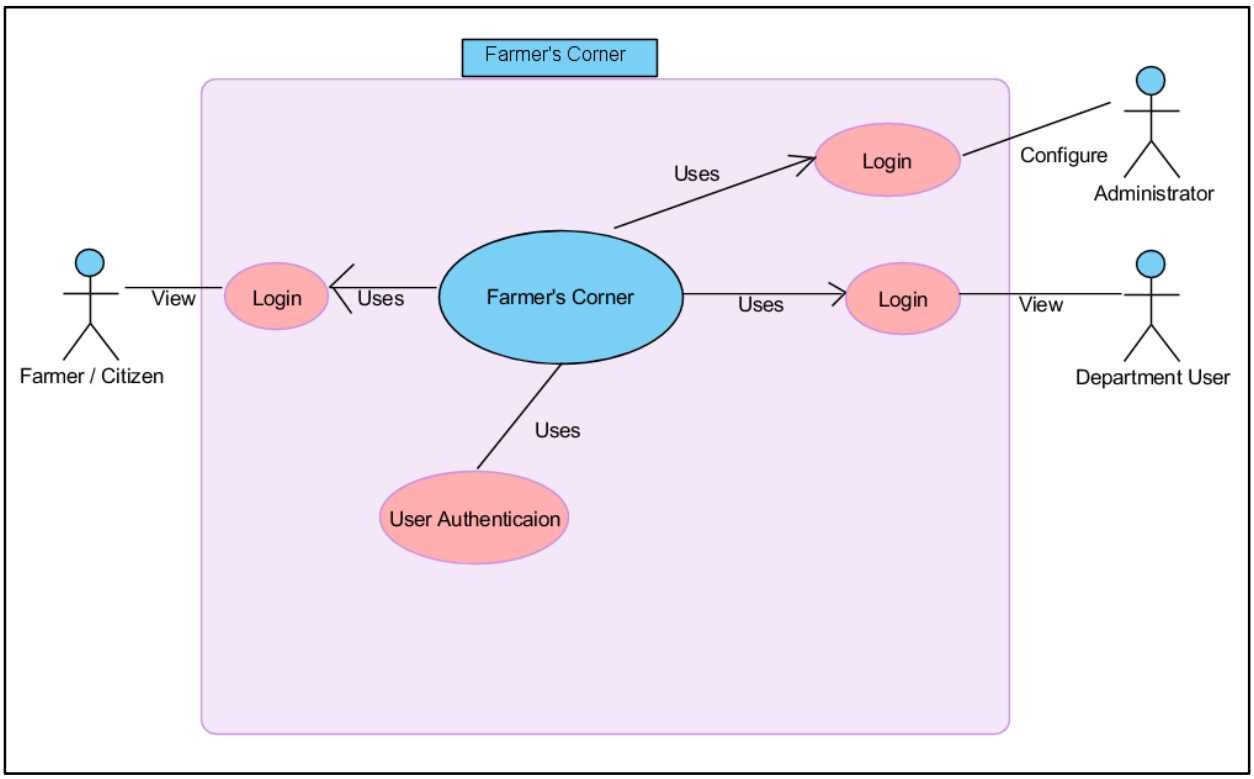
Since LRI Digital Library is a repository of the data there is no specific functionalities from application perspective. But to import the data from multiple sources, migration tools will be provided with the following functionalities.

Mapping & Migration Tool is used to migrate the data to destination tables in sql server using feature and attribute mapping. It will have two tabs with provision for Mapping and migration. There will be provision for the administrator to select the source table from the list and after mapping the user defined fields the data will be migrated to target data source.



4.2 LRI GEO PORTAL

LRI Geo-portal shall be a centralized system for organizing, storing and retrieving LRI GIS & MIS data. This will be gateway of information for farmers, Citizens, LRI Partners and Stakeholders. Below diagrams depicts the modules of Geoportal/MIS.


Farmer's Corner
Login
Uses
Configure
Administrator
View
Login
Uses
Farmer's Corner
Uses
Login
View
Farmer / Citizen
Department User
Uses
User Authenticaion

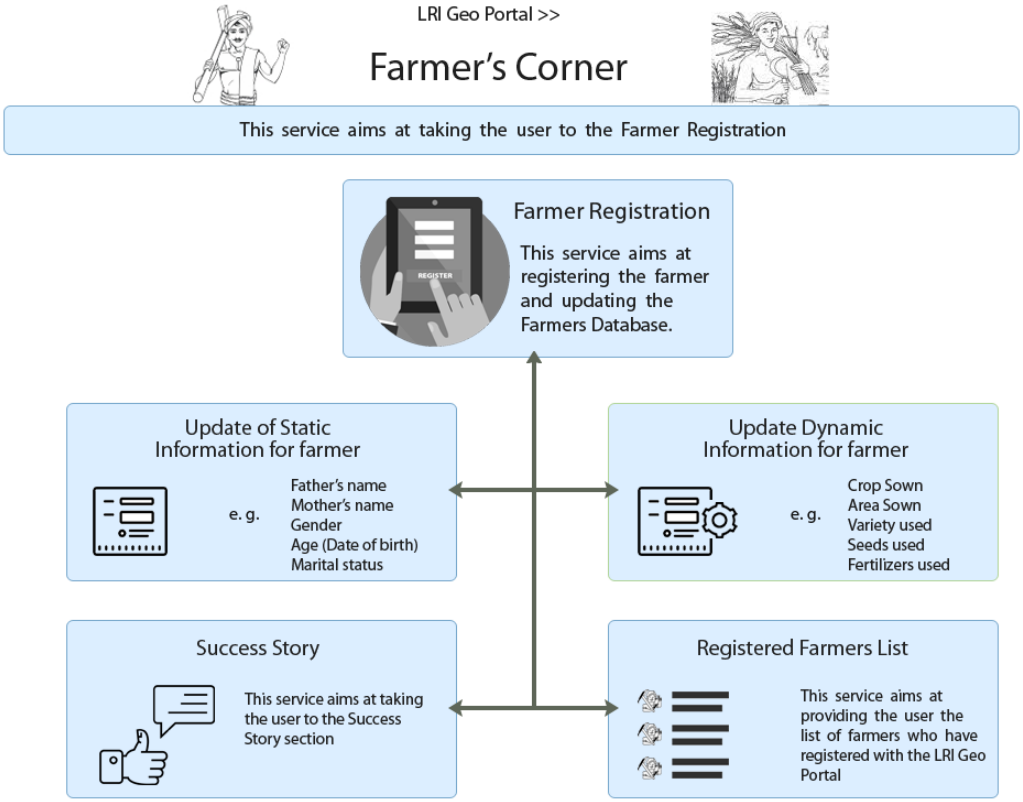

LRI Geo Portal >>
Farmer's Corner
This service aims at taking the user to the Farmer Registration
Farmer Registration
This service aims at registering the farmer and updating the Farmers Database.
Update of Static Information for farmer
e. g.
Father's name
Mother's name
Gender
Age (Date of birth)
Marital status
Update Dynamic Information for farmer
e. g.
Crop Sown
Area Sown
Variety used
Seeds used
Fertilizers used
Success Story
This service aims at taking the user to the Success Story section
Registered Farmers List
This service aims at providing the user the list of farmers who have registered with the LRI Geo Portal

Figure 4-1 Framer's Corner

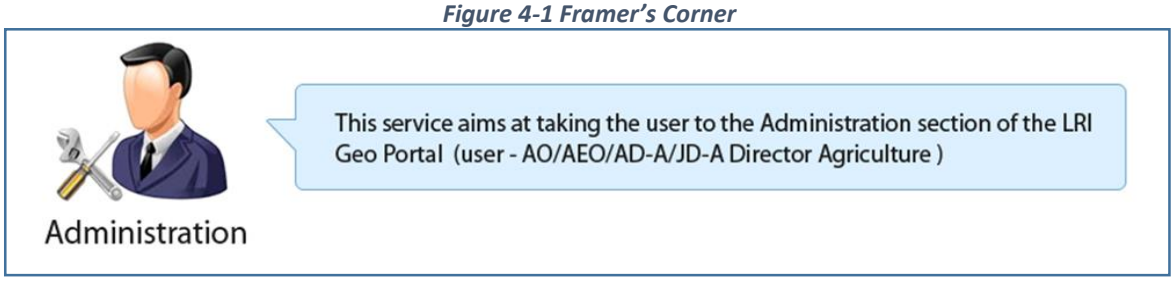


Figure 4-2 Administrator Module

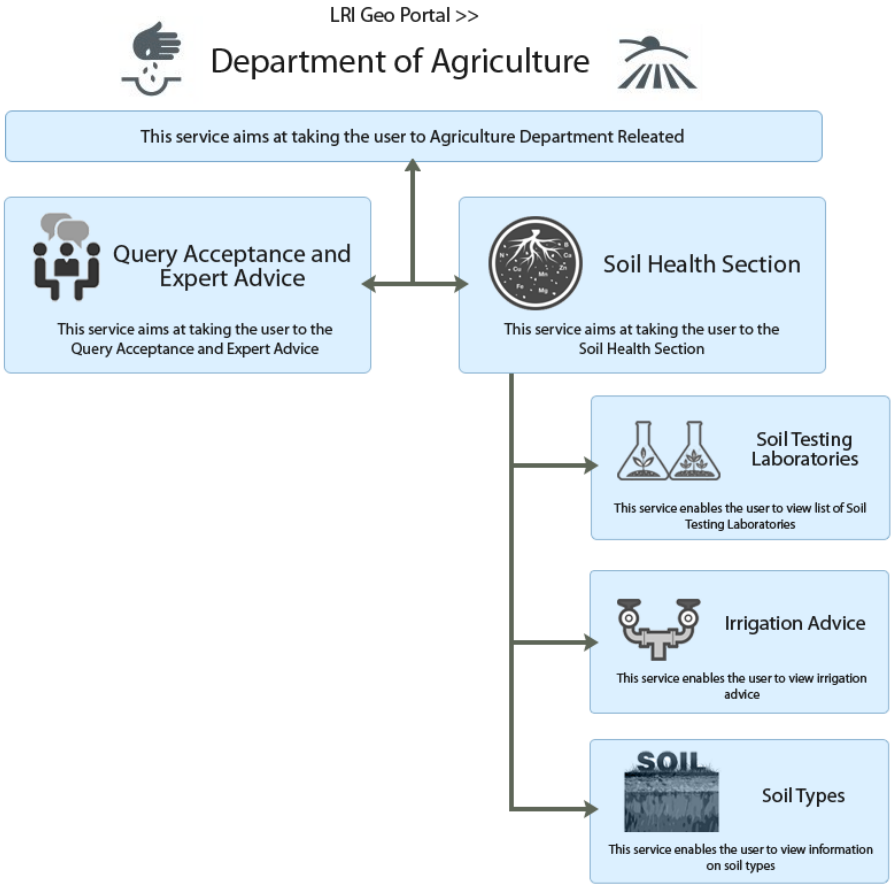


Figure 4-3 Agriculture Department

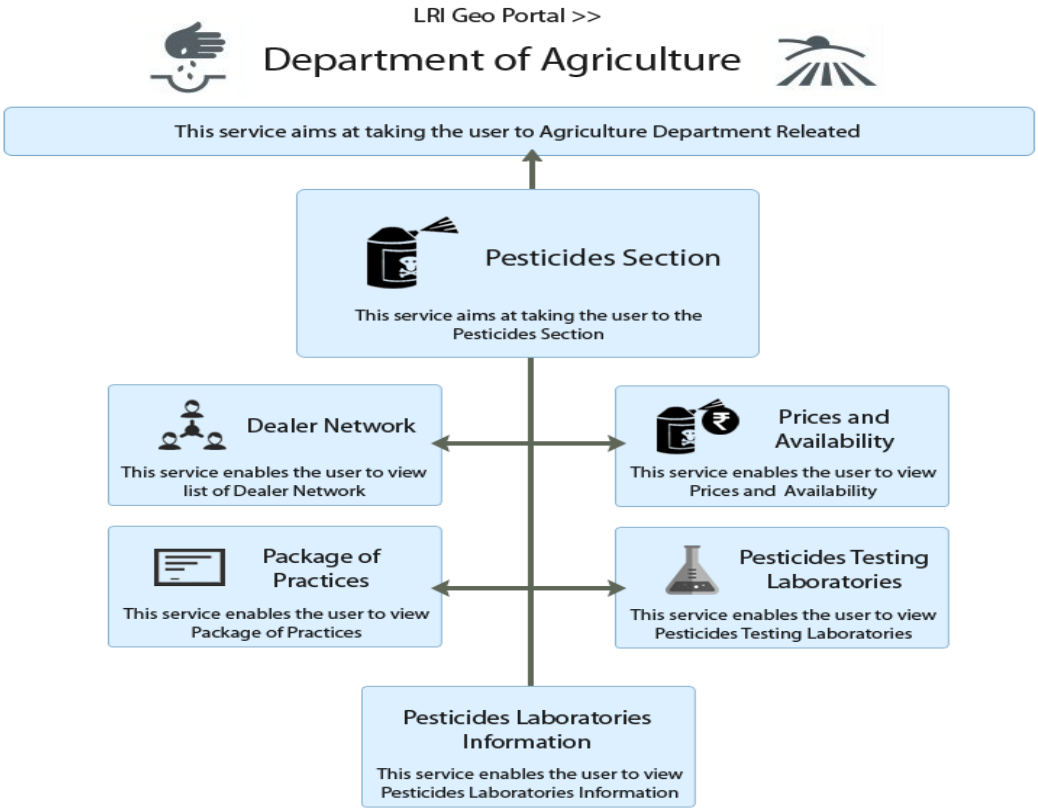


Figure 4-4 Pesticides Section

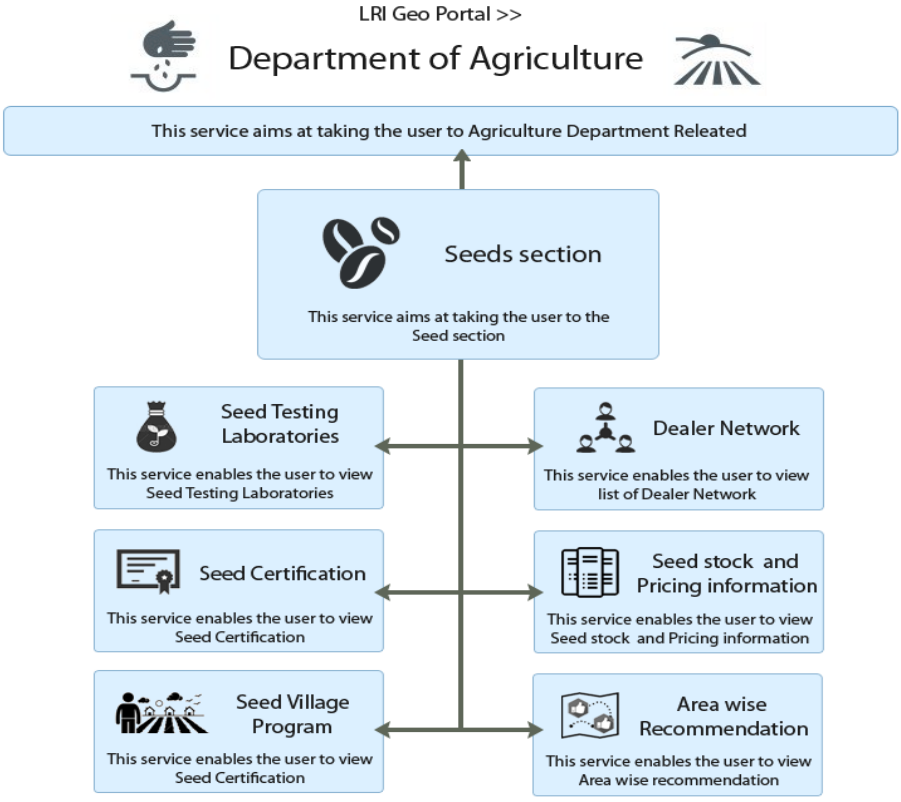


figure 4-5 Seed Section

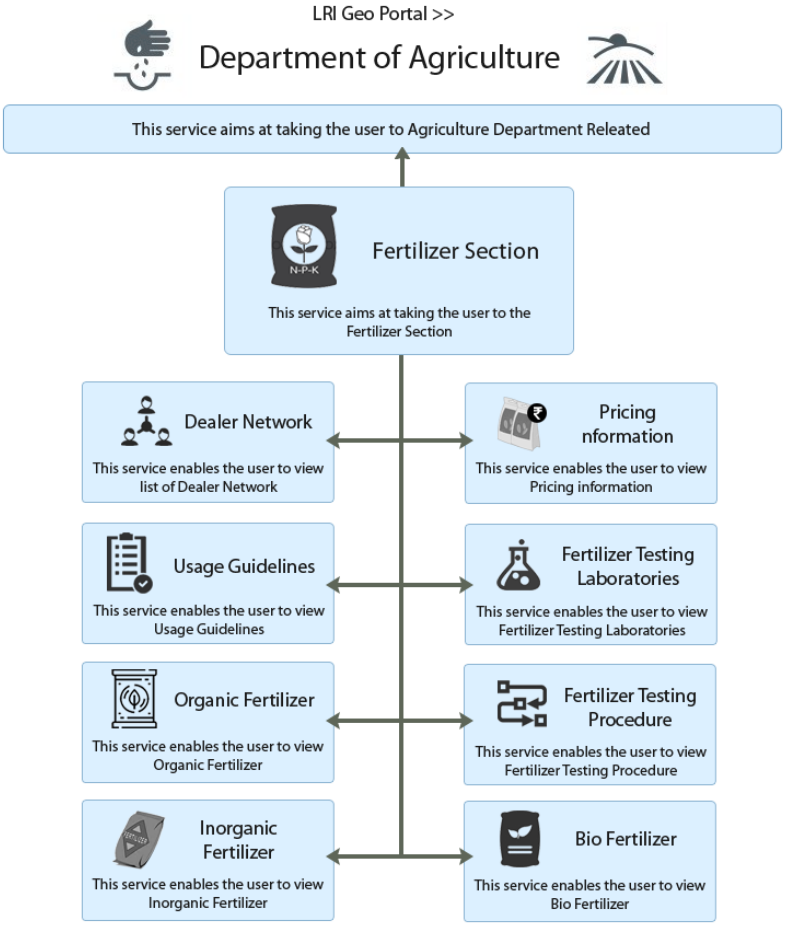


Figure 4-6 Fertilizer Section

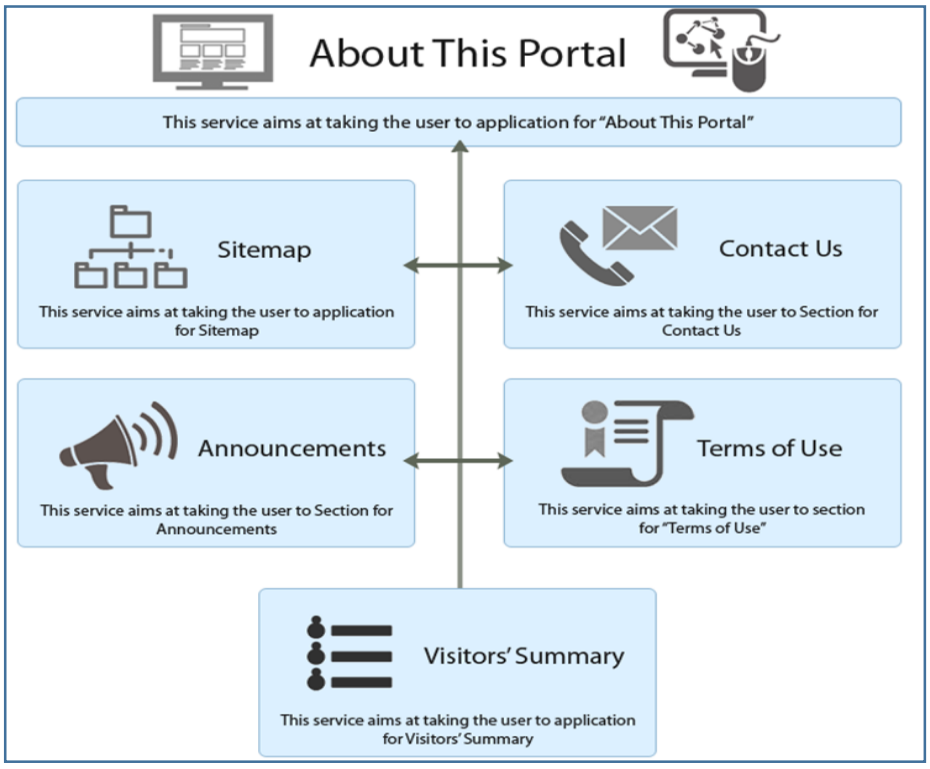


Figure 4-7 About Portal

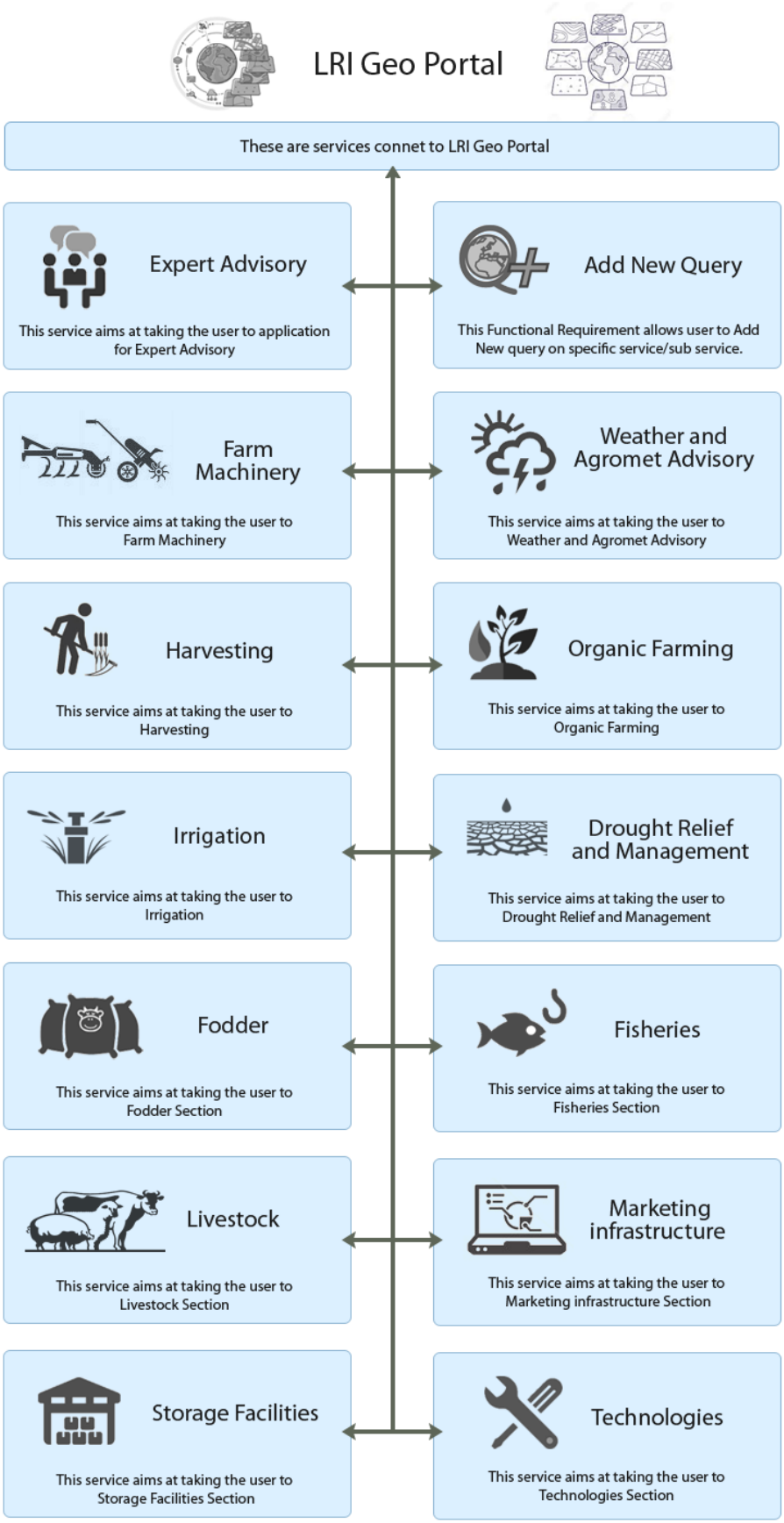


Figure 4-8 LRI Portal General Requirement 1

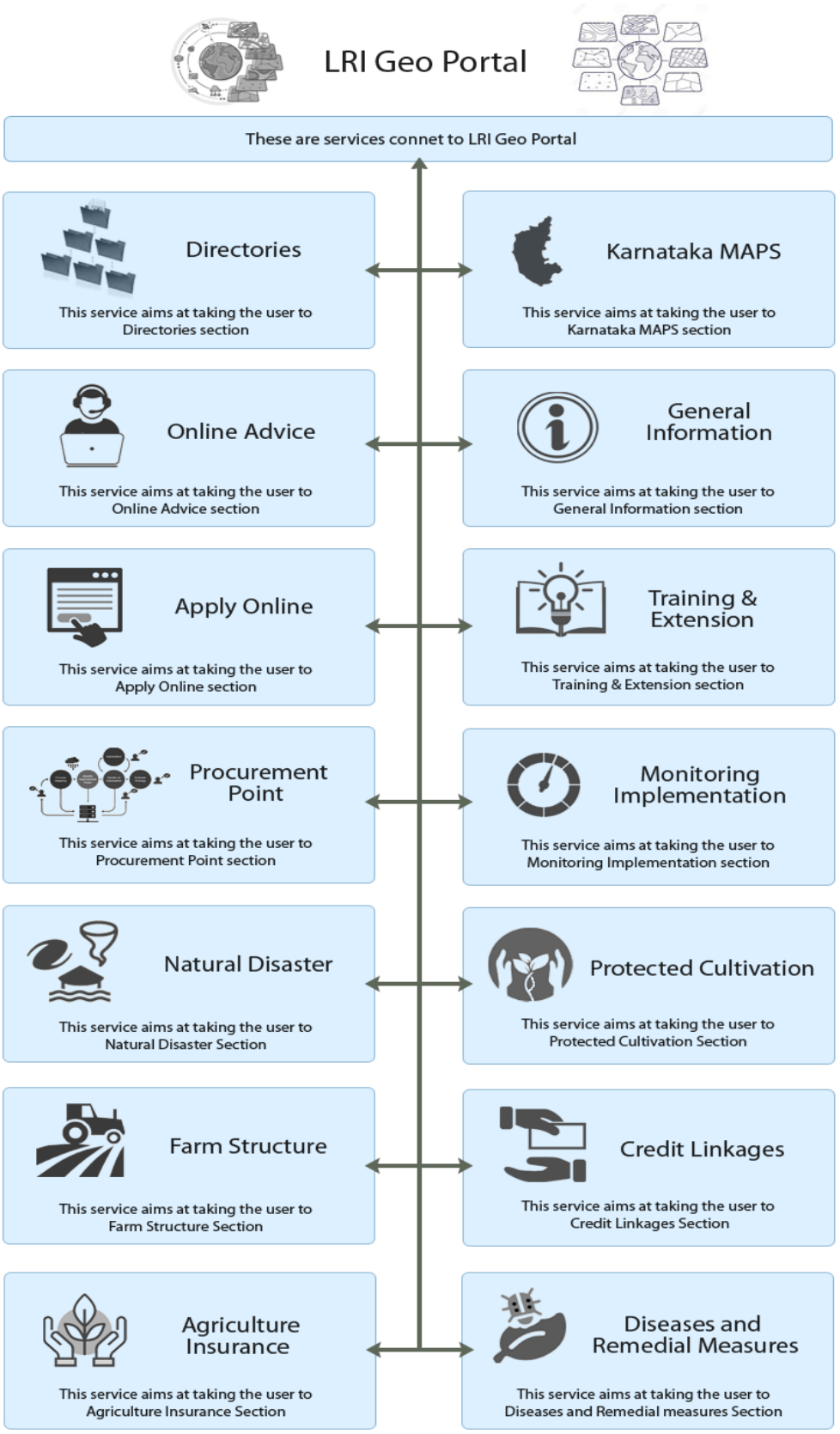


Figure 4-9 LRI Portal General Requirement-2

4.2.1 ADMIN MODULE

Admin module shall have the functionalities with which administrator shall do the user management, Content Management, Web GIS configuration, Data insert/update/delete on master tables. Data insert/update/delete in DSS Criteria table.

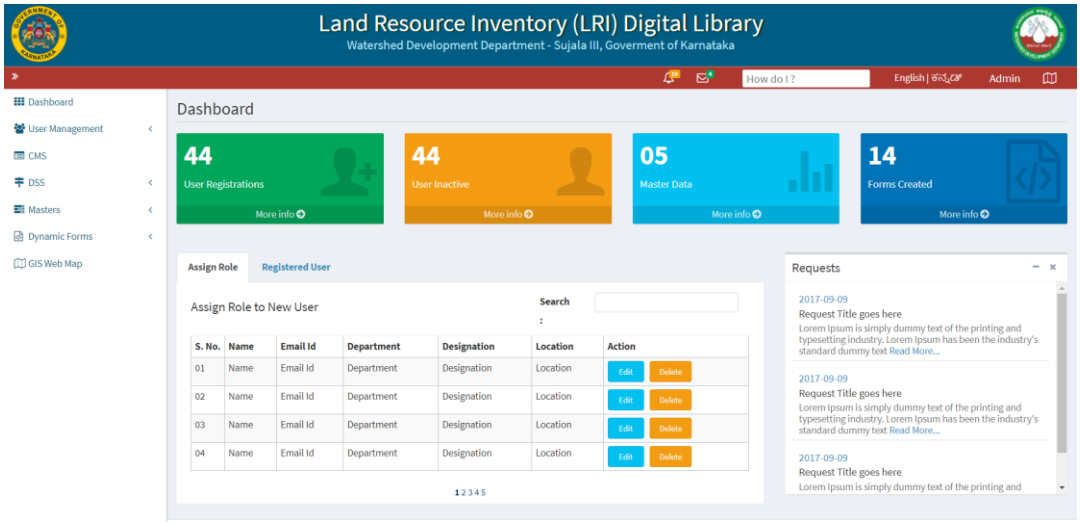


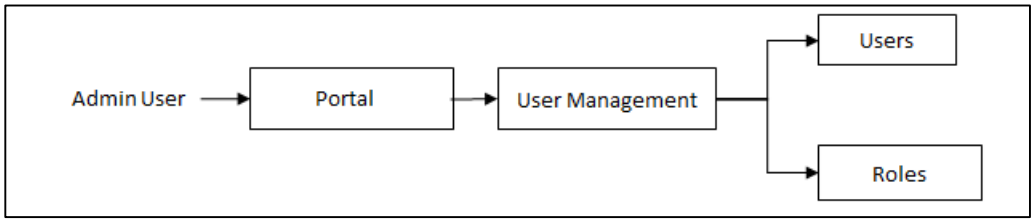
Figure 4-10 Indicative Screen - Admin Module

4.2.1.1 USER MANAGEMENT

This functionality deals with the management of the users of the LRI System.

4.2.1.1.1 DESCRIPTION

The administrator shall have a suitable interface to do the following.



- Create a user.
- Edit/update user details.
- Delete users.
- Create/ edit/Assign Roles to the users.
- Change Password
- Reset Password

4.2.1.1.2 GRAPHICAL USER INTERFACE

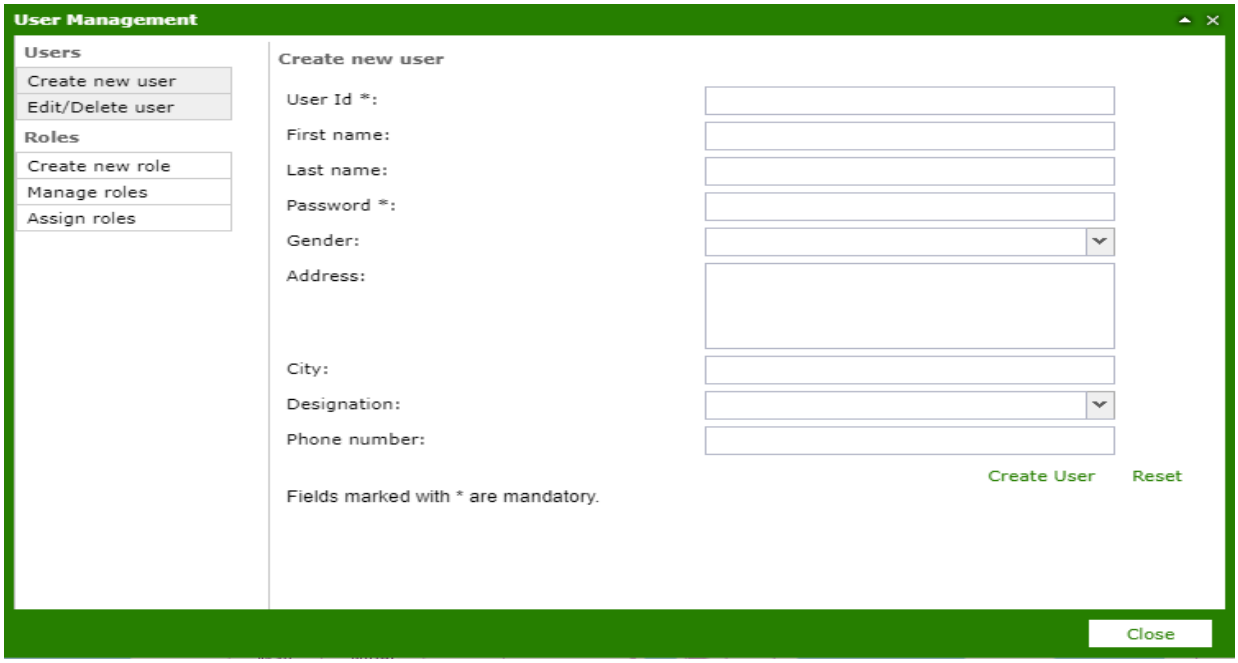


Figure 4-11 Indicative User Management

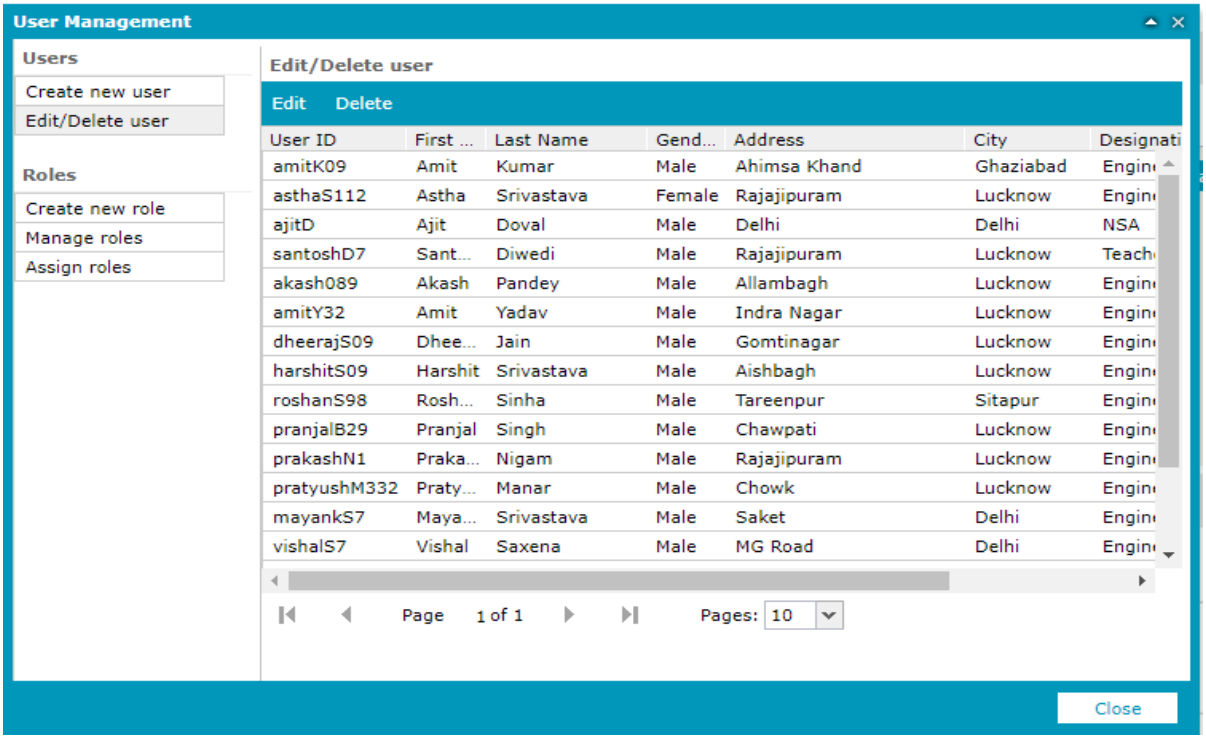


Figure 4-12 Indicative screen User Management Edit/ Delete User

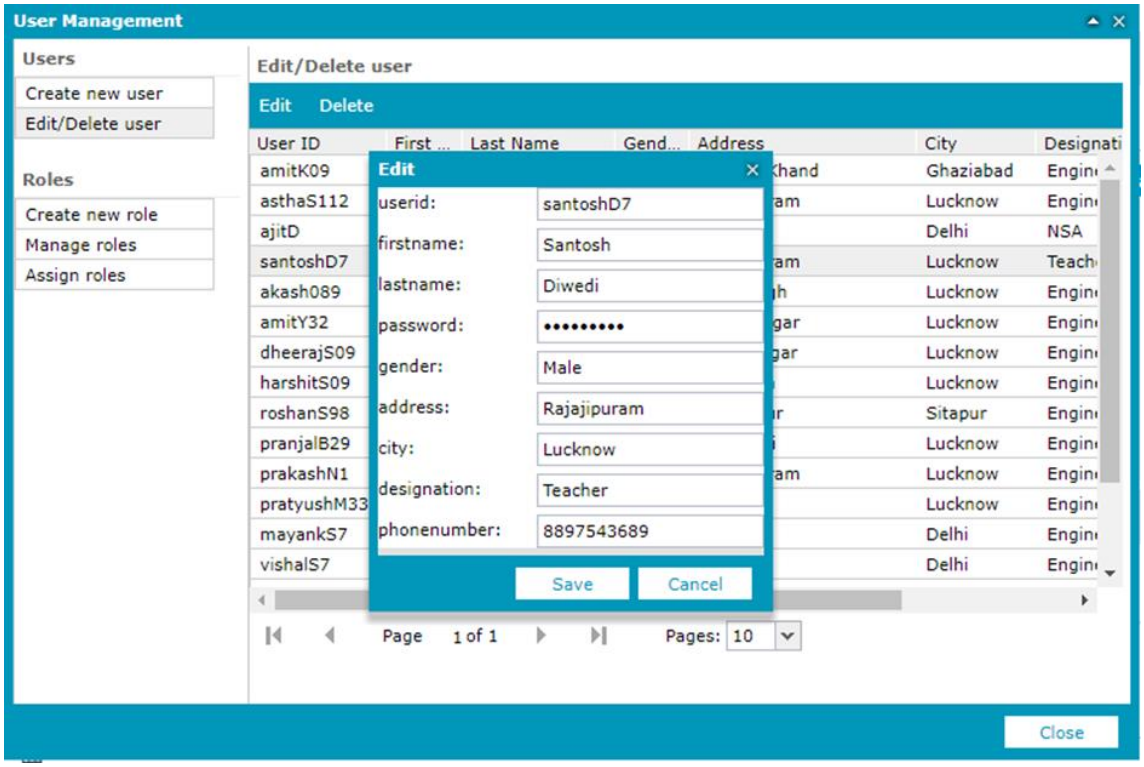


Figure 4-13 Indicative Screen User Management Edit User

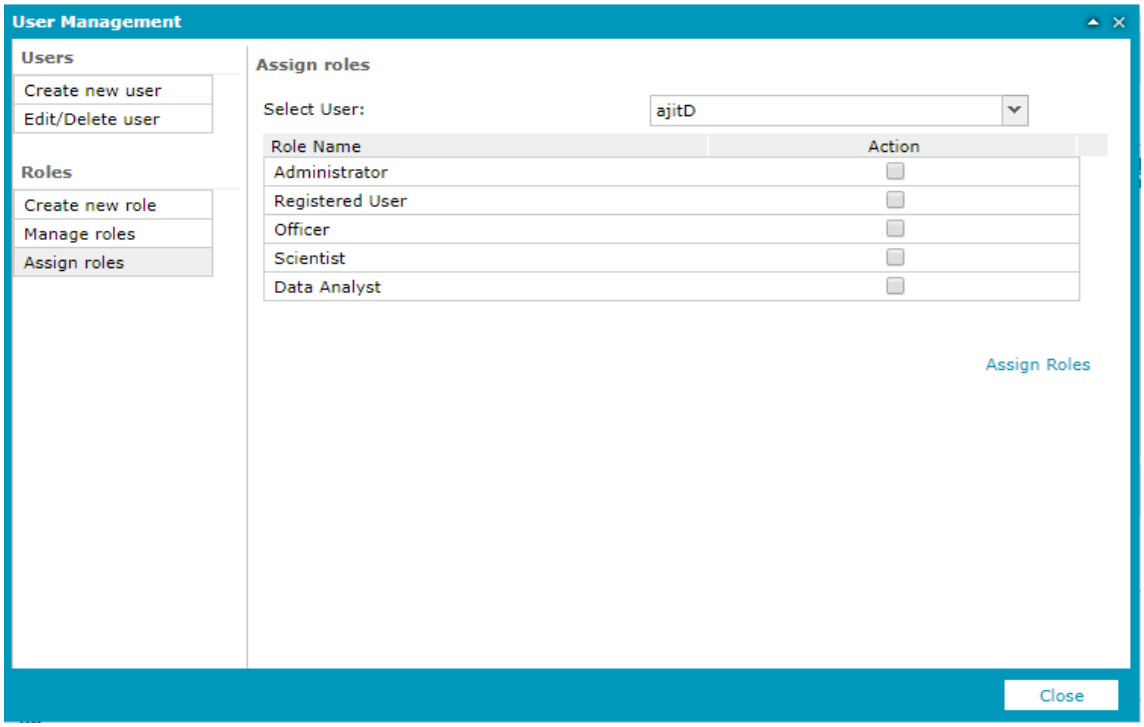


Figure 4-14 Indicative Screen User Management - Assign Role

4.2.1.1.3 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAs

User shall open the User Management/profile update dialog according to access right. The user shall be provided with the User Management Dialog that shall contain the User, assign group management tools and profile update dialog.

4.2.1.1.4 FUNCTIONAL REQUIREMENTS

- The administrator shall have the option to create the users in the System.
- The administrator shall have the option to edit the user details of the System.
- The administrator shall have the option to delete the user from the System.
- Administrator shall have the option to reset any user's password through user edit functionality.
- User shall have the option to change his/her password through profile update.
- The administrator shall have the option to assign the group to the user.
- The administrator shall have the option to remove the group assigned to user.
- There shall be single admin role only.
- There can be multiple admin user having admin role.

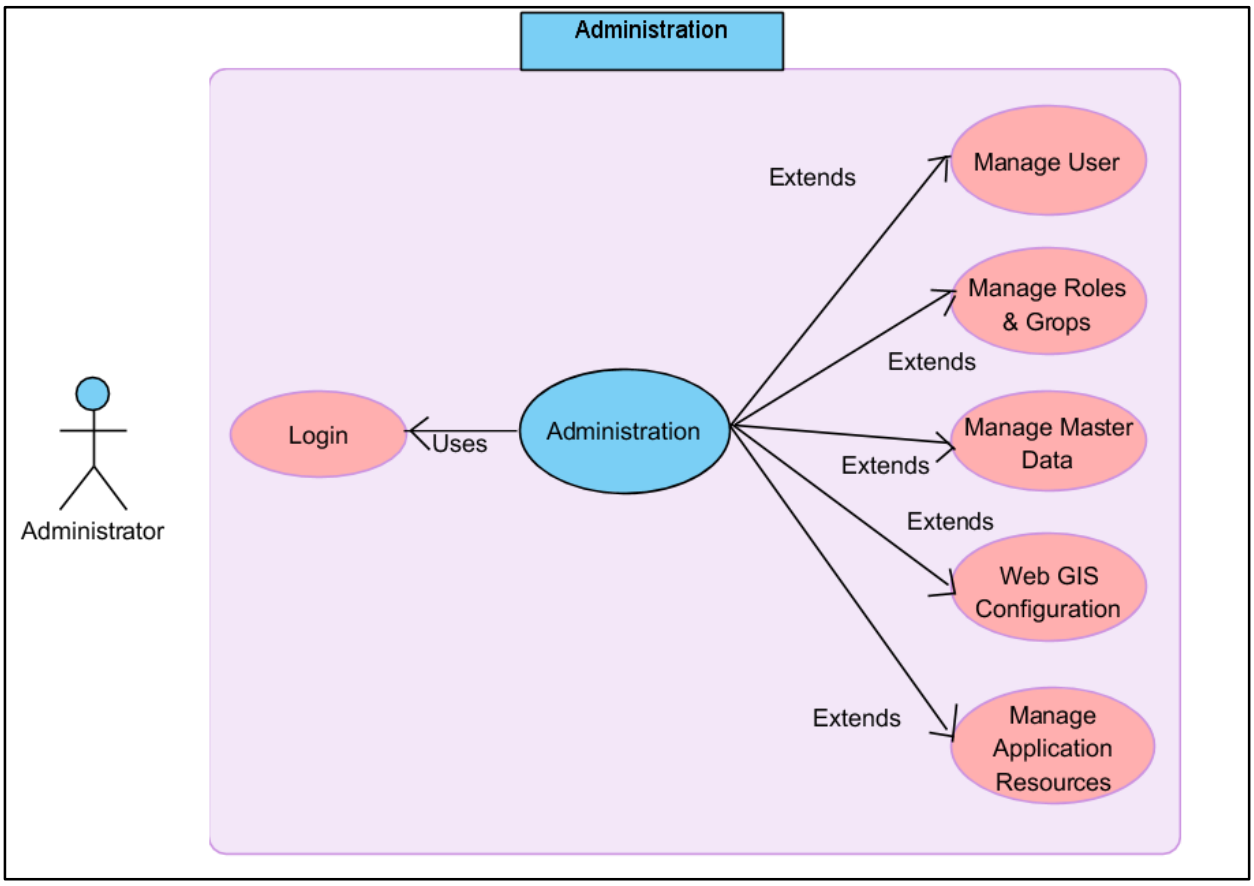
4.2.1.2 DSS AND MASTER TABLE DATA ENTRY

Administrator User or Authorized User shall be able to insert/update/delete the data of Master table as well as data in DSS criteria tables

4.2.1.3 WEB GIS CONFIGURATION

Administrator shall have provision for

- System setting such as cache, Setting related mapServer, logging, Miscellaneous, virtual Directories
- To create/manage the instance of the web GIS
- To Configure the, Map services, Layouts, Searches, Maps & Workspaces, 3rd Party Map providers



4.2.2 LANDING PAGE

When user enters the website address in the standard web browsers such as Internet Explorer or Google Chrome, LRI Landing page shall be displayed. User shall have a provision to select English or Kannada, so that web page will be displayed in respective language.

4.2.2.1 DESCRIPTION

On Landing Page User shall be able to view Static information as well as the information related to announcement, Weather Forecast, important links as indicated below, Information about the LRI Partners, Stakeholders and Map of Karnataka State.

4.2.2.2 GRAPHICAL USER INTERFACE

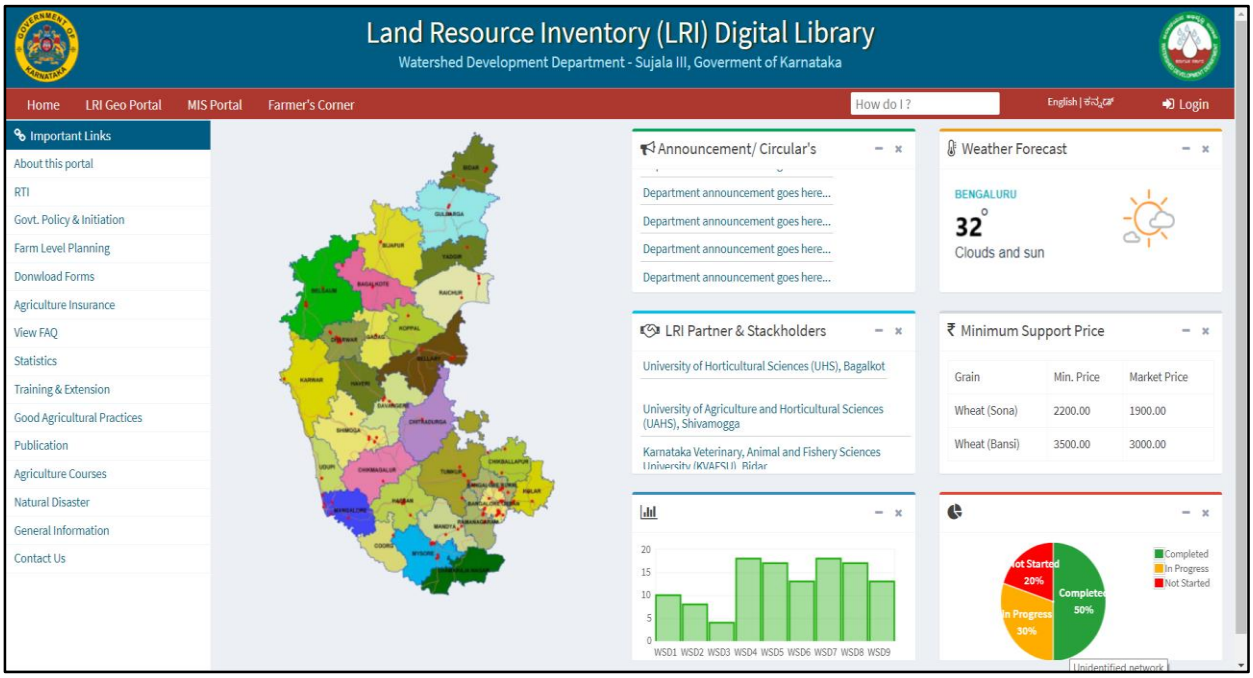


Figure 4-15 Indicative Screen - Landing Page

4.2.2.3 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAS

- User shall enter the web address.
- System shall load the Landing page depending upon the language selected

4.2.3 LOGIN PAGE

4.2.3.1 DESCRIPTION

By entering username and password, user shall be able to Login to the Geoportal. The login page shall also have the “forgot password” and “New User Registration” links.

4.2.3.2 GRAPHICAL USER INTERFACE

Figure 4-16 Login Page

4.2.3.3 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAS

- User shall click on login button which is in the Landing page.
- System shall redirect to the Login page.
- If user is already registered. He shall enter the username and password.
    - System shall check the login credentials and if it is correct System shall open the Geoportal page. Depending upon the role of the user, system shall enable the functionalities for the user.
    - If the entered username and password is incorrect, System shall show the message box stating “Username and Password is incorrect”.
- If user clicks on Forgot password, System shall redirect to the Forgot password page.
    - System shall open the Forgot password Page.
    - User shall enter the registered Username
    - System shall validate the username
    - On successful validation system shall ask user to choose registered email ID or Mobile Number to send the OTP.

- User shall select either email or mobile number
- System shall generate the OTP which is valid for 15minutes and send it to user through registered email and/or SMS.
- User shall able to enter the OTP and click on Submit button.
- On entering the valid OTP, system shall enable user to reset the password.

- If User clicks on “Forgot Username” link, system shall redirect the page to forgot Username page
  - User shall enter his registered email id or mobile number
  - System shall validate the email id or mobile number
  - On successful validation system shall send the username on registered email id/mobile number
- If User clicks on “New User Registration” link, system shall redirect the page to Registration form.

4.2.4 HOME PAGE

4.2.4.1 DESCRIPTION

On LRI Geoportal Page user shall able use different tools/functionalities depending upon his role such as clearing house, farmers corner, Decision Support systems, Search etc.

4.2.4.2 GRAPHICAL USER INTERFACE

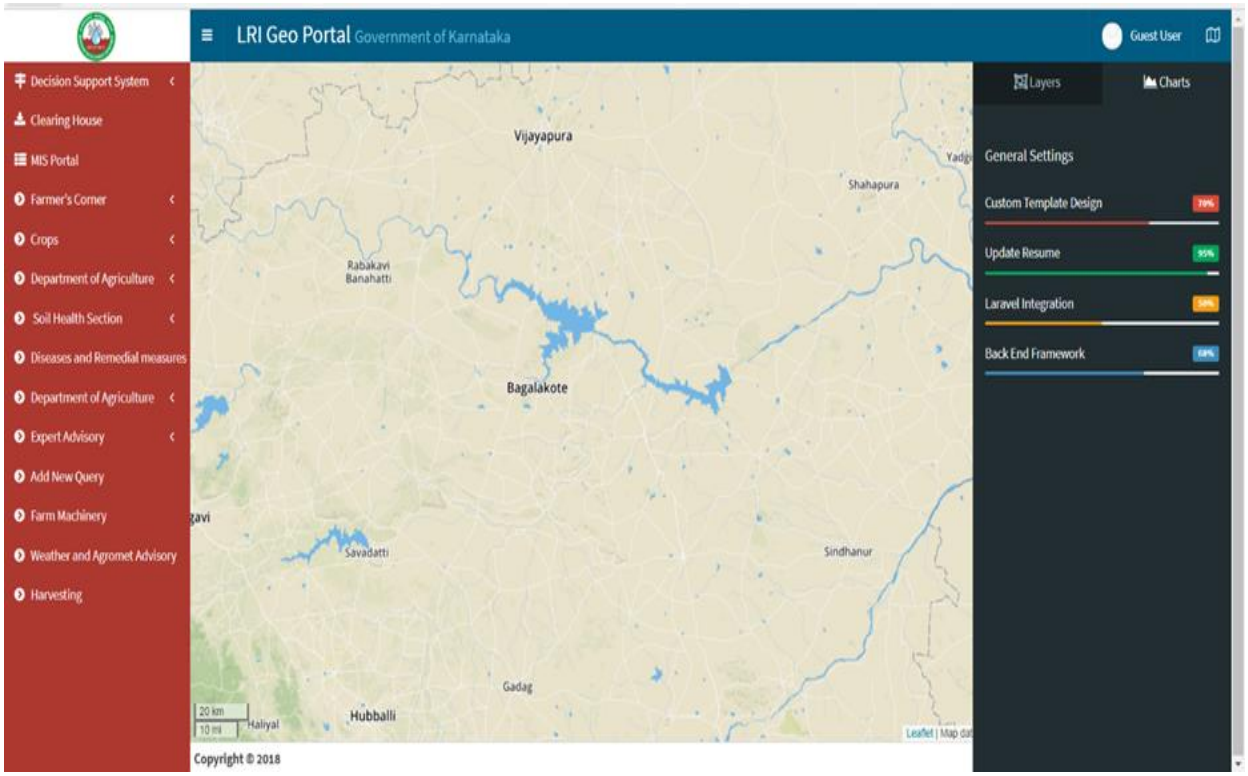


Figure 4-17 Indicative Screen Geo-portal Page

4.2.4.3 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAS

- User shall enter the web address,
- System shall redirect to application to Geoportal page once the user logged in successfully.
- System shall enable different tools/functionalities of the geo-portal depending upon the role of logged in users

4.2.5 VIEWER / DATA DISPLAY

4.2.5.1 DESCRIPTION

Based on the locational information such as Taluka, Village, Panchayat or at a parcel level, depending upon the data availability, user shall able to view thematic maps of selected watershed for site characterization, chemical – physical – hydraulic properties of surface and subsurface soil, weather and climate parameters, land use and land cover information, socio-economic data, cropping pattern, water resources availability, hydrological parameters, thematic maps derived from decision support system, location of water harvesting and soil conservation structures.

4.2.5.2 GRAPHICAL USER INTERFACE

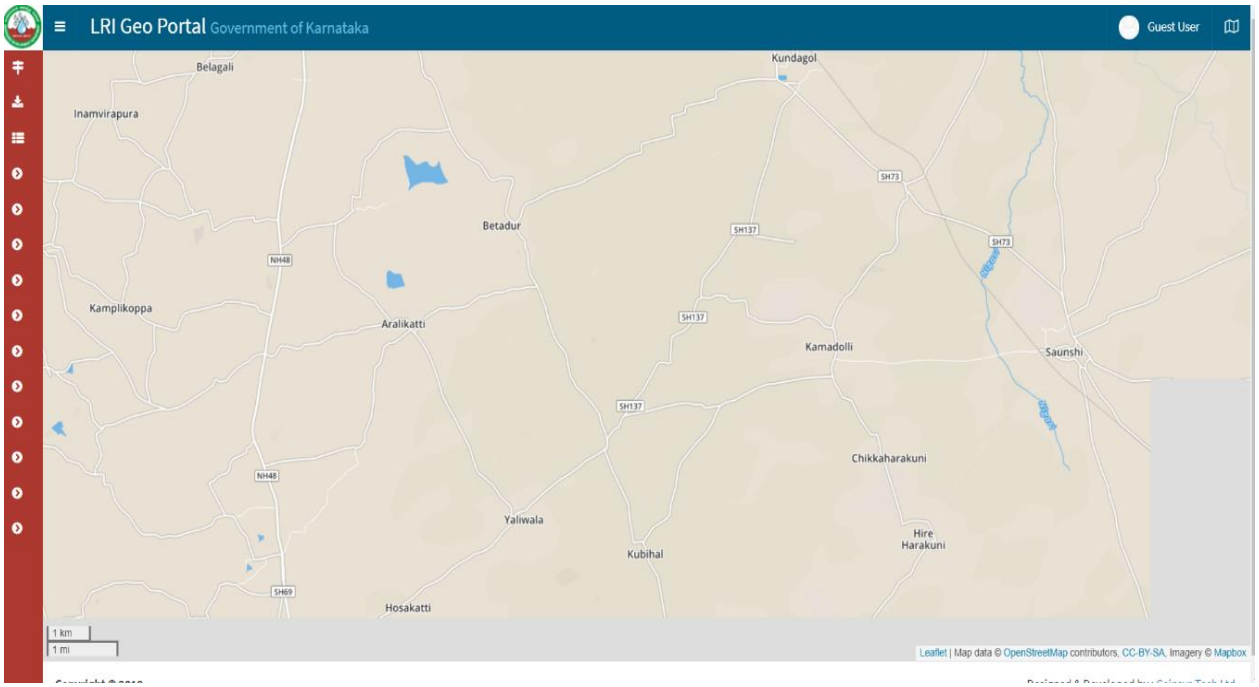


Figure 4-18 Indicative Screen - LRI Portal – Viewer

The Geoportal shall have following GIS related functionalities

- Shall act as a connector and consumer for all the OGC compliant services.
- Shall be compliant to OGC (WMS,WFS,WFST,WCS)

4.2.5.3 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAS

- User shall login to the LRI Web site
- User shall able to view the Map
- User shall able to do the Navigation (zoom in, zoom out, Pan), search, Measurement functionality
- User shall able to view the layer list

In addition to the web portal functionalities, the functionalities available in the COTS such as Thematic Mapping, Legends, Managing Data sources, search, Editing, sharing of map, printing etc. shall be implemented.

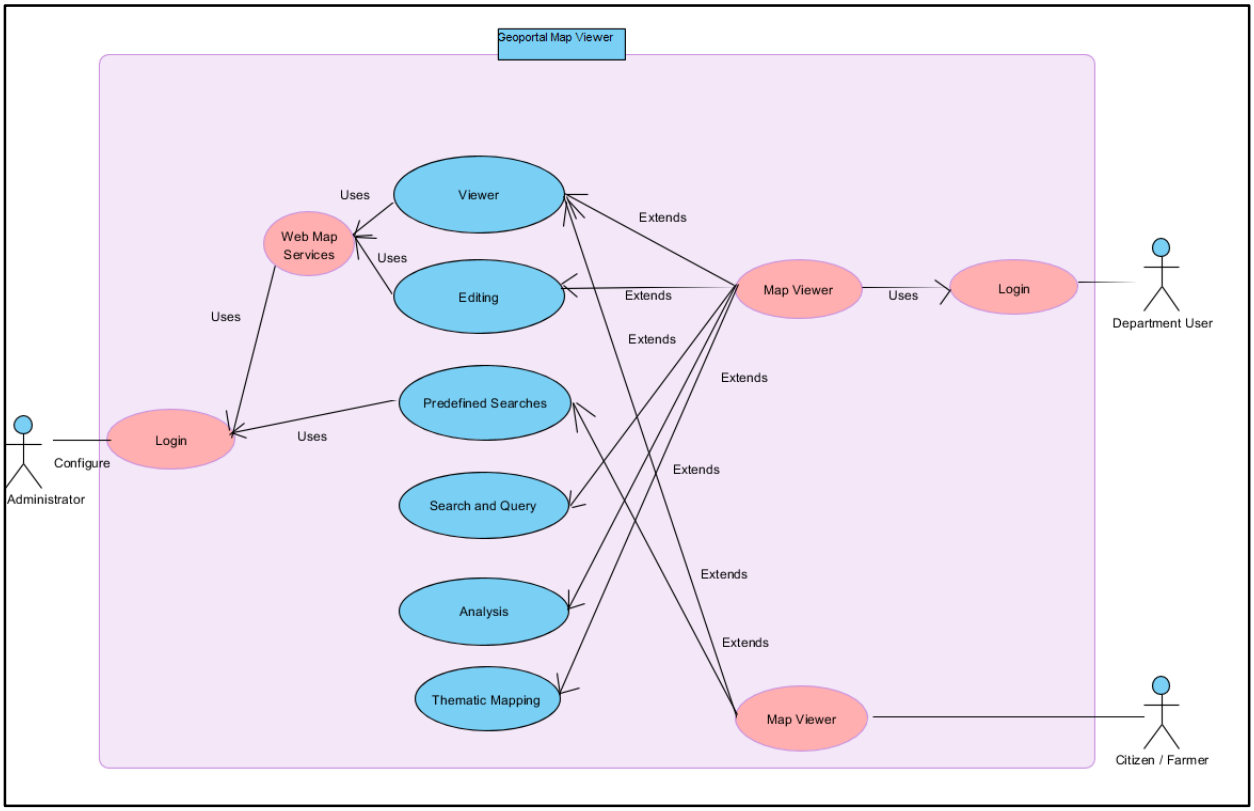
4.2.5.4 GIS FUNCTIONALITIES

Depending upon the user roles, following functionalities shall be available.

- There shall be Navigation functionalities such as Zoom-in, Zoom-out, Pan, previous map view, next map view, Zoom by rectangle, Zoom by map scale.
- User shall be able to view GIS layers based on his role. (e.g. district, Taluka, Hobli and Village map)
- User shall be able to get Feature Info, Scale Bands Configuration, User Maps, Print maps, locate Current Location, Link to the Map, Dynamic Object View, Notification History Window, Query Window, Set the Map Scale, and Current Browser language.
- Measurement tools: User shall be able to get the geographical coordinates of a designated point, measure distance and area.
- Data Source shall let the User to Show the Data Source, Define a Data Source, Display Maps, and Display Feature classes and Queries.
- User shall able to perform buffering and attribute based analysis.
- User shall be able to select features by Point, Polyline, Polygon and Rectangle.
- Search: User shall able to perform predefined search
- User shall have facility to key-in X,Y coordinates and zoom to those coordinates automatically on the map
- Edit: User shall able to perform edit functionality on spatial and non-spatial data.
- The portal shall be able to process the WPS by clicking on geo-processing tab
- The system shall support Download the data in KML, GML, .CSV format.
- Portal shall have functionality to interactively add data services like Bing Maps, Google Maps, Bhuvan and Open Street Map, GeoRSS, OGC CSW, WMS, WFS, WFS-G, WPS, WCTS, WMTS and Open LS.
- Layers: In the Layers tab, the layers that are currently available in the map window shall be shown. Layer properties such as Translucency, Scale Bands, and Rename shall be set in the Layers tab.

- Search for data (metadata): Catalog Web Service (CSW) shall let the User to search for metadata in the database. User shall type the required metadata parameter in the Search criteria field.

- Analyses: The Analyses panel shall let the User perform a series of attribute or spatial queries on vector data from the selected sources.
- Display of location of existing Conservation measures along with all the attributes through the web services by NIC.



4.2.6 CLEARING HOUSE

4.2.6.1 DESCRIPTION

The proposed LRI Infrastructure comprising of digital library and Geo-Portal shall enable collaboration of the data through web. The Clearing house will have provision to display the list of available data based on search and query, view the data and review the metadata. Depending upon the user authentication, data can be accessed and enable users to upload or download the data.

The metadata Standard will be as per the KGIS standard (Annexure 1) which will provide information about the description, source, generation, identification, extent, quality, spatial and temporal schema, spatial reference and distribution.

4.2.6.2 GRAPHICAL USER INTERFACE

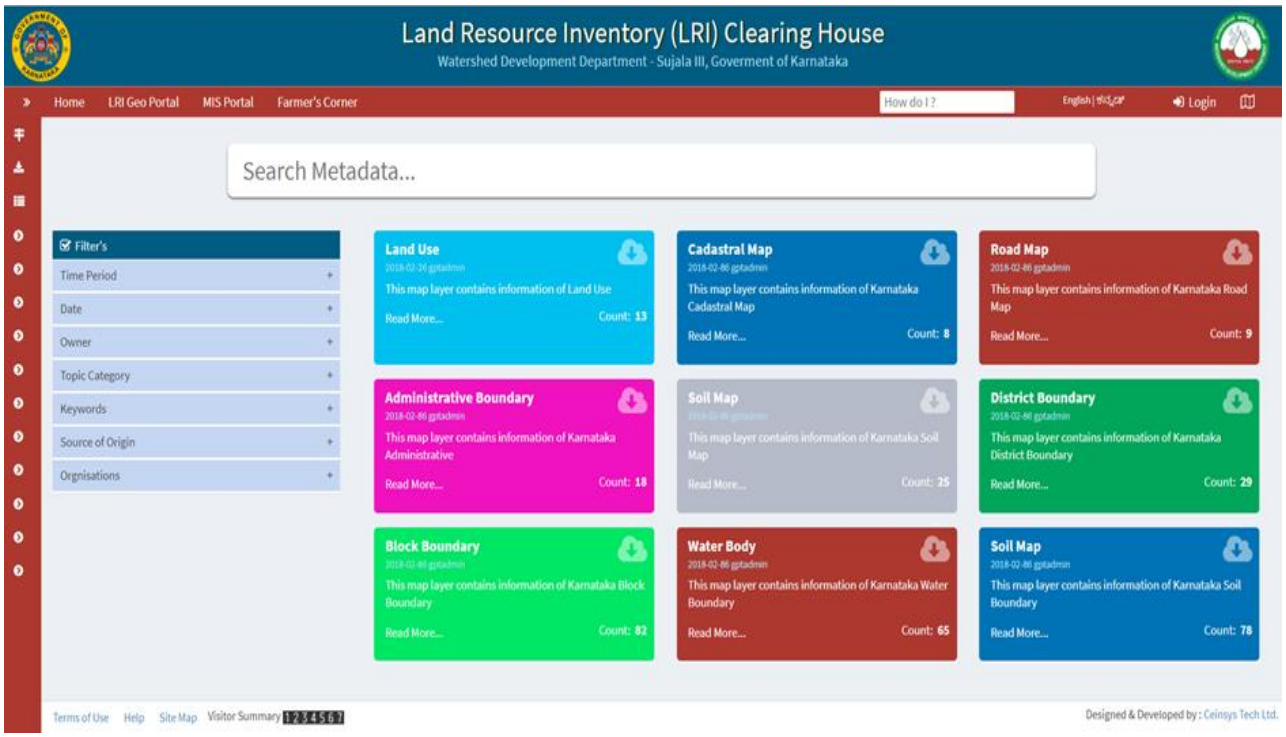


Figure 4-19 Indicative Screen -Clearing House

4.2.6.3 RESPONSE SEQUENCE/ACCEPTANCE CRITERIA

- After successful validation of login credential, user shall able to navigate to clearing house page by clicking on clearing house menu.
- System shall navigate page to clearing house.
- User shall able to search the desired metadata.

System shall display the results for the metadata search. Catalog Web Service (CSW) lets users to search for a metadata in the LRI database.

- To search for metadata, users can;
  - ✓ Type the required metadata parameter in the Search criteria field, and click Search. The found metadata displays in the sidebar in the table below the search dialog box.
  - ✓ To limit search to metadata in the area which corresponds to the current map window, User can click "Overlap the current map window".

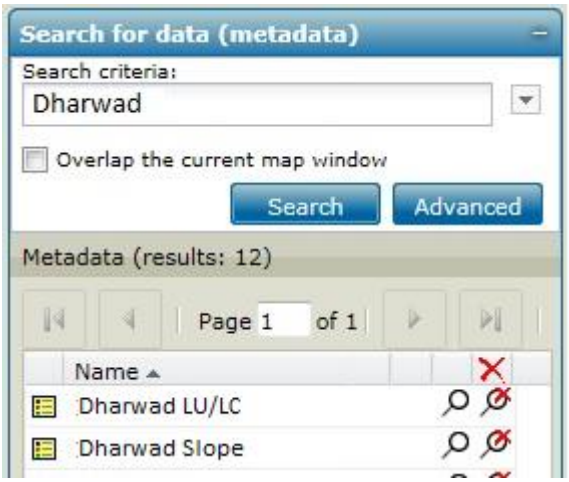


Figure 4-20 Indicative Screen - Metadata Search

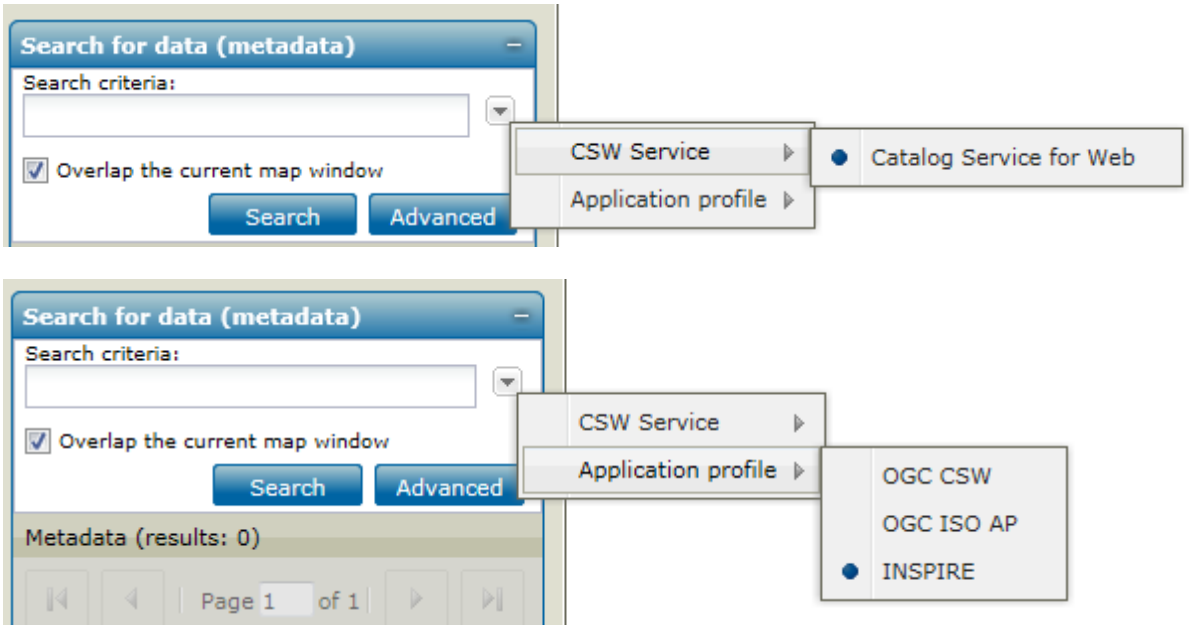
Metadata shall be displayed to the users with the following Icons.

Icon	Description
	Metadata for series
	Metadata for services
	Metadata for dataset

User shall perform the following actions in the table of results for metadata:

Icon	Description
	Adds the selected service to the **Map Content**.
	Removes the selected service from the **Map Content**.
	Centers the map on the selected metadata and shows its range.
	Removes the selected metadata range from the map.

Users shall right-click menu in the search dialog box to select the service from which metadata will be searched.



For Advanced Search user shall select advanced search and enter the parameters to browse the metadata.

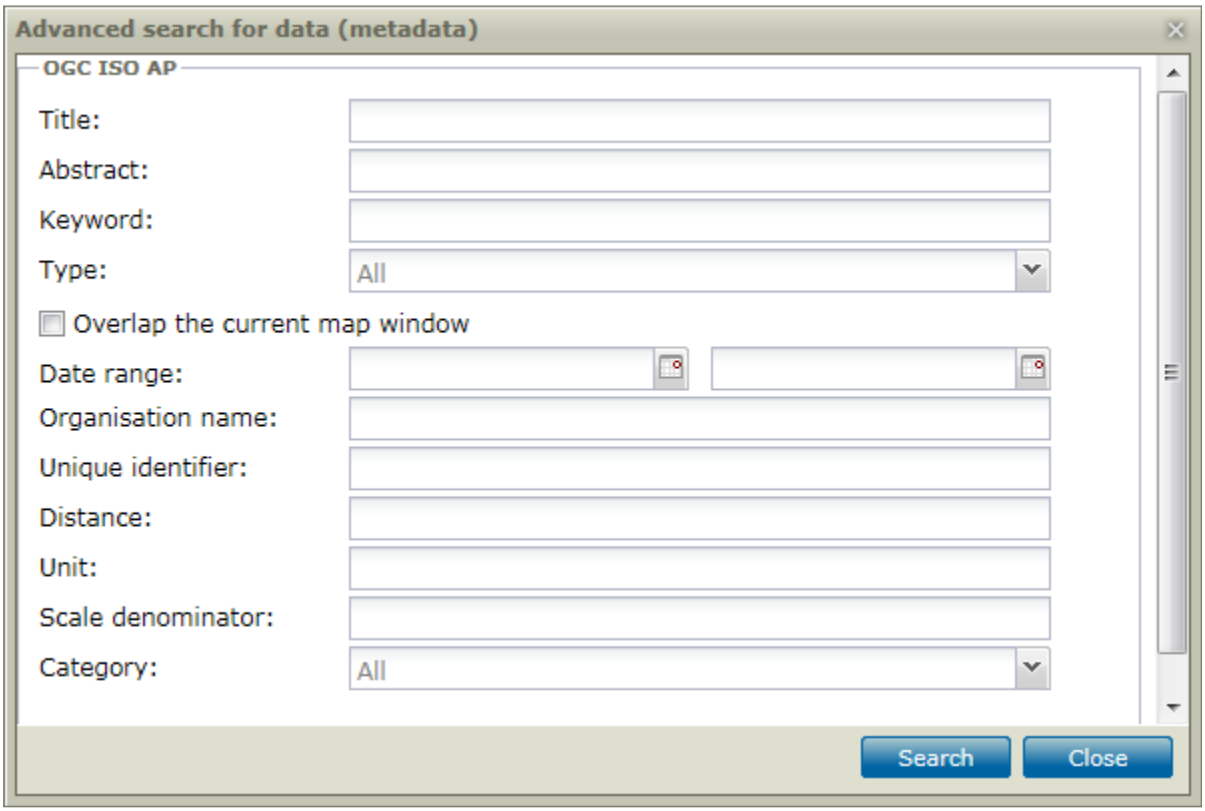
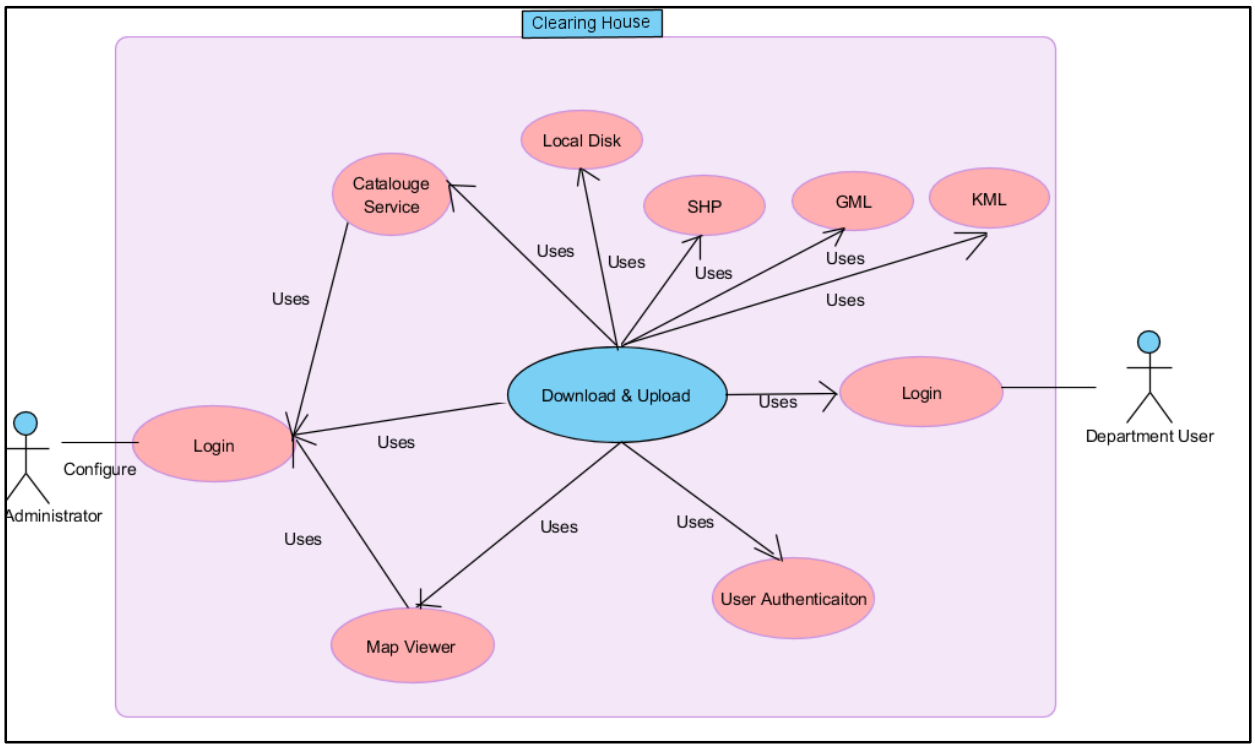


Figure 4-21 Indicative Screen - Metadata Advance search



4.2.6.4 DATA DOWNLOAD

4.2.6.4.1 DESCRIPTION

Registered user shall be able download geospatial data based on the user defined extents.

4.2.6.4.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAS

- User will login to the LRI Geo portal
- System shall authenticate the user
- After Successful login to the Geo-portal, user shall define the extent of area to download the data
- By clicking on the download button user will be able to down load the data from LRI digital library.
- If the source data is from data generating agencies such as KSRSAC/KGIS, the request for spatial data download will be redirected to respective agencies to push the data.

4.2.6.5 DATA UPLOAD

4.2.6.5.1 DESCRIPTION

Registered user shall able upload the map layers, geo-tagged. Photograph.

4.2.6.5.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAS

- User shall login to the LRI Geoportal

- System shall authenticate the user
- After Successful login to the Geoportal, user shall select the Upload tool
- To Upload the Geotagged photograph,
    - User shall select the associated feature
    - User shall open the Upload tool.
    - User shall select the photo and click on upload button.
    - System shall upload the Photo and associate it with the selected feature
- To Upload the Customized Map Layers
    - User shall open the Upload tool
    - User shall browse the customized map layers and click on upload button.
    - System shall upload and store these map layers in the temporary database.
    - Provision shall exist for PMU/Authorized users to review the data and update the LRI digital library

4.2.7 User Registration

This functionality deals with User Registration for the LRI System.

4.2.7.1 Description

The department as well as citizen user shall have suitable interface to carry out the user registration.

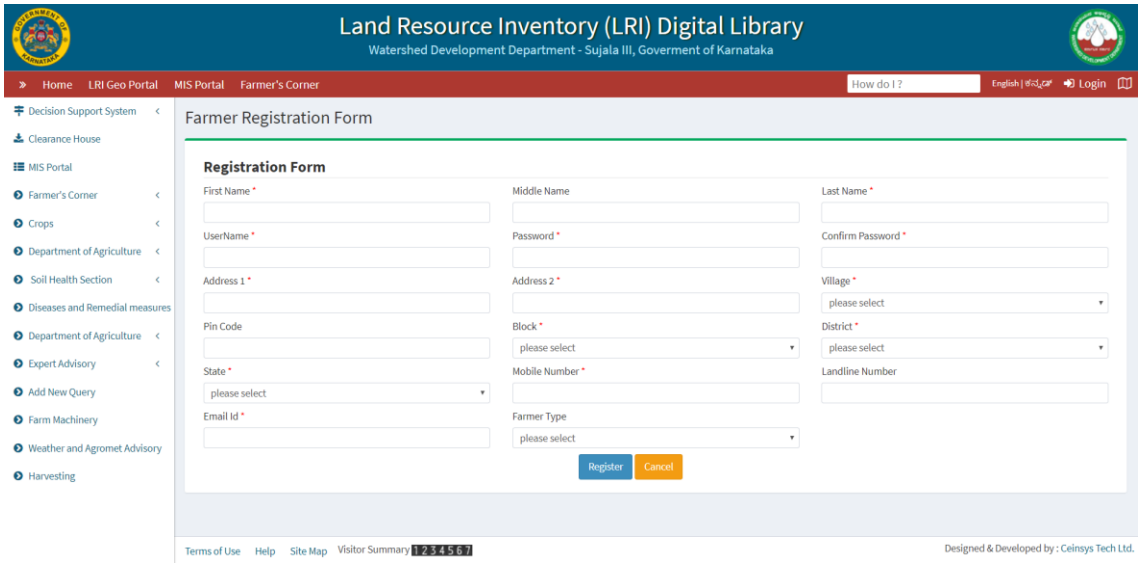


Figure 4-22 Indicative Screen - Farmer/Citizen Registration

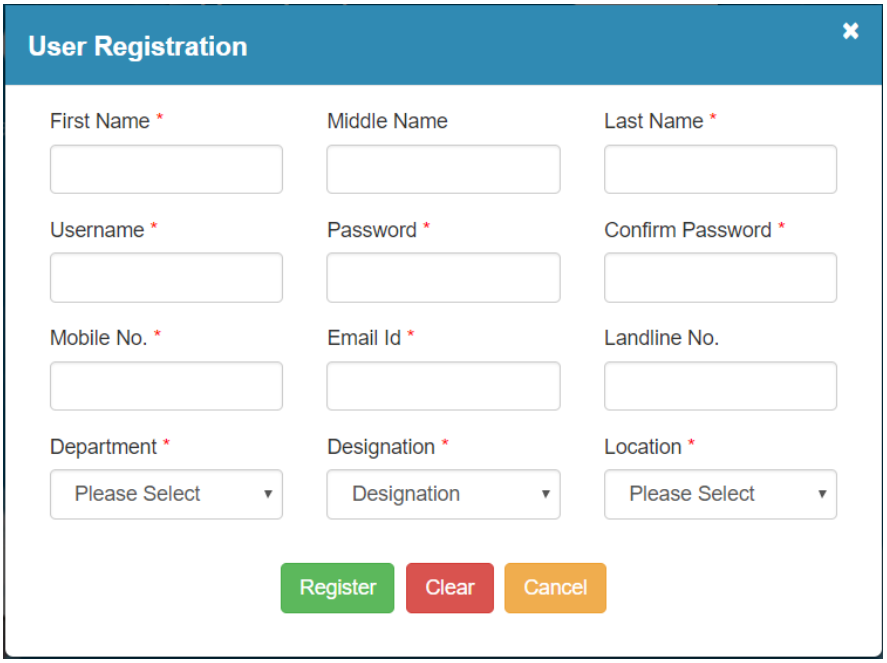


Figure 4-23 Indicative Screen - Department User Registration

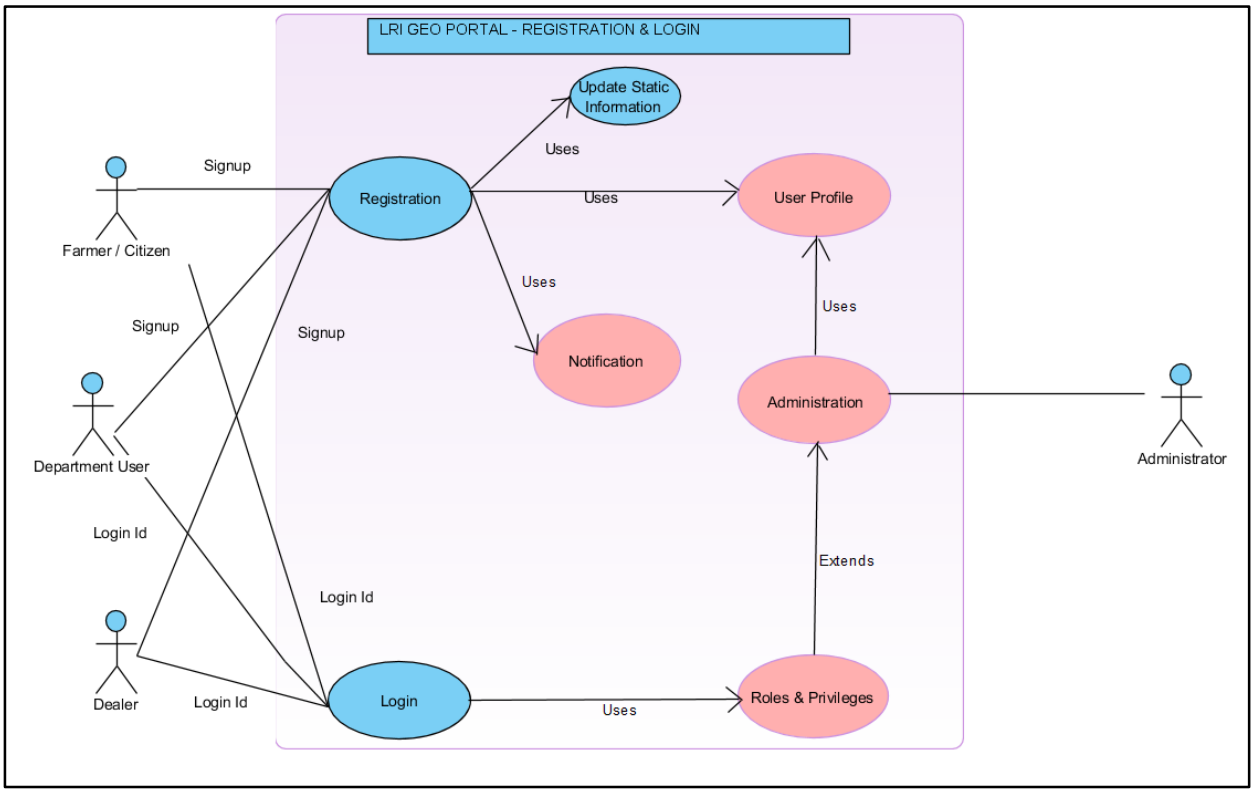
4.2.7.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAs

- On click of Registration link, system shall redirect to user registration screen.
- System shall ask user to select user Type –Department, Citizen, Trader/Dealer
- On Selection of Department User type system shall redirect to Department User Registration form
    - User shall enter details in the form such as First Name, Middle Name, Last Name, Username, Password, Confirm Password, mobile Number, email id, Landline no.
    - User shall select his/her department, designation, and location
    - On click on “Register” button system shall validate the entered data.
    - On successful validation system shall send the OTP on users email id and/or mobile number.
    - User shall enter the OTP.
    - On successful validation of the OTP, system shall register the user.
    - System shall send the notification to administrator to assign the appropriate role to the registered user.
- On Selection of Farmer/Citizen User type system shall redirect to Farmer Registration form

- User shall enter details in the form such as First Name, Middle Name, Last Name, Username, Password, Confirm Password, address, mobile Number, email id, Landline no., pin code
- User shall select Village name, Taluka name, District Name, farmer type (Agricultural, Livestock, Fisherman)
- On click on “Register” button system shall validate the entered data.
- On successful validation system shall send the OTP on users email id and/or mobile number.
- User shall enter the OTP.
- On successful validation of the OTP, system shall register the user with farmer role.
- System shall provide option to the user to update "Static Information” with Yes/No
- If user select no the system shall redirect user to the dashboard page
- If user select yes system shall redirect user to Static Information update page.

- On Selection of Trader/Dealer User type system shall redirect to Dealer Registration form
  - User shall enter details in the form such as First Name, Middle Name, Last Name, Username, Password, Confirm Password, address, mobile Number, email id, Landline no., pin code
  - User shall select Village name, Taluka name, District Name
  - On click on “Register” button system shall validate the entered data.
  - On successful validation system shall send the OTP on users email id and/or mobile number.
  - User shall enter the OTP.
  - On successful validation of the OTP, system shall register the user with Dealer role.
  - System shall redirect to Dealer information page.

- On Dealer Information page user shall enter his Agency details such as Agency/shop Name, Office Address, License Number, License Validity, office phone number, email id, Product Category.



4.2.8 STATIC INFORMATION OF FARMER

This functionality enables the user to provide the static information required

4.2.8.1 DESCRIPTION

Static information Page under Farmer's corner shall enable the user to provide his static information.

- Static information includes personal details, family details, farm details, financial details and other details. This information shall be updated in database tables for respective user.

4.2.8.2 GRAPHICAL USER INTERFACE

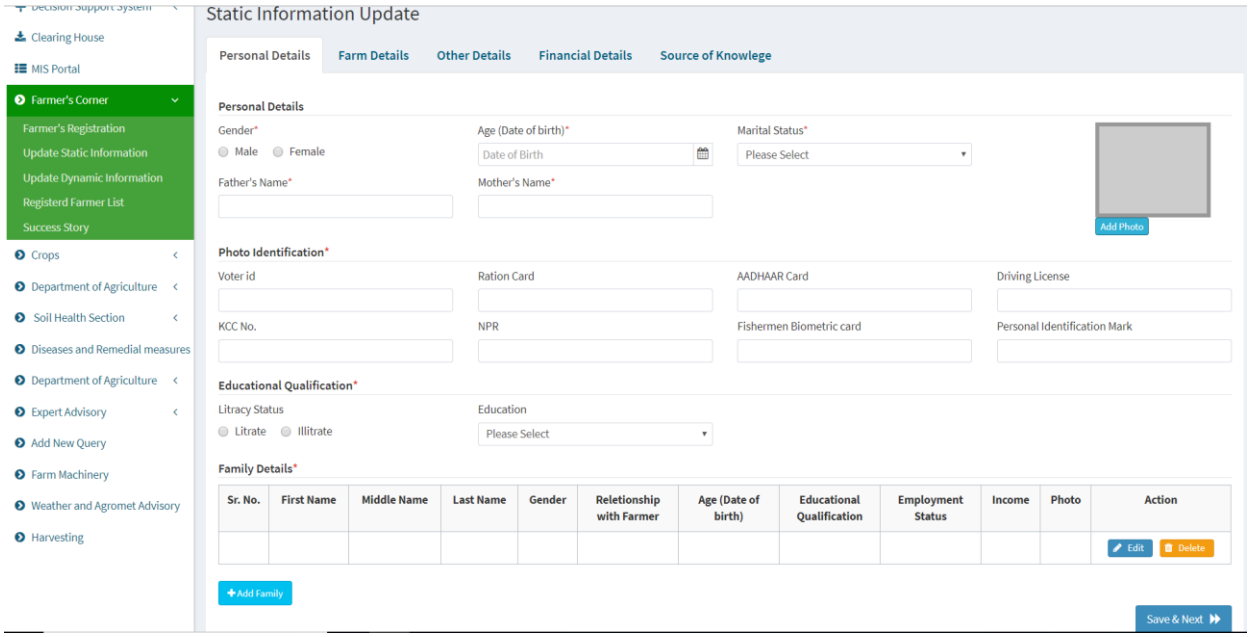
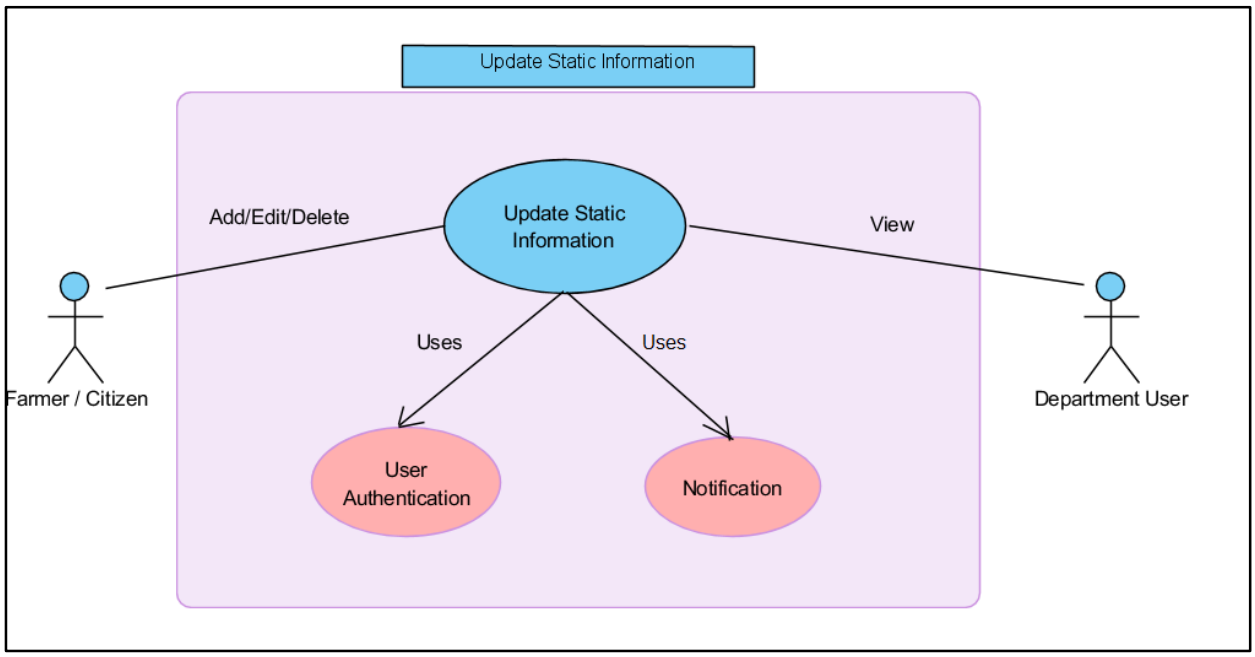


Figure 4-24 Indicative Screen - Static Information

4.2.8.3 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAs

- On click of Static Information link under Farmer's Corner, system shall redirect to Static Information Page.
- User shall able view his static information.
- User shall able to insert/update his static information
- The information needs to be inserted/updated is as per the FRS document (Annexure 3– Geoportal/MIS functions. Serial No. 1 to 3)
- After the information is update, System shall send email to user on his registered email Id.



4.2.9 DYNAMIC INFORMATION OF FARMER

This functionality enables the user to provide the dynamic information required and update the Farmers database

4.2.9.1 DESCRIPTION

Dynamic Information of farmer functionality shall enable farmer/citizen to update the dynamic information for every season of each year. Dynamic information shall include

- Detail information about crop i.e. crop sown, fertilizers used, pesticides used, productivity of crop, money spent on crop, income from crop etc. User shall update this information in parts.

4.2.9.2 GRAPHICAL USER INTERFACE

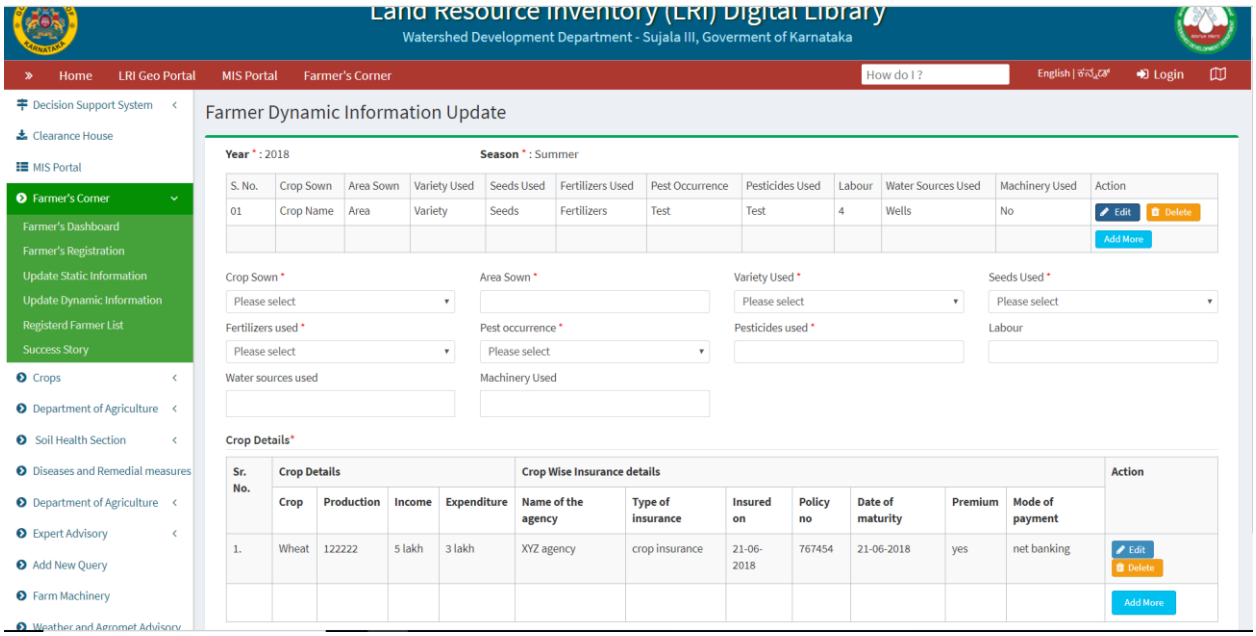
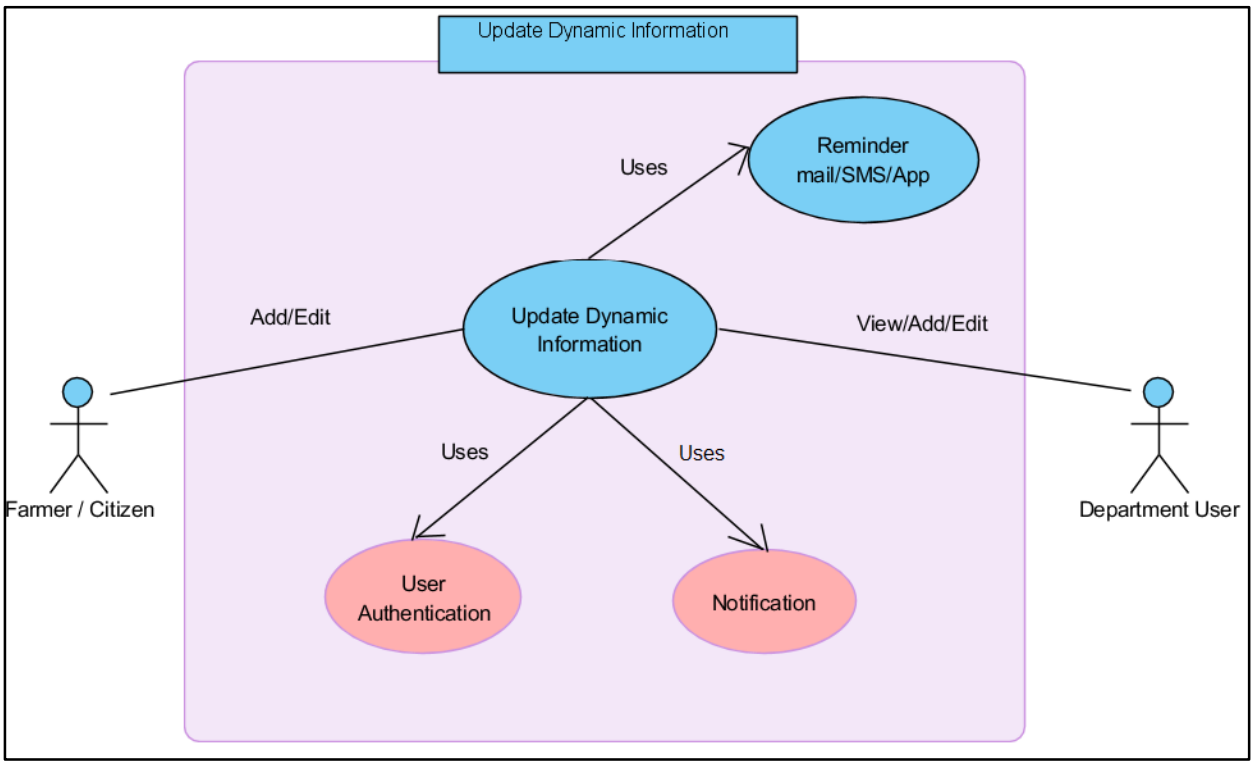
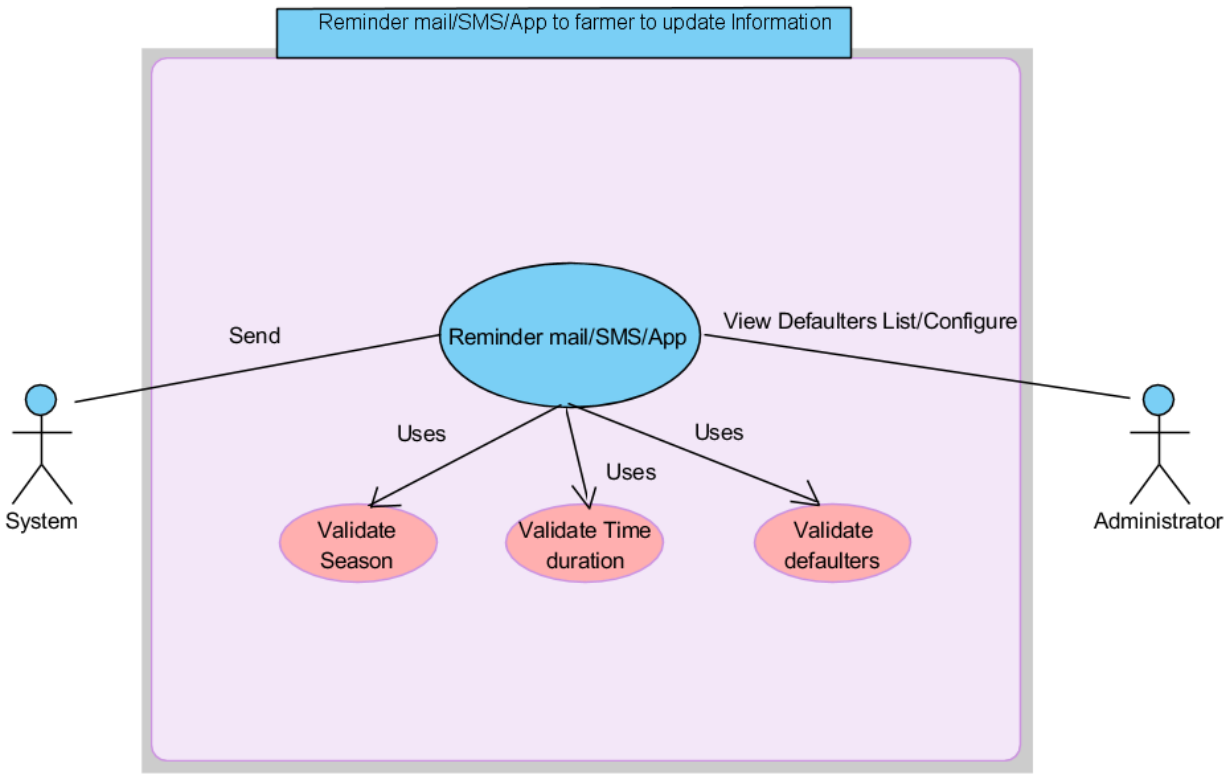


Figure 4-25 Indicative Screen - Dynamic Information

4.2.9.3 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAs

- On click of Dynamic Information link under Farmer's Corner, system shall redirect to Dynamic Information Page.
- User shall able view his dynamic information for the selected year and season. By default information for the Current year and season should be displayed.
- User shall able to insert/update his Dynamic information.
- The details about the information which needs to be inserted/updated is as per the FRS document (Annexure 3–Geoportal/MIS functions. Serial No. 4)
- After the information is update, System shall send email to user on his registered email Id.
- System shall send reminder emails and/or SMS based on time set for trigger to registered farmers who has not update season information for the selected year and season.





4.2.10 REGISTERED FARMERS LIST

This functionality enables the authorized user such as District office admin to view the list of farmers registered

4.2.10.1 DESCRIPTION

This functionality shall provide departmental user (District Office Admin) facility to view the list of have registered farmers. Using this list user shall able to view the static and dynamic information of registered farmer.

4.2.10.2 GRAPHICAL USER INTERFACE

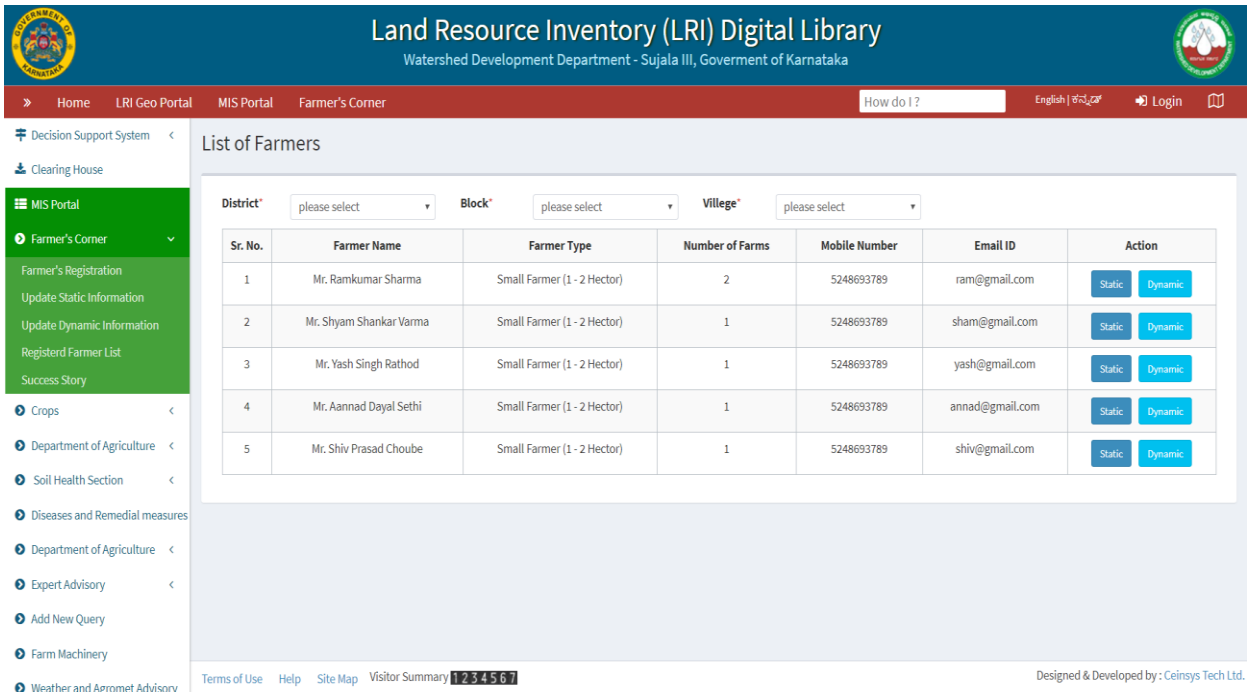
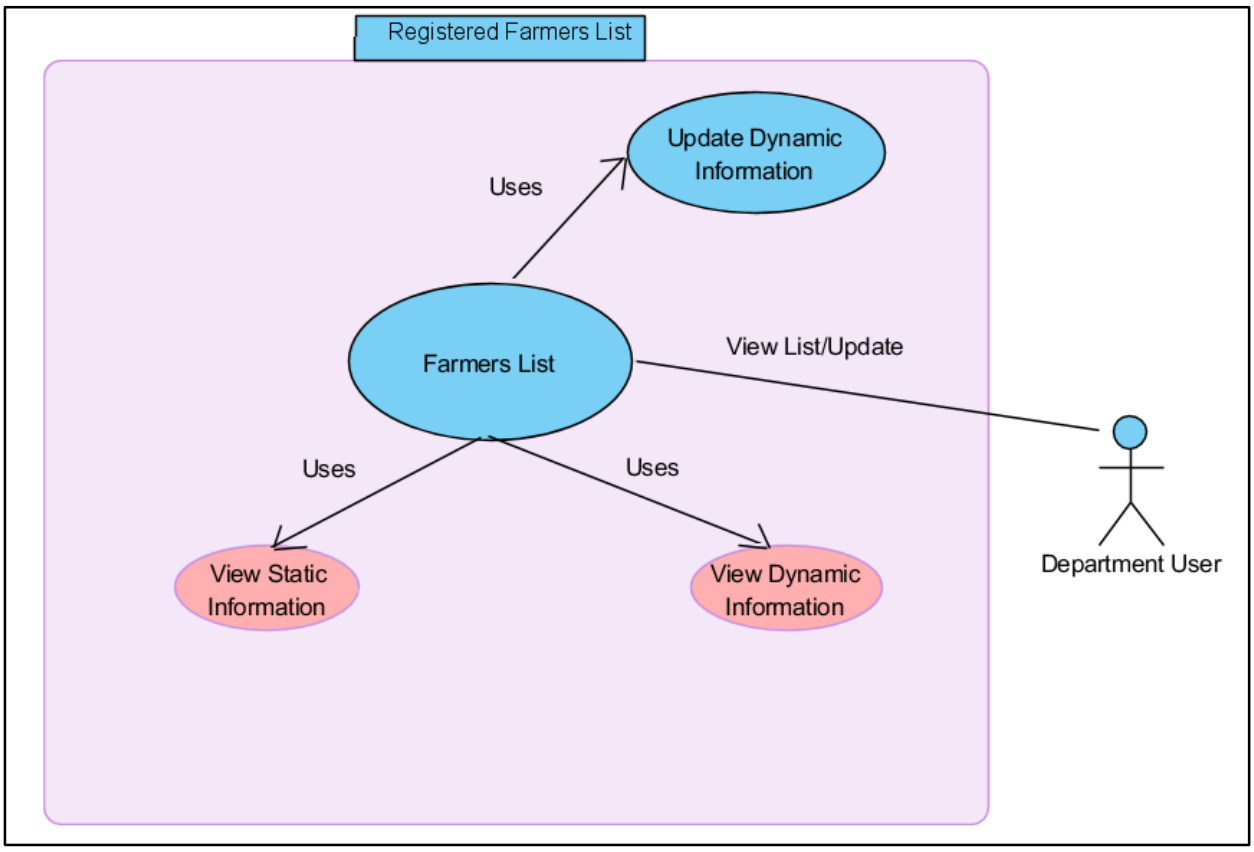


Figure 4-26 Indicative Screen - Farmer Registered List

4.2.10.3 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAS

- On click of "Registered Farmer List" link under Farmer's Corner, system shall redirect to Dynamic Information Page.
- User (District Office Admin) shall able view list of have registered farmers with basic details based on filter options.
- User shall able to filter the list by District, Taluka, and Village.
- There shall be provision to view static as well as dynamic information of the selected farmer.
- The View shall have static his dynamic information for the selected year and season. By default information for the Current year and season should be displayed.



4.2.11 CROP SECTION

This functionality shall enable the user to access the Crops related information

4.2.11.1 DESCRIPTION

Using this functionality user shall able to view the information related to major cropping systems of Karnataka. User shall be able to view the information related to agro climatic features, horticulture and floriculture.

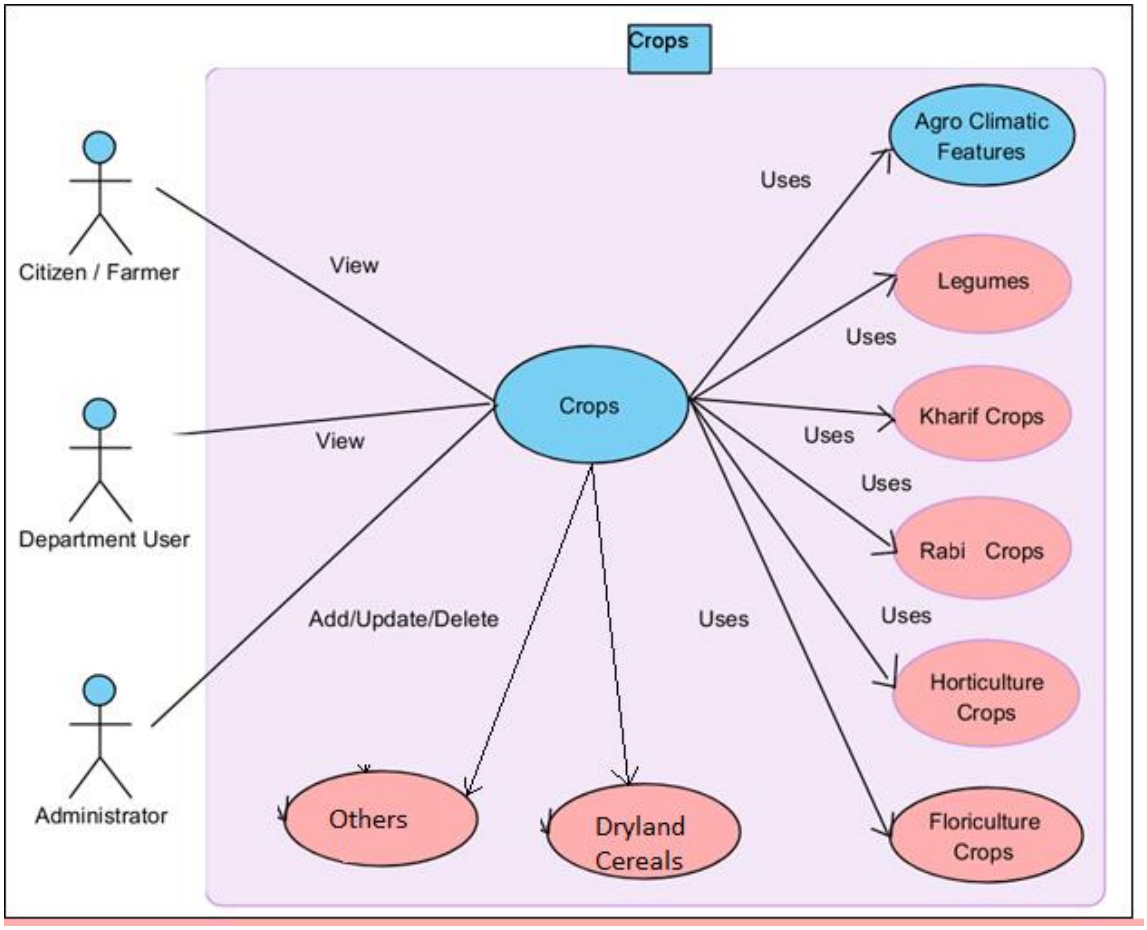
Following modules shall be available under this section

- Agro Climatic Features
  - Climate
  - Soil
  - Land Use Pattern
  - Water Resources
  - Crop and Cropping System

- Dryland Cereals
- Legumes
- Tuber Crops
- Kharif Crops
- Rabi Crops
- Horticulture Crops
- Floriculture Crops

4.2.11.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAs

- On click of “Crop section” link, system shall display the links for above mentioned modules
- User shall be redirected to related information page as per the chosen link.



4.2.12 SOIL HEALTH SECTION

This section shall enable the user to access the Soil Health related information.

4.2.12.1 DESCRIPTION

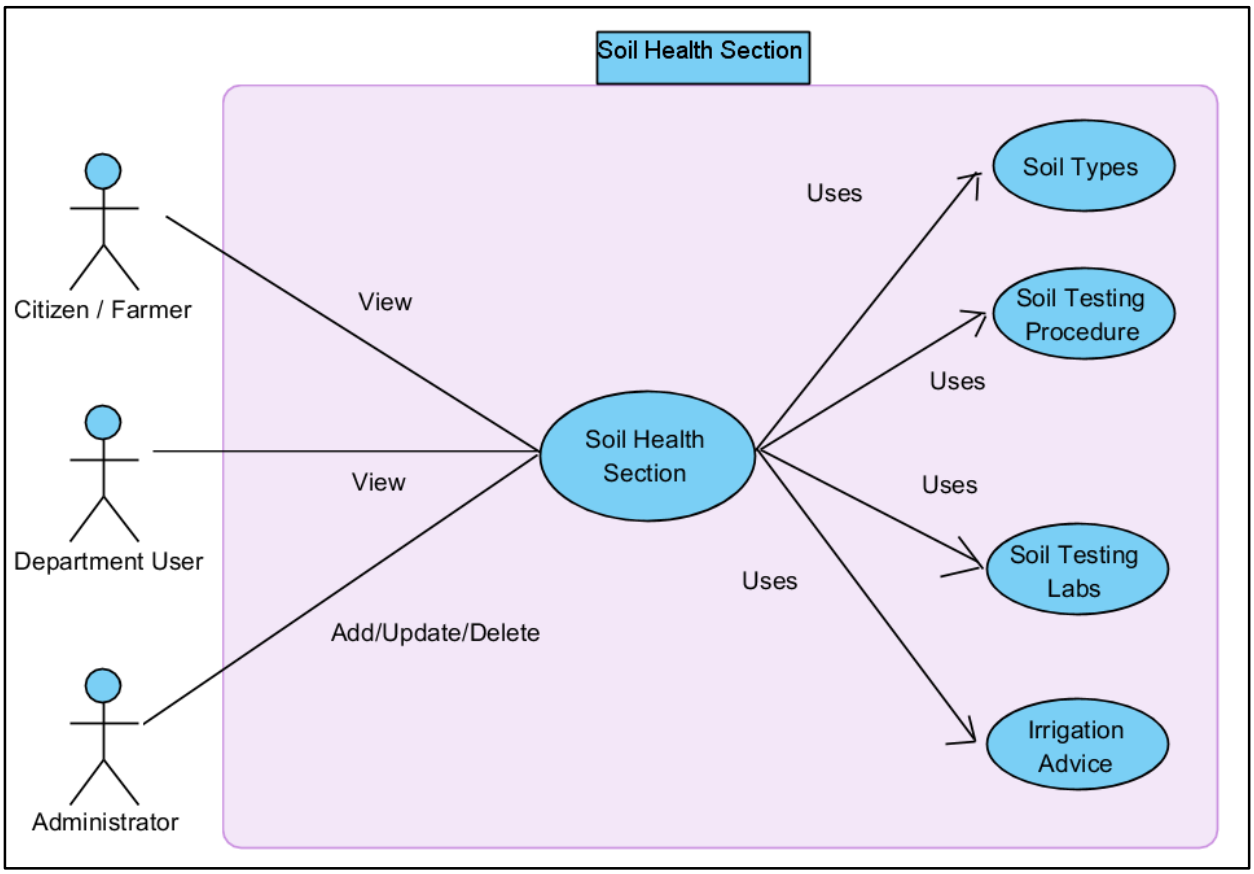
farmer shall able to view the soli related information like soil quality, types of soil in Karnataka, Soil Testing procedure, name and address of soil testing laboratories and irrigation advice .

Under Soil Health Section following links shall be available

- Soil Types
- Soil Testing Procedure
- Soil Testing Labs
- Irrigation Advice

4.2.12.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAS

- On click of “Soil Health Section” link, system shall display the links for above mentioned modules
- User shall be redirected to related information page as per the chosen link.
- If user clicks on “Soil Type” link, system shall display the soil type of Karnataka state
- If user clicks on “Soil Testing Procedure” link , system shall display information related to Soil Testing Procedure
- If user clicks on “Soil Testing Lab”, system shall display List of Soil Testing Laboratories with the information such as Lab Name, Address, Contact Person, and Contact Number. User shall able to filter the list depending upon the district.
- If user clicks on “Irrigation Advice”, System shall redirect to the Irrigation advice page
    - Form shall be displayed to the user for input required such as District, Taluka, village, survey number, crop grown, Date of sowing.
    - Depending upon the location selected system shall get soil type.
    - System shall provide Irrigation advice for the selected crop based on above parameters.



4.2.13 DISEASES AND REMEDIAL MEASURES

This Functionality shall enable the user to access the application for Diseases and Remedial Measures

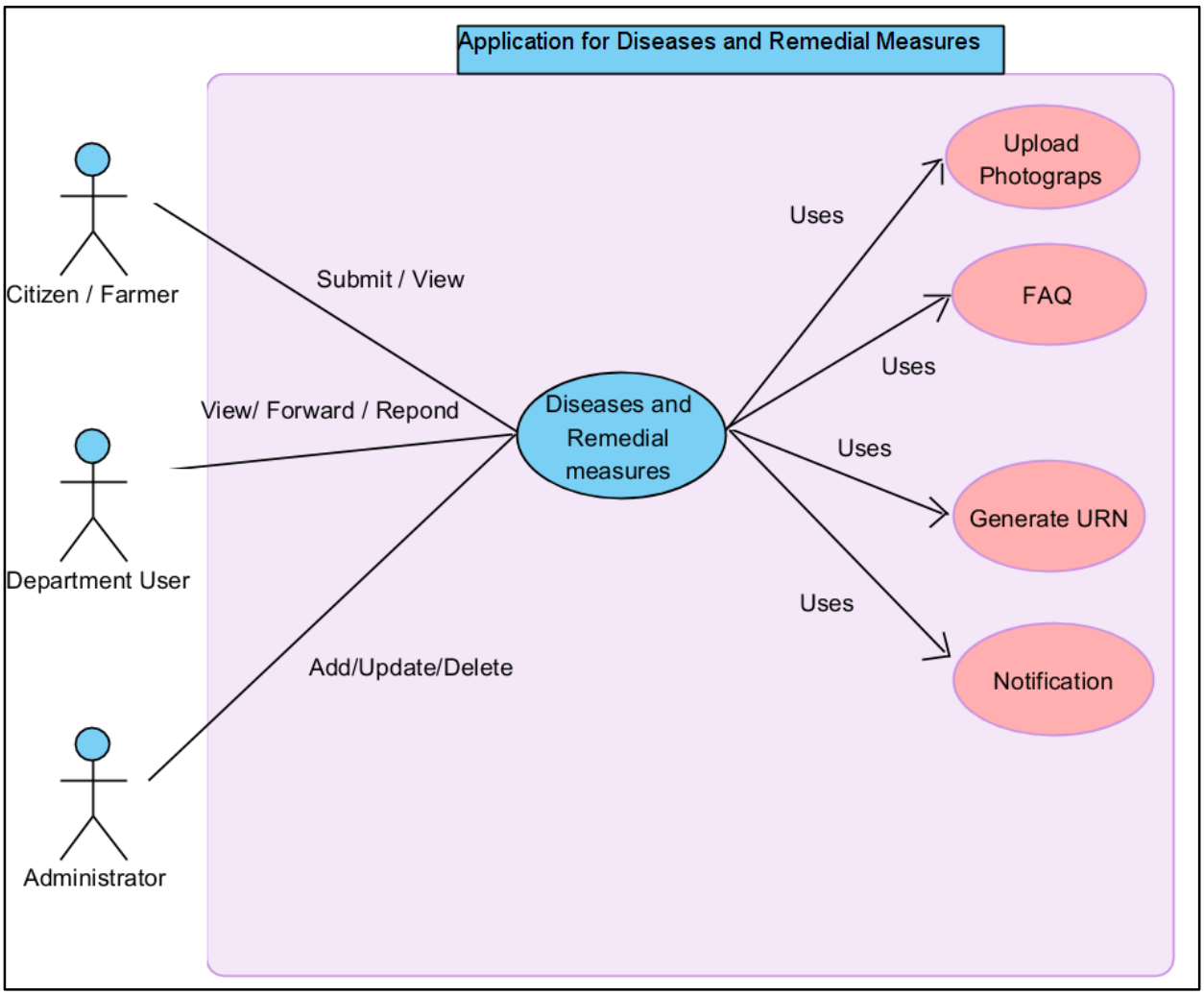
4.2.13.1 DESCRIPTION

This functionality shall provide the user detail information about the common diseases found in the Karnataka state and it's Remedial Measures. Also there shall be provision to upload the photograph along with the information related to diseases.

4.2.13.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAS

- On click of "Diseases and Remedial Measures" link, system shall redirect the page to the Disease and Remedial Measures page.
- The page shall have detailed information about the common diseases found along with the Remedial Measures.
- A Button shall be made available for the user to Query about the Disease, which is found in his farm.

- On click of a button, system shall display the form for entering the details such as Farmer name, mobile number, email ID, Address of farm, Crop grown, Description, photograph (maximum three).
- On click of “Submit” button, system shall upload and save this information.
- System shall generate “Unique Reference Number” and display it as well as send it to the user via SMS/Email.
- Depending upon the location, System shall assign the query to the concerned departmental User.
- Once departmental user logged in to the portal,
    - He shall able to view the queries/concerns raised by the farmers.
    - He shall able to view the information along with the photographs for the selected query.
    - He shall able to respond to the query.
- System shall send the notification to the farmer via SMS/Email about the response to his query.



4.2.14 SEED SECTION

This section enable user to access the Seed related information.

4.2.14.1 DESCRIPTION

- In this section user shall able to view the information about the seeds along with information related to dealers list, seed stock & pricing information, area wise recommendation, Seed Testing Laboratories and seed village program in the state of Karnataka. This information will be accessed using web service published by kkisan Application (http://kkisan.karnataka.gov.in/). Agriculture department website will be accessed for registration / License certification by the dealers
    - Display the list of licensed Seed which the public can view
    - Display the list of insecticide/Fertilizer/Seed Inspectors at Hobli, Taluka, Sub division District and State Level.

4.2.14.2 RESPONSE SECTION

- On click of “Seeds Section” link, system shall display following links

- Dealers List
- Seed Stock and Pricing Information
- Area wise recommendation
- Seed Testing Laboratories
- Seed Certification Application
- Seed Village Program
- Mark Location of Sample seeds

- On click of “Dealers List”, System shall display list of dealer’s along with details such as district, Taluka, product category, brand names, dealer name, office address, phone number, license number and license validity.
  - User shall able to filter the list using district, Taluka, product category and brand name.

- On click of “Seed Stock and Pricing Information”, system shall display Dealer name, district, Taluka, crop, product category, price, quantity, stock available.
  - User shall able to filter the list using district, Taluka, product category.

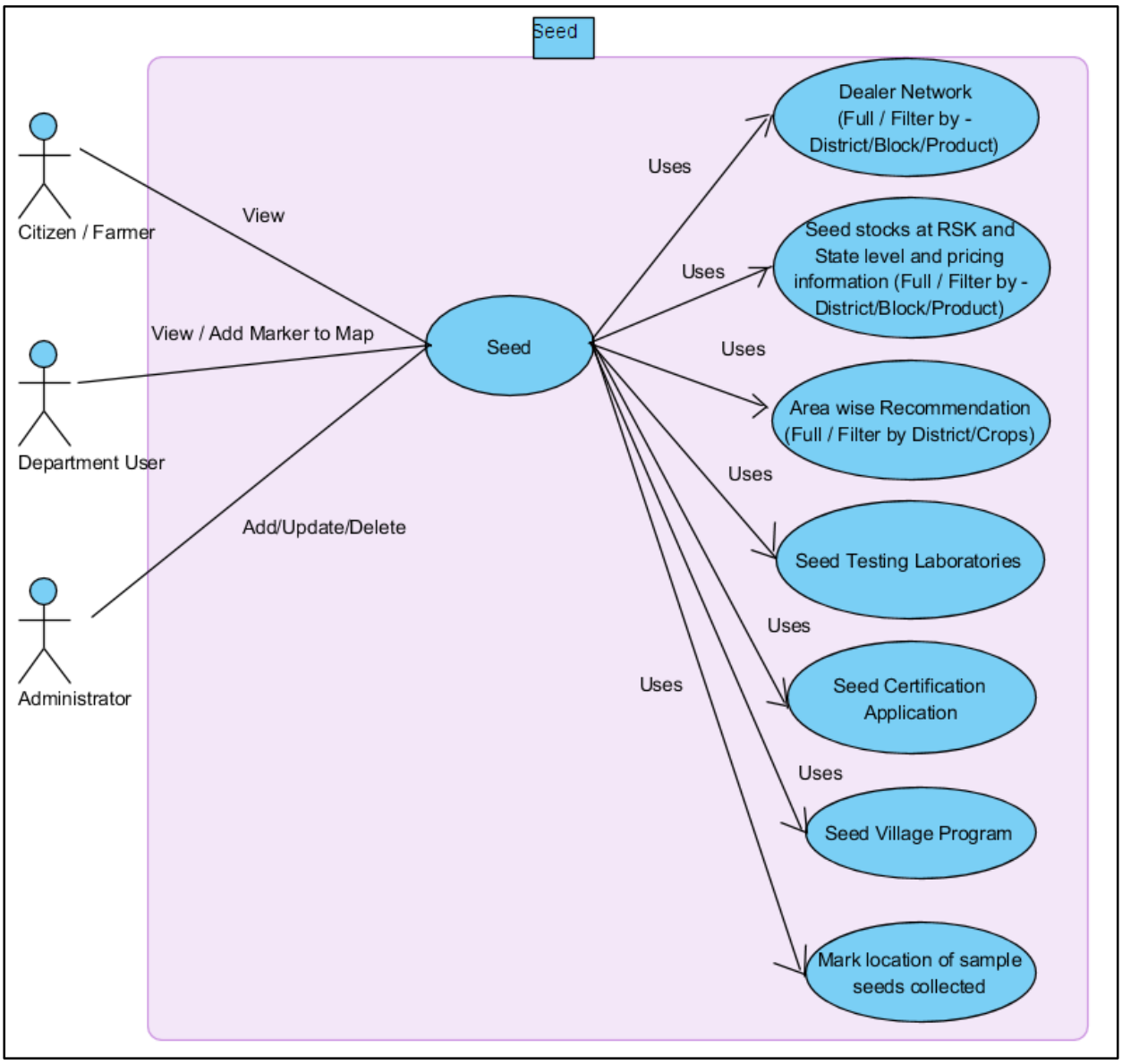
- On Click of “Area Wise Recommendation”, system shall redirect page to Area wise Recommendation
  - User shall able to select District, Crop.
  - System shall display the list with the information such as District, Crop Grown, seeds specified quantity (Kg/hectare).

- On click of “Seed Testing Laboratories”, system shall display list of Seed Testing Laboratories with information such as Lab Name, Address, Contact Person, Contact Number

- On Click of “Seed Certification”, the user shall able to apply for seed certification through email.

- On click of “Seed Village Program”, system shall detail information about the seed village program.

- On GIS Map, make provision for the department to mark location of samples of seeds based on complaint/suspicious about the quality received from the farmers. Provision to be made on Map window to update details of quality testing as remarks.



4.2.15 FERTILIZER SECTION

This section enable user to access the Fertilizer related information.

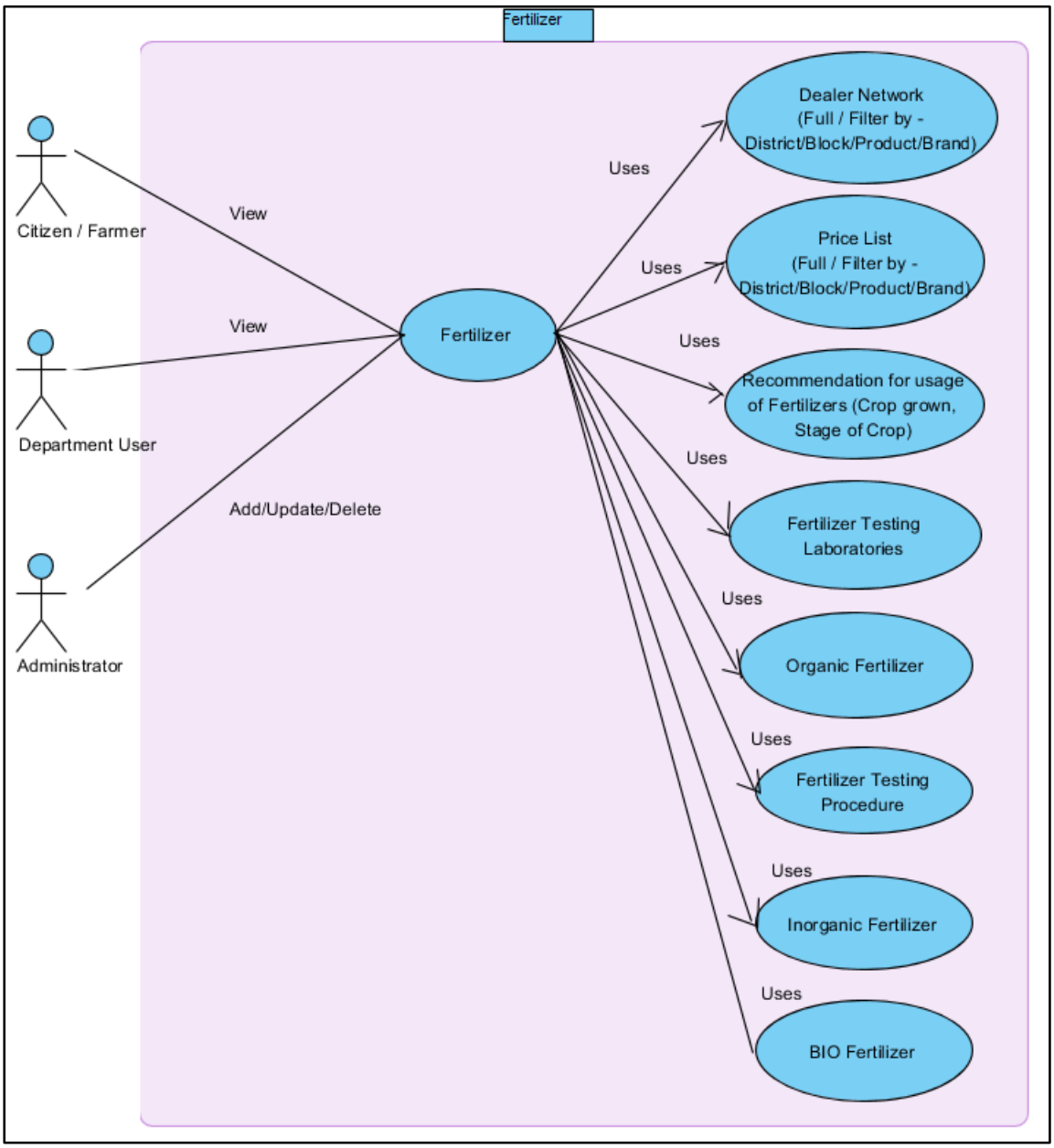
4.2.15.1 DESCRIPTION

- In this section user shall able to view the information about the Fertilizer. Information shall include types of Fertilizer, list of dealers who provides the Fertilizer, prices and availability of Fertilizer, recommendation of Fertilizer as per the area, information about Fertilizer testing laboratories, Organic Fertilizer, Inorganic Fertilizer and Bio Fertilizer. Karnataka. This information will be accessed using web service published by kkisan Application (http://kkisan.karnataka.gov.in/). Agriculture department website will be accessed for registration / License certification by the dealers
    - Display list the licensed Fertilizer which the public can view

- Display the list of insecticide/Fertilizer/Seed Inspectors at Hobli, Taluka, Sub division District and State Level.

4.2.15.2 RESPONSE SECTION

- On click of "Fertilizer Section" link, System shall display the information about Fertilizer. As well as links for Dealer List, Pricing and Availability, Usage Guidelines, Fertilizer Testing Laboratories, Organic Fertilizer, Fertilizer Testing Procedure, Inorganic Fertilizer, Bio Fertilizer shall be displayed
- On click of "Dealers List", System shall display list of dealer's along with details such as district, Taluka, product category, brand names, dealer name, office address, phone number, license number and license validity.
  - User shall able to filter the list using district, Taluka, product category and brand name.
- On click of "Stock and Pricing Information", system shall display Dealer name, district, Taluka, crop, product category, price, quantity, stock available.
  - User shall able to filter the list using district, Taluka, product category.
- On Click of " Usage Guidelines", system shall display the page to user
  - User shall able to select district, Crop Grown, Stage of crop (pre sowing, sowing, and post sowing).
  - System shall display Fertilizers recommended, specified quantity (Kg/hectare) and the supplier details.
- On click of "Fertilizer Testing Laboratories", system shall display list of Fertilizer Testing Laboratories with information such as Lab Name, Address, Contact Person, Contact Number
- On click of " Organic Fertilizer", System shall display the respective information
- On click of " In-Organic Fertilizer", System shall display the respective information
- On click of " Bio-Fertilizer", System shall display the respective information
- On Click of "Fertilizer Testing Procedure", system shall display information about the fertilizer testing procedure.



4.2.16 PESTICIDES SECTION

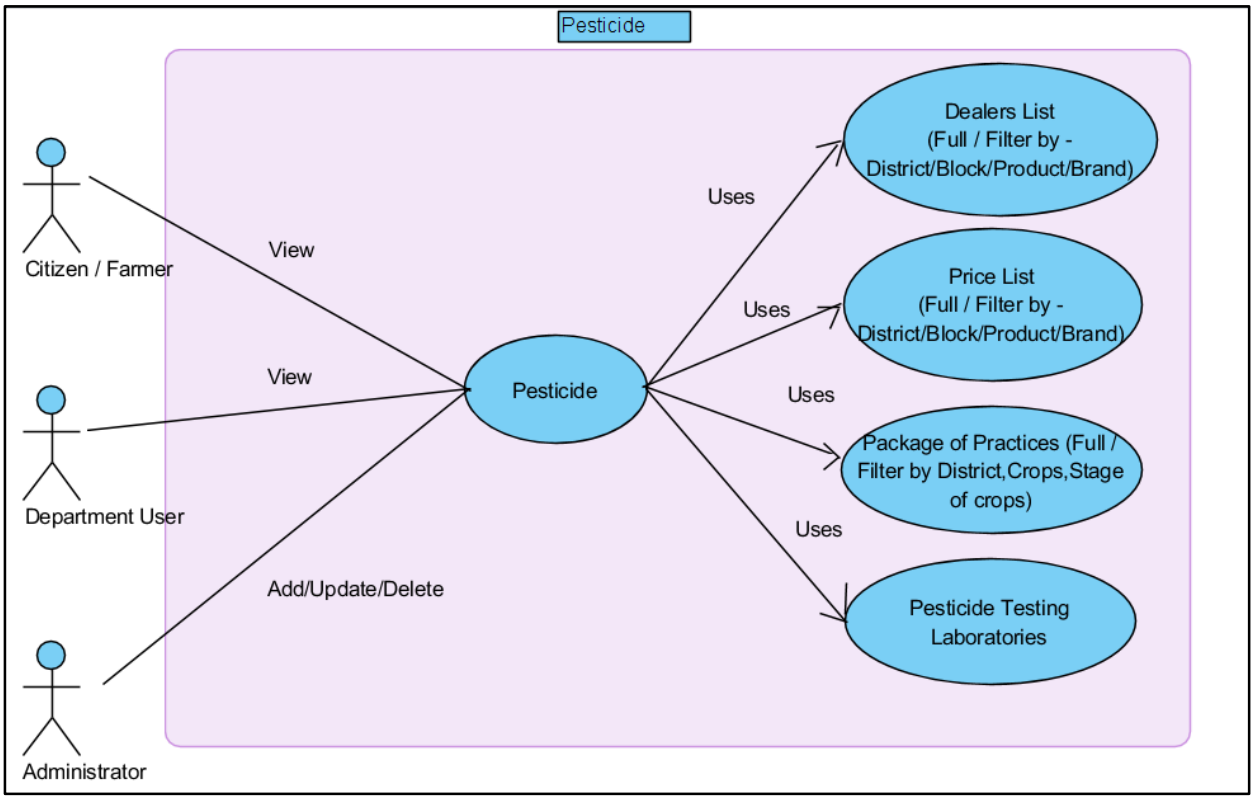
This section enable user to access the Pesticide related information.

4.2.16.1 DESCRIPTION

In this section user shall able to view the information about the pesticides. Information shall include types of pesticides, list of dealers who provides the pesticides, prices and stock of pesticides, recommendation of pesticides and information about pesticides testing laboratories. Karnataka. This information will be accessed using web service published by kkisan Application (http://kkisan.karnataka.gov.in/). Agriculture department website will be accessed for registration / License certification by the dealers

- Display list the licensed Pesticides which the public can view
- Display the list of insecticide/Fertilizer/Seed Inspectors at Hobli, Taluka, Sub division District and State Level.

Area wise details of the Registered Pesticides (including Insecticides, Fungicides, Herbicides, Acaricides, Rodenticides, Bio pesticides and Botanical Pesticides) with recommended crop, pest/diseases, recommended dose, waiting period etc. to be displayed.



4.2.16.2 RESPONSE SECTION

- On click of “Pesticides Section” link, System shall display the information about Pesticides. As well as links for Dealer List, Pricing and Availability, Package of Practices, Pesticides Testing Laboratories shall be displayed.
- On click of “Dealers List”, System shall display list of dealer’s along with details such as district, Taluka, product category, brand names, dealer name, office address, phone number, license number and license validity.
  - User shall able to filter the list using district, Taluka, product category and brand name.
- On click of “Stock and Pricing Information”, system shall display Dealer name, district, Taluka, crop, product category, price, quantity, stock available.
  - User shall able to filter the list using district, Taluka, product category.
- On Click of “packages of practices”, system shall display the page to user

- User shall able to select district, Crop Grown, Stage of crop (pre sowing, sowing, and post sowing).
- System shall display pesticide recommended, Specified quantity (Kg/hectare) and the supplier details.

- On click of "Pesticide Testing Laboratories", system shall display list of Pesticide Testing Laboratories with information such as Lab Name, Address, Contact Person, Contact Number

4.2.17 EXPERT ADVISORY

This functionality enables the user to get expert advice on their queries.

4.2.17.1 DESCRIPTION

This section shall have the following links View FAQ, Add New Query and Query Acceptance and Expert Advice. View FAQ shall have the frequently asked queries and their responses. User shall able to raise any query to get advice of the subject matter expert user Add New Query functionality. Once user submit the query, it shall be sent to subject matter expert of selected FAQ category. A System generated reference number against the submitted query shall be sent to the user's registered mobile number in local language. Using this reference number, the user can view the status of the submitted query on the portal/ service home page.

4.2.17.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAS

- On click of "Expert Advice" link, System shall display the list of Frequently Asked Question as well as links for Add New Query.
- User shall able to view the FAQ's and its response. User shall be able to filter the FAQ depending on service/sub service name, FAQ category name
- If user Clicks on "Add New Query", system shall redirect page to the New Query form
  - The add new Query form shall have provision to select service/sub service, FAQ category and location area (District/Taluka/ Panchayat/Village/ Survey No.) as well as shall have provision to input the Query text, mobile number, email id..
  - If user is registered user of LRI Geo Portal, then after the login, mobile number and email id shall be populated using registered information of user.
  - System shall display the Captcha image– The user shall require to specify the Captcha image being shown on the screen.
  - Upon Successful validation system shall display the Message "Your Query has been successfully submitted."
  - System shall generate the URN and shall send it to user's registered mobile number.
  - User shall able to view the status of his query using URN on portal home page.
  - The query shall be forwarded to the subject matter expert for acceptance/ rejection.

4.2.18 QUERY ACCEPTANCE AND EXPERT ADVICE

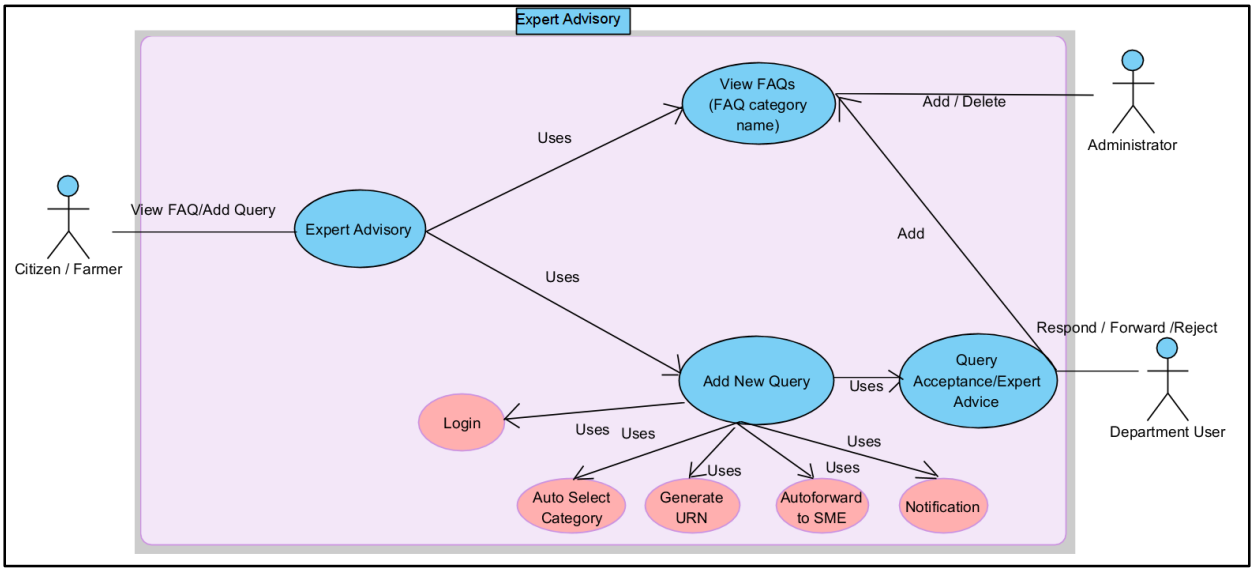
This shall provide functionality to the user to give advices against the received queries.

4.2.18.1 DESCRIPTION

The function enables subject matter expert (SME) shall provide the advice or answer the queries of farmer/citizen. Published answers shall be added in FAQ list and displayed on the home page of the LRI Geo Portal. SMS shall be sent to Farmer/citizen mobile number.

4.2.18.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAS

- After successful login of SME, User shall able to access the “Query Acceptance and Expert Advice”
- System shall display the list of queries depending on the FAQ category.
- User shall able to Accept, Reject Query.
- User shall able to forward the query to the relevant Subject Matter Expert
    - System shall displays options such as Centre level, State level, District Level.
        - Depending upon the option selected by the user system shall display the names SME for the FAQ/Subject Category of the respective level.
    - On Click of “Forward” button, System shall forward the query to the selected SME and shall display the message “Query forwarded successfully.”
- IF query is not responded within stipulated time, then system shall automatically forward it to the next higher level of SME.



4.2.19 FARM MACHINERY

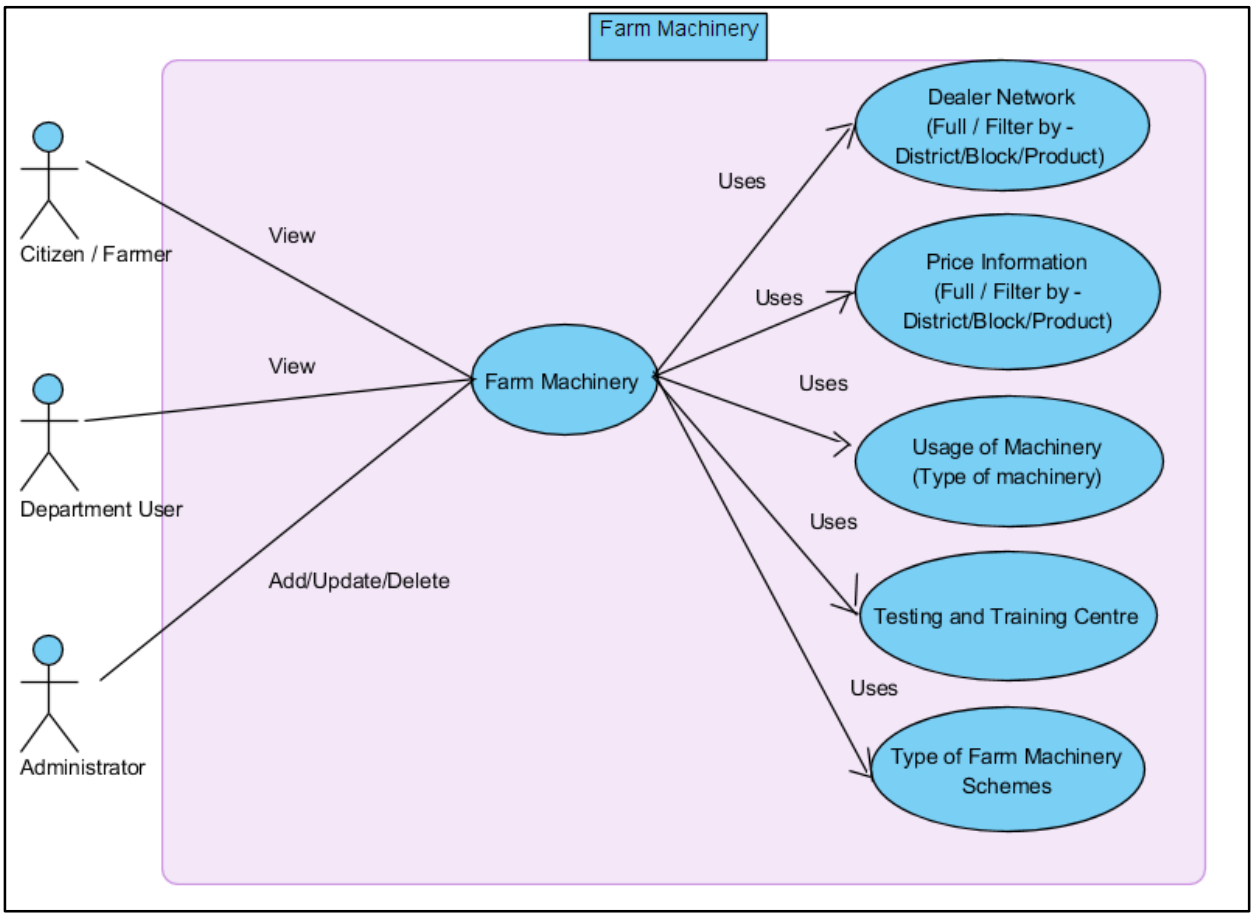
This section enables user to view information related to Farm Machinery.

4.2.19.1 DESCRIPTION

In this section user shall able to view the information about the Farm Machinery. Information shall include Type of Farm Machinery, list of dealers, prices Information, Usage of Machinery, information about Testing and Training Center, Farm Machinery Schemes.

4.2.19.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAS

- On click of " Farm Machinery" Link, System shall display Information related to Farm Machinery as well as link shall be displayed for Type of Farm Machinery, Dealers Network, prices Information, Usage of Machinery, Testing and Training Center, Farm Machinery Schemes.
- On Click of "Type of Farm Machinery", System shall display the information of "Type of Farm Machinery"
- On click of "Dealer Network", System shall display list of dealer's along with details such as district, Taluka, Type of Farm Machinery, dealer name, office address, phone number.
    - User shall able to filter the list using district, Taluka, Type of Machinery.
- On click of "Price Information", system shall display Dealer name, district, Taluka, Type of Farm Machinery, price.
    - User shall able to filter the list using district, Taluka, Type of Machinery.
- On click of " Usage of Machinery", information about the usage of machinery shall be displayed
    - User shall be able to select the Type of Farm Machinery to view its Usage information
- On click of "Testing and Training centre", system shall display list of Testing and Training Center with information such as Name, Address, Contact Person, Contact Number
- On Click of "Types of Farm machinery schemes", system shall display the types of Farm machinery schemes available in Karnataka state.



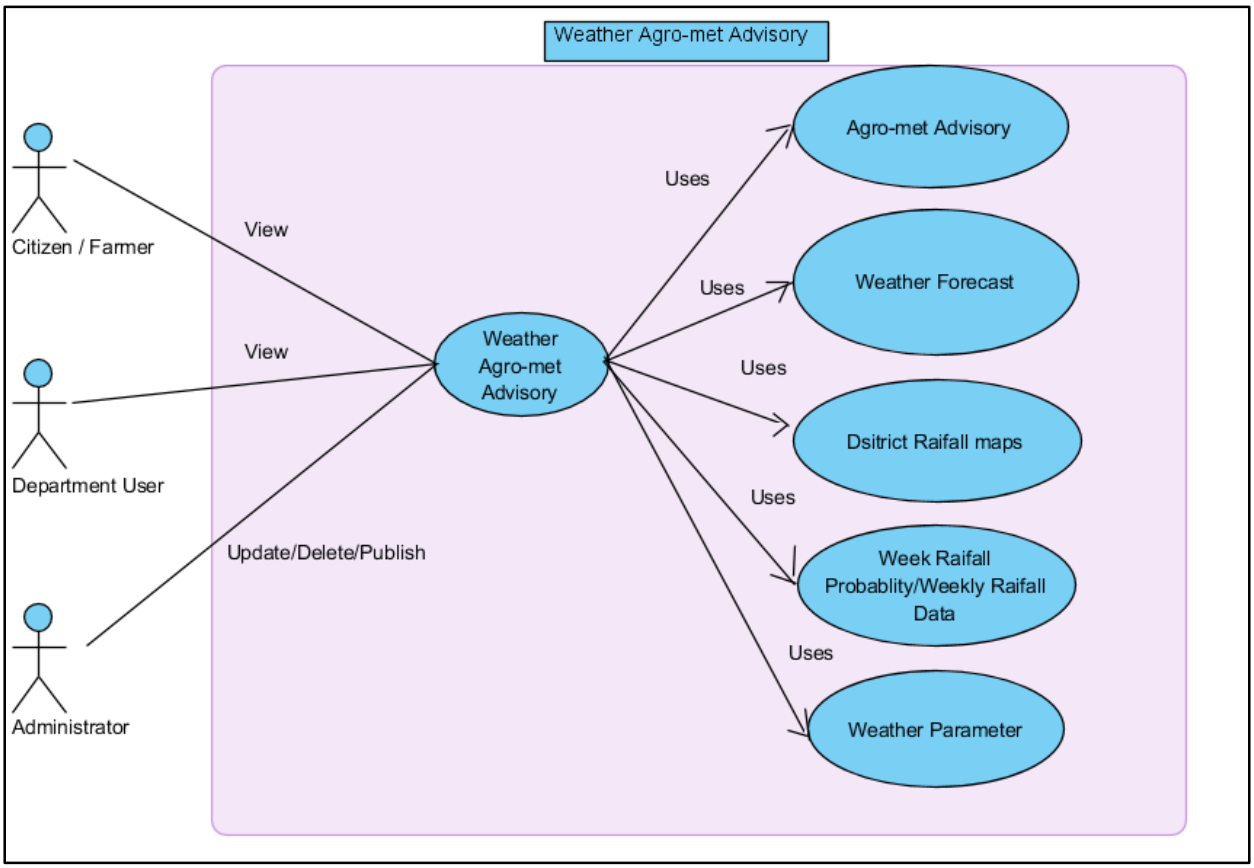
4.2.20 WEATHER AND AGROMET ADVISORY

4.2.20.1 DESCRIPTION

This functionality enables the user view information about Weather Forecasting and Agromet Advisory. Information shall include Agro-met Advisory, Weather Forecast, District Rain fall Maps, Temperature, Weather Parameter, Week Rainfall Probability, Weekly Rainfall Data.

4.2.20.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAS

- On Click of “Weather Agro-met Advisory”, System shall redirect the page to “Weather Agro-met Advisory” Page.
- User shall able to view the information related to Agro-met Advisory, Weather Forecast, District Rain fall Maps, Temperature, Weather Parameter, Week Rainfall Probability, Weekly Rainfall Data.
- User shall be able to view the above information for his location by selecting District, Taluka, Village



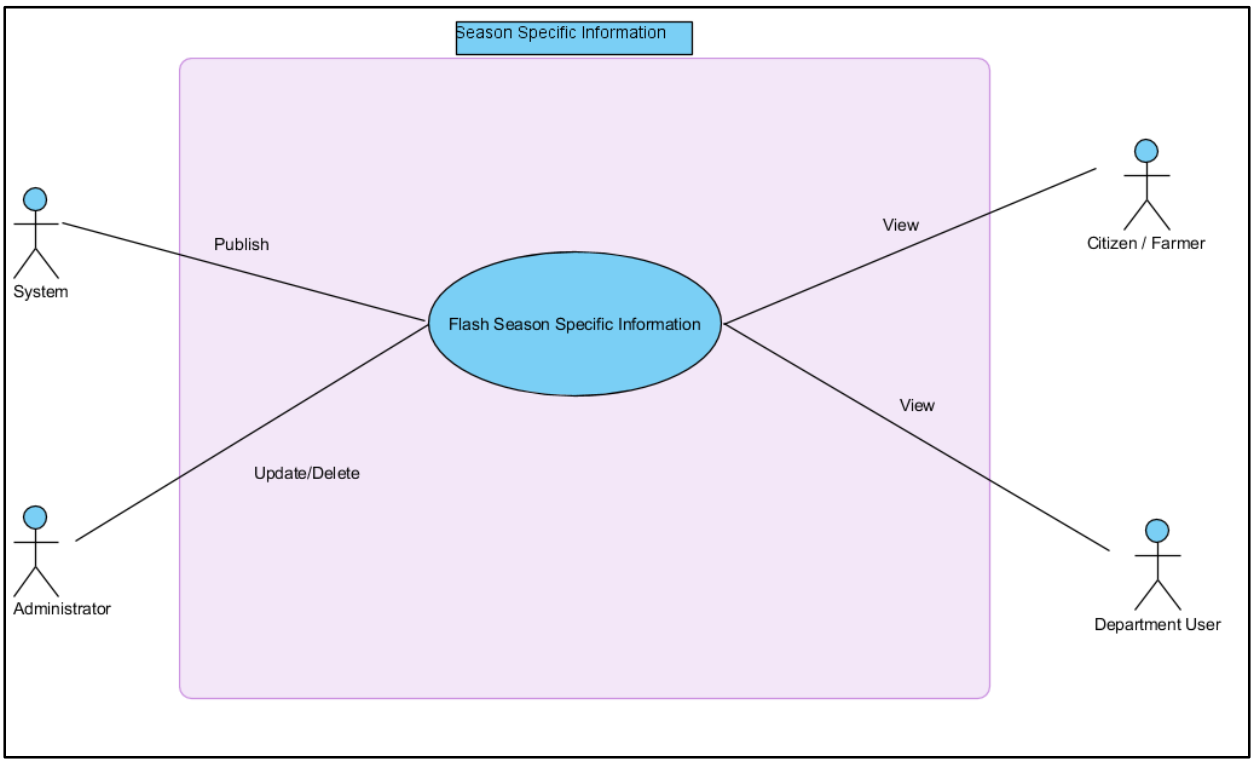
4.2.21 FLASH SEASON SPECIFIC INFORMATION

4.2.21.1 DESCRIPTION

This functionality enables user to view information relevant to Crop for the season.

4.2.21.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAS

- User shall be able to click on “Flash Season Specific Information”
- System shall display the information relevant to crop for the season



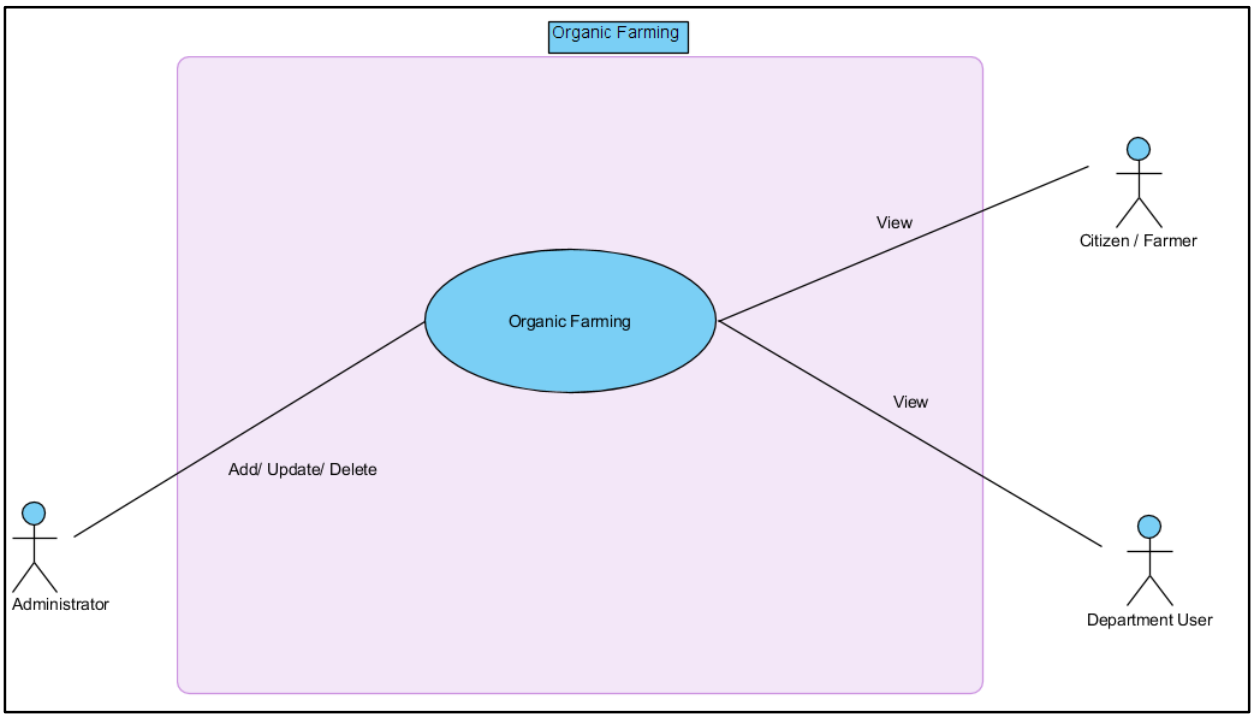
4.2.22 ORGANIC FARMING

4.2.22.1 DESCRIPTION

This functionality enables user to view information relevant to Organic Farming.

4.2.22.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAS

- User shall be able to click on “Organic Farming”
- System shall display the information relevant to Organic Farming



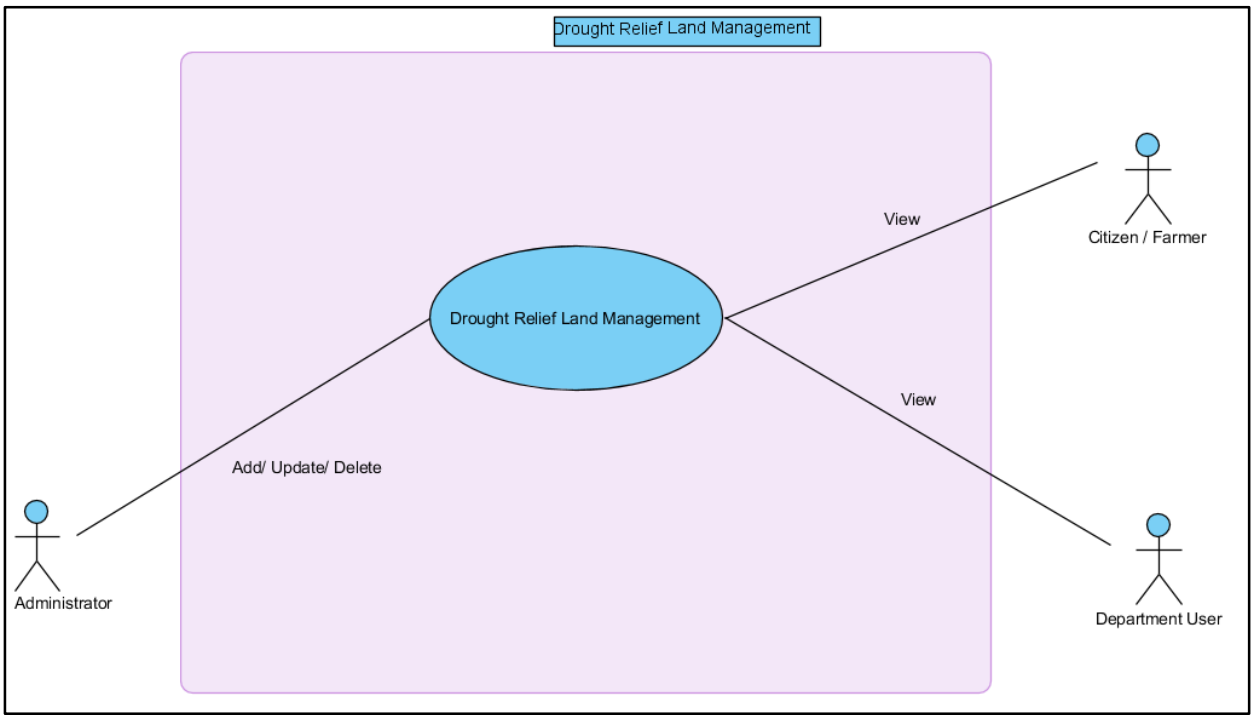
4.2.23 DROUGHT RELIEF LAND MANAGEMENT

4.2.23.1 DESCRIPTION

This functionality enables user to view information relevant to Drought Relief Land Management.

4.2.23.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAS

- User shall be able to click on “Drought Relief Land Management”
- System shall display the information relevant to Drought Relief Land Management



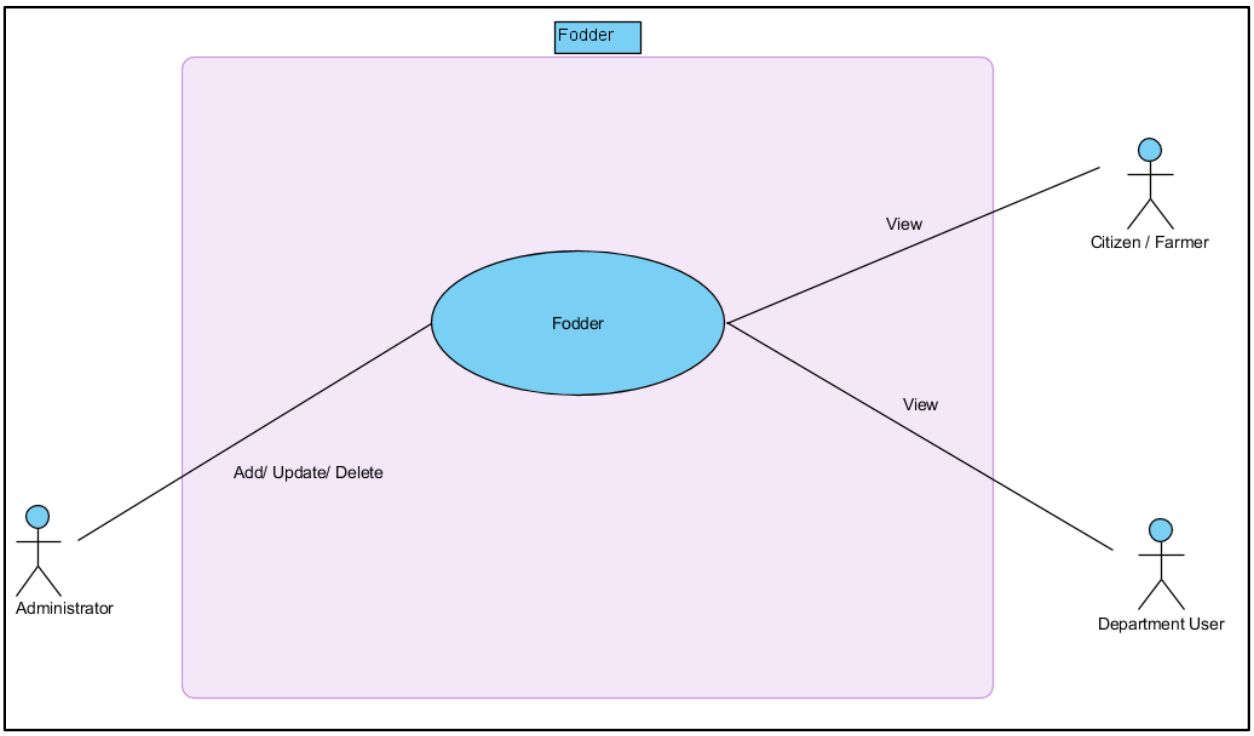
4.2.24 FODDER

4.2.24.1 DESCRIPTION

This functionality enables user to view information relevant to Fodder.

4.2.24.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAS

- User shall be able to click on “Fodder”.
- System shall display the information relevant to Fodder.



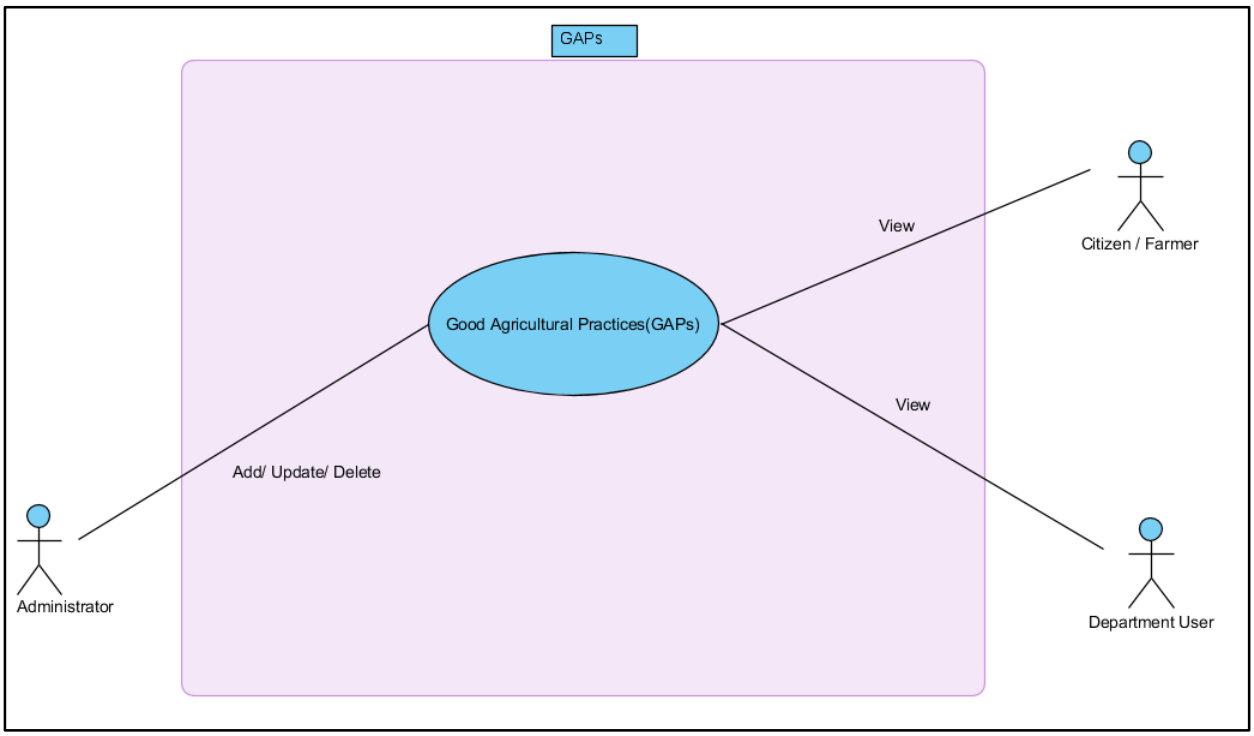
4.2.25 GOOD AGRICULTURAL PRACTICES (GAPS)

4.2.25.1 DESCRIPTION

This functionality enables user to view information relevant to Good Agricultural Practices (GAPs).

4.2.25.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAS

- User shall be able to click on “Good Agricultural Practices (GAPs)”.
- System shall display the information relevant to Good Agricultural Practices (GAPs).



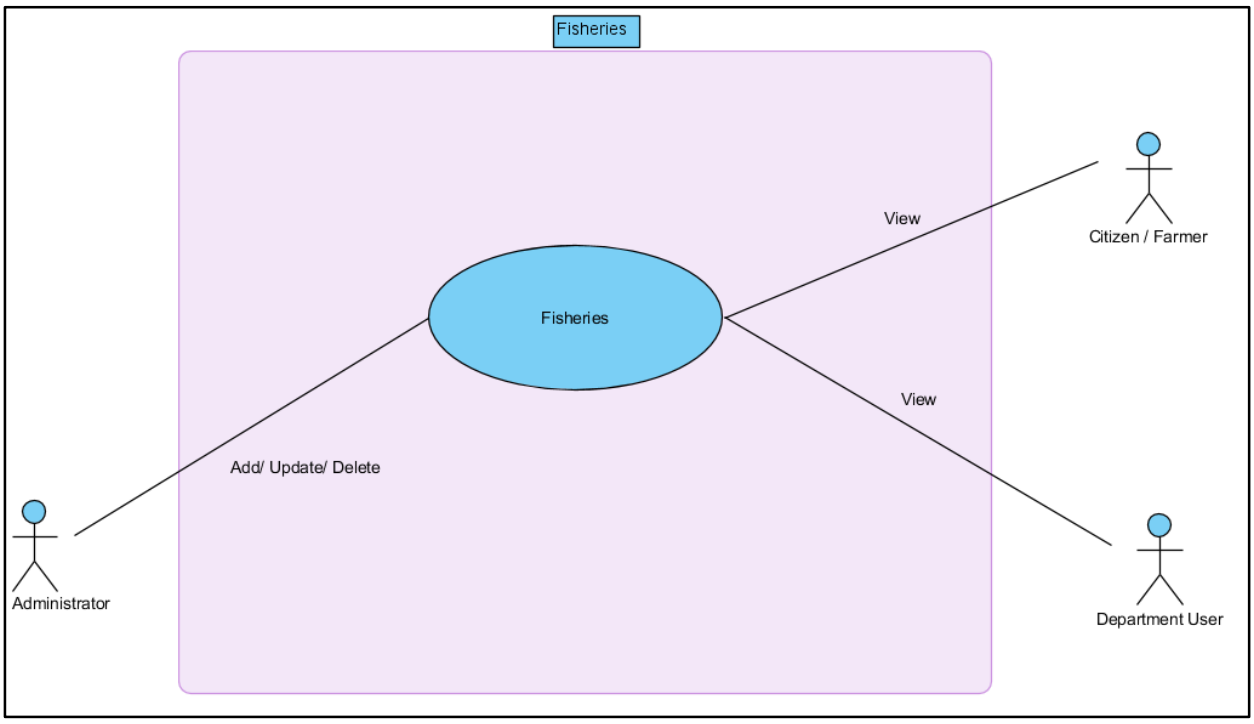
4.2.26 FISHERIES

4.2.26.1 DESCRIPTION

This functionality enables user to view information relevant to Fisheries.

4.2.26.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAS

- User shall be able to click on “Fisheries”.
- System shall display the information relevant to Fisheries.



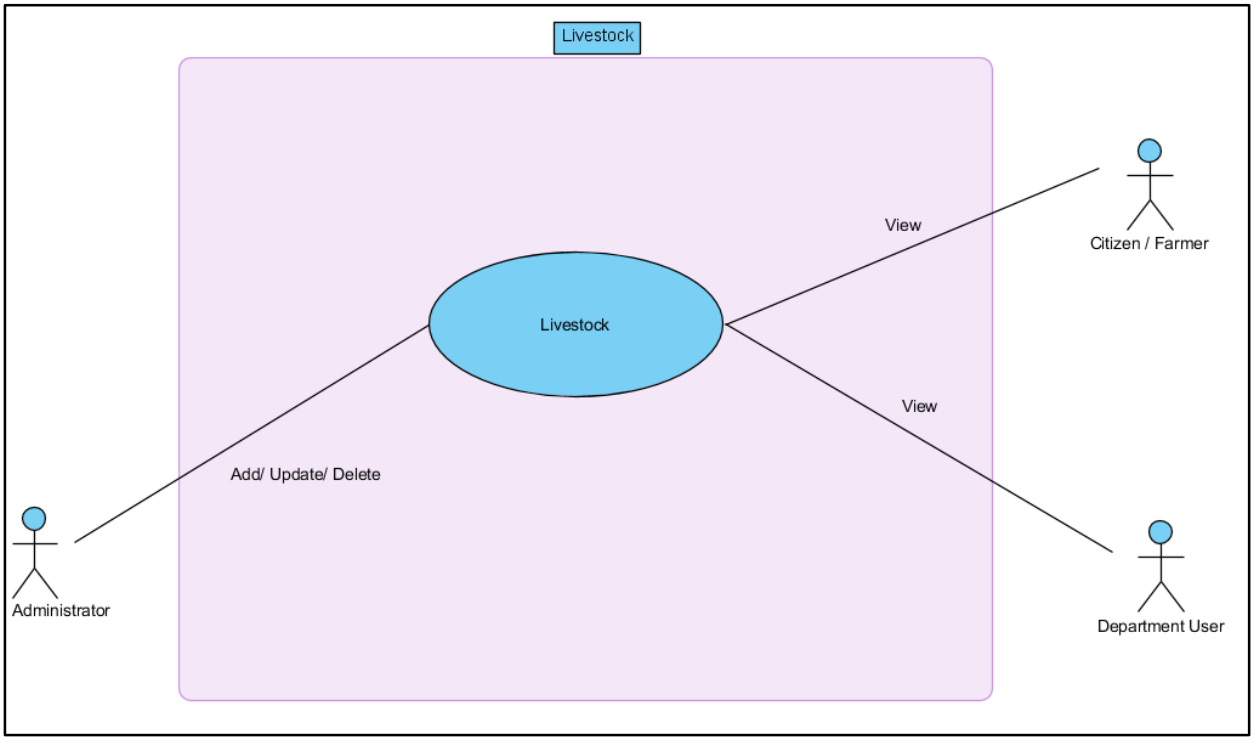
4.2.27 LIVESTOCK

4.2.27.1 DESCRIPTION

This functionality enables user to view information relevant to Livestock.

4.2.27.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAS

- User shall be able to click on “Livestock”.
- System shall display the information relevant to Livestock.



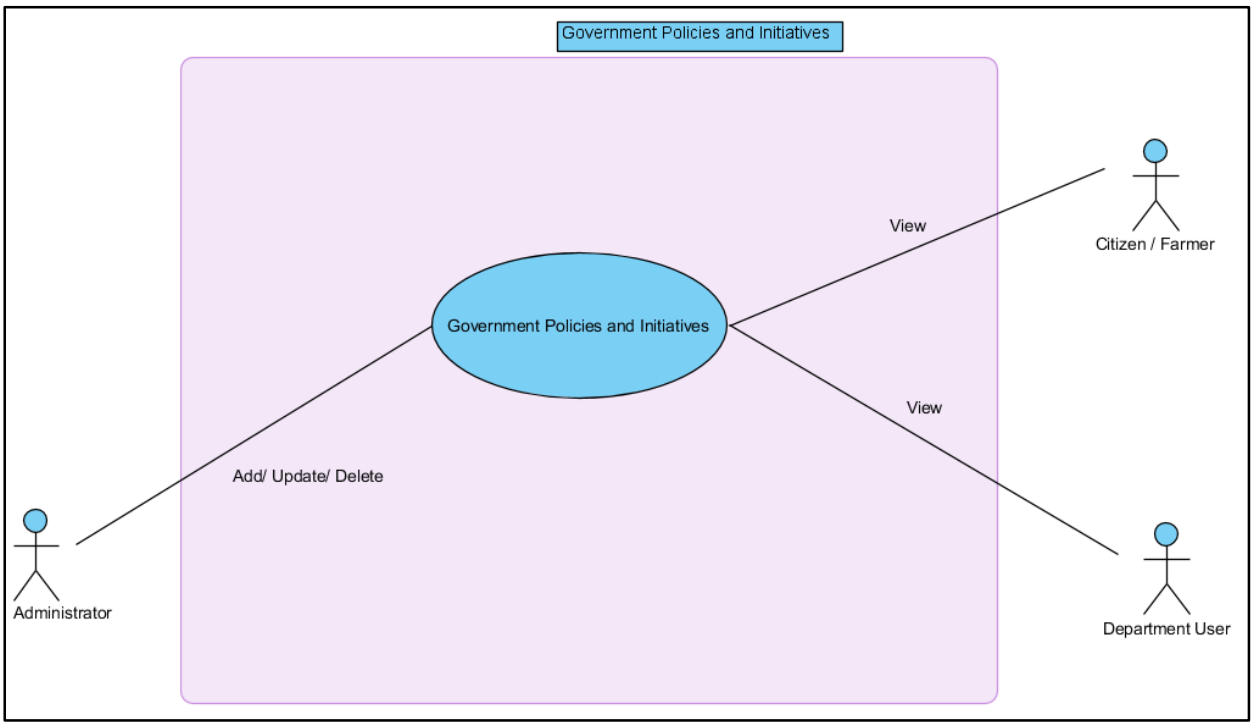
4.2.28 GOVERNMENT POLICIES AND INITIATIVES

4.2.28.1 DESCRIPTION

This functionality enables user to view information relevant to Government Policies and Initiatives.

4.2.28.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAS

- User shall be able to click on “Government Policies and Initiatives”.
- System shall display the information relevant to Government Policies and Initiatives.



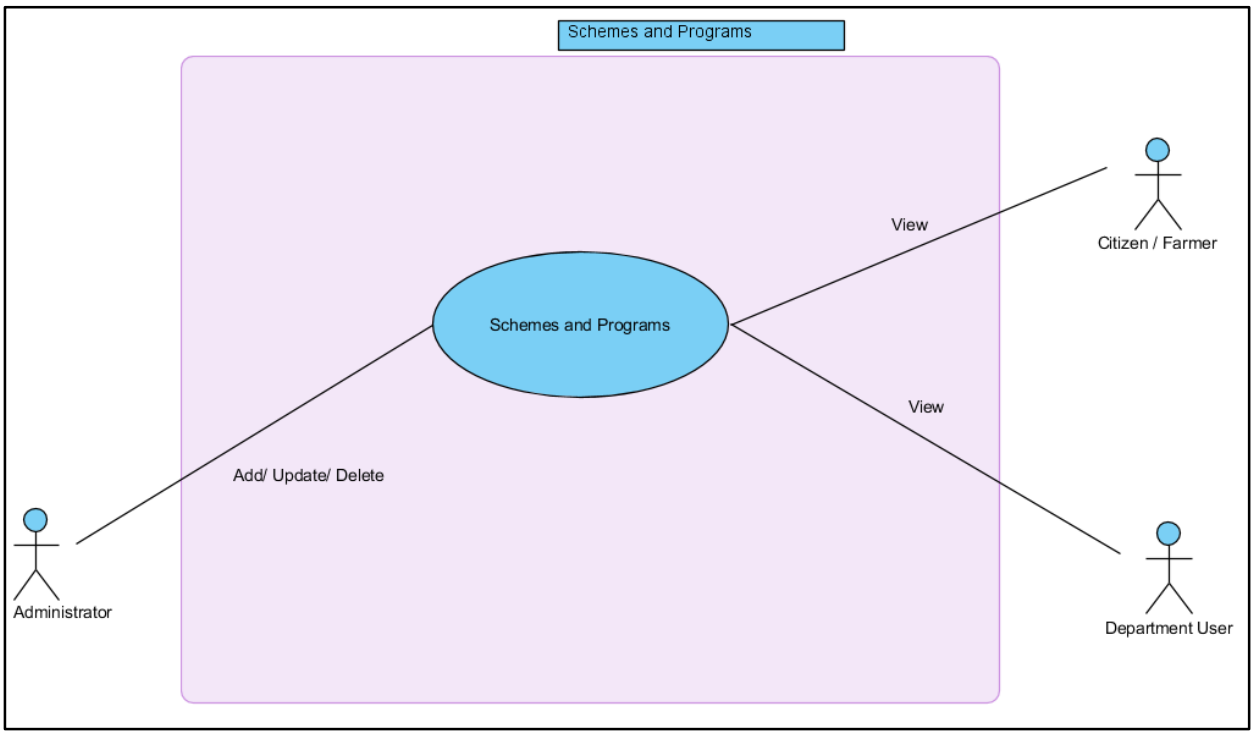
4.2.29 SCHEMES AND PROGRAMS

4.2.29.1 DESCRIPTION

This functionality enables user to view information pertaining to various Agriculture, Horticulture and Sericulture related Schemes and Programs through linkages to respective departments portals.

4.2.29.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAS

- User shall be able to click on “Schemes and Programs”.
- System shall redirect to the respective Departmental website URLS. .



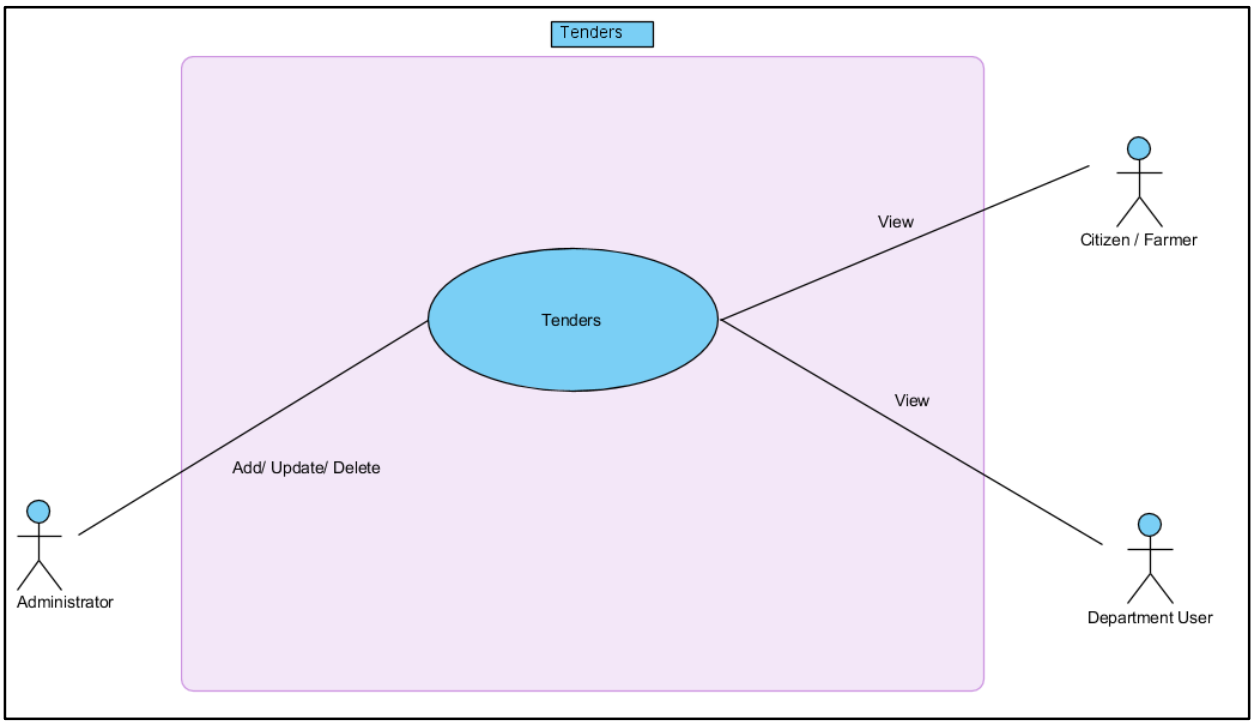
4.2.30 TENDERS

4.2.30.1 DESCRIPTION

This functionality enables user to view information relevant to Tenders published.

4.2.30.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAS

- User shall be able to click on “Tenders”.
- System shall display the List of Tenders published by the WDD as well as link shall be provided to access the tenders.



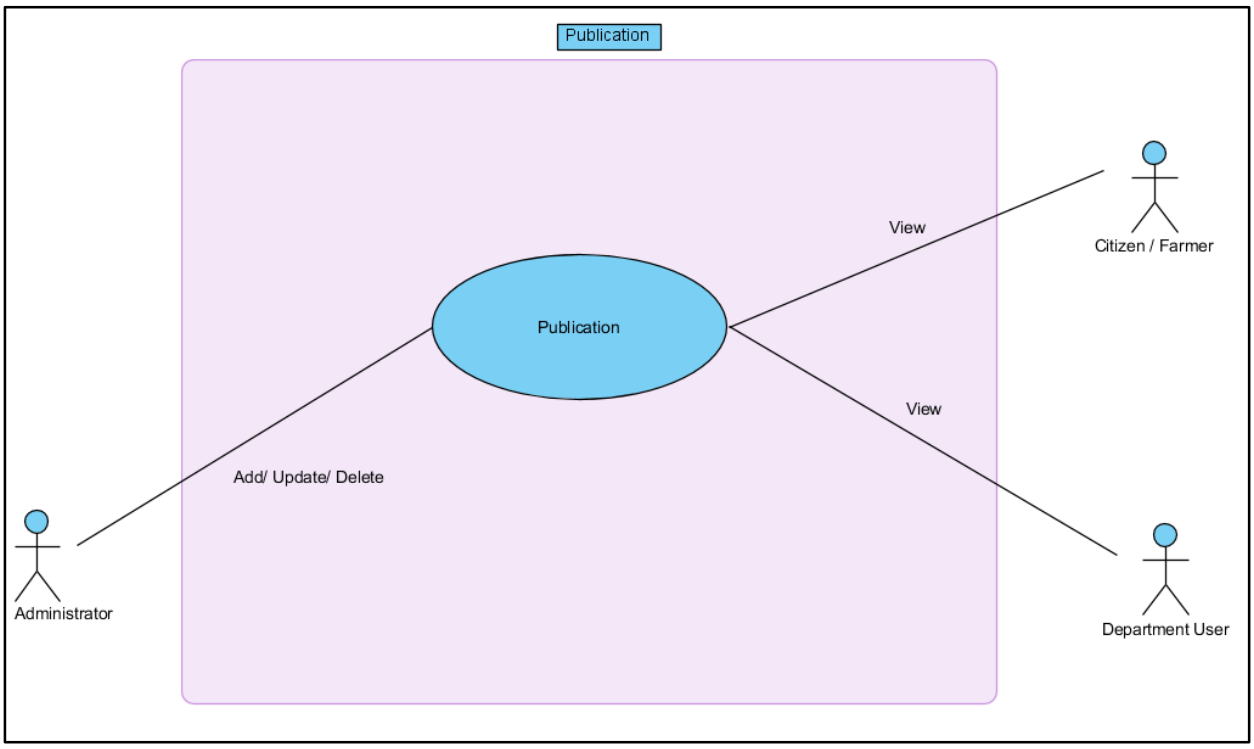
4.2.31 PUBLICATION

4.2.31.1 DESCRIPTION

This functionality enables user to view list of various publication published by WDD, Department of Agriculture, Sericulture, Horticulture and Animal Husbandry.

4.2.31.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAS

- User shall be able to click on “Publication”.
- System shall display the List of publication published by the respective departments.
- User shall be able to click on the particular publication in the list and shall able to view it.



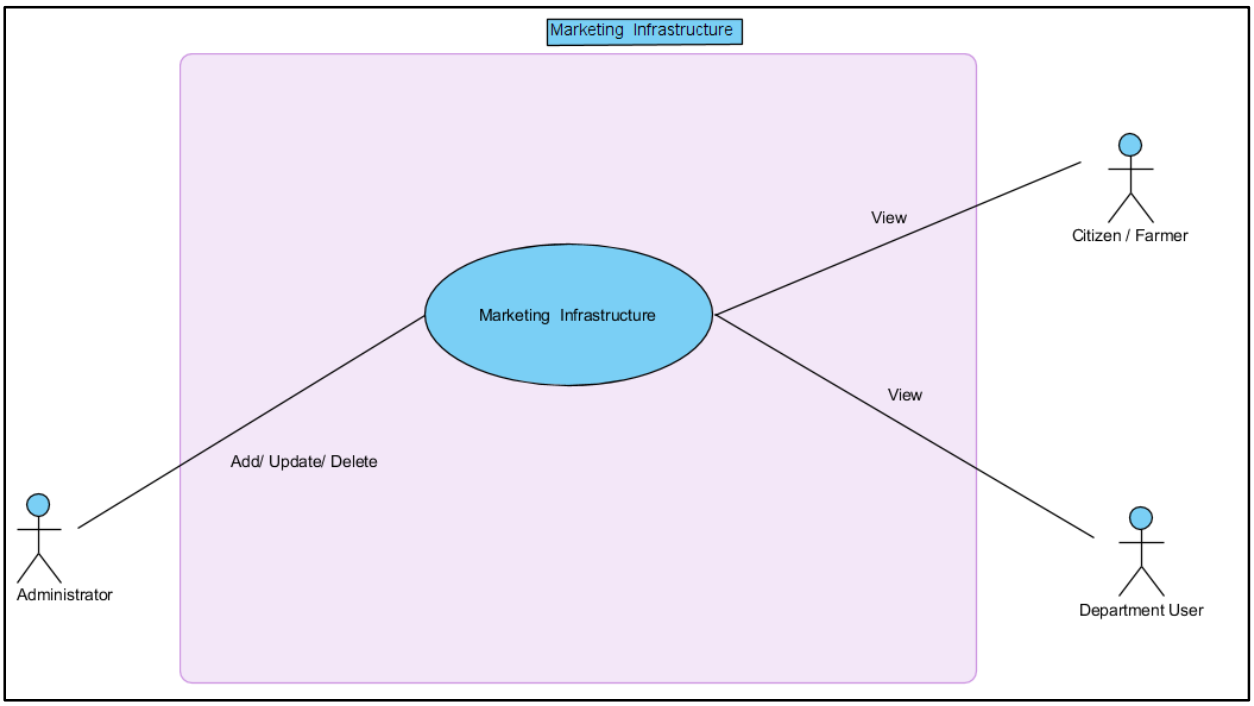
4.2.32 MARKETING INFRASTRUCTURE

4.2.32.1 DESCRIPTION

This functionality enables user to view information relevant to Marketing infrastructure.

4.2.32.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAS

- User shall be able to click on “Marketing infrastructure”.
- System shall display the information relevant to “Marketing infrastructure.”



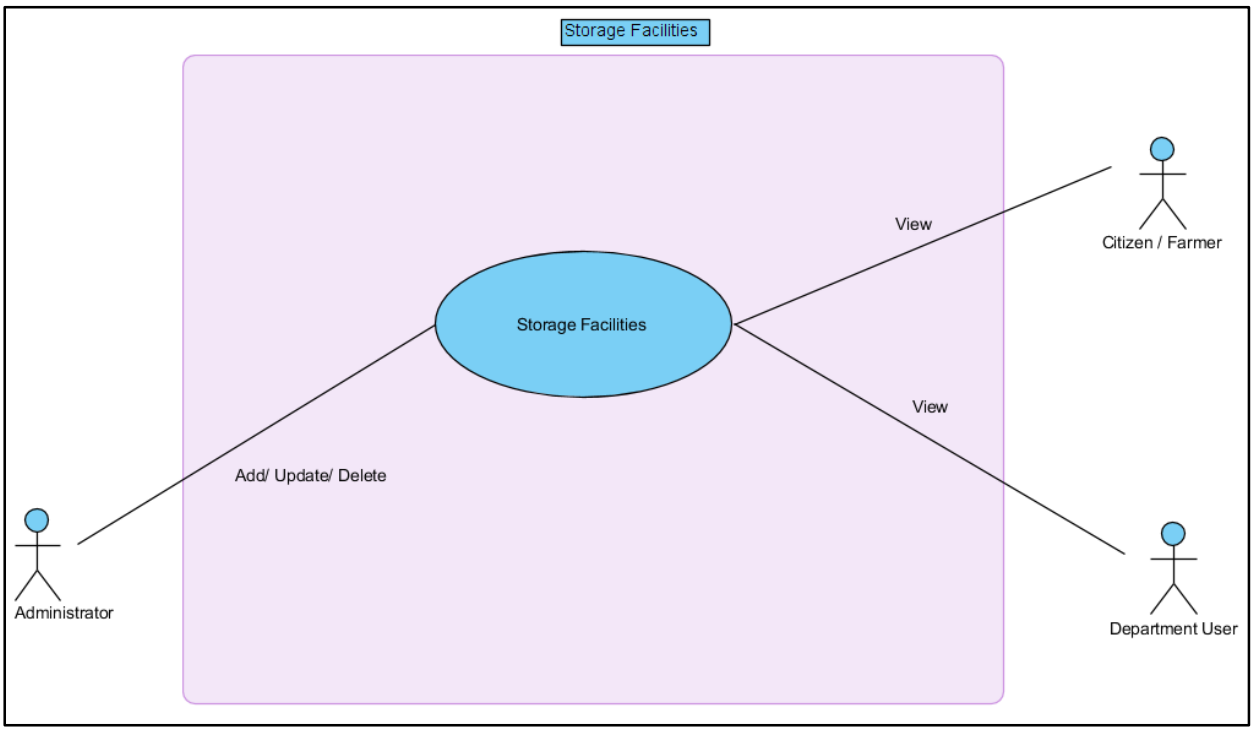
4.2.33 STORAGE FACILITY

4.2.33.1 DESCRIPTION

This functionality enables user to view list of Storage Facilities available in the Karnataka State.

4.2.33.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAS

- User shall be able to click on “Storage Facility”.
- System shall display the List of Storage Facilities available in the Karnataka State.
- User shall be able to click on the particular Storage Facilities in the list and shall able to view the detail information such as Name, Address, Contact Person Name, Phone number.



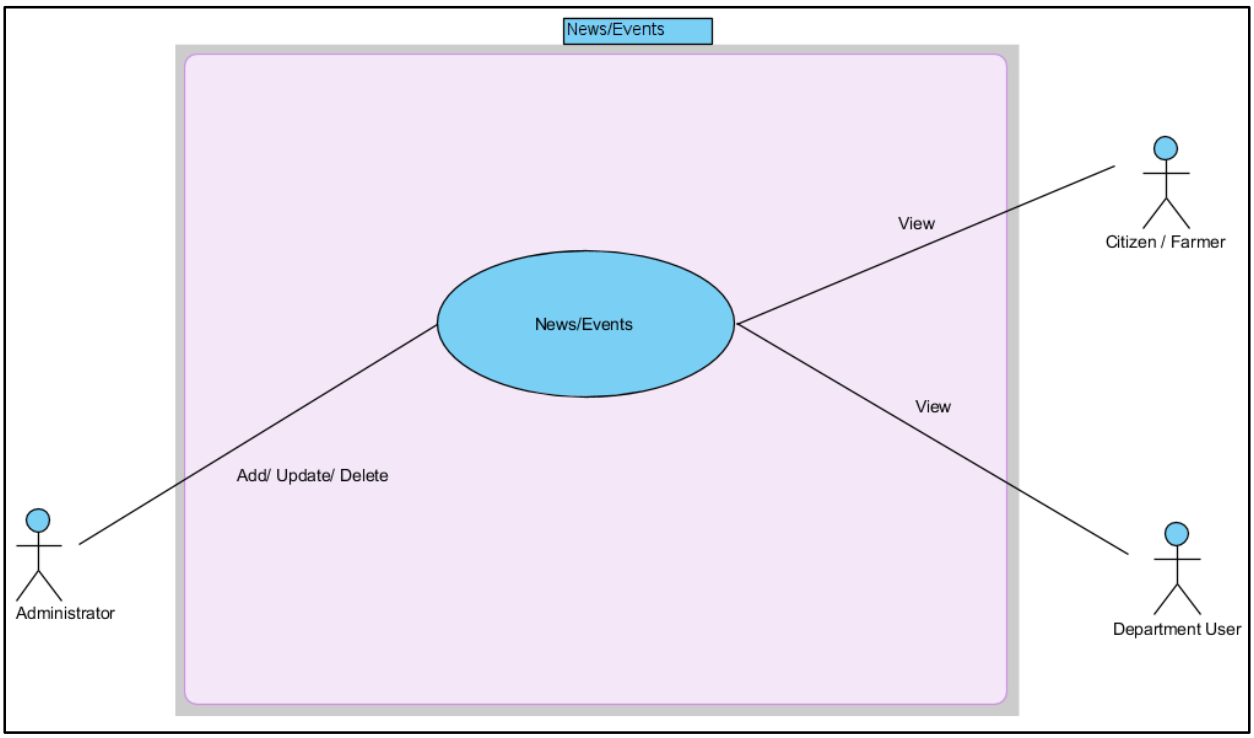
4.2.34 NEWS/EVENTS

4.2.34.1 DESCRIPTION

This functionality enables user to view News/Events related to WDD Department.

4.2.34.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAS

- User shall be able to click on “News/Events”.
- System shall display News/Events related to WDD Department.



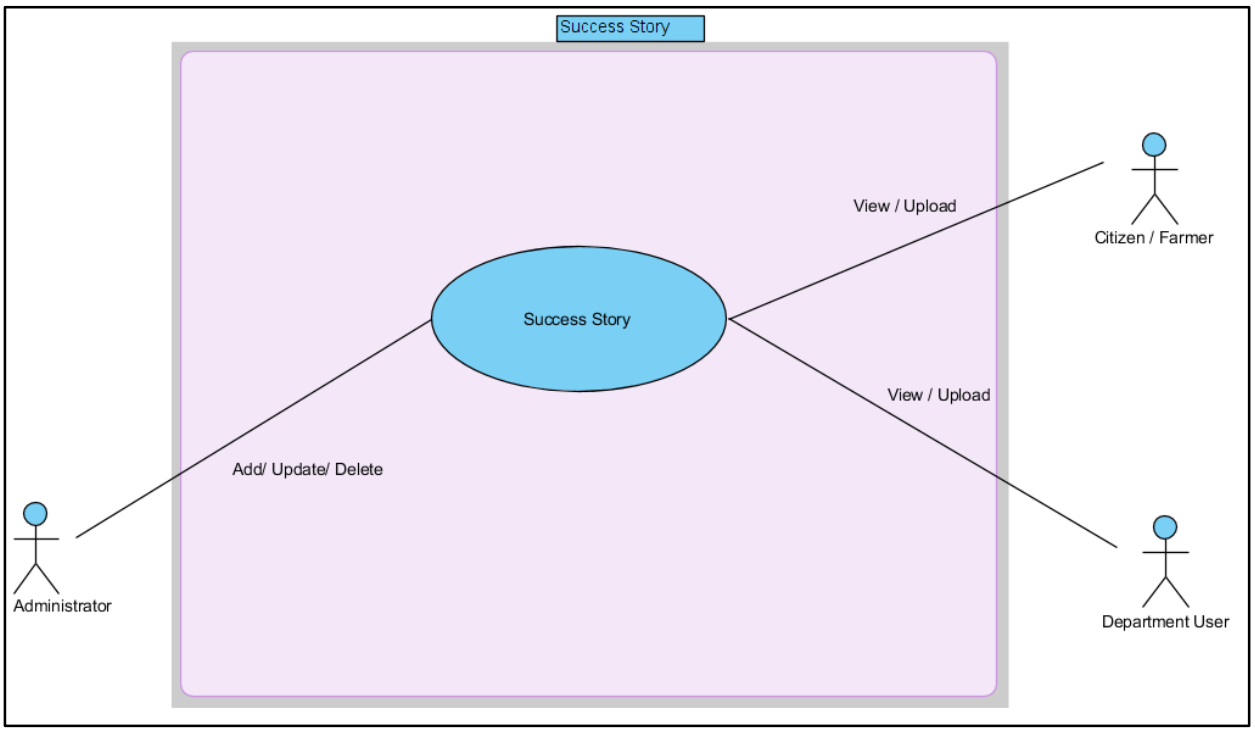
4.2.35 SUCCESS STORIES

4.2.35.1 DESCRIPTION

This functionality enables user to view different Success Stories.

4.2.35.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAS

- User shall be able to click on “News/Events”.
- System shall display list of different Success Stories.
- On click of one of the success story from the list, System shall display the content of the selected success story



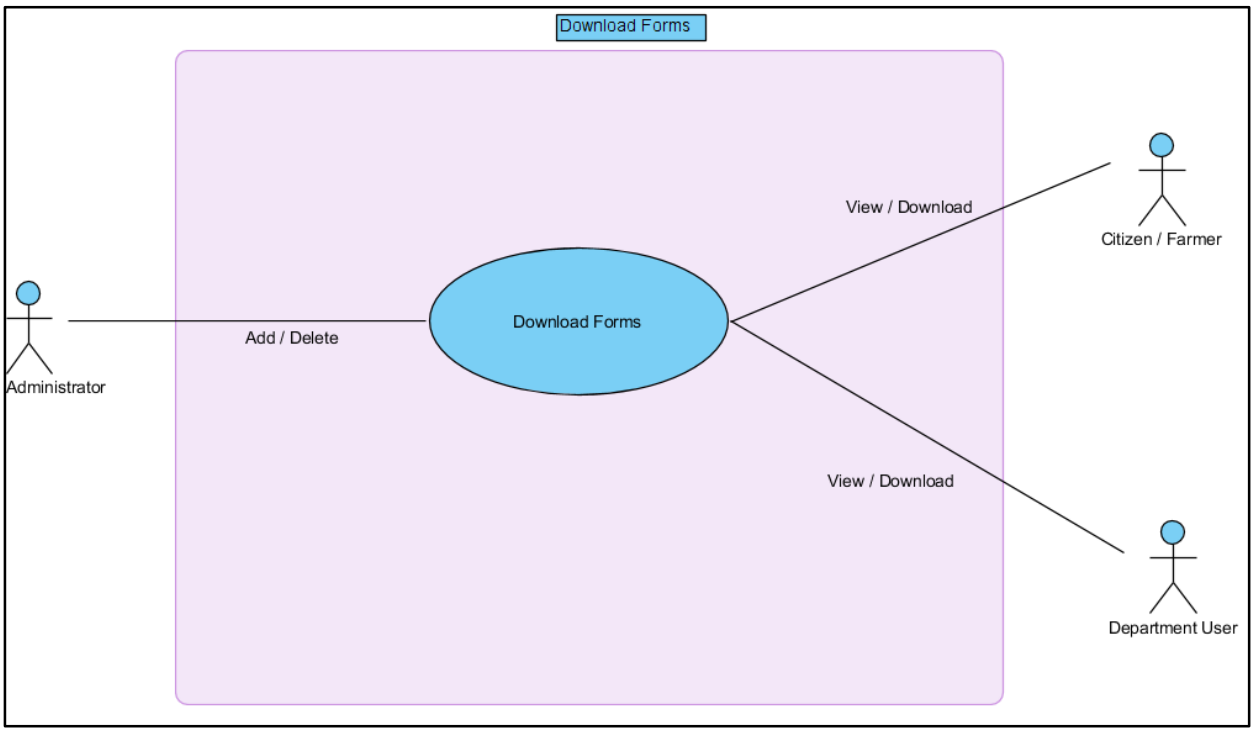
4.2.36 DOWNLOAD FORMS

4.2.36.1 DESCRIPTION

This functionality enables user to view the list of forms available for download. By click on any of the form link User shall able to download it.

4.2.36.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAS

- User shall be able to click on “Download Forms”.
- System shall display list of forms with download option.
- On click of one of the form download link from the list, User shall be able to download the respective form.

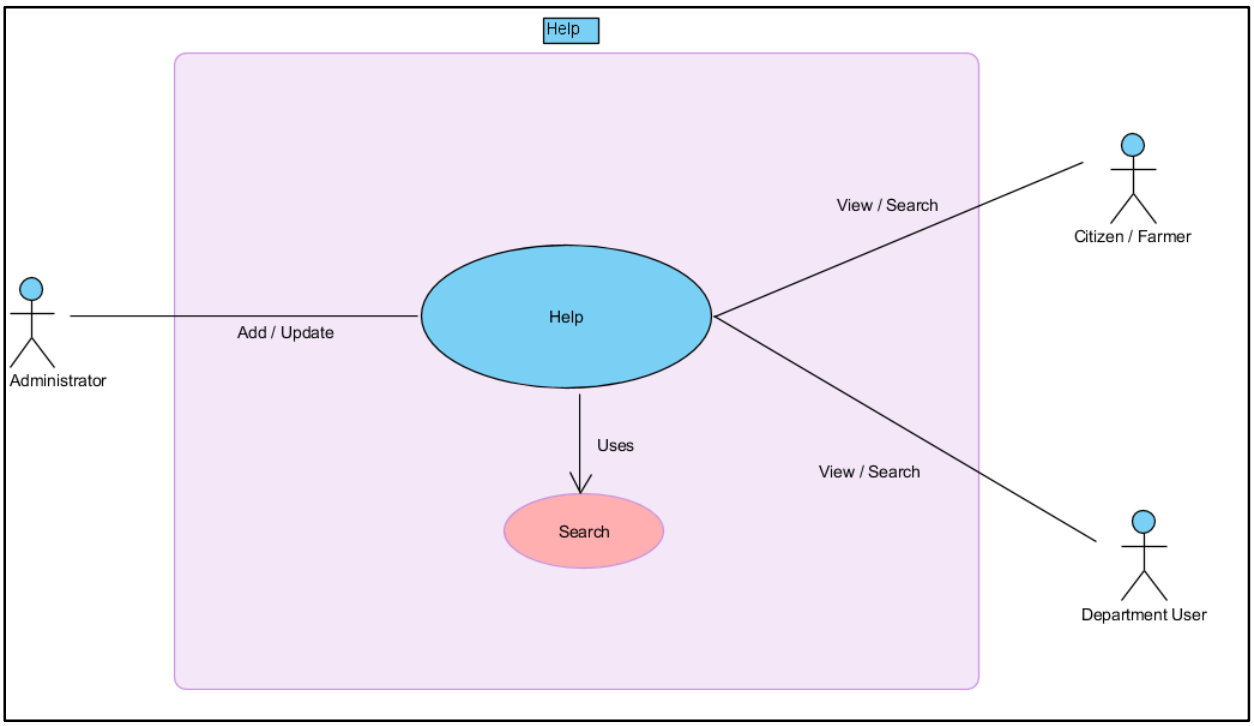


4.2.37 HELP

This functionality enables user to view the portal help document.

4.2.37.1 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAS

- User shall be able to click on “Help”.
- System shall display the portal help document.
- User shall be able to search any topic or word within this help document.



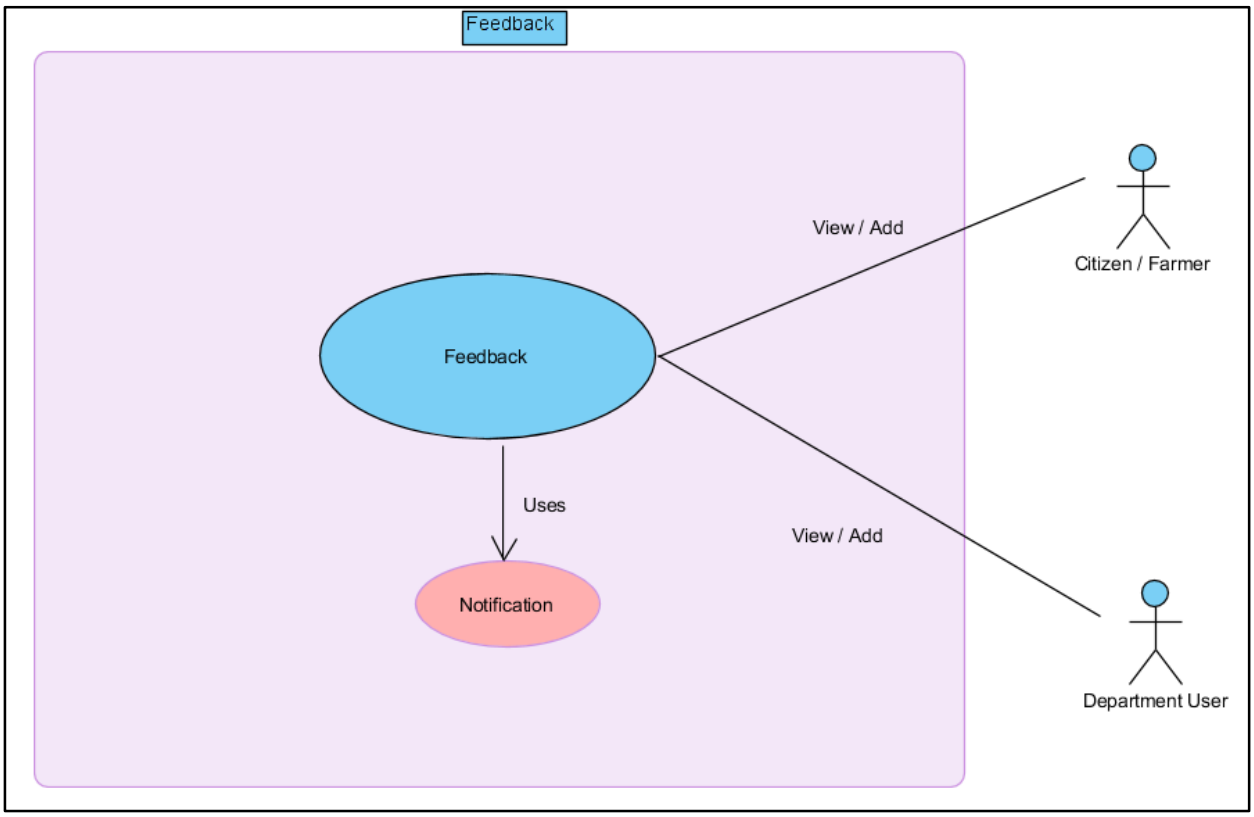
4.2.38 FEEDBACK

4.2.38.1 DESCRIPTION

This functionality enables user to submit his feedback.

4.2.38.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAS

- User shall be able to click on “Feedback”.
- System shall display the form for filling the feedback. The form shall have provision to insert Name, Phone number, mobile number, email Id, specific category of service, Feedback content.
- User shall able to fill the form and submit it.
- After Successful validation of the input data, System shall save the data and shall display the message “Your Feedback submitted successfully”.
- System shall send the SMS/email to the user about the successful submission of the feedback.

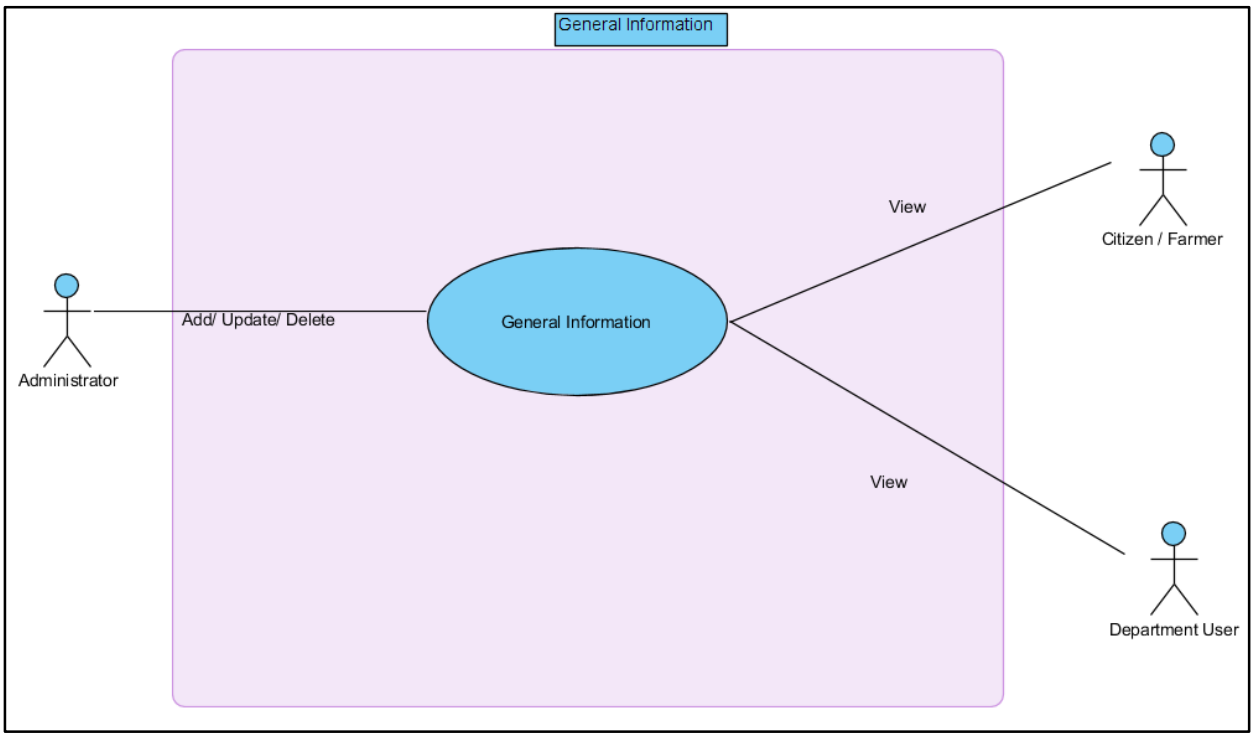


4.2.39 GENERAL INFORMATION

This functionality enables user to view general information.

4.2.39.1 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAs

- User shall be able to click on “General Information”.
- System shall display the general information.



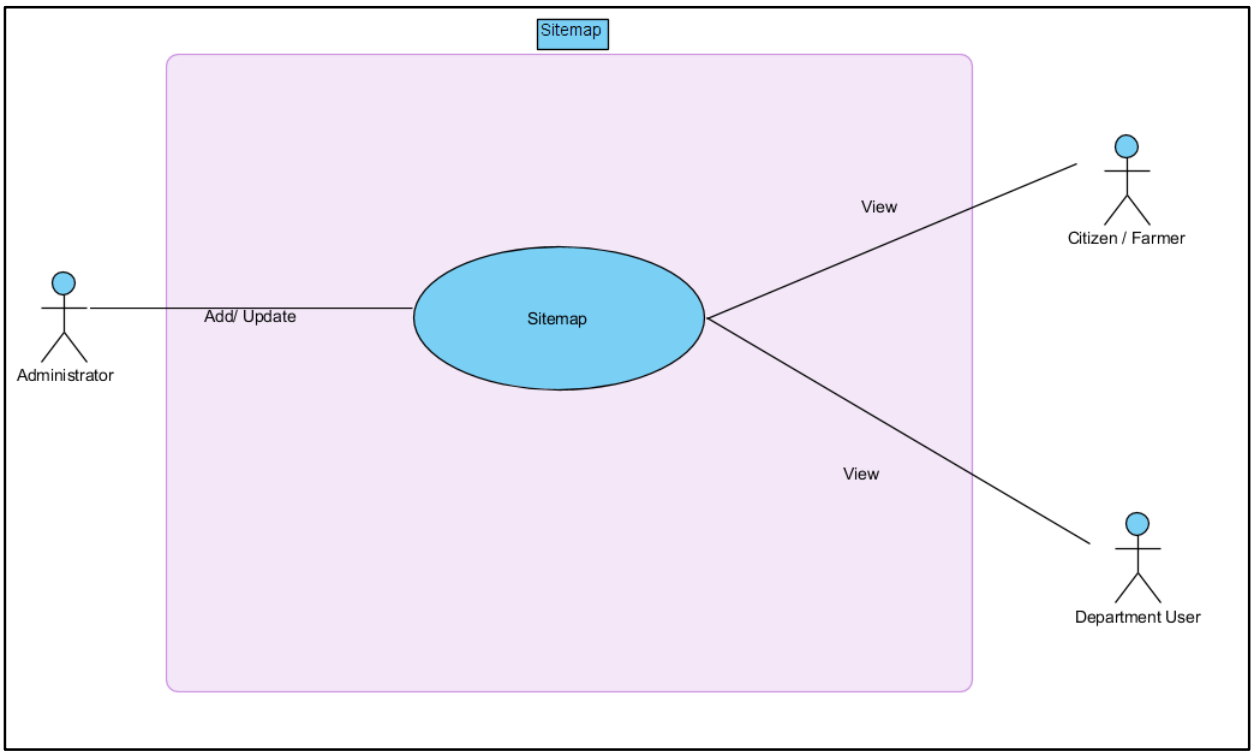
4.2.40 SITEMAP

4.2.40.1 DESCRIPTION

This functionality enables user to view the sitemap

4.2.40.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIA

- User shall be able to click on “Site Map”.
- System shall display the site map.



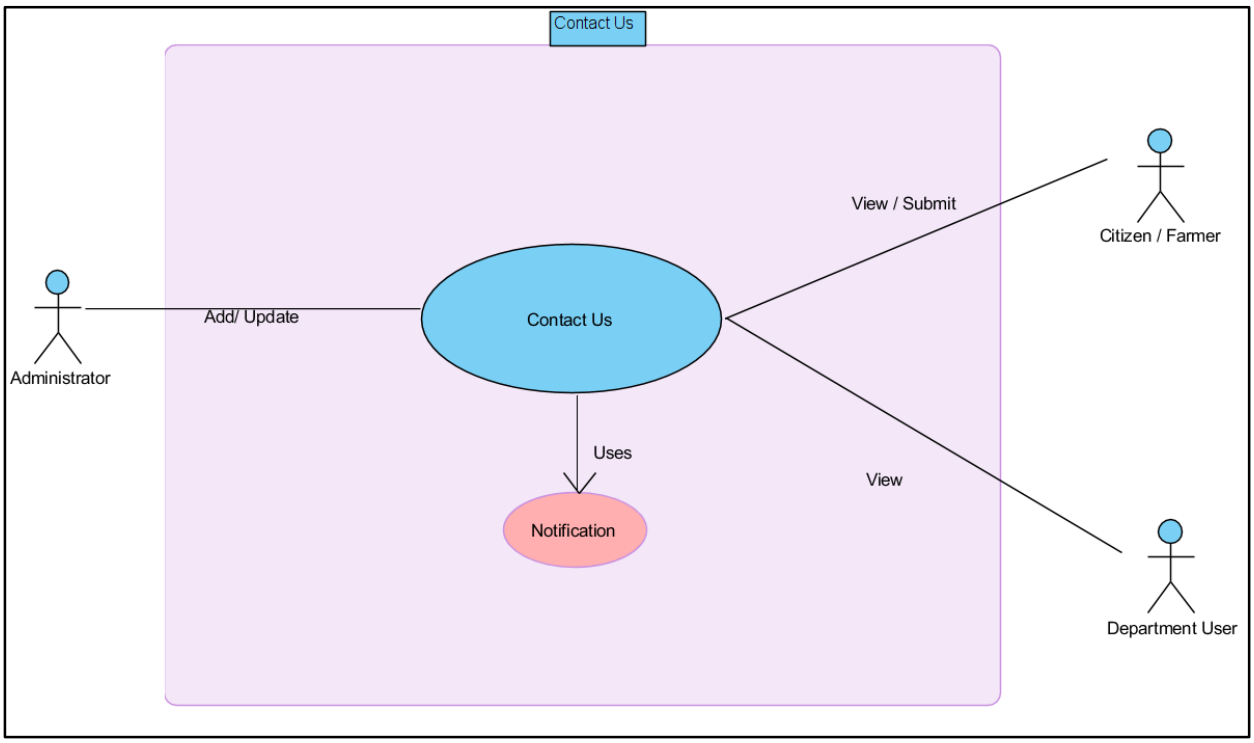
4.2.41 CONTACT US

4.2.41.1 DESCRIPTION

This functionality enables user to view the contact details of the WDD department

4.2.41.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIA

- User shall be able to click on “Contact Us”.
- System shall display the contact details of the WDD department such as Contact Person Name, Designation, Address, Telephone No, E-mail Address, Comments



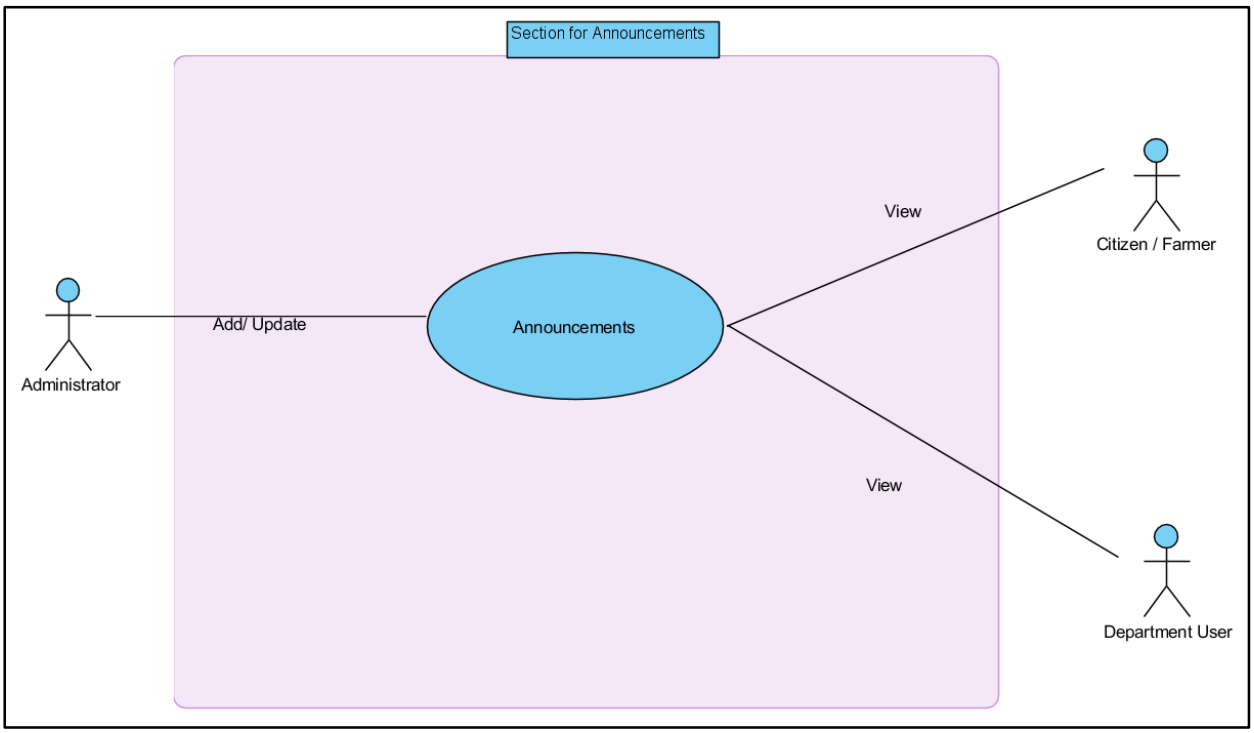
4.2.42 ANNOUNCEMENTS

4.2.42.1 DESCRIPTION

This functionality enables user to view the Announcements by WDD department

4.2.42.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIA

- User shall be able to click on “Announcement”.
- System shall display the Announcement made by the WDD department.
- These announcement shall be visible in landing page also.



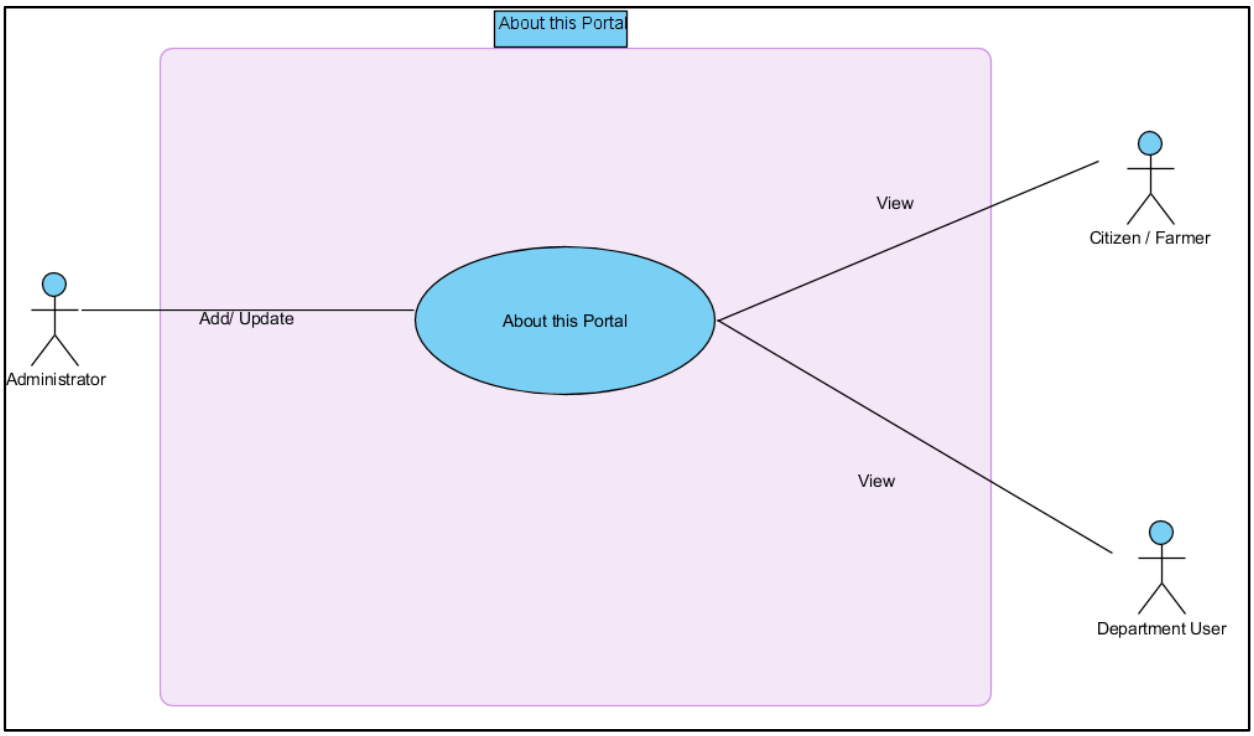
4.2.43 About This Portal

4.2.43.1 Description

This functionality enables user to view the Information about the portal

4.2.43.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIA

- User shall be able to click on “About this portal”.
- System shall display the information about the portal. The Content is already managed and published for this page by authorized users. System shall display the same.



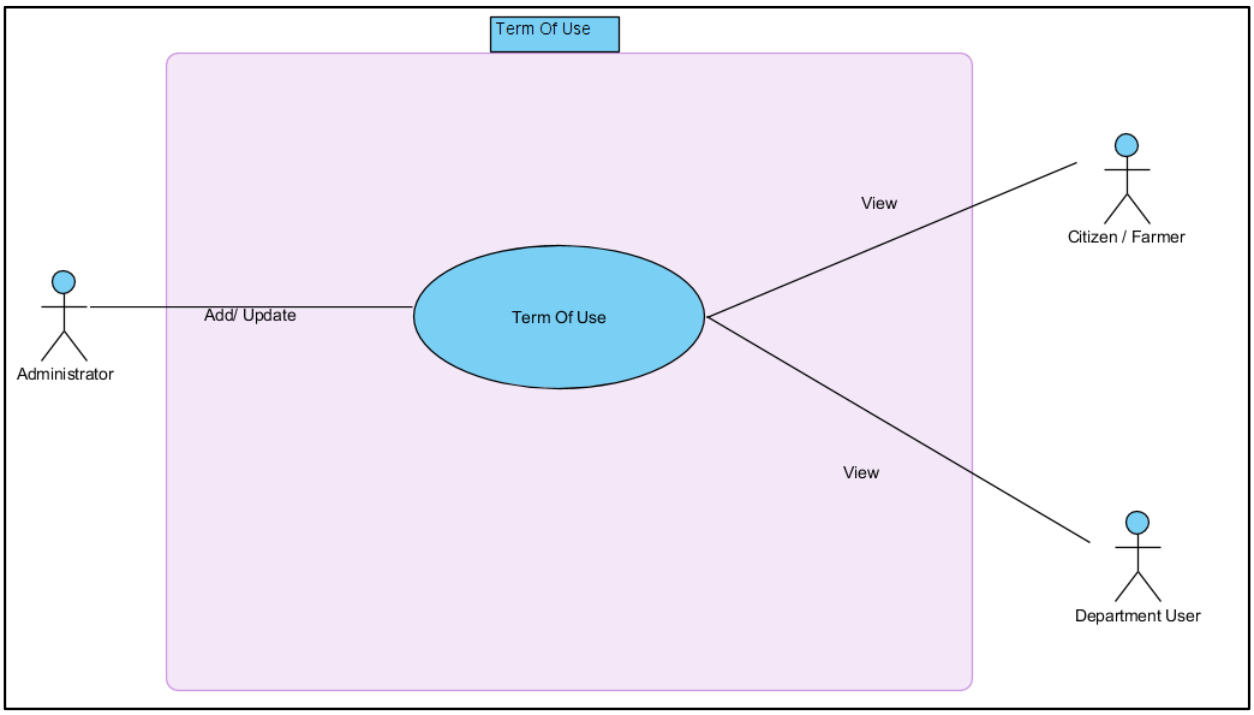
4.2.44 TERMS OF USE

4.2.44.1 DESCRIPTION

This functionality enables user to view the information about Terms of Use.

4.2.44.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIA

- User shall be able to click on “Terms of Use”.
- System shall display the information about Terms of Use.

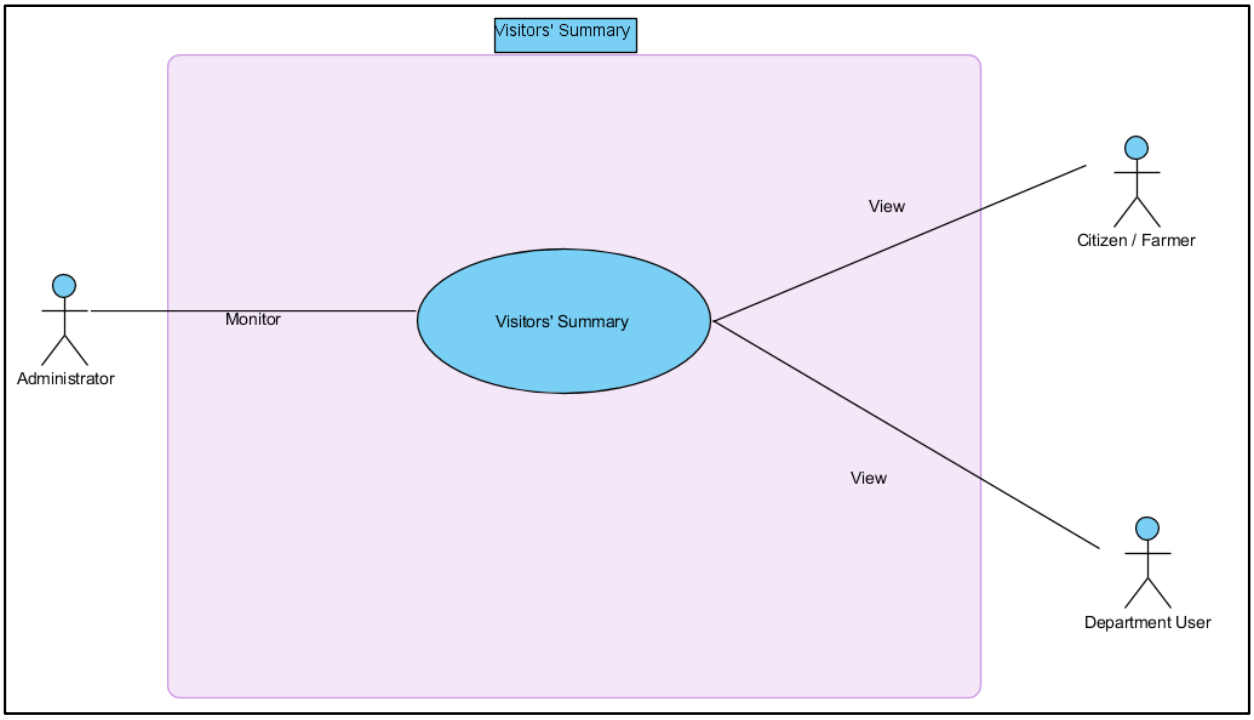


4.2.45 VISITORS' SUMMARY

This functionality enables user to view the Counts of visitors who has visited the web site.

4.2.45.1 RESPONSE SEQUENCE/ACCEPTANCE CRITERIA

- Landing page shall display the Counts of visitors who has visited the web site.



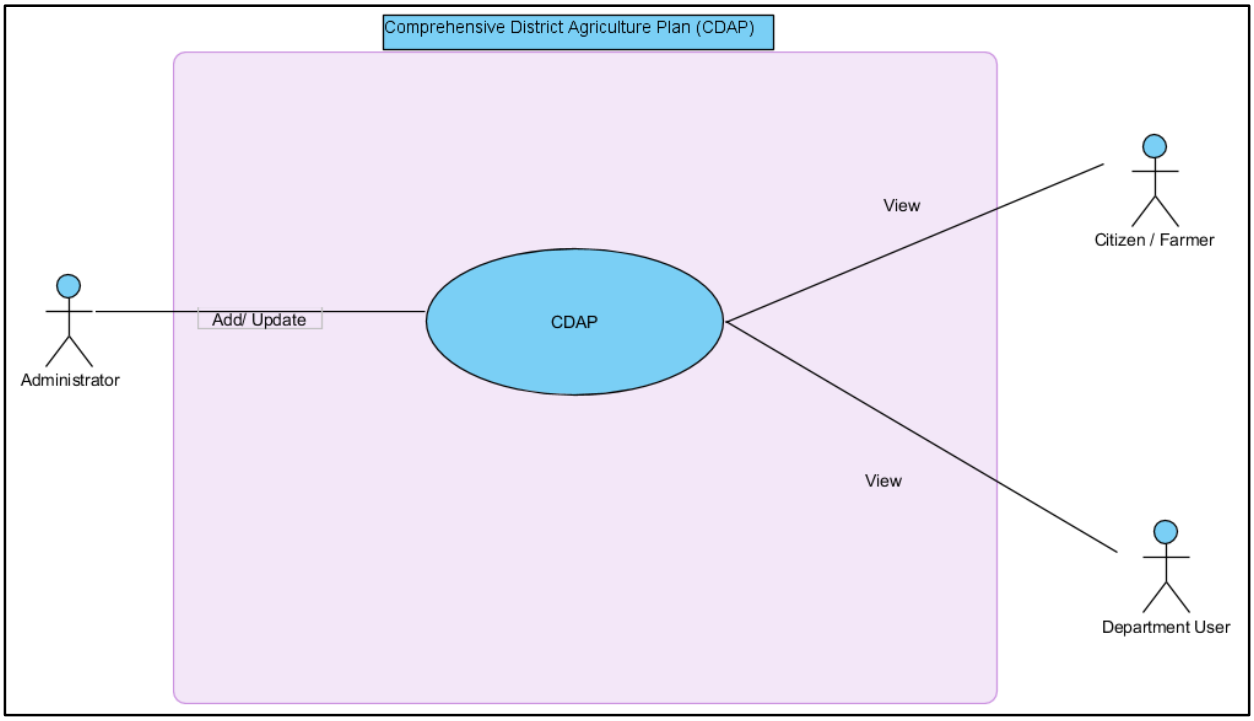
4.2.46 COMPREHENSIVE DISTRICT AGRICULTURE PLAN (CDAP)

4.2.46.1 DESCRIPTION

This functionality enables user to view the information related to CDAP.

4.2.46.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIA

- User shall be able to click on “Comprehensive District Agriculture Plan”.
- System shall display the information related to CDAP.



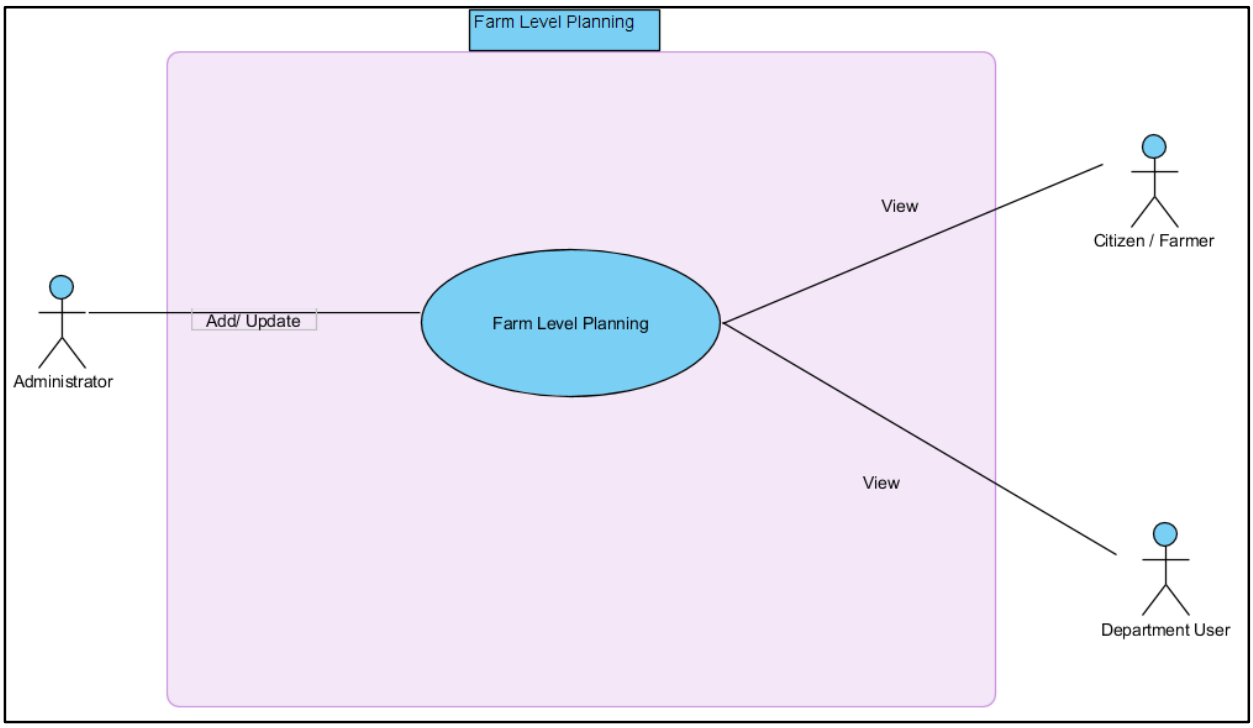
4.2.47 FARM LEVEL PLANNING

4.2.47.1 DESCRIPTION

This functionality enables user to view the information related to Farm Level Planning.

4.2.47.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIA

- User shall be able to click on “Farm Level Planning”.
- System shall display the information related to Farm Level Planning.



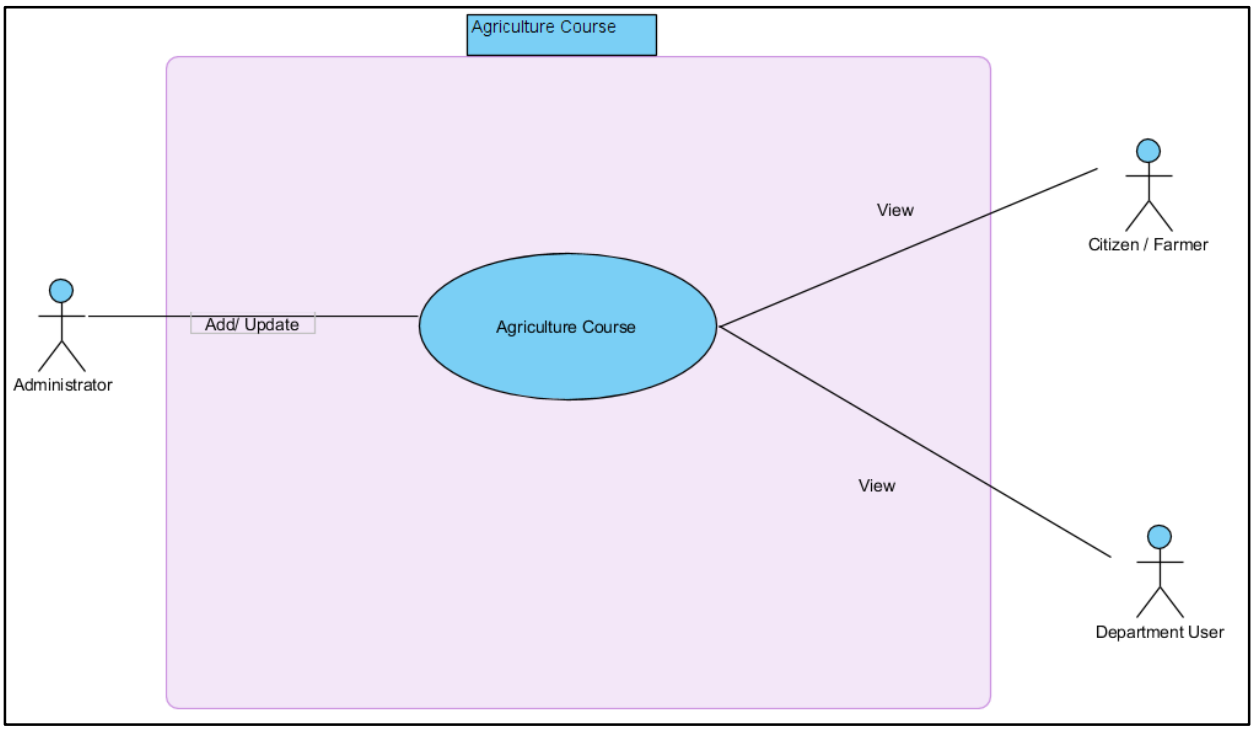
4.2.48 AGRICULTURE COURSES

4.2.48.1 DESCRIPTION

This functionality enables user to view the information related to Agriculture Courses.

4.2.48.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIA

- User shall be able to click on “Agriculture Courses”.
- System shall display the information related to Agriculture Courses.



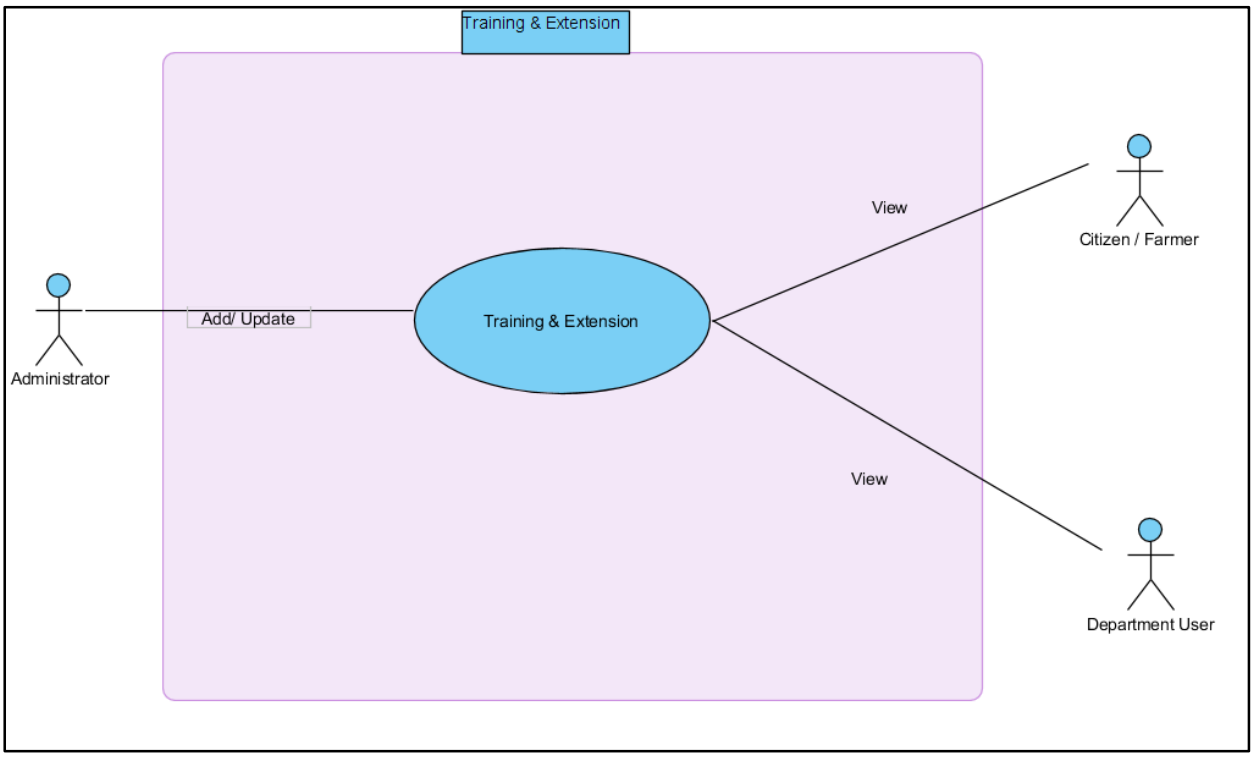
4.2.49 TRAINING & EXTENSION

4.2.49.1 DESCRIPTION

This functionality enables user to view information related to the Training &Extension.

4.2.49.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIA

- User shall be able to click on “Training &Extension”.
- System shall display the information related to the Training &Extension.



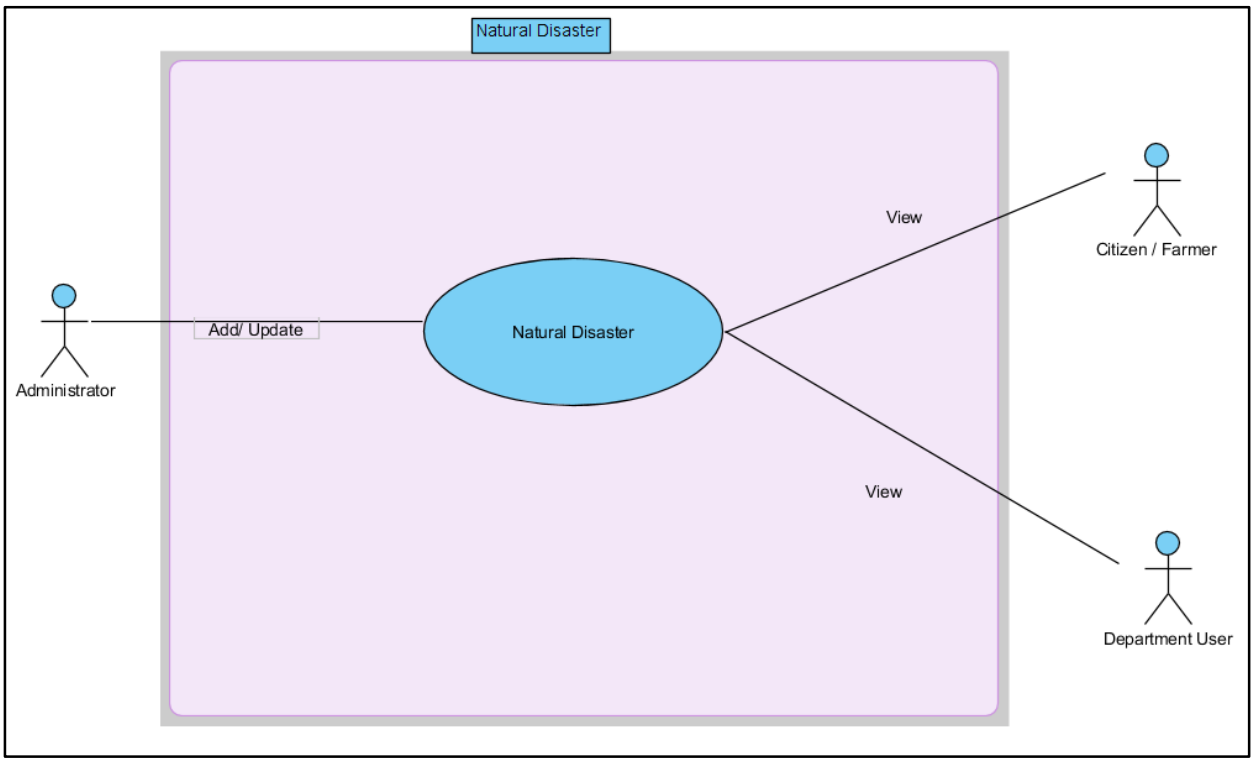
4.2.50 NATURAL DISASTER

4.2.50.1 DESCRIPTION

This functionality enables user to view information related to the Natural disaster.

4.2.50.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIA

- User shall be able to click on “Natural disaster”.
- System shall display the information related to the Natural disaster. The information shall be displayed related to Drought, Flood, Earthquake, Tsunami.



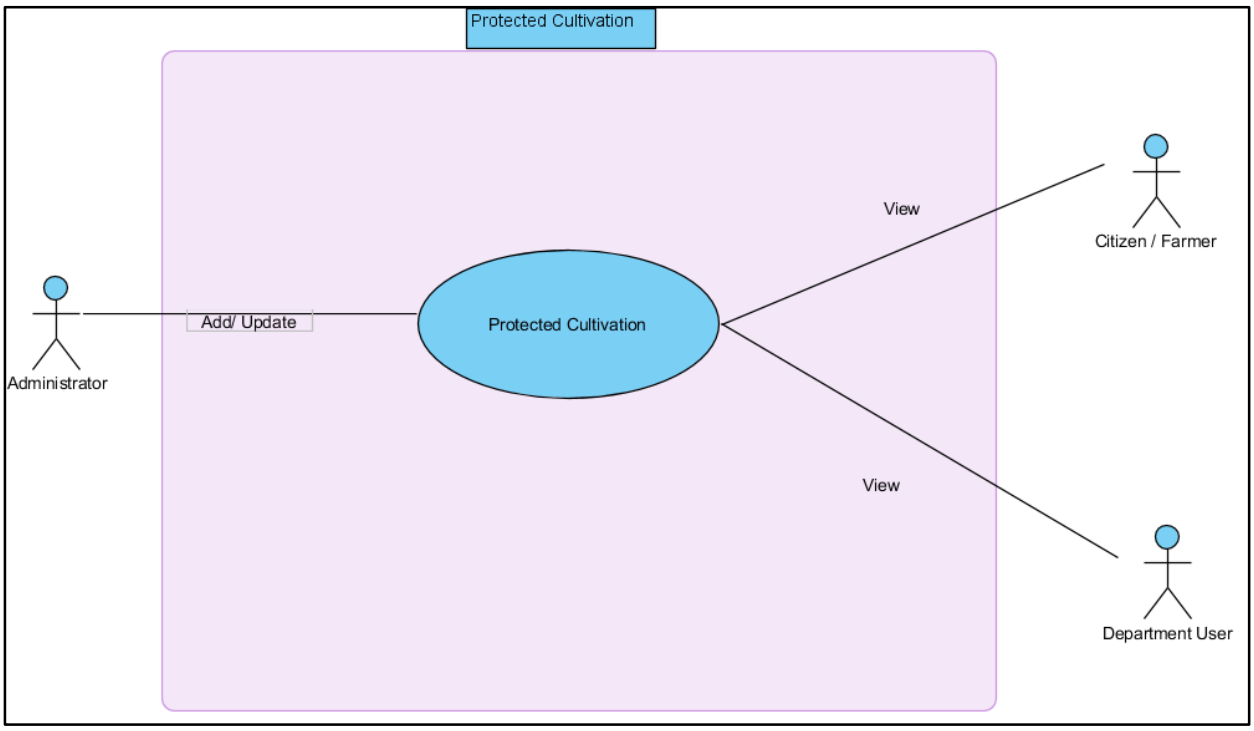
4.2.51 PROTECTED CULTIVATION

4.2.51.1 DESCRIPTION

This functionality enables user to view information related to the protected cultivation.

4.2.51.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIA

- User shall be able to click on “Protected Cultivation”.
- System shall display the information related to protected cultivation. The information shall be related to Green house, Poly house, Agro shadenet.



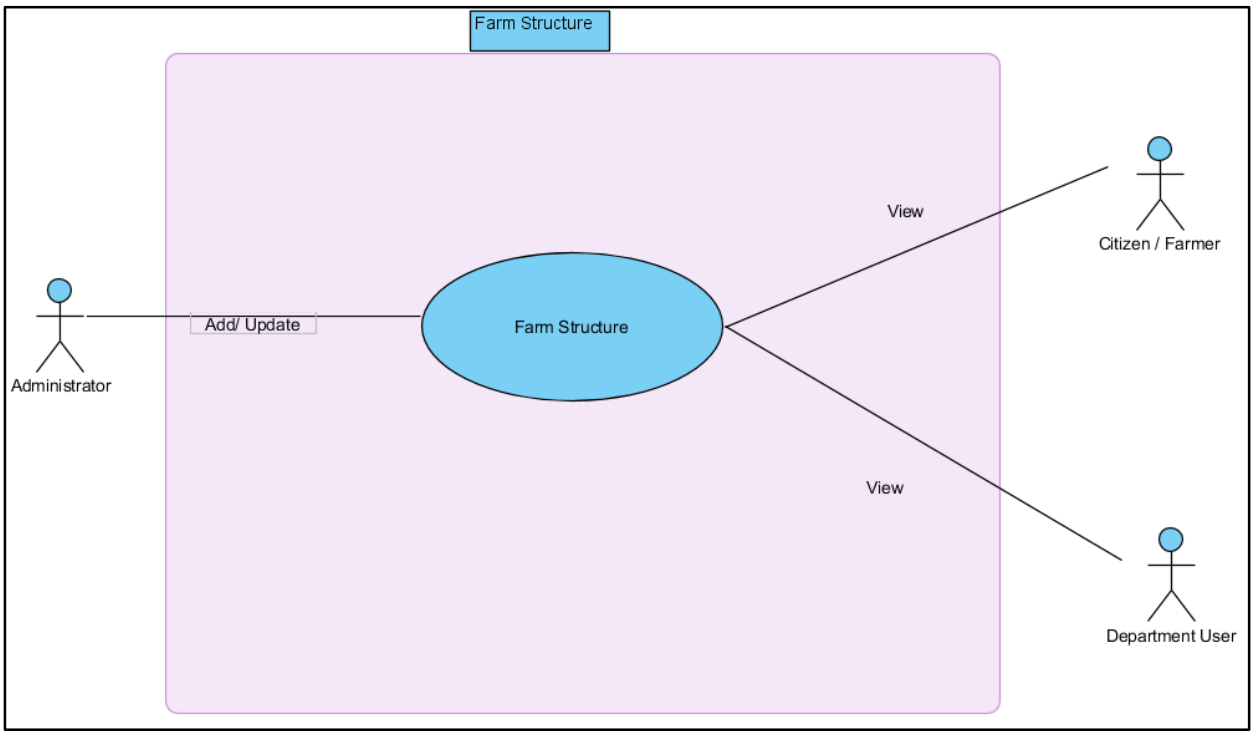
4.2.52 FARM STRUCTURE

4.2.52.1 DESCRIPTION

This functionality enables user to view information related to the Farm Structure.

4.2.52.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIA

- User shall be able to click on “Farm Structure”.
- System shall display the information related to Farm Structure. The information shall be related to Godowns, Green storage structure, Thrashing floor, Implement storage.



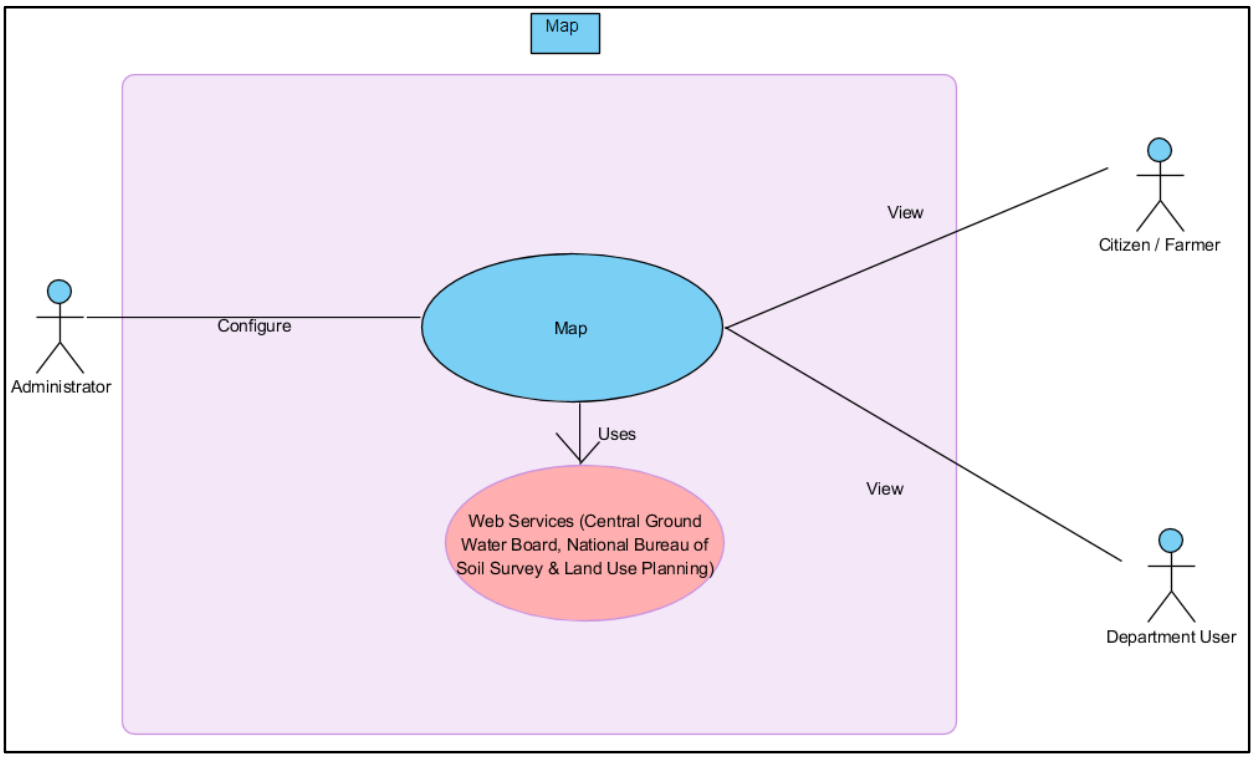
4.2.53 MAP

4.2.53.1 DESCRIPTION

This functionality enables user to view Maps.

4.2.53.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIA

- User shall be able to click on “Maps”.
- System shall display the option of selecting following types of maps
    - Ground Water maps made by the Central Ground Water Board.
    - Soil maps National Bureau of Soil Survey & Land Use Planning.
- User shall be able to select one of the option, depending on the selected option system shall show the map



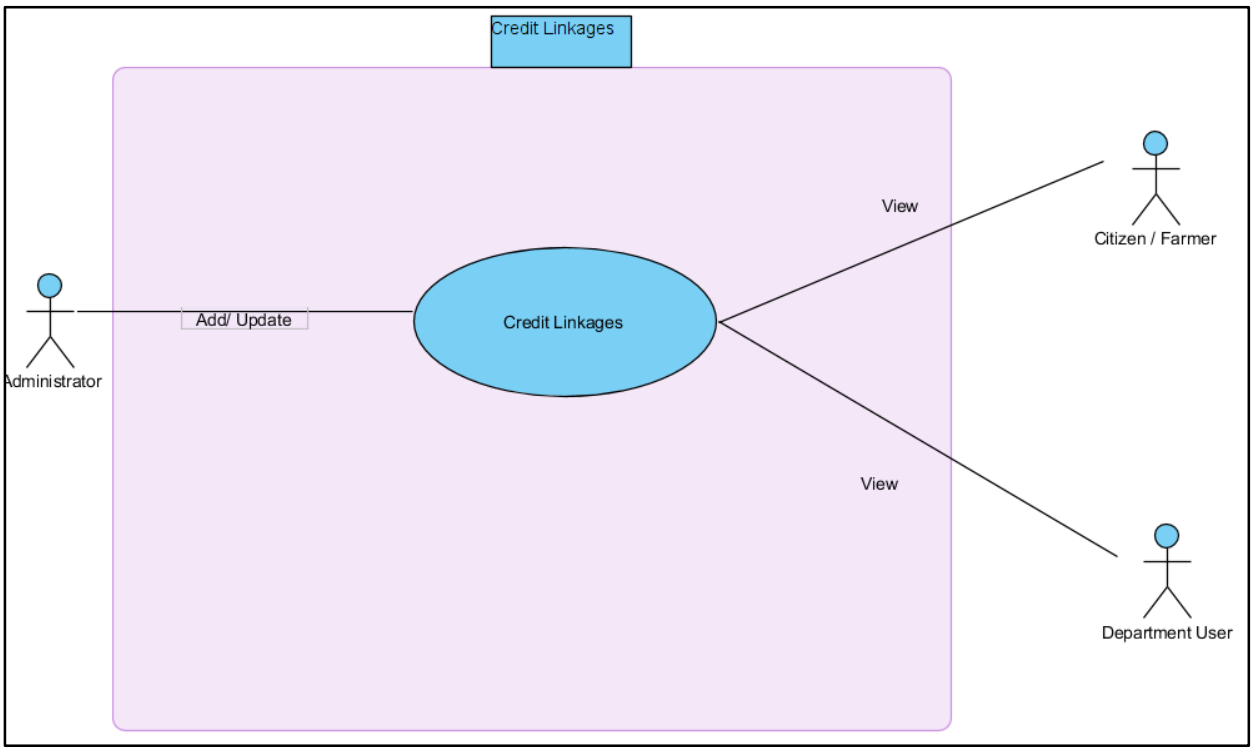
4.2.54 CREDIT LINKAGES

4.2.54.1 DESCRIPTION

This functionality enables user to view information related to the Credit Linkages.

4.2.54.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIA

- User shall be able to click on “Credit Linkages”.
- System shall display the Credit Linkages information.



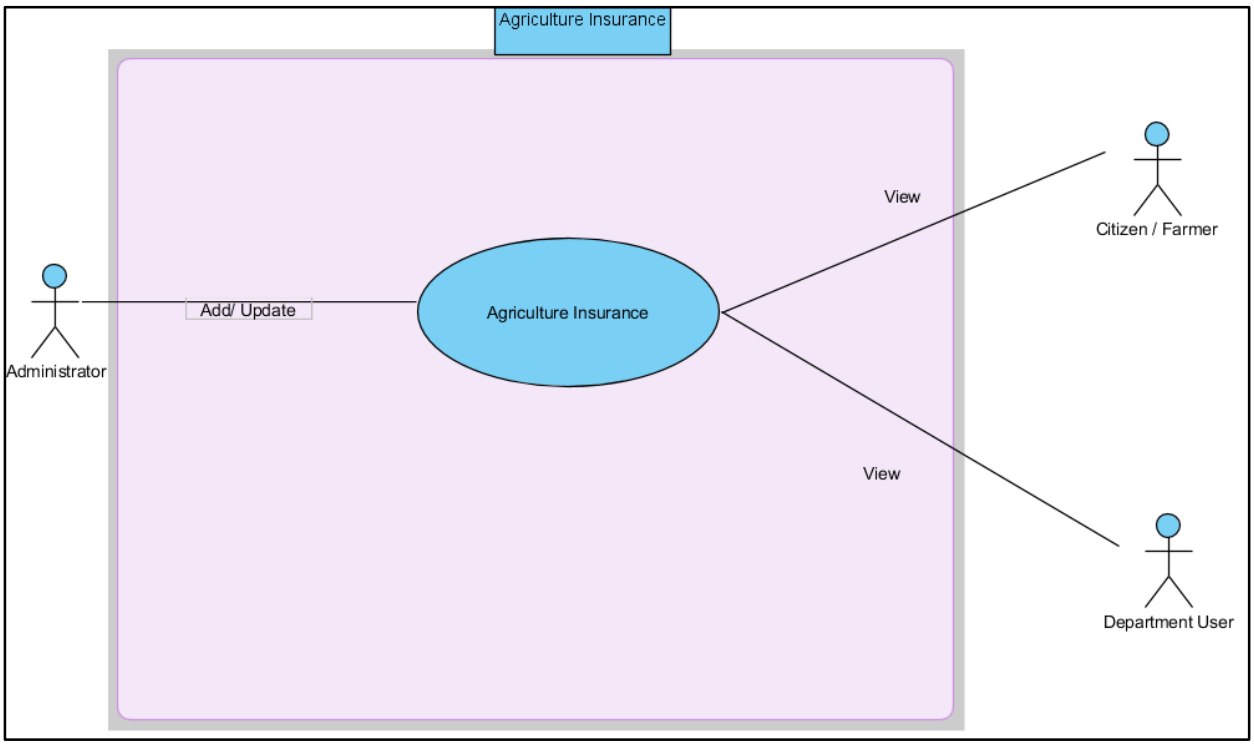
4.2.55 AGRICULTURE INSURANCE

4.2.55.1 DESCRIPTION

This functionality enables user to view information related to Agriculture Insurance.

4.2.55.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIA

- User shall be able to click on “Agriculture Insurance”.
- System shall display information related to Agriculture Insurance.
- System shall display the list for notified crops, livestock, fish etc. for insurance as per the NAIS (National Agricultural Insurance Scheme).
- User shall be able to select one of the option, system shall display the Details on Insurance Companies for the selected option



4.2.56 RTI

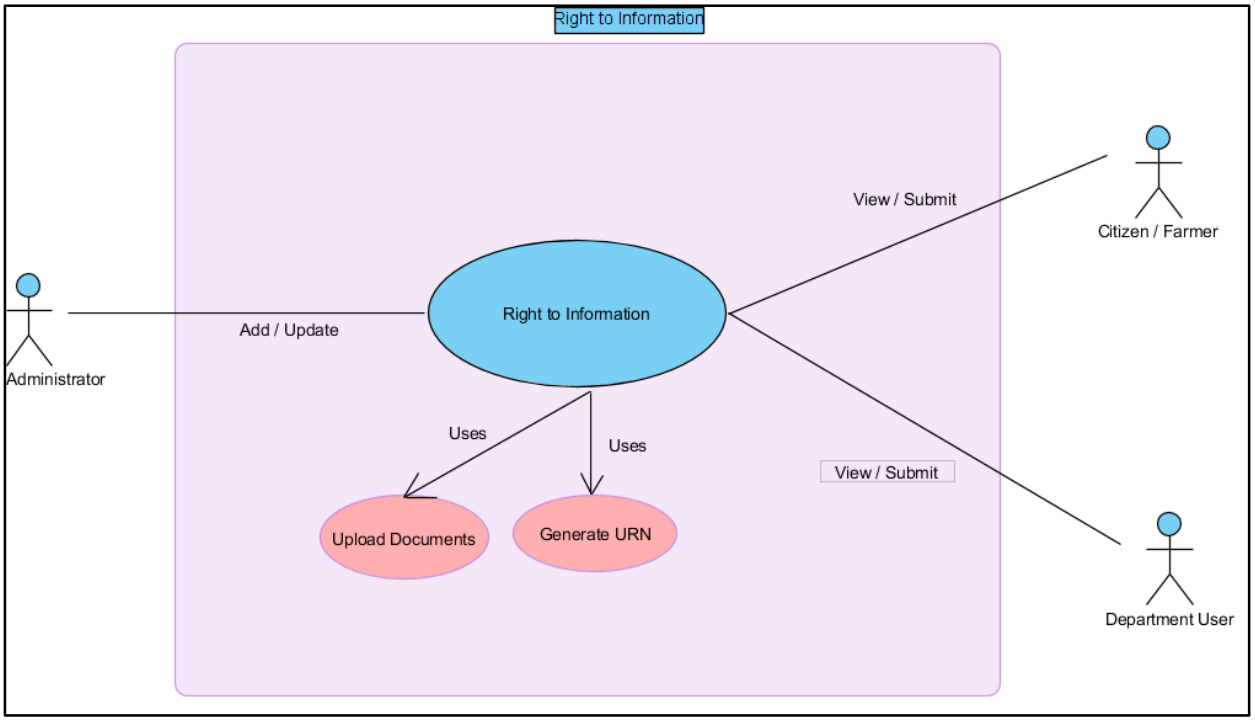
4.2.56.1 DESCRIPTION

This functionality enables user to view the list of the State Ministry like Agriculture, departments, list of organization/Public Authority. System shall have provision to enter Complaints particulars such as Title, Name, Surname, Citizen Status, and Is Complaint below Poverty line, Compliant Address, Telephone Number, Mobile Number, Email Id, Complaint Details. Complaint Description, supporting documents

4.2.56.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIA

- User shall be able to click on “RTI”.
- System shall display the links for list of the State Ministry.
- On selection of State ministry, system shall show the list display department.
- System shall display the list of organization/Public Authority.
- System shall display the form to insert the complaint particulars as mentioned above
- User shall able to insert the details and shall able to submit it.

- After successful submission system shall display the message “RTI submitted successfully” along the URN.



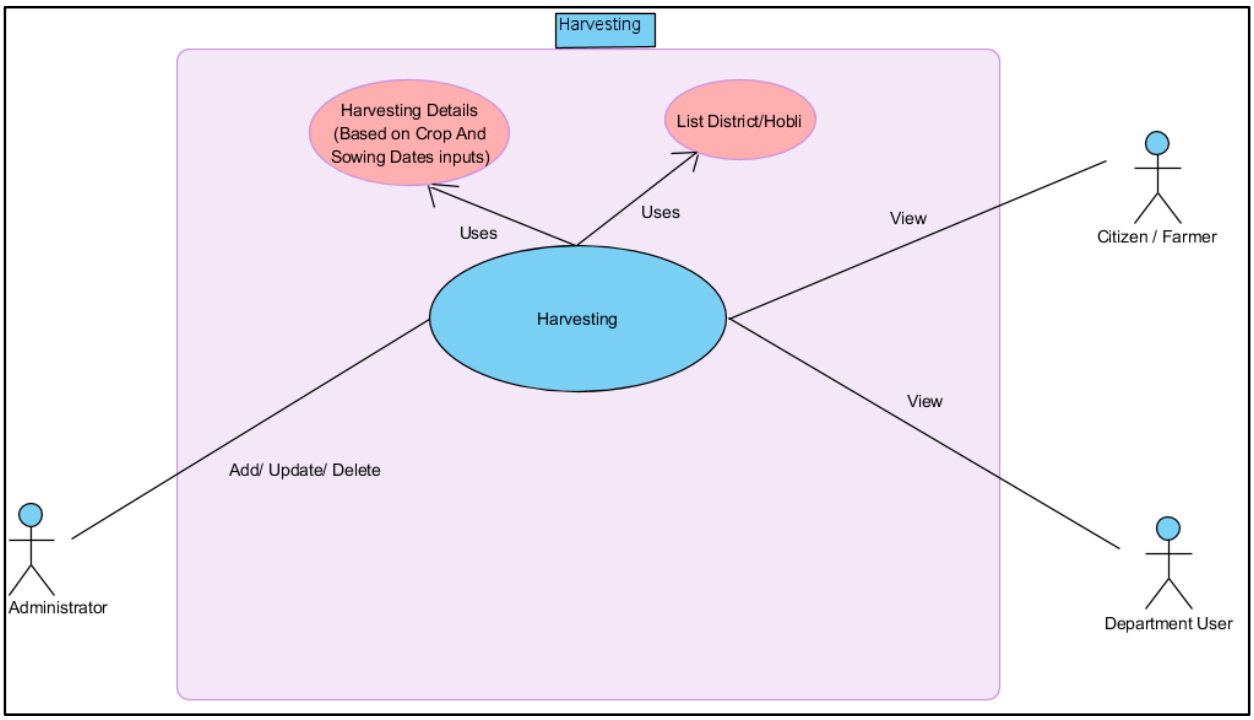
4.2.57 HARVESTING

4.2.57.1 DESCRIPTION

This functionality enables user to view information related to Harvesting.

4.2.57.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIA

- User shall be able to click on “Harvesting”.
- User shall be able to select District and Hobli.
- User shall then be able to enter crop and date of sowing.
- System shall display the information related to the Harvesting based on these inputs provided by the user.



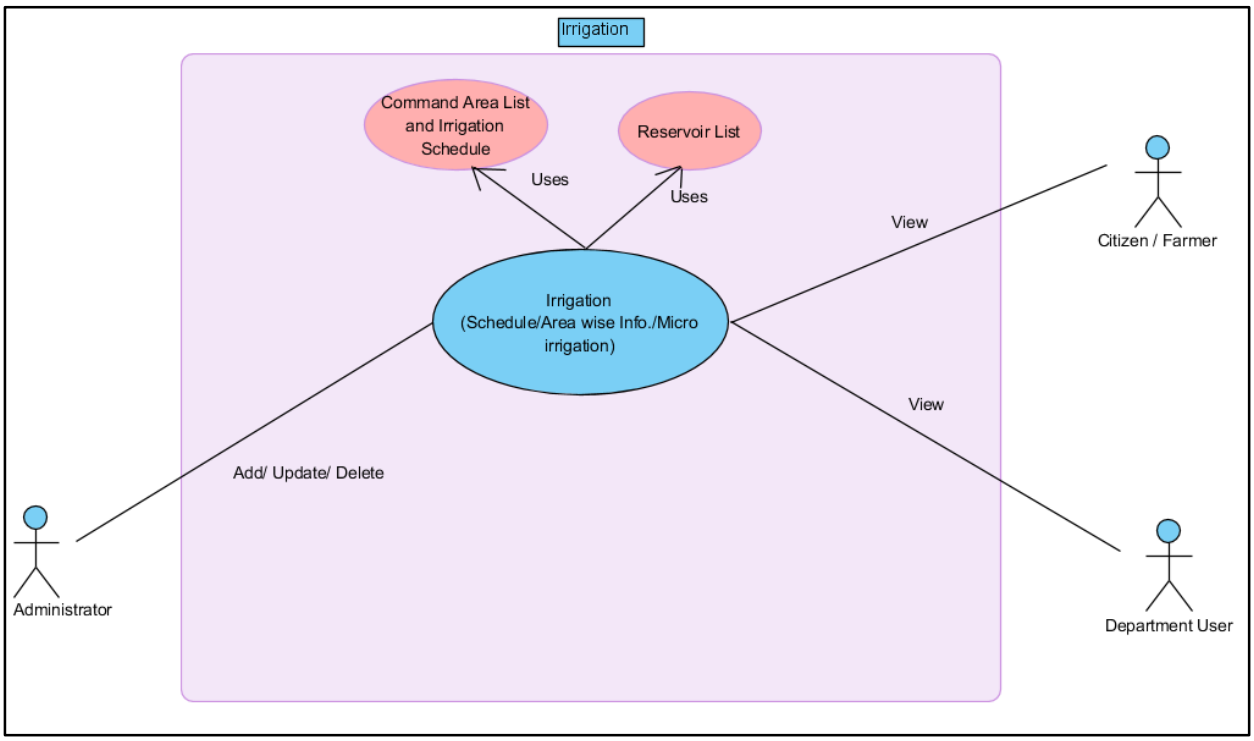
4.2.58 IRRIGATION

4.2.58.1 DESCRIPTION

This functionality enables user to view information related to Irrigation schedule, Areawise information and micro irrigation details.

4.2.58.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIA

- User shall be able to click on “Irrigation”.
- User will then select reservoir in the area of interest.
- System shall display command area under that reservoir.
- Once user selects the command area the irrigation schedule related to that command area will be displayed.



4.2.59 HORTICULTURE

Already defined under 4.2.11 “Crop Section”.

4.2.60 FLORICULTURE

Already defined under 4.2.11 “Crop Section”.

4.2.61 STATISTICS

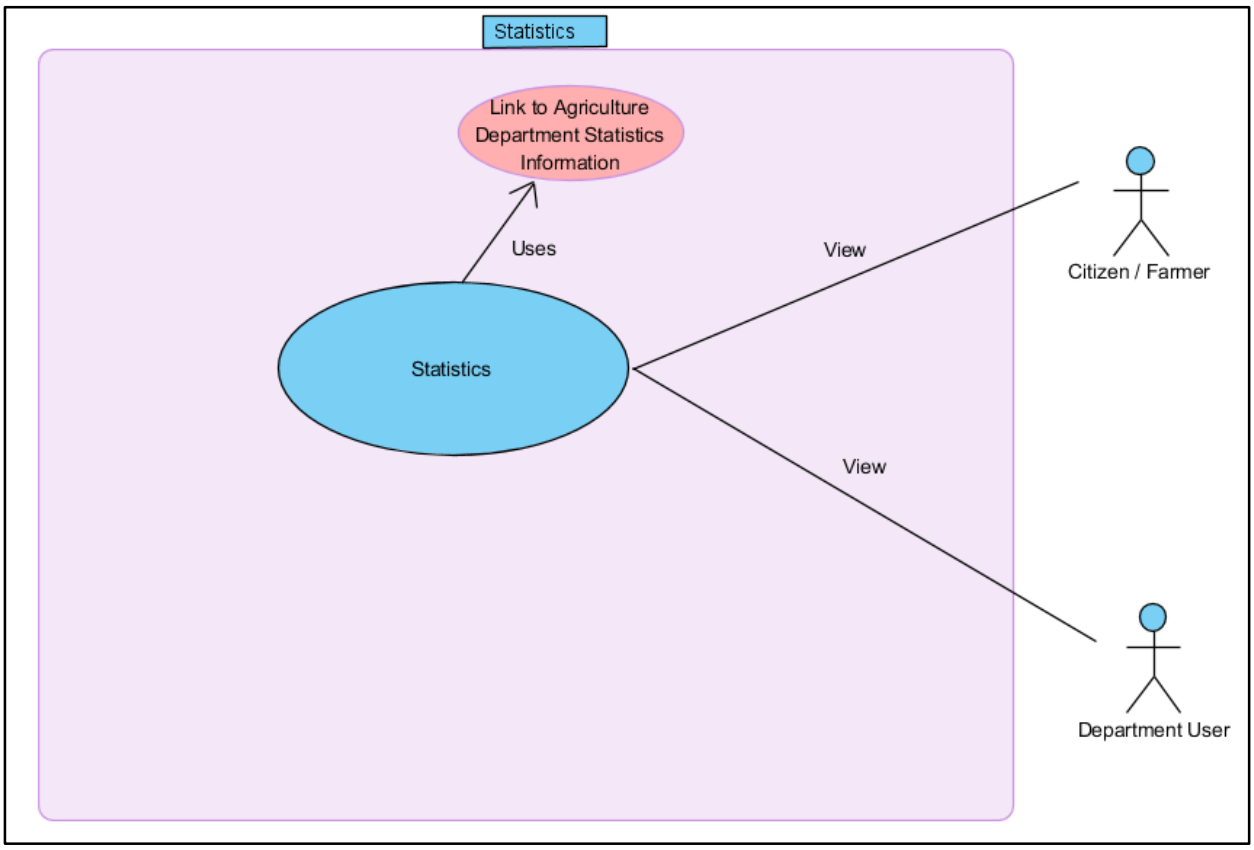
4.2.61.1 DESCRIPTION

This functionality enables user to view information related to statistics of Karnataka agriculture department.

4.2.61.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIA

- User shall be able to click on “Statistics”.
- System shall direct the user to the following link:

  http://raitamitra.kar.nic.in/ENG/statistics.asp



4.2.62 TECHNOLOGIES

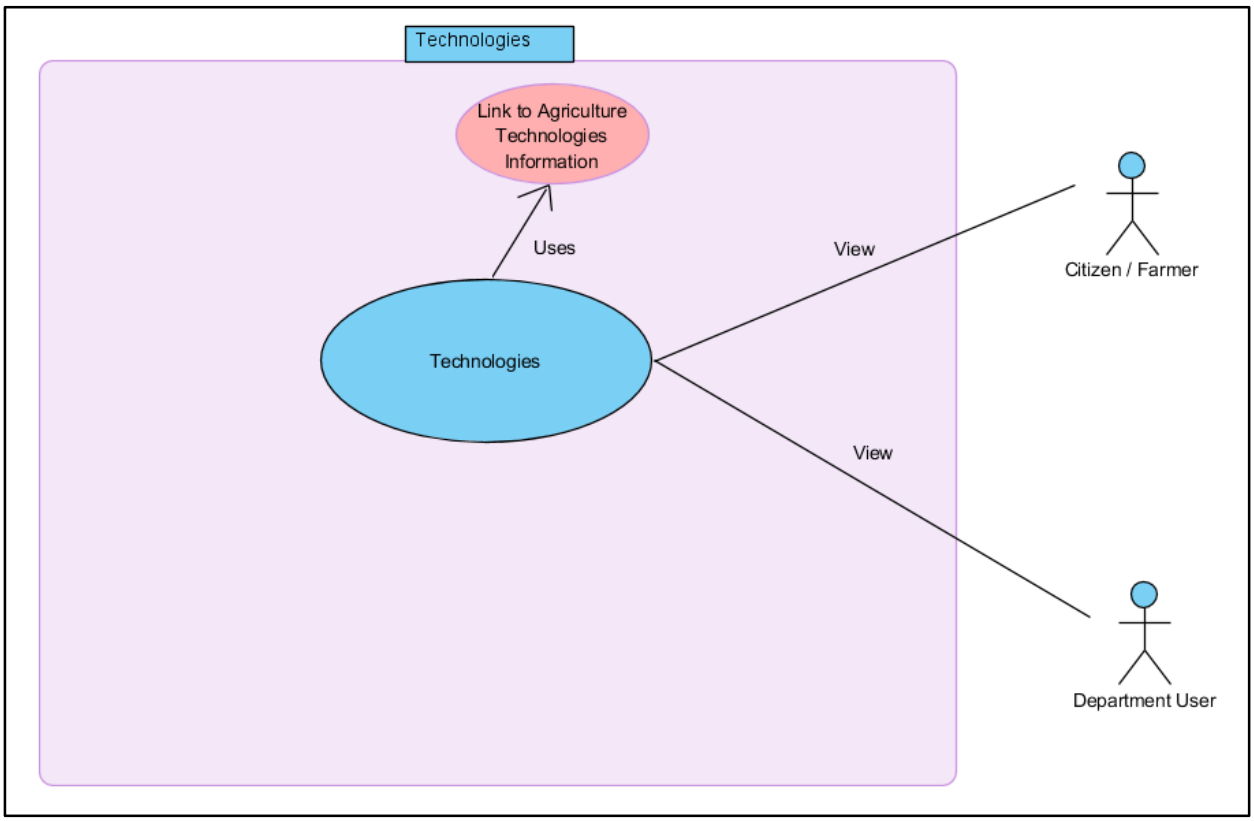
4.2.62.1 DESCRIPTION

This functionality enables user to view information related to technologies application.

4.2.62.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIA

- User shall be able to click on “Technologies”.
- System shall direct user to the following link:

  http://stg4.kar.nic.in/agri_mis/



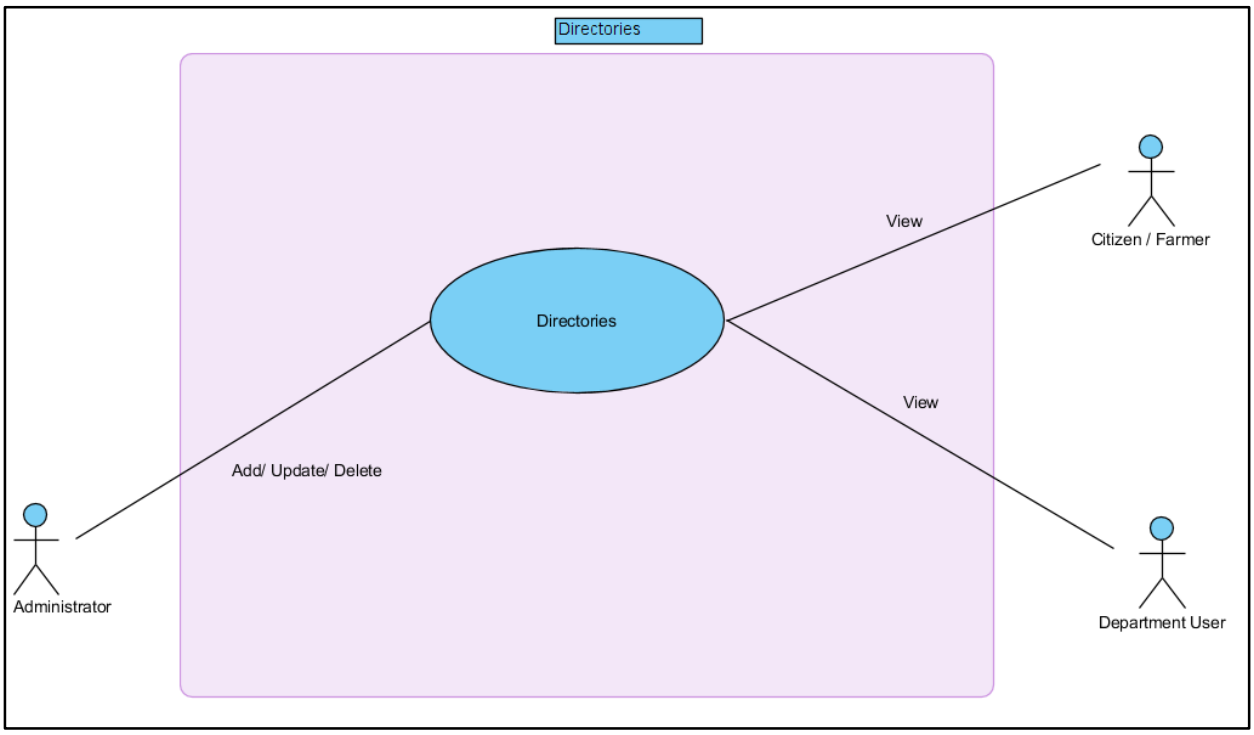
4.2.63 DIRECTORIES

4.2.63.1 DESCRIPTION

This functionality enables user to view information related to Directories application.

4.2.63.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIA

- User shall be able to click on “Directories”.
- System shall direct user to Directories application.



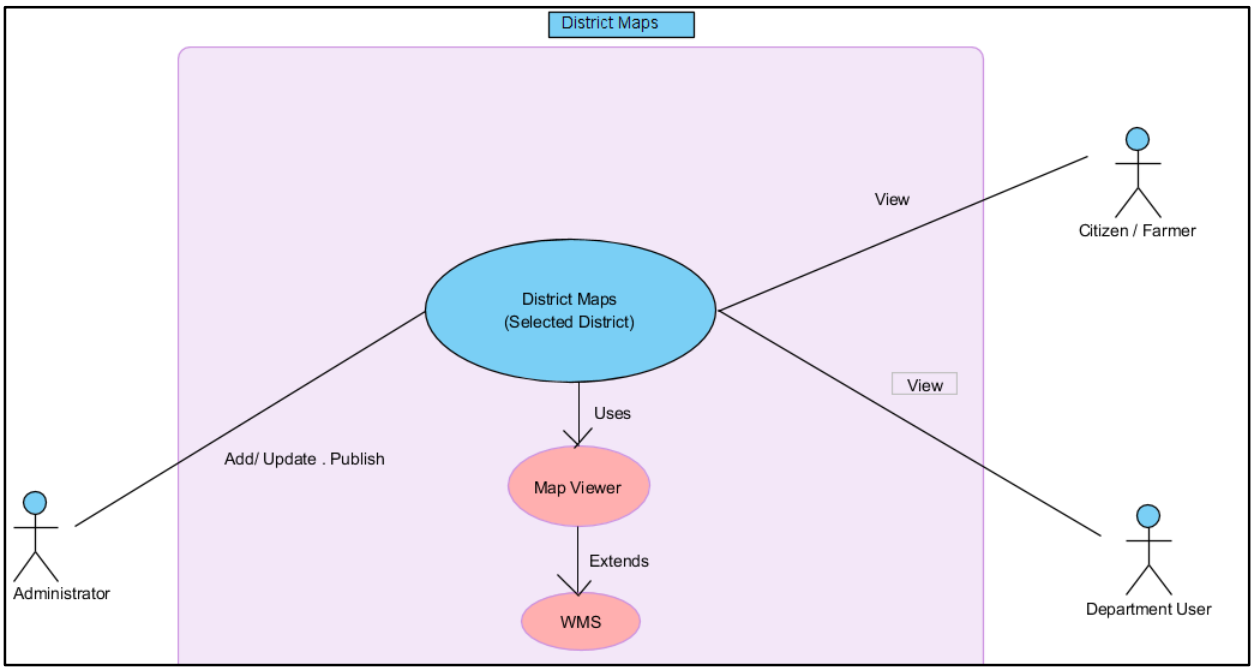
4.2.64 District Maps

4.2.64.1 Description

This functionality enables user to view selected district, hobli, village on the maps.

4.2.64.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIA

- User shall be able to click on “District Maps”.
- User will then be prompted for select district he wants to view on the map.
- System shall display selected district on the GIS Map.
- Similarly user will be able to view selected hobli, village on the GIS Maps.



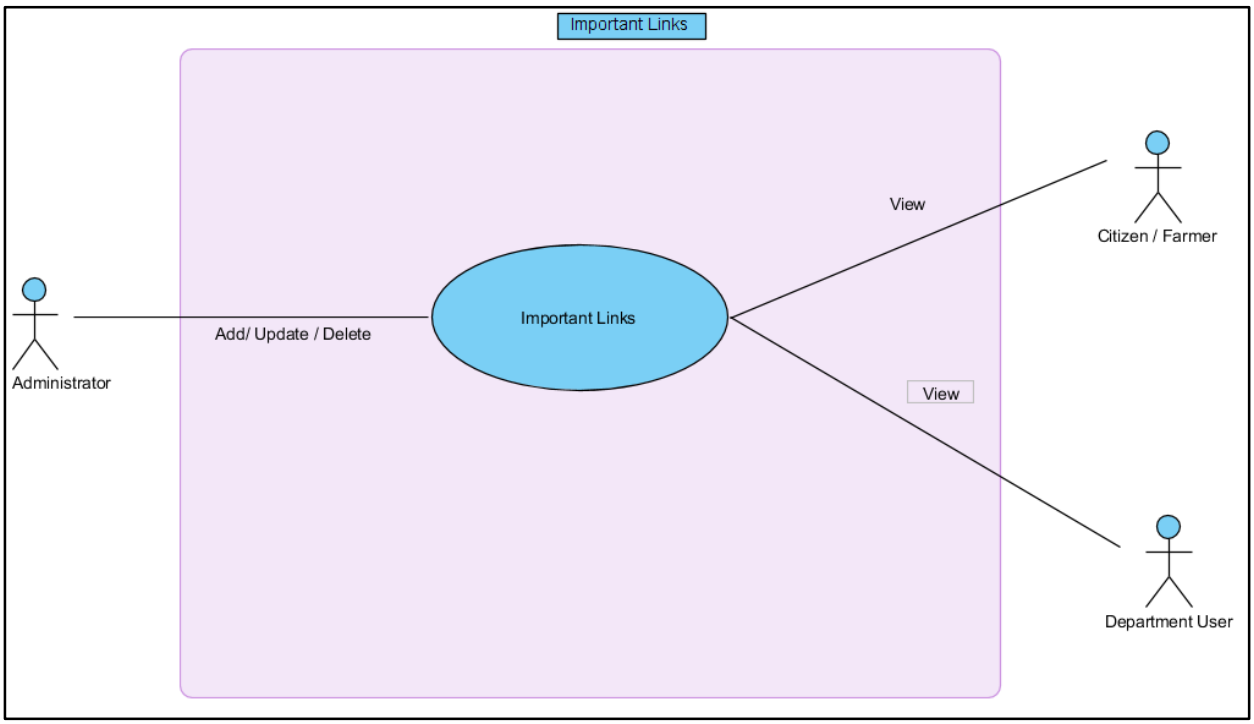
4.2.65 IMPORTANT LINKS

4.2.65.1 DESCRIPTION

This functionality enables user to view information related to Important Links.

4.2.65.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIA

- User shall be able to click on “Important Links”.
- System shall direct user to Important Links.
- All important links will be available on Landing Page, any other important link would be added to content management system.



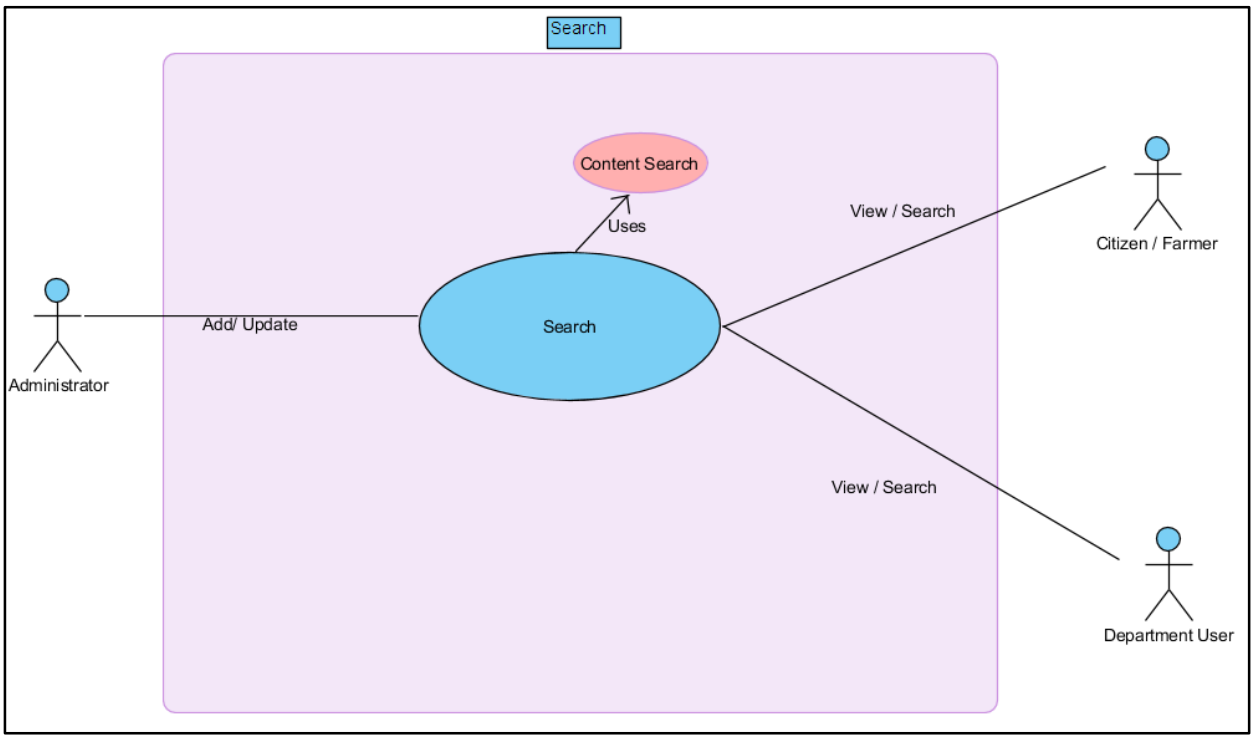
4.2.66 SEARCH

4.2.66.1 DESCRIPTION

This functionality enables user to perform search on the LRI Geo Portal based on keywords.

4.2.66.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIA

- User shall be able to click on “Search” and enter keyword.
- System shall direct display selected options based on the keywords.



4.2.67 PESTICIDES LABORATORIES INFORMATION

Already defined under 4.2.16 “Pesticides Section”.

4.2.68 PROCUREMENT POINTS

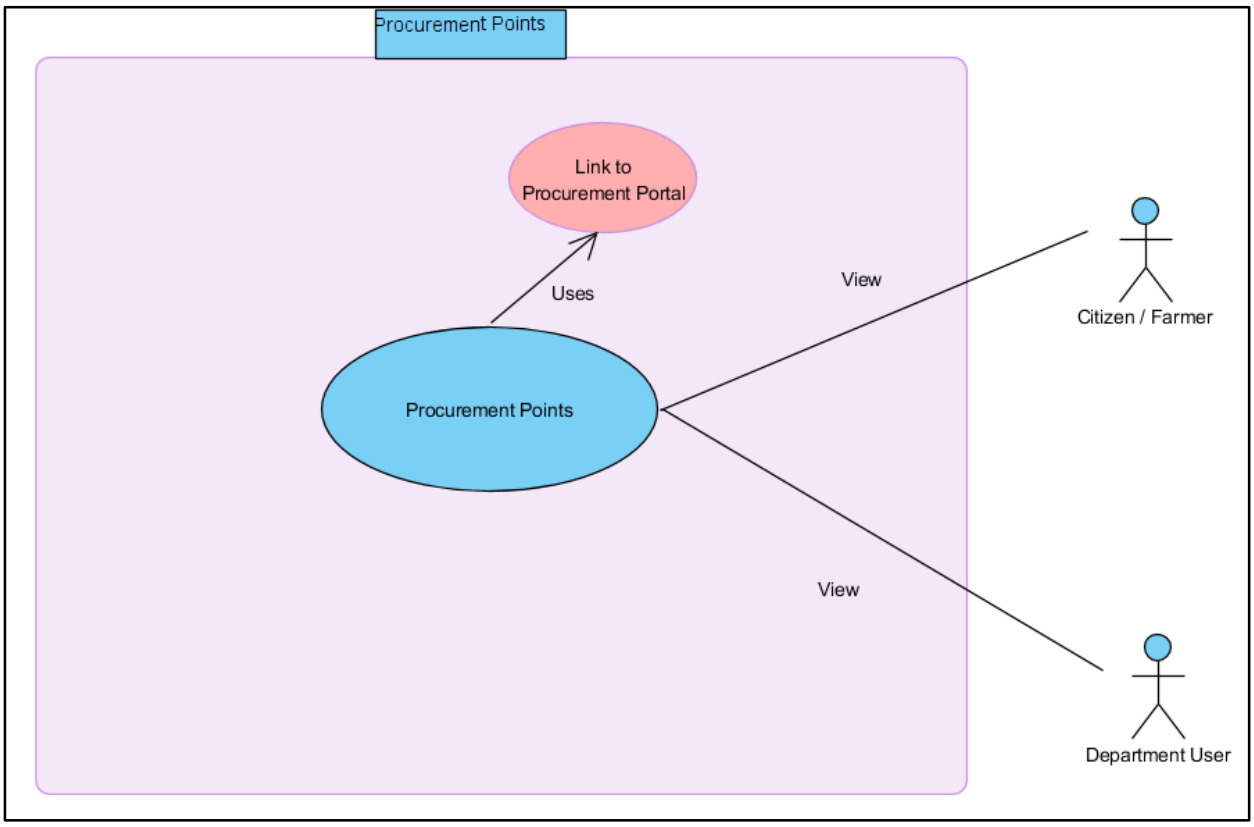
4.2.68.1 DESCRIPTION

This functionality enables user to view information related to Procurement Points.

4.2.68.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIA

- User shall be able to click on “Procurement Points”.
- System shall direct user to following link:

  https://eproc.karnataka.gov.in//eprocportal/pages/index.jsp



4.2.69 MONITORING IMPLEMENTATION

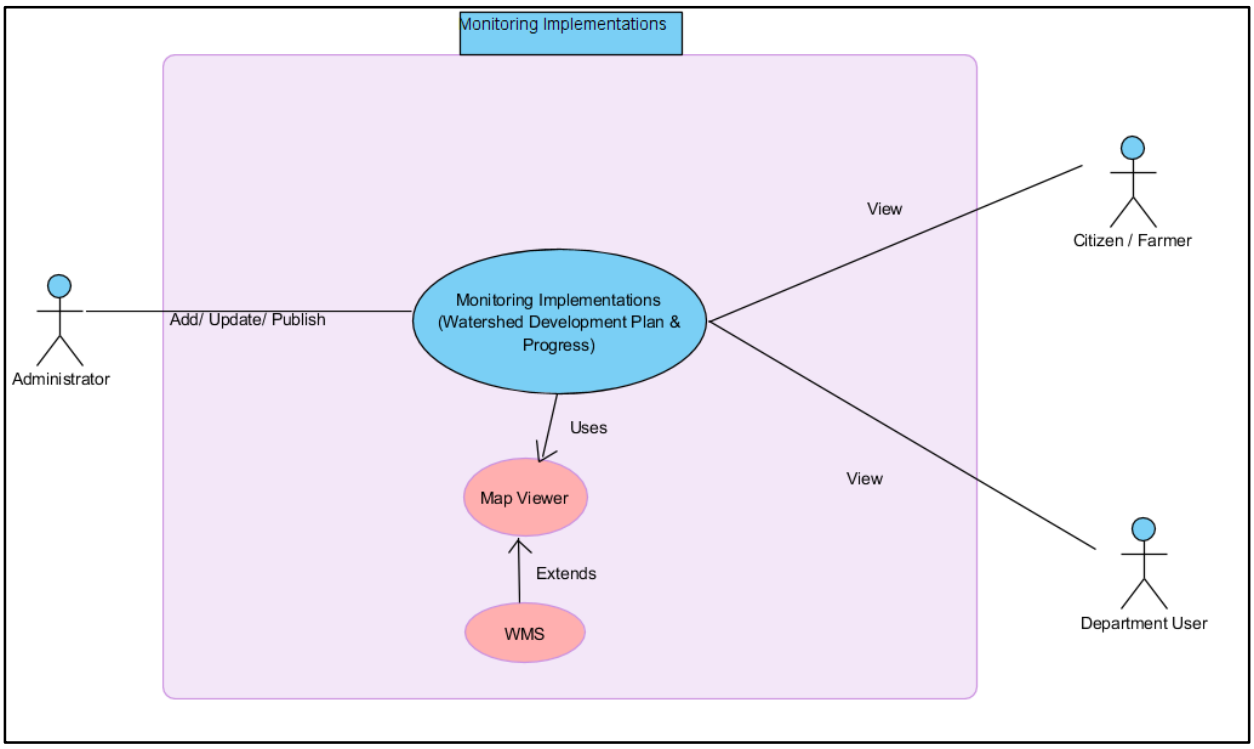
4.2.69.1 DESCRIPTION

This functionality enables user to view information related to progress of Wathershed development projects under Sujala III.

4.2.69.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIA

- User shall be able to click on “Monitoring Implementation”.
- System shall display map showing the areas covered under Sujala III and LRI activities

  Progress of LRI activities.



4.2.70 APPLY ON LINE

4.2.70.1 DESCRIPTION

This functionality enables user to direct to link related to schemes being implemented for various departments.

4.2.70.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIA

- User shall be able to click on “Apply Online”.
- System shall display links of schemes being implemented by various departments. User can click on link and it will direct user to respective portal.

4.3 LRI MOBILE APPLICATION

The mobile application shall be designed to support controlled access to the LRI application through username/password. The system shall provide user friendly GUI both in Kannada& English including easy to use functionalities for different levels of users (including public, farmers and Gram Panchayat / Taluk / District level administrators). The app will be available through mobile app store (Android) and have one time registration using mobile number.

Following are the Geoportal functionalities available on mobile using the graphical user interface depicted in section 4.2.1.2. Details about the functionalities are as mentioned in Chapter -4

Sr. No	Functionalities	Sr. No.	Functionalities
1.	Farmer's Corner	15.	Usage Guidelines
2.	Farmer Registration	16.	Fertilizer Testing Laboratories
3.	Update of Static Information for farmer	17.	Fertilizer Testing Procedure
4.	Update Dynamic Information for farmer	18.	Pesticides Section
5.	Notifications to farmer to update season information (Dynamic Information)	19.	Pricing and Availability
6.	Crop section	20.	Expert Advisory
7.	Agro Climatic Features	21.	Farm Machinery
8.	Soil Health	22.	Weather and Agromet advisory
9.	Soil Testing Procedure	23.	Weather Forecast
10.	Soil Types	24.	Flash Season specific Information
11.	Soil Testing Labs	25.	Harvesting
12.	Diseases and Remedial Measures	26.	Irrigation
13.	Seeds	27.	Drought Relief Land Management
14.	Input Dealer Network	28.	Fisheries
15.	Input Stock and Pricing Information	29.	Horticulture
16.	Area Wise Recommendations	30.	Floriculture
17.	Seed Testing Laboratories	31.	Crop suitability
18.	Fertilizer Section	32.	Nutrient management

The departmental user , LRI partners , shall be able to access the mobile application. Using mobile application Departmental users shall be ablle to

- Access the infomration of the data avialable in LRI Digital library.
- Able to Monitor and update the activity plan.
- Depending upon the role user shall be able to view the dashboard having information about the number of queires raised by the citizens/farmers, summary of the work completed against the activities, Stock available of seeds/fertilizers/pesticides in the specfic area (depending upon the Information shared by Kkisan as web service).

4.3.1.1 GRAPHICAL USER INTERFACE

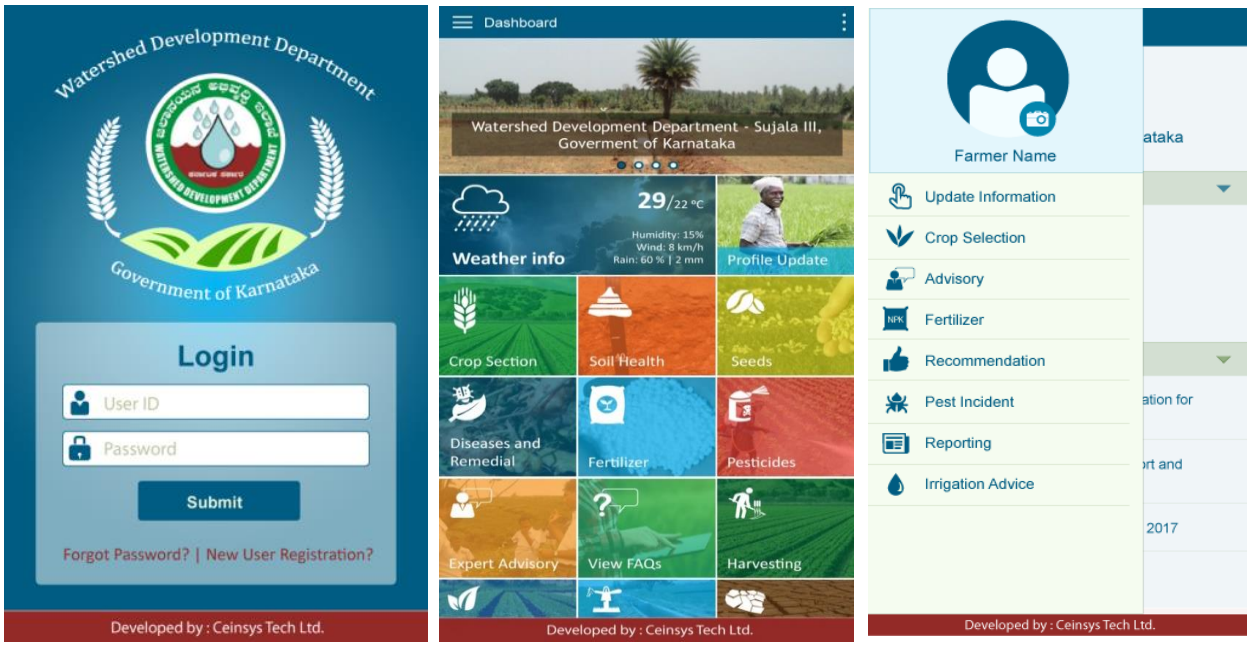


Figure 4-27 Indicative Screen - Mobile Application

4.3.1.2 PROCESS FLOW

The workflow shall broadly remain same as in the process flow documented under Geoportal.

4.3.1.3 ADDITIONAL FUNCTIONAL REQUIREMENTS

4.3.1.3.1 PEST / DISEASE IDENTIFICATION AND RECOMMENDATION

- The user shall capture the photographs of the pest/Disease.
- User shall access the Pest/ Disease identification and recommendation section of the mobile app.
- User shall upload the photographs, he shall able to enter any additional information in remarks.
- User shall click on submit button.
- System shall upload the photograph and information to the server.
- The officers shall login to the LRI portal and access this information.
- The officers shall identify pest/disease based on the photograph and information provided by the farmer.
- The officers shall recommend the pesticide for the identified pest/disease.

- The system shall dissemination the information related to recommendation to the farmer on mobile app.
- The Mobile app shall receive the information related to recommendation and display it to the farmer.

4.3.1.3.2 MARKET PRICE INFORMATION

- The mobile app shall have the Market price information section wherein farmer shall able to get the market prices of various commodities in the nearby markets.
- User shall click on Market Price Information tab.
- User shall select the crop type.
- Mobile App shall send the request to the Server.
- Server shall provide the information available to Mobile user.

4.4 LRI DECISION SUPPORT SYSTEM

Decision Support System shall support visualization of both map and corresponding textual information. It shall be a part of LRI portal that serve management, operations, and planning levels of Sujala-III implementing agencies. Following are the Decision Support systems which shall have user interface both in English and Kannada.

4.4.1 SOIL & WATER CONSERVATION PLAN

DSS shall be useful for Soil & Water conservation plan. The criteria for selection of treatment types are divided into arable-black soils, arable red and lateritic soils, and non-arable soils. Selection of conservation plan is decided based on land slope, depth, texture, gravel, and rainfall.

System shall provide the details about the conservation plan suitable for the particular survey number.

4.4.1.1 GRAPHICAL USER INTERFACE

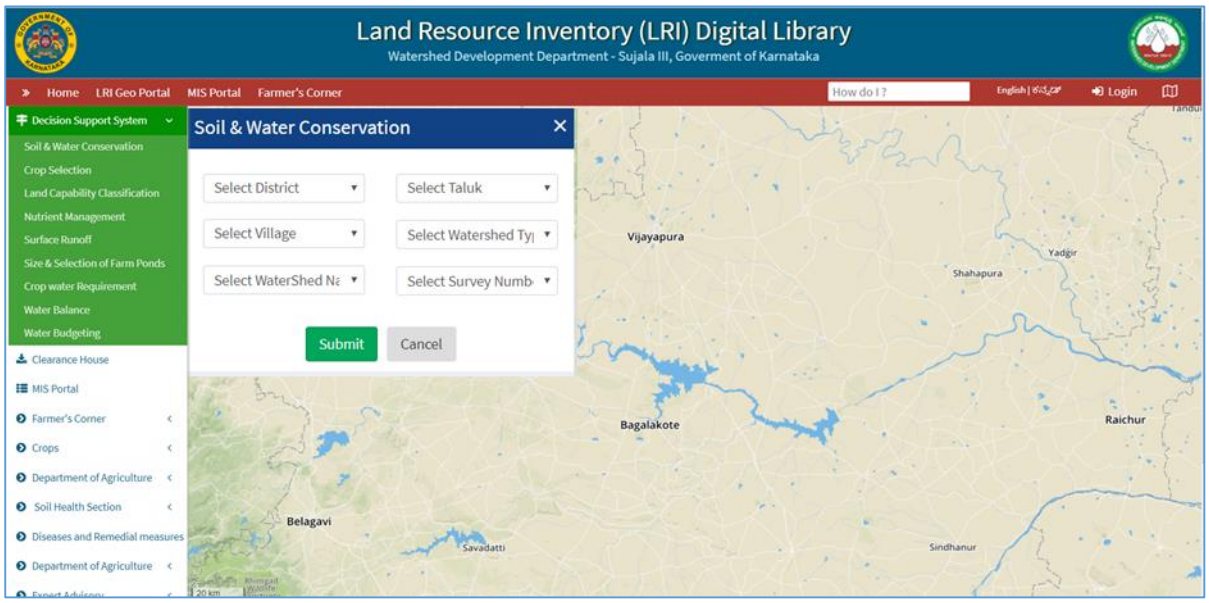
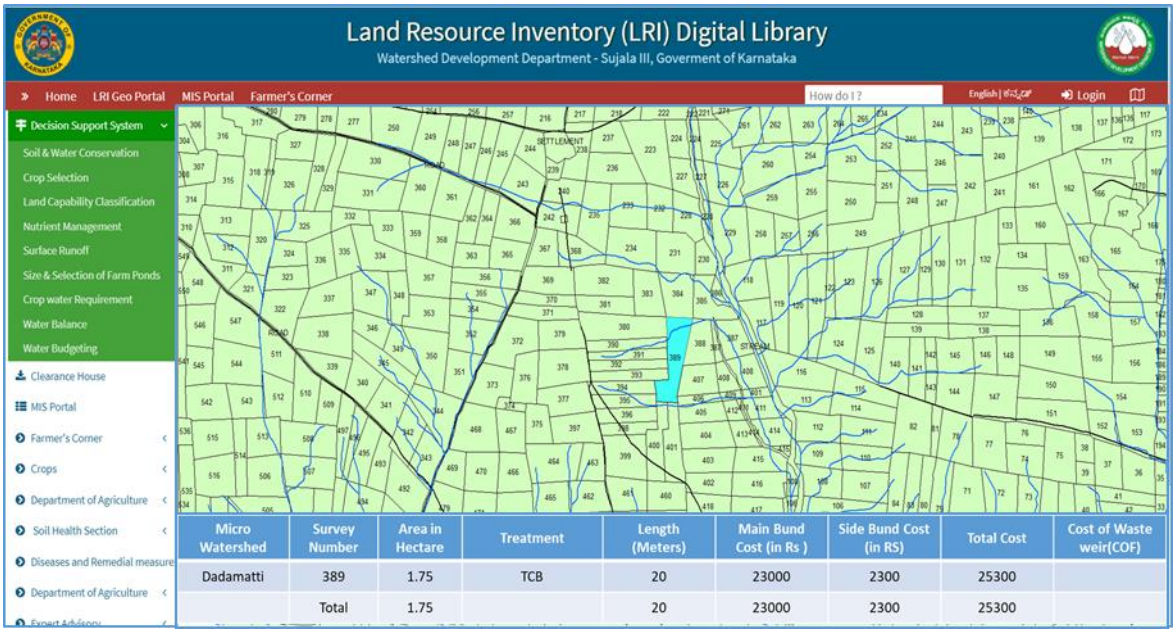


Figure 4-28 Indicative Screen - Displaying the Inputs Required for Soil and Water Conservation

4.4.1.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAs

- User shall select the District, Taluk, Village, and/or Watershed Name and Survey number. User shall also be able to enter the XY coordinates as Lat-Long .
- Depending upon the survey no. / XY Coordinates, system shall get the required information from different GIS data and tables available in the data base for deciding the treatment.
- System shall compare the values with the criteria tables given in the FRS and shall provide the details about the treatment required for the selected survey no.
- System shall display the result table showing the information such as Watershed name, survey number, Area in Hectare as well as information related to Treatment proposed, its length, cost for the main bund, cost for side bund, Total cost and also cost of Waste Weir. System shall also highlight the Land parcel related to the selected survey number in GIS map.



Micro Watershed	Survey Number	Area in Hectare	Treatment	Length (Meters)	Main Bund Cost (in Rs)	Side Bund Cost (in RS)	Total Cost	Cost of Waste weir(COF)
Dadamatti	389	1.75	TCB	20	23000	2300	25300	
	Total	1.75		20	23000	2300	25300	

Figure 4-29 Indicative Screen - Displaying Result for Soil and Water Conservation

4.4.2 CROP SELECTION

The Crop selection shall be based on the Land suitability assessment data such as soil-site characteristics, water, weather, Climate. The site-specific land resources database generated through LRI helps to establish the suitability of the resources to any selected crop for the area in a very objective manner.

4.4.2.1 GRAPHICAL USER INTERFACE

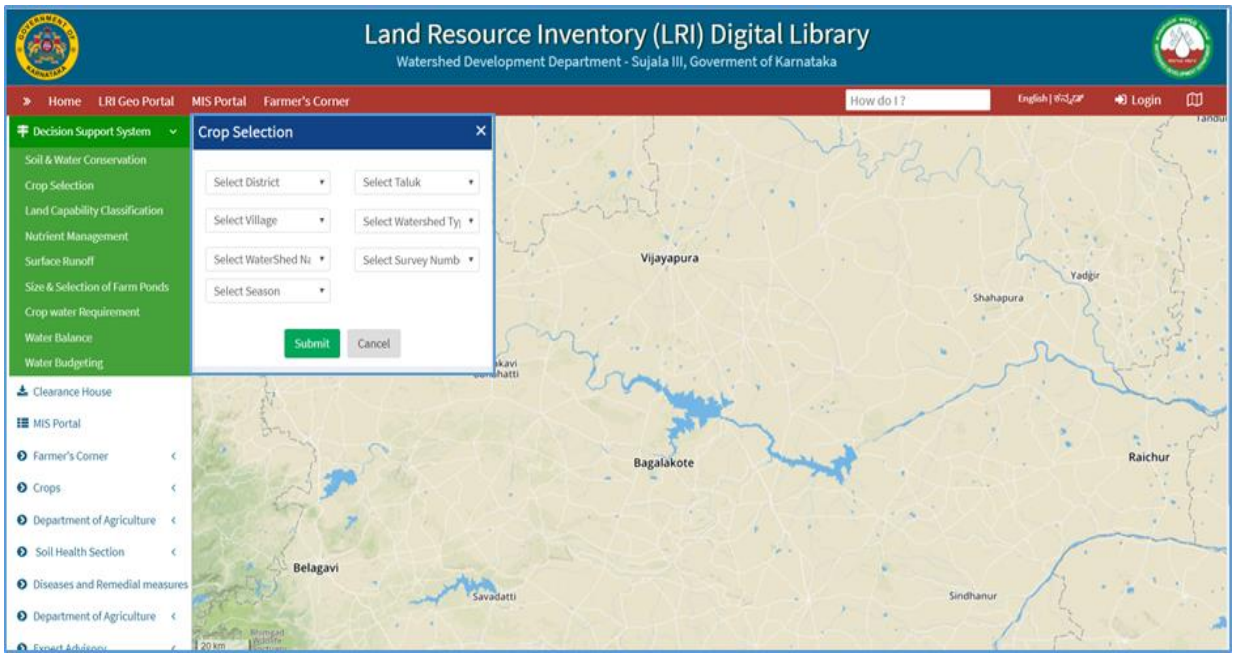


Figure 4-30 Indicative Screen - Displaying the Inputs Required for Crop Selection

4.4.2.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAs

The System shall calculate crop suitability for all the land parcels (Survey Numbers) and shall be stored in static database tables. Provision shall be available to update the database tables as and when any parameter is changed. The process of Crop selection is as below.

- User shall select the District, Taluk, Village, Survey Number, Watershed and Season
- Depending upon the survey number, system shall get the required information from different tables available in the data base for selecting Soil parameters and fetch climate data from KSNDMC using web service.
- System shall compare the values with the criteria tables given in the FRS and shall provide the details about the ranking of each crop and prioritize the same.
- Result displays the type of Crop for the particular Survey Number, with Season, Suitability Class, Benefit Ratio and the Rank. System shall also highlight the Land parcel related to the selected survey number in GIS map.
- There should be provision where user shall be able to select crops which he wants to grow.
    - System shall provide the result displaying suitability of the selected crop as well as system shall display the message " For More information please contact << Number >> << Name of the Person>>" . Also link for Package of practices will be provided. On click PDF of POP will be displayed.

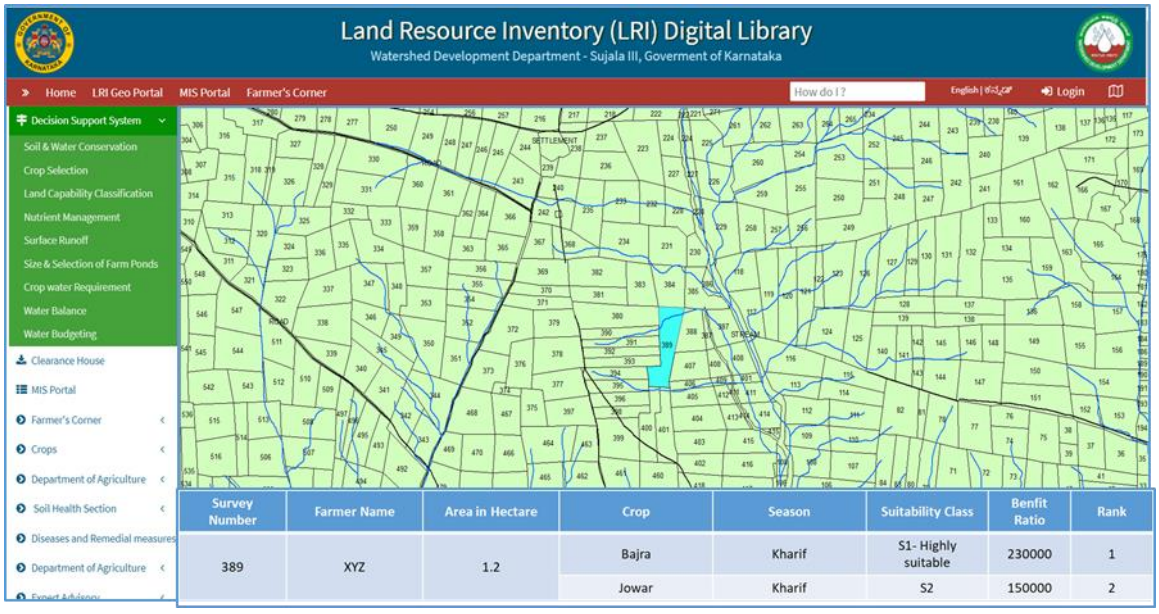


Figure 4-31 Indicative Screen - Displaying the Result Required for Crop Selection

4.4.3 LAND CAPABILITY CLASSIFICATION

This system is aimed to find out the general capability of the resources of an area for agricultural crops, forestry and other uses. In this Land Capability Assessment, the mapping units occurring in an area are grouped according to their limitations they pose for cultivation, the risk of damage if they are used for the identified use, and the way they respond to management interventions. In the capability system, mapping units are generally grouped at three levels – capability class, subclass and unit. The following land and soil characteristics are used to group the land resources identified in an area into various classes and units.

1.1.3.1 Graphical User Interface

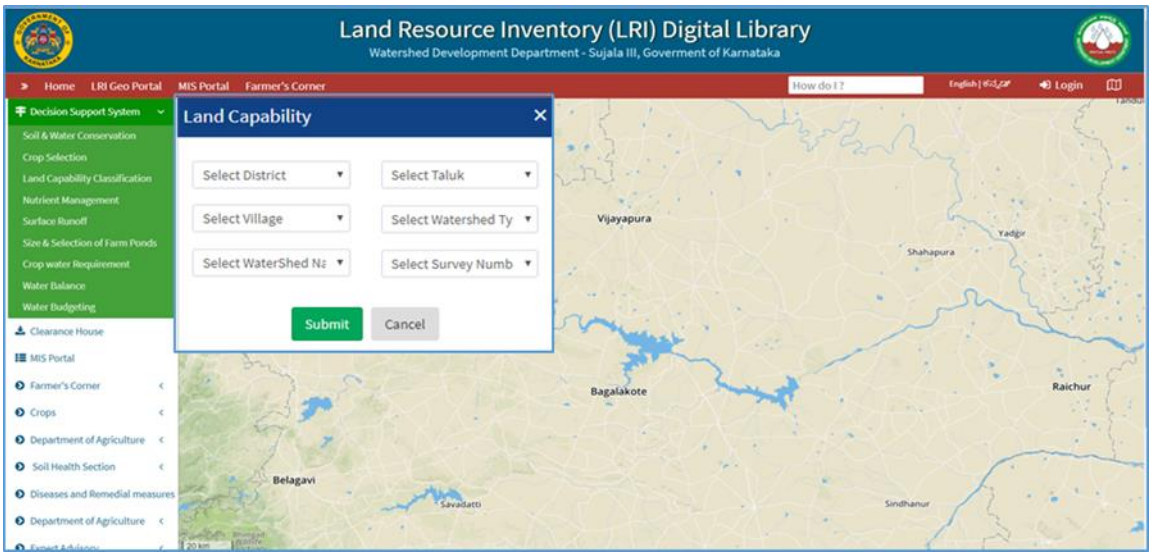


Figure 4-32 Indicative Screen - Displaying the inputs Required for Land Capability Classification

4.4.3.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAs

- User shall select the District, Taluk, Village, Micro Watershed and Survey number.
- System shall compare the values with the criteria tables given in the FRS and shall provide the details about Land Capability rating.
- Result displays according to Survey number, whether the Land is Arable or Non- Arable, their Land Capacity Class and the Limitation. System shall also highlight the Land parcel related to the selected survey number in GIS map.

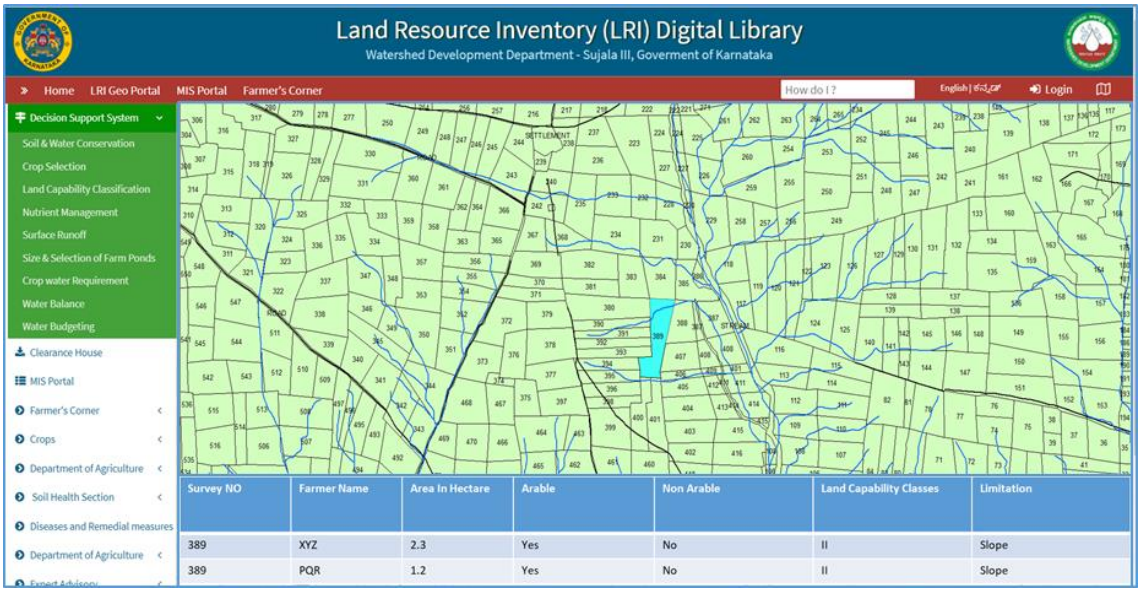


Figure 4-33 Indicative Screen Displaying the Result for Land Capability Classification

4.4.4 NUTRIENT MANAGEMENT

Surface soils samples are collected at 250/325 meters grid intervals to find out the soil fertility status. Various parameters are analyzed including nitrogen, phosphorous, potassium, calcium, magnesium, and sulphur, copper, iron, zinc, manganese, boron.

4.4.4.1 GRAPHICAL USER INTERFACE

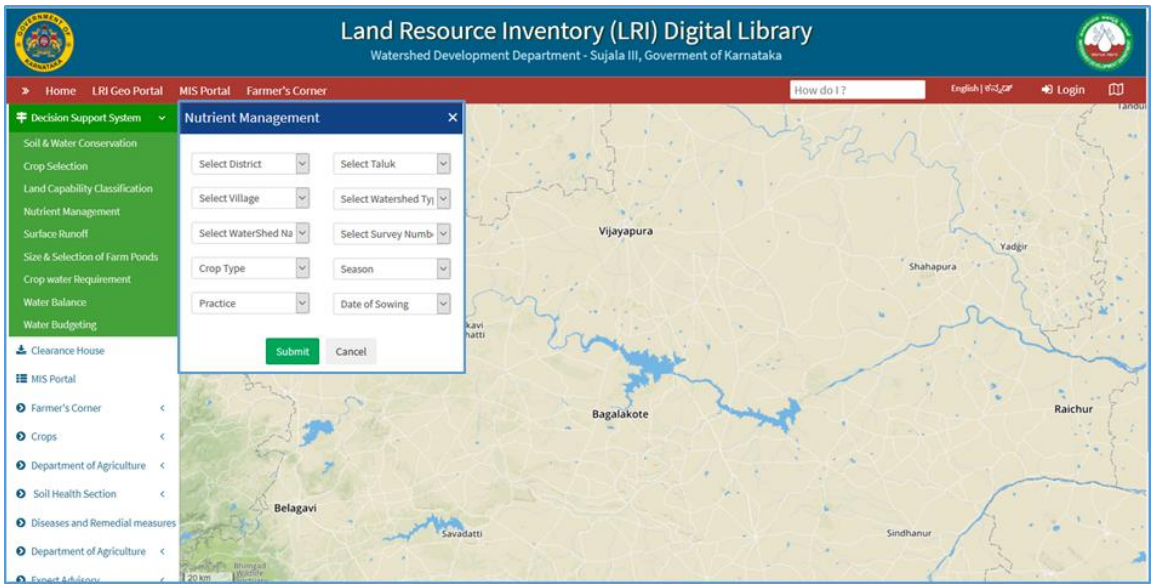


Figure 4-34 Indicative Screen Displaying the Inputs Required for Nutrient Management

4.4.4.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAs

- Farmer shall select District, Taluk, Village, survey number, Crop type, season, Practice and Date of Sowing.
- System shall read soil fertility status from the database for the selected land parcel and compare it with the criteria table given in FRS.
- Depending upon the input for Crop type, season, Date of Sowing system shall select nutrient recommendations with respect to soil fertility from the criteria table given in the FRS.
- System shall Read the nutrient (Micro and Macro) content in fertilizers given in the FRS table
- Result displays Crop Type, Fertilizer Required, Fertilizer Scheduling, Total Quantity of Fertilizer, Basal Dose, Top Dressing, Total Cost of Fertilizer, and Package of Practices (pdf).
- In addition, it will also display the amount of Bio-Fertilizer and Organic Manure required by the recommended crop. System shall also highlight the Land parcel related to the selected survey number in GIS map.

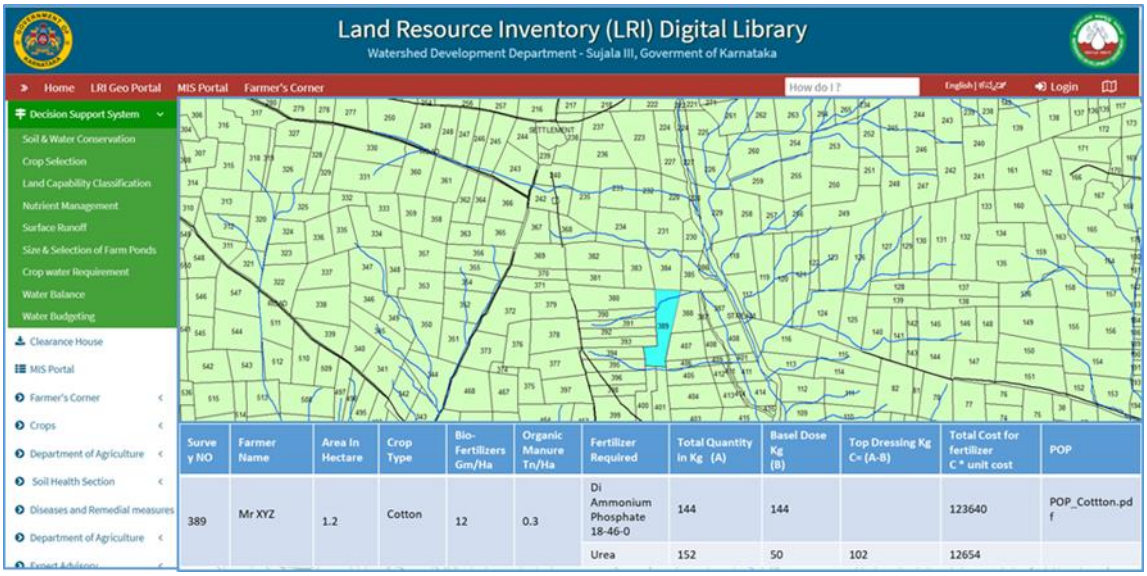


Figure 4-35 Indicative Screen Displaying the Result for Nutrient Management

4.4.5 SURFACE RUNOFF

Runoff is influenced by multiple factors like intensity and duration of rainfall, existing land use, initial abstraction, rate of infiltration, Soil Hydrological Group, slope gradient and length, percolation rate, presence of hard substratum, antecedent moisture, Time of Concentration and so on. For Estimation of surface runoff, it is recommended by WDD to provide options based on the following three methods. The workflow and the parameters as required for SCS and RM are already provided and for infiltration Method is being worked out in consultation with Hydrology knowledge partner of WDD:

1. SCS Curve Number method
2. Infiltration method
3. Rational method

4.4.5.1 GRAPHICAL USER INTERFACE

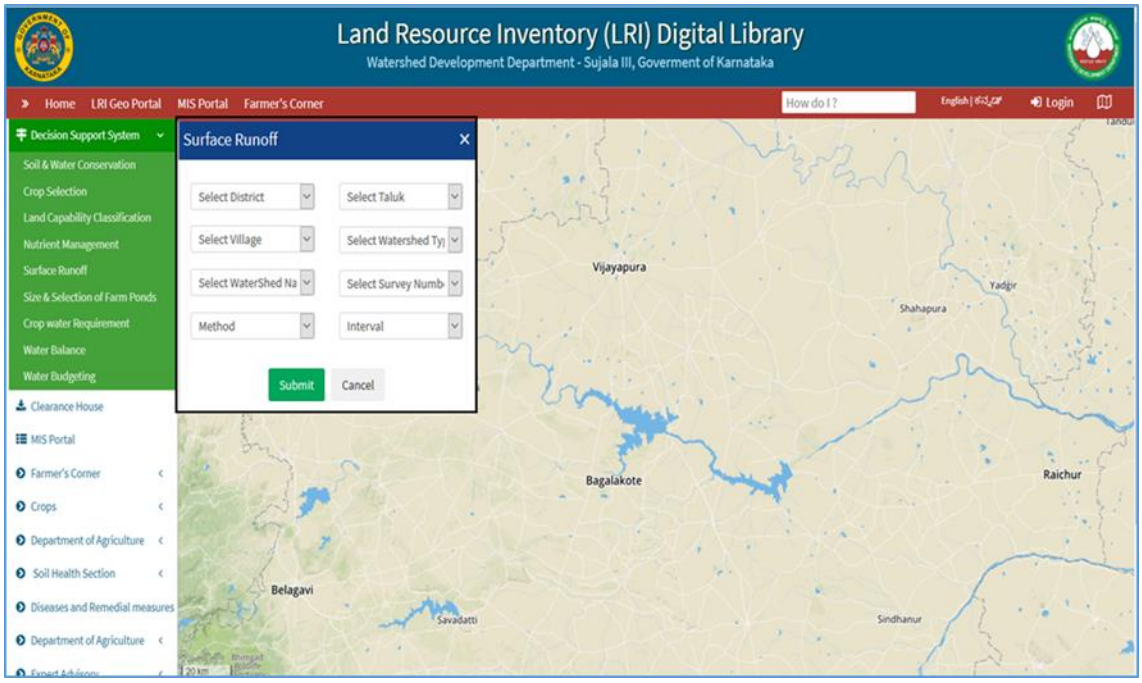


Figure 4-36 Indicative Screen Displaying the Inputs Required for Surface Runoff

4.4.5.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAs

- User shall select the District, Taluk, Village, Micro Watershed, Survey no , the method to calculate Surface Runoff for given rainfall Interval.
- System shall filter and display the management Units available in selected Watershed.
- System shall read the input data depending on the type of Method selected by the User.
- Depending on the type of data, system shall display result of Surface runoff along with the Farmer's name for the selected Survey no. and watershed wise. System shall also highlight the Land parcel related to the selected survey number in GIS map

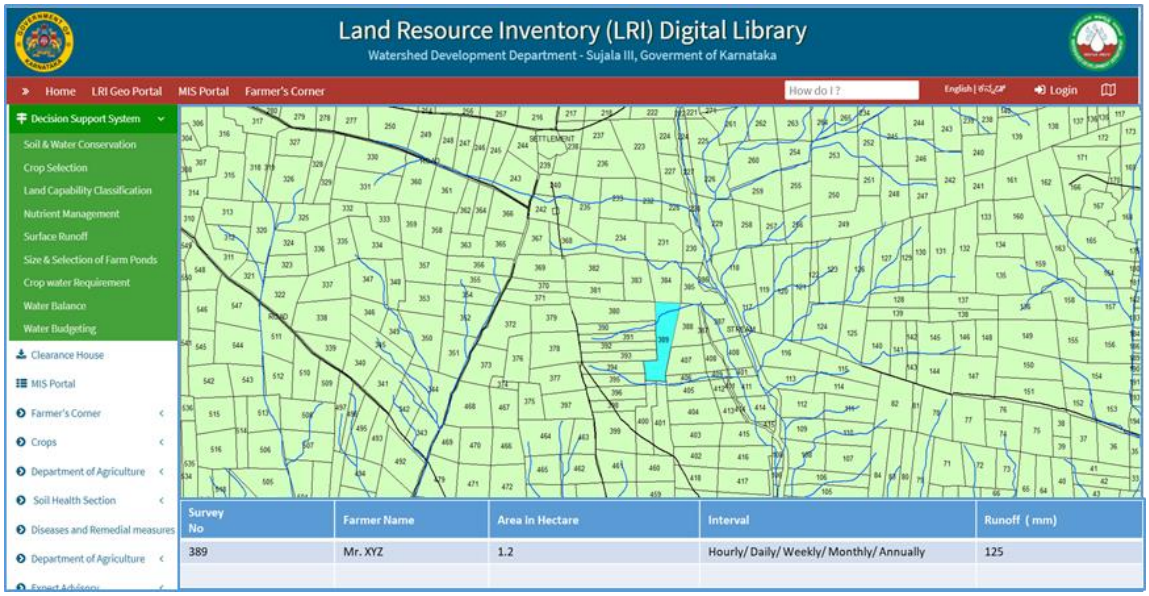


Figure 4-37 Indicative Screen Displaying the Result for Surface Runoff-Survey no. wise

- User shall able to get the result for the watershed. In this case result will be displayed management unit wise And System shall highlight the Management Units with different color in GIS map.

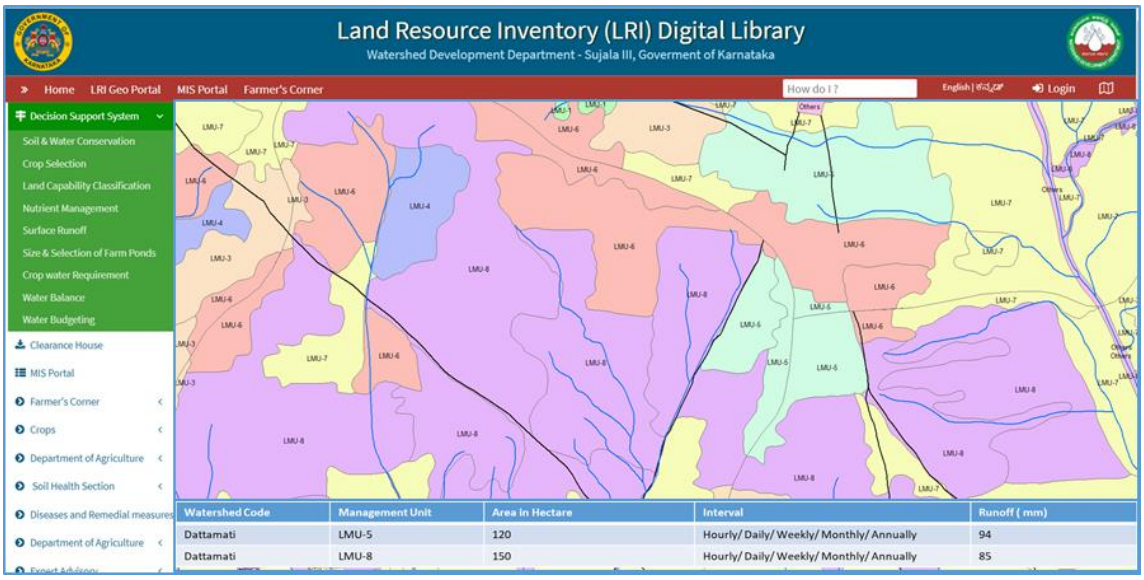


Figure 4-38 Indicative Screen Displaying the Result for Surface Runoff-Watershed wise

- Along with the result System shall also display the Disclaimer stating “The Runoff estimated is based on the Model selected by the User. It may / may not vary much with the ground based Runoff. For more details, contact Hydrology Knowledge Partners

4.4.6 SIZE AND LOCATION OF FARM PONDS

Farm Ponds are constructed for storing rainwater which could be used for uninterrupted physiological activities of the crops.

4.4.6.1 GRAPHICAL USER INTERFACE

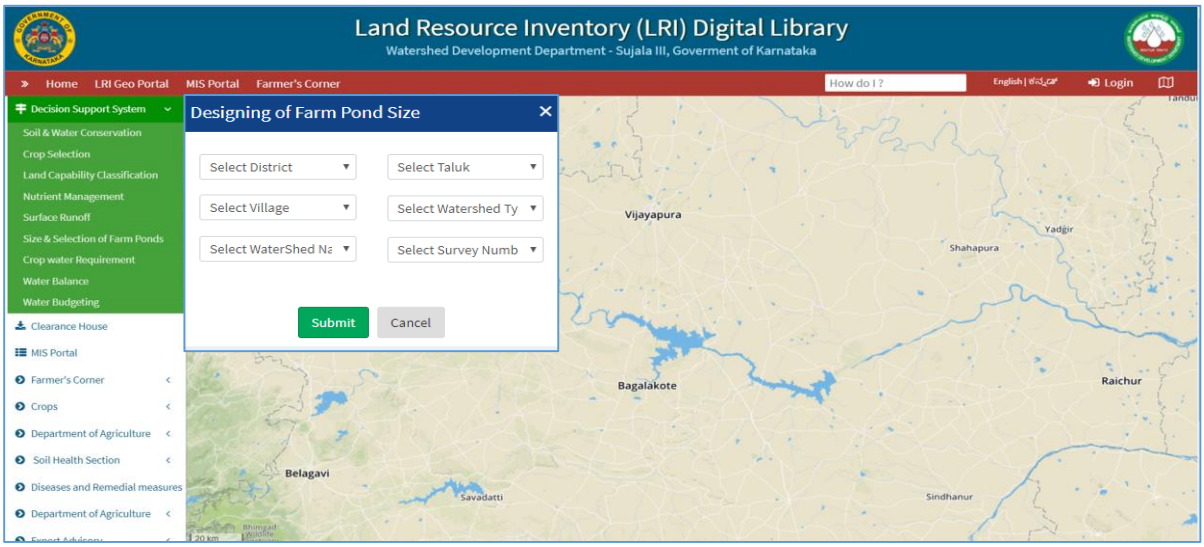


Figure 4-39 Indicative Screen Displaying the Inputs Required for Size and Location of Farm Ponds

4.4.6.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAS

- User shall select District, Taluk, Village and the survey number.
- Depending on the criteria table found in DSS, the system will select the matching farm pond size as per the Runoff obtained in DSS for Surface Runoff.
- Result displays Storage capacity, cost estimated for constructing selected farm pond size using standard rates from criteria table. System shall also highlight the Land parcel related to the selected survey number in GIS map.

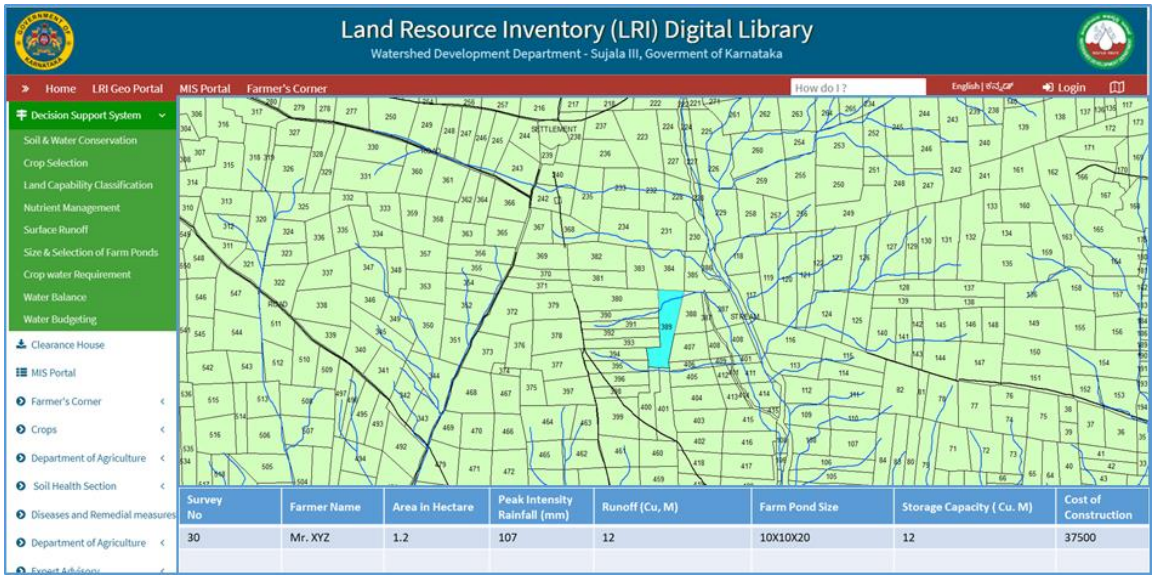


Figure 4-40 Indicative Screen Displaying the Result for Size and Location of Farm Ponds

4.4.7 CROP WATER REQUIREMENT

DSS for estimating the crop water requirement at MWS/SWS levels based on the existing land use or crops that are planned to be taken up for cultivation at MWS or higher levels. Crop water requirement will be estimated using FAO 56 Penman-Monteith method.

4.4.7.1 GRAPHICAL USER INTERFACE

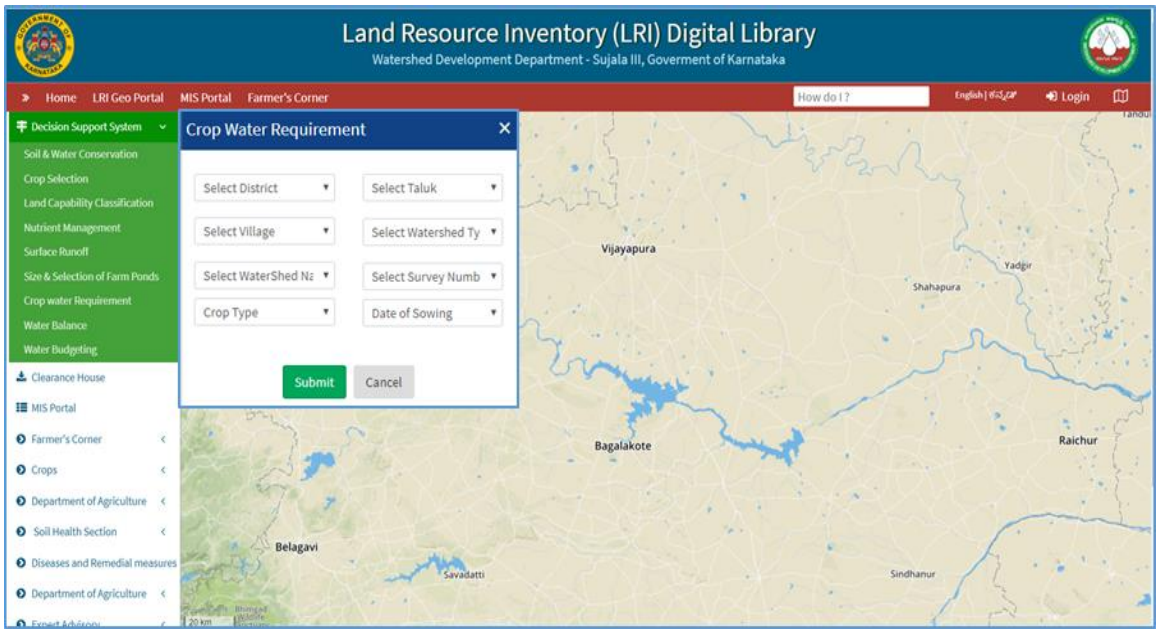


Figure 4-41 Indicative Screen Displaying the Inputs Required for Crop Water Requirement

4.4.7.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAs

- User shall select District, Taluk, Village, Micro Watershed and Survey no.
- User shall also have the provision to enter the crop grown and Date of sowing.
- Using Weather parameters provided by KSNDMC system shall calculate potential evapotranspiration on daily time scale
- System shall calculate crop water requirement using crop coefficient (from lookup table) and potential evapotranspiration.
- System shall aggregate crop water requirement for each parcel of land, management unit level or micro watershed level as per User requirement.
- Result Displays Survey no., Farmer's name, area, crop type, crop stage, crop-wise water requirement (mm/day and Ltr/day), available soil moisture content, balance amount of water required shall be displayed . System shall also highlight the Land parcel related to the selected survey number in GIS map.

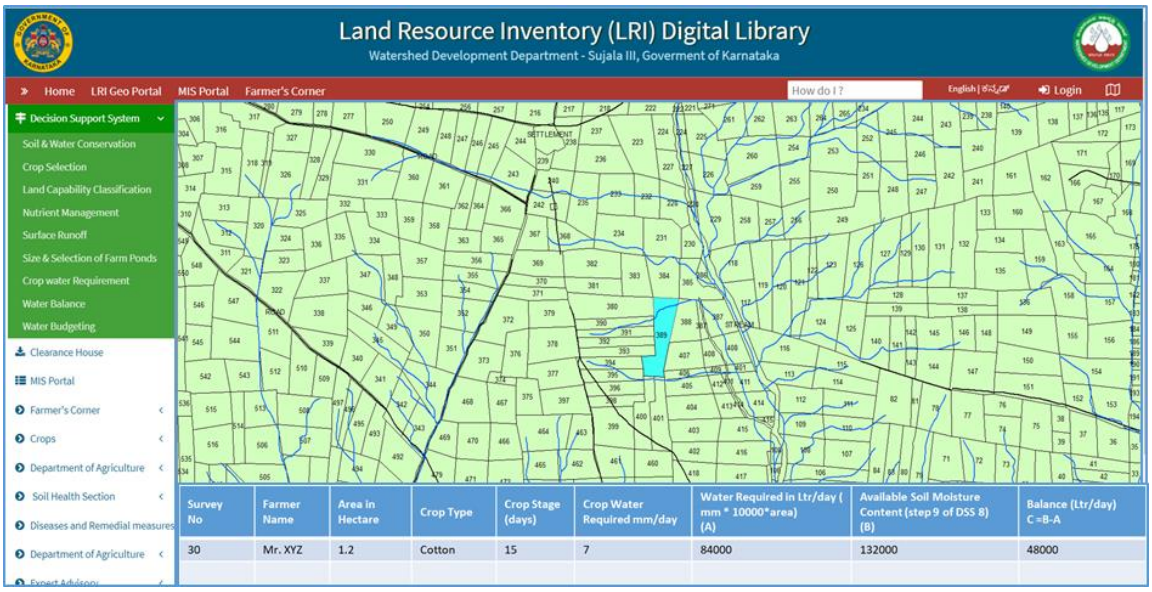


Figure 4-42 Indicative Screen Displaying the Result for Crop Water Requirement

4.4.8 WATER BALANCE

Water balance shall be estimated at MWS or higher levels by considering Rainfall, Irrigation, crop water requirement, Surface Runoff, Evapotranspiration and Deep percolation.

4.4.8.1 GRAPHICAL USER INTERFACE

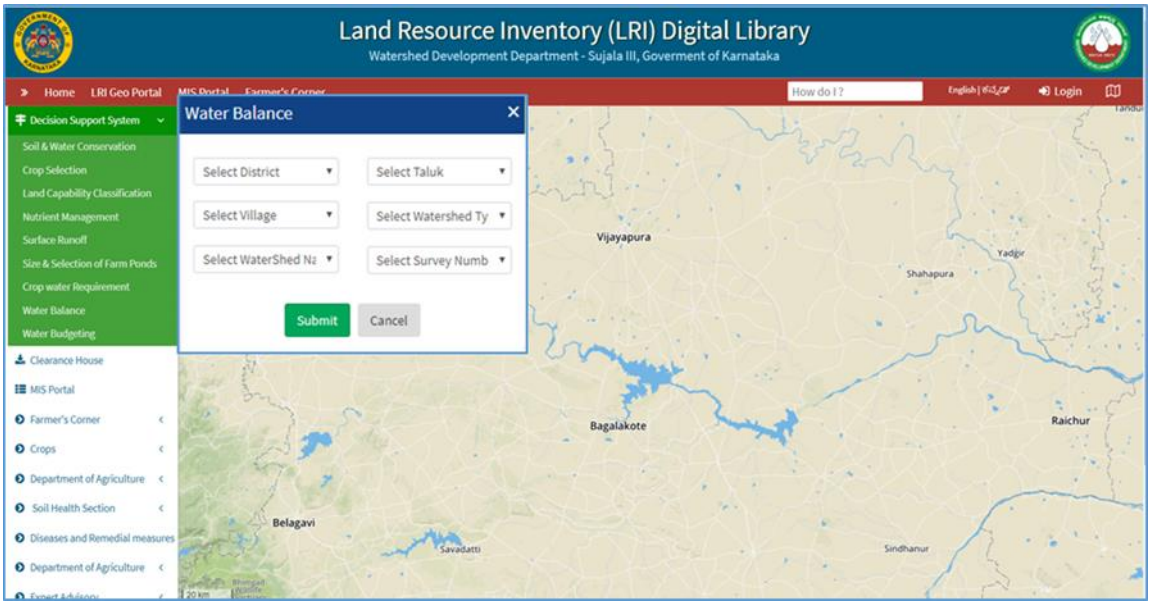


Figure 4-43 Indicative Screen Displaying the Inputs Required for Water Balance

4.4.8.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAS

I. User shall select District, Taluk, Village, Watershed, and Survey no.

II. System shall compute the water balance components at daily time scale (Soil moisture, Eta, runoff and deep percolation) at individual field scale.

III. System shall display water balance component at land parcel scale.

IV. System shall aggregate water balance component at management unit and micro-watershed scale.

V. System shall display the management unit wise Watershed Name, Management Unit, area, Rainfall, Soil Moisture balance and Water Balance. System shall also highlight the Management Units in GIS map.

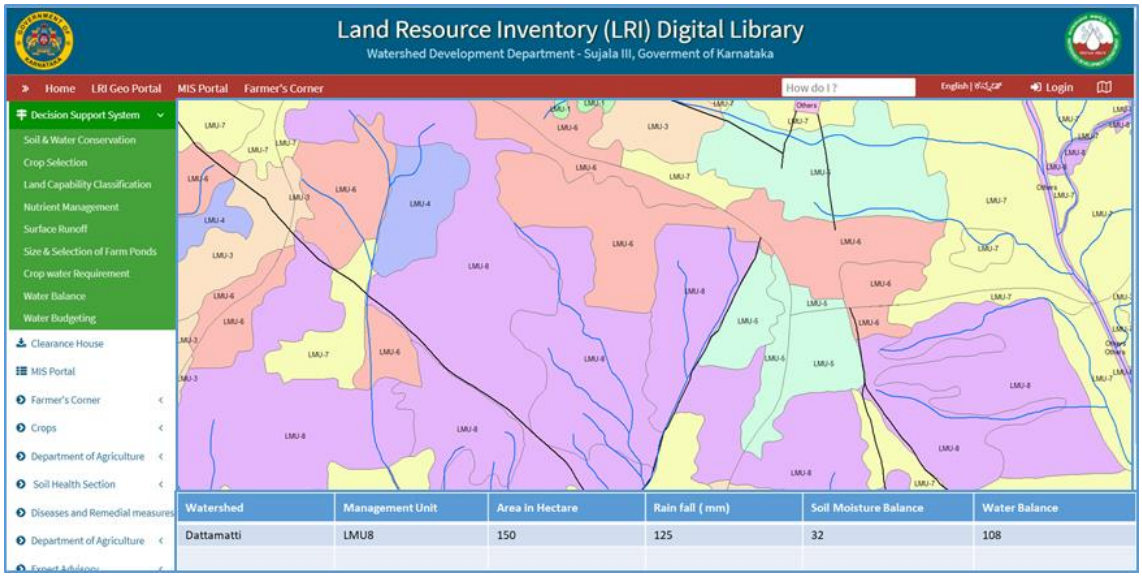


Figure 4-44 Indicative Screen Displaying the Result for Water Balance

4.4.9 WATER BUDGETING

DSS for water budgeting taking into consideration the needs of various uses/users at MWS/ Village level- crop needs, human needs, livestock needs etc.

4.4.9.1 GRAPHICAL USER INTERFACE

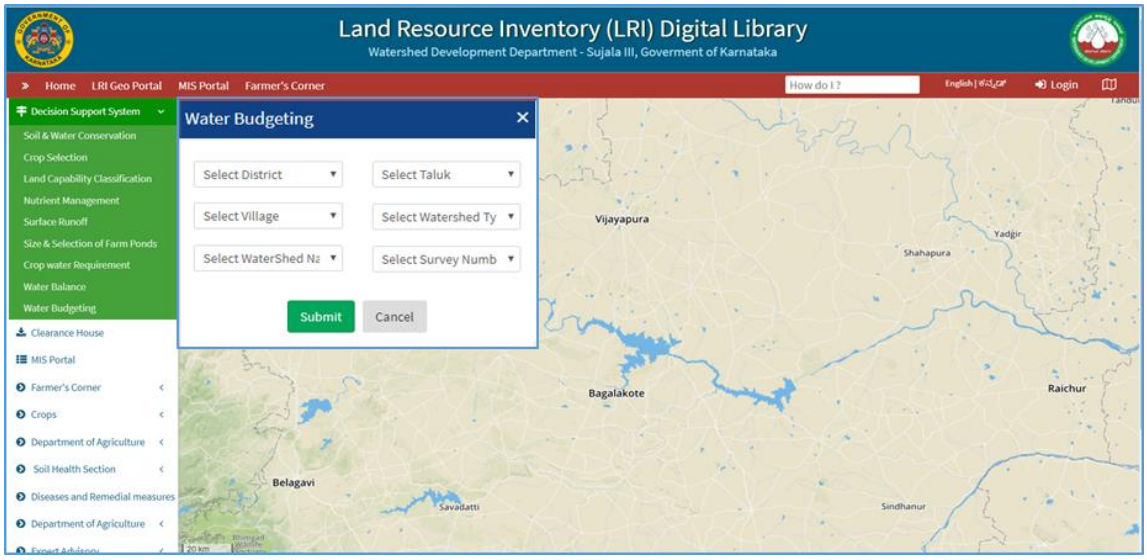


Figure 4-45 Indicative Screen Displaying the Inputs Required for Water Budgeting

4.4.9.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAS

- User shall select District, Taluk, Village, Watershed, and Survey no.

- Depending on the demographic data, system shall read the water requirement for Human need, livestock, Irrigation and water available at surface water bodies.
- System shall run the output obtained in Crop water requirement and Irrigation requirement.
- System shall estimate water available for irrigation by subtracting water requirement for human and livestock from total water available in micro watershed.
- Displays water budget for micro-watershed.
- System shall display the result management unit wise as Watershed name, Management Unit, Area, Rainfall, 75% of Water balance (from Water Balance DSS), human need, livestock need, and crop water need. System shall also highlight the Management Units in GIS map.

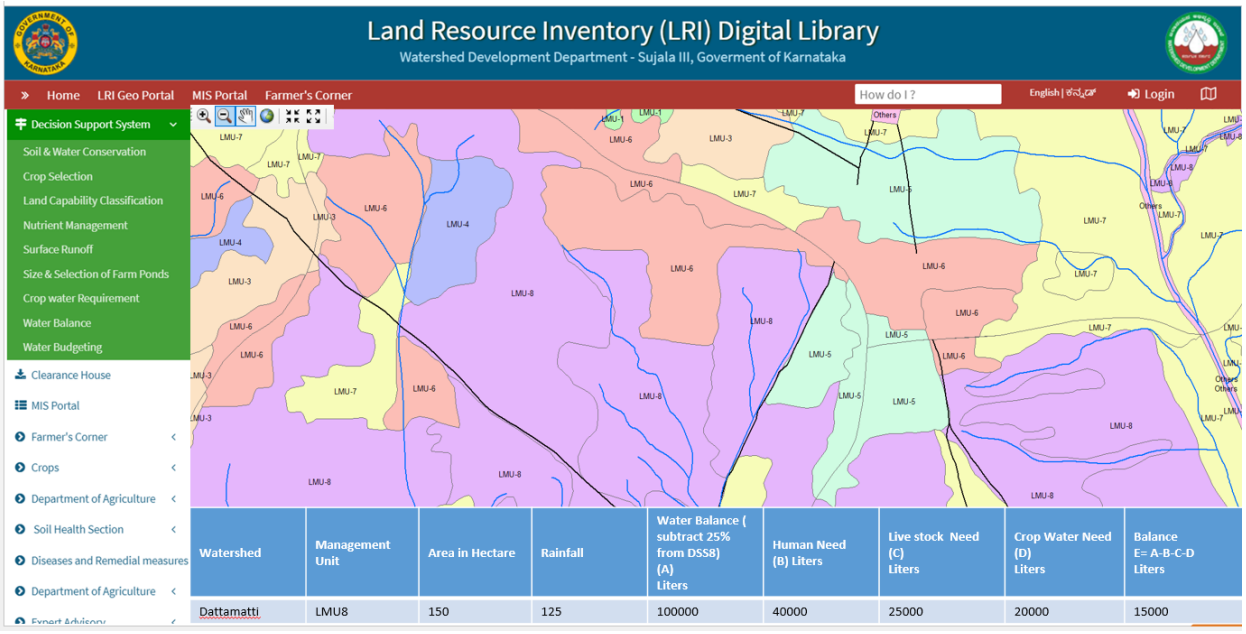


Figure 4-46 Indicative Screen Displaying the Results for Water Budgeting

4.5 LRI MIS Portal

LRI MIS Portal shall have User Dashboard for WDD, Department of Agriculture, Horticulture, Sericulture, and Animal Husbandry. Each department shall have the provision to enter data related to Activity plans and scheme details and progress details. Department Users shall be able to generate Reports.

4.5.1 User Dashboard

4.5.1.1 DESCRIPTION

The system will display role based dashboards which will provide actionable insights.

4.5.1.1.1 FARMER DASHBOARD

The Farmer Dashboard shall have the following

- GIS window: By default Shall display the location of his farm depending upon his survey number
- Weather info: Shall display the Current weather information at his farm location
- Recommendations: - Any recommendations for the farmer shall be shown. On click on any recommendation system shall show detailed information about the recommendations.
- Notification: - Any notification for the farmer such as Updation of dynamic information, Response to his/her queries, etc. On click of any notification system shall display the detailed information about the notification
- Land Info: Information about his/her farm details
- Crop Details: Information about the Crop grown, Recommended crop
- Fertilizer Details: Information about the fertilizer used/Recommended fertilizer, Price information
- Pesticide Details: Information about the pesticide used/Recommended pesticide, Price information
- Seed Details: Information about the seeds used/Recommended Seeds, Price information
- Equipment Details: Information about the Equipment used, Price information
- Farm Insurance: Information about the Insurance taken, Recommendation on Insurance
- Query Section: Status of his queries
- Market Price for the crops/
- Near by FPO's, RSKs

4.5.1.1.2 PLANNER DASHBOARD

This Dashboard shall be personalized dashboard for WDD, Department of Agriculture, Horticulture, Sericulture, and Animal Husbandry. Filtering option shall be provided on the basis of District, Taluka,

Village, and Watershed. Depending on the filtered location, planner dashboard shall display the summary information for the following

- GIS window shall show the map of the filtered location
- Maps showing spatial distribution of soil fertility for given Taluka with overlays of Cadastral boundaries and watershed boundaries. The Grid wise fertility data is maintained by NIC and the Health cards are being generated through the portal.
- Landform (physiography, elevation, contour). On click shall show the map
- Weather and Climate (meteorological data)
- Land use. Also shall display the thematic map
- Site characteristics (slope, erosion, drainage, coarse fragments, rock outcrops, etc.). Shall show the thematic map on click of particular Site characteristics.
- Soil characteristics (depth, texture, colour, coarse fragments, structure, pH, CEC, Base saturation, nutrient status, etc.). Shall show the thematic map on click of particular Soil characteristics
- Hydrology (surface runoff, evaporation, infiltration, base flow, sediment load, groundwater).
- Socio-economic details
- Marketing and infrastructural facilities
- Programmes and schemes in operation in the project areas
- Information about the seeds/ fertilizers/pesticides/equipment/ seedlings based on the requirement/ indent by the farmers through MIS.

4.5.1.1.3 IMPLEMENTATION MONITORING DASHBOARD

Filtering option shall be provided on the basis of District, Taluka, Village, and Watershed. Depending on the filtered location, Implementation Monitoring dashboard shall display the summary information for the following

- GIS window shall show the map of the filtered location
- Number of Activities completed, In progress, Not Yet started
- Number of Atlases submitted to WDD.

- Number of the DPR submitted.
- Number of final reports submitted.
- Graphical representation of total area covered.
- Land use. Also shall display the thematic map.

4.5.1.1.4 SUBJECT MATTER EXPERT

Filtering option shall be provided on the basis of District, Taluka, Village, and Watershed. Depending on the filtered location, subject Matter Expert dashboard shall display the summary information for the following

- Number of Queries Received , Number of un-answered queries, Answered queries
- GIS window shall show the map of the filtered location
- Geology of the area
- Landform (physiography, elevation, contour). On click shall show the map
- Weather and Climate (meteorological data)
- Land use. Also shall display the thematic map
- Site characteristics (slope, erosion, drainage, coarse fragments, rock outcrops, etc.). Shall show the thematic map on click of particular Site characteristics.
- Soil characteristics (depth, texture, colour, coarse fragments, structure, pH, CEC, Base saturation, nutrient status, etc.). Shall show the thematic map on click of particular Soil characteristics
- Hydrology (surface runoff, evaporation, infiltration, base flow, sediment load, groundwater).

4.5.1.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAs

- Registered user shall login to the Portal
- System shall validate the login credentials
- Portal will display the role based dashboard which shall provide information about all the activities performed / to be performed by the user in the system.

4.5.2 DATA ENTRY FORMS

It will be used for collecting information into the LRI Portal for example, user registration form, and LRI data update form.

4.5.2.1 DESCRIPTION

- The system shall support Kannada and English interface.

Following are some of the requirements

- MIS Forms needs to be provided to the farmers/RSKs to provide information about the seeds/Fertilizers/Pesticides before 1 month of Kharif /Rabi/summer seasons. This should enable the agriculture department to plan their stocks of seeds at respective RSKs/Dealers
- For Sericulture Department, MIS should have provision to enter the details of rearing equipment, construction of rearing house, construction of mounting house. The system should have provision to display and link the related document pertaining to quality control and advance technologies details. This should also include details of subsidy provided to farmers.
- MIS to create new form for schemes/ programs related to decease control and Pashu Bhagya Yojana to monitor activities.

4.5.2.2 RESPONSE SEQUENCE/ACCEPTANCE CRITERIAS

- Registered user shall login to the Portal
- System shall validate the login credentials
- Depending upon the role of user system shall display menus.
- User shall select appropriate forms for data entry.
- The form shall have text boxes, drop down lists, submit button, cancel button, Reset button.
- User shall enter the data in the form and click on submit button.
    - System shall validate the enter data
    - System shall display messages against incorrect data entered.

- Upon successful validation of entered data, system shall insert the data into SQL server database

- If user clicks on Cancel button, System shall clear and close the form.
- If user clicks on Reset button, system shall clear all the input entered by user in the form.

4.5.3 REPORTS

4.5.3.1 DESCRIPTION

System shall generate following reports using the data available in LRI database

- Provision to generate report showing list of structures proposed for given watershed and recommended design details.
- Plan and progress of watershed and other programs
- Drought affected districts
- Rainfall status and future scenario
- Progress of sown area
- Water availability scenario
- Requirement and availability for seed and fertilizer

4.5.4 ACTIVITY MONITORING/ PLAN

The system shall have the functionality to plan the month wise activities to implement various schemes through MIS portal and output in form of Charts.

4.5.4.1 RESPONSE SEQUENCE/ACCEPTANCE CRITERIA

- On successful login and validation of Departmental user On Click of “Activity Plan”, System shall redirect the page to the Activity plan form.
- User shall be able to select the desired month and the scheme/ Task to insert/update the list of activities with schedule start date, schedule end date, actual start date, actual end date, work completed in percentage.
- On the dashboard, shall be able to view the status of the activities.
- User shall be able to generate the report related to plan and its status.

- The system shall generate reports which can be exported in various format e.g. pdf.

Apart from above User shall be able to generate the query and export it to the report.

4.5.5 Repository Updating Component

LRI Digital library shall store all spatial and non-spatial data. Some of these datasets are static and some change with time interval. Dedicated nodes shall be provided to partners for capturing / updating the data on LRI.

Citizen relevance:

- Farmers should be able to register
- Adding or updating records on farm cultivation

Department relevance

- Dedicated node to update or add data into LRI through clearing house.
- Update the parameters of the Decision criteria matrix for respective Decision Support Systems. Such updates will be done by the administrator based on the expert advice by the Knowledge partners. .

4.5.6 WATERSHED MANAGEMENT WORKFLOW

Based on the inputs received during User Needs Assessment study, below is the existing workflow being followed to prepare LRI Atlas and DPR.

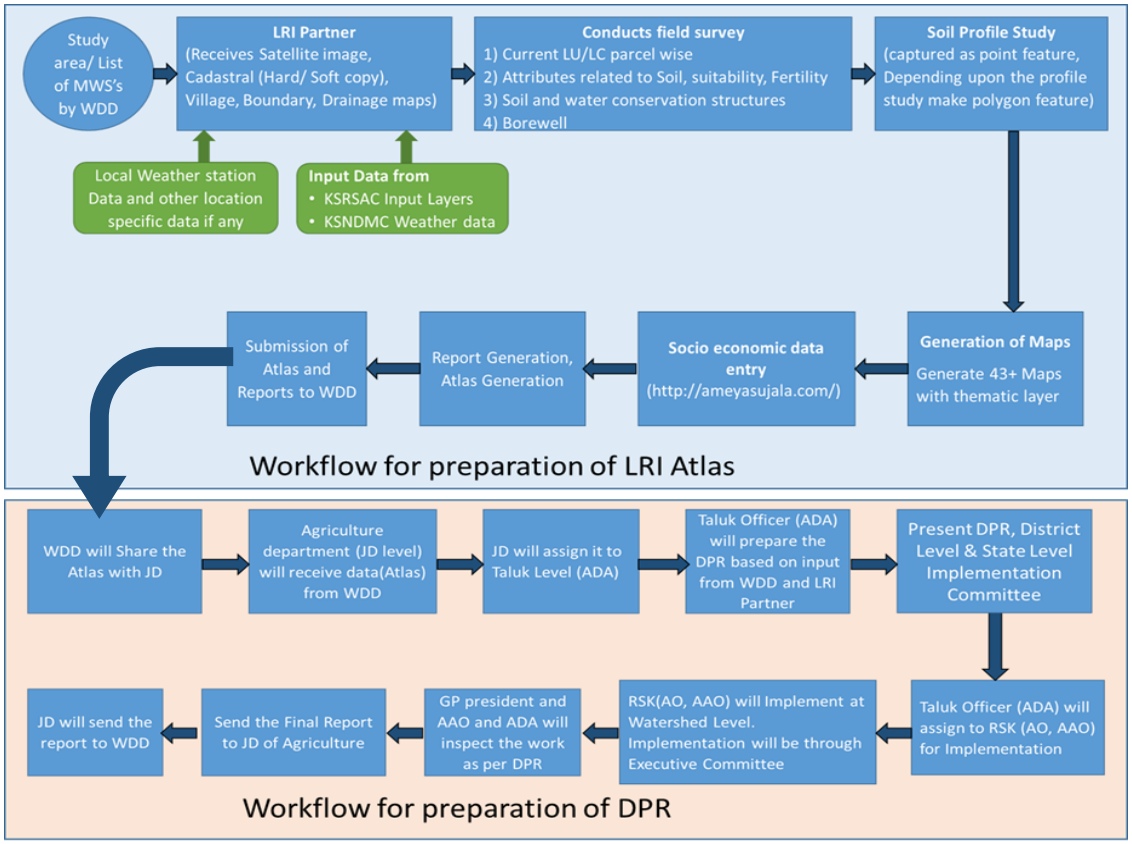


Figure 4-47 Existing LRI Watershed Management Workflow

The LRI portal shall map existing workflows for various activities related to watershed planning and implementation and aided with decision support system using data available in LRI.

4.6 Content Management System

In order to manage the content of the Web portal, Orchard Content Management is being used which enables to create, manage and maintain content of the portal. The major functionalities of the proposed Content Management Modules are

- CMS shall have functionalities to insert/update/delete the content of the Web portal.
- Creation Tool to create the content through widgets. Provision to save as draft.
- Collaboration tool to enable team of people work together and track every access to the content and changes made.
- Provision to schedule the content to be published for the given date and time.
- Tagging tool to tag the content

- Searching and Indexing the content
- Administration: The admin dashboard shall display easy to manage all the tasks involved in content production. This includes track of schedule content and related assets.

4.7 HELP DESK

The Helpdesk is being established with five helpdesk operators to address any technical queries related to Geoportal. The users can be both department users and the external users like farmers/citizens etc. When the call is received by the helpdesk, helpdesk personnel will be able to answer the queries or question raised by the caller both in Kannada or English. Each Helpdesk agent will have dedicated system with helpdesk application which can be accessed to generate tickets for the incidents and also can be able to access the Geoportal if required to answer the queries. This helpdesk will be operational during office hours.

Following are the major functionalities of the Helpdesk solution

- **Single point of contact** – A single direct inward dialing (DID) number of WDD shall be published. Users can dial this number to seek any help related to farming, usages of data and queries related to portal.
- **Queue Management:** If the operator line turns to be busy with other query call, system shall put the call in queue. System shall provide information to the user Queue position/Approx. Wait Time. With any operator getting free at any point of time, the first person in queue shall get connected to the operator.
- **SMS/Email Acknowledgement:** After every call, an SMS or an Email can be send to the citizen by the operative acknowledging the concern being raised on call
- **Advanced and Detailed Reports** - The authority of helpline will be able to view and download various advanced and detailed reports like, agent activity report, agent performance report, inbound/outbound call report, graphical analysis of various call activities, etc.
- **Live Agent and Call Monitoring: -** The supervisors can check the details of live calls coming on the helpline number.
- **Automatic Call Distribution:** The calls can be distributed among the operators in various algorithms like round robin, most idle, service rank, etc. This reduces the burden of attending all calls of a single service all by a single operative

Following shall be the tentative Flow of helpdesk Call

- When a User dials helpdesk number, the call shall land at IVR system. Once the call is connected, the caller shall be connected to the corresponding operator.
- The operator shall have access to the portal with which he/she shall able to enter the details of the query, as well as shall have access to the different functionalities of the Geo-portal with which he can respond.
- After every call, an SMS or an Email shall be send to the citizen by the operator acknowledging the concern being raised over the call.
- The system shall generate reports like agent activity report, agent performance report, and inbound/outbound call report.
- The system shall have the real time dashboard, with which the supervisor can check the details of live calls coming on the helpline number.
- The system shall capture the feedback of the User after end of each call over IVRS.

4.8 Network Monitoring System

Network Monitoring Shall able to monitor IT infrastructure which includes Server, desktop, switch.

- The proposed system shall have following modules

1. Service management module
2. Network Management
3. Virtualization
4. Application & DB monitoring

4.8.1 Service management module

- Provide end to end performance, availability, fault, event and impact management
- Provide Service desk (incident and problem management), Change, and SLA management
- Provide the agent and agentless monitor to collect & manage event/fault, performance and capacity data

- Speed-up problem identification and resolution of the IT performance anomalies with intelligent events
- Identify the root cause using a variety of filtering and statistical correlation methods
- Analyze based on inbuilt intelligence for detecting inconsistency in advance.
- Be able to score the events and display the descending top events or any other order as customized by the administrator
- Monitor all the proposed applications at SDC.
- Monitor the server instances, database and instance status, initialization parameters, CPU usage, parallel processing, and SQL tracing.

The module also supports integrated IT Service Management (Help desk) which shall include:

- Centralized IT helpdesk for technical and functional support.
- The Helpdesk shall be accessible through various communication channels viz., Telephone, Web Based Facility and email.
- Module shall respond to the queries/problems in the time limits as specified in Service Level Agreement.

4.8.2 NETWORK MANAGEMENT MODULE (NMS)

The Network Management shall monitor performance across networks having multiple categories of devices like firewall, switches etc. The module shall provide a unified event reporting interface for network, server & database components. The module shall include:

- SNMP, ICMP and TCP/IP standard based module and permit network layer level management
- Shall utilize management standards like SNMP etc. to monitor and manage the network
- Shall use model layer 2 and layer 3 network technologies including: Internet Protocol (IP), Ethernet, BGP, OSPF, VPN, VLAN, ATM and frame relay, MPLS, Layer 2 Ethernet VPNs (including virtual private LAN services and virtual private wire services), Protocol Independent Multicast, and Carrier Ethernet
- Shall integrate with any third part tool with API based integration
- Shall use intelligent alarm de-duplication algorithms to learn the behavior of the network infrastructure components over a period of time

- Shall provide intelligent automation of device configuration.

Key Features shall include:

- Real-time and accurate validation of configuration changes including out of band detection and management of changes and non-disruptive rollback
- Enables accurate and rapid configuration changes, enable configuration comparisons across versions & devices
- Offer direct command-line access to the device that is logged and auditable
- Permission setup: for example who can execute this function and which part of the network they can access
- Enforce change control process based on role and user access including comprehensive change management capabilities with multi-level approvals
- Provide ability to define and reuse common configuration tasks (templates)
- Provide out-of-the-box and customizable reports
- Provide back-up and restore of device configurations
- Maintain complete historical audit trail of all network changes, so as to detect who did do what and when.
- Protect end user for configuration errors (for errors like syntax, boundary and command order errors) and now parent and child relation within a device configuration.

Desktop Terminal Management / Asset Management shall

- Provide ability to allow remote control of end-user desktop for facilitating resolution of desktop issues without the need to go to the end-user desktop, through agents installed on them.
- Send queries to an engine (to pump the inventory information to the console) to be executed at predefined days and time.
- Support centralized policy management, centralized session management
- Support multiple connection protocols for remote control, including TCP/IP, HTTP etc.

4.8.3 VIRTUALIZATION MODULE

- Shall Offer heterogeneous hypervisor support & deliver integrated management for VMware® Virtuozzo® XenServer® and Microsoft® Hyper-V®
- Shall provide recommendations, capacity planning, performance monitoring, VM cluster control, configuration management, alert remediation, and chargeback automation.

Virtualization module shall cover:

- **Optimization of physical resources**: Analytical Intelligence shall provide recommendations for VM management & capacity planning, identify VM sprawl, which shall help in reclaim and optimize space
- **Device Dashboard**: Shall use real-time dashboards to easily identify and troubleshoot performance, capacity, and configuration problems
- **Provide complete visibility**: Shall integrate with Server & Application Monitor for complete visibility of the application stack—from app to VM to database with Application Database monitoring tool integration
- **Proactive alerting** : Shall use baseline thresholds for alerting on performance discrepancies on clusters, hosts, VMs, and data-stores
- **One stop solution**: Shall support multiple hypervisor management from single window. Eliminate frequent logins into vCenter™ and take action within virtualization tool

1. Key Features:

- **Heterogeneous Virtualization Management**: Shall manage VMware, Microsoft, HyperV, eNlight, Virtuozzo environments through a single console
- **Virtualization Management Actions:** Shall incorporate Virtualization that provides virtualization management actions, such as restarting, power on/off, and suspending a VM.
- **Asset Management:** Shall manage configuration provided to the individual VM like RAM or disk space
- **Full Application Stack Visibility and Contextual Awareness**: Shall obtain a complete view of the Application Stack Management Bundle for encompassing related awareness of performance issues

- **Virtualization Performance Monitoring and Management:** Shall proactively monitor through a single console and evaluate virtualization - specific performance issues in VMware, Microsoft, eNlight, Virtuozzo and Hyper-V environments
- **Alert Remediation:** Shall configure an alert to trigger a management action based on the set threshold limits
- **Virtualization Dashboards** Shall receive better understanding of the performance, configuration, usage, and capacity of your virtualized infrastructure
- **VM Right-Sizing and Capacity Planning:** Shall plan, maintain, and optimize eNlight, VMware, Hyper-V, Microsoft, and Virtuozzo virtual infrastructure capacity
- **VM configuration change monitoring**: If there is any change in the VM configuration, system shall inform by sending alerts regarding the configuration changes
- **Virtualization Performance Alerts:** Shall instantly spot the point of failure and take immediate actions on performance related concerns using flexible and instantaneous alerts
- **Auto discovery of VMs:** Shall enhance the experience in importing VMs by Auto-discovering VM clusters
- **VM sprawl control:** Shall identify idle and over provisioned VMs, remove or add CPU and RAM, and delete VMs
- **Chargeback mechanism**: For Multitenant Structure VMownership, user shall be defined &chargeback mechanism is made available

4.8.4 APPLICATION & DB MONITORING

- Shall deliver powerful application and database monitoring capabilities for IT pros, DBA, enabling them to diagnose and troubleshoot performance issues faster, ensuring and maintaining the proper health of any application
- Shall not let slow applications and downtime impact the end-users and business services
- Shall pinpoint the root cause of application, database issues across various layers of the IT stack

Key Features:

- DBA shall monitor alarm dashboard with 3-4 clicks to find resolution
- DBA and Developer Collaboration – Application, Database Performance monitoring shall be accessible to everyone in the IT organization, improving collaboration and accelerating problem resolution
- Shall have Less than 1% load on monitored DB or web servers, even during heavy monitoring periods
- Multi-Dimensional Performance monitoring
- Shall simplify root cause analysis by correlating SQL statements, context, system and storage health, wait events, Backup job status and response time
- Threshold based alerts and reports shall be generated
- Shall proactively monitor database & application health, identifying trends before they become problems
- Shall ensure high availability and performance of applications

5. FUNCTIONAL REQUIREMENTS FROM LINE DEPARTMENTS

5.1 RURAL DEVELOPMENT AND PANCHAYAT RAJ DEPARTMENT (MG NREGS)

Table 5-1 Rural Development Application Requirement

Department Name: Rural Development And Panchayat Raj Department			
Application ID:	**5.1.1**		
Application Name:	**Water Conservations Assets**		
Section Name:	**Rural Development – MNERGA**		
Contact Person:	**Joint Director – MNEREGA & State Project Manager**		

Purpose/ Description:	At present the proposed Decision Support System has a provision to enter the Survey number as the input. Based on land slope, depth, texture, gravel, and rainfall, the conservation plan is decided for arable-black soils, arable red and lateritic soils, and Non arable soils. The conservation plan includes Bunding, Terracing and Trenching.
	
	Following are the recommendations for the LRI Geoportal
	
	• In addition to survey number as input, provision should be made to enter the XY co-ordinates (as Lat Long), this will ensure the assessments of feasibility of the existing conservation measures.
	• There has to be provision to superimpose the layers showing
	  ○ Existing conservation measures in the layer manager.
	  ○ Administrative Boundaries.
	  ○ Watershed Boundaries.
	  ○ Soil Map etc. as indicated in data Requirement
	• On a click of mouse button over existing structure, attribute details should be displayed
	• Provision to generate report showing list of structures proposed for given watershed and recommended design details.
	• LRI Geoportal should access the location of existing Conservation measures along with all the attributes through the web services by NIC.		

Functional	GIS Map View ☒	GIS Query ☒	GIS Geo-processing ☒

Department Name: Rural Development And Panchayat Raj Department	
Application ID:	**5.1.1**
Application Name:	**Water Conservations Assets**
Section Name:	**Rural Development – MNERGA**
Contact Person:	**Joint Director – MNEREGA & State Project Manager**

Requirement			
	GIS Layer Manager ☒	Reports ☒	Navigation ☒
	Clearing House ☒	Dashboard ☒	Attribute based Mapping ☒
	DSS ☒	Attribute Editing ☐	Data Entry/ MIS Module ☐

Data Requirement (Reference to Table 2-1):							
Base Maps	☒ 1.1	☒ 1.2	☒ 1.3	☒ 1.4	☒ 1.5	☒ 1.6	☒ 1.7
	☒ 2.1	☒ 2.2	☒ 2.3	☒ 2.4	☒ 2.5	☒ 3.1	☒ 4.1
Cadastral Maps	☒ 5.1	☒ 5.2					
Watershed Boundaries	☒ 6.1	☒ 6.2	☒ 6.3	☒ 6.4	☒ 6.5	☒ 6.6	☒ 6.7
	☒ 6.8						
Grid Data	☐ 7.1	☐ 7.2					
Land Use /Land Cover	☒ 8.1						
Soil Map	☒ 9.1	☒ 9.2	☒ 9.3	☒ 9.4	☒ 9.5	☒ 9.6	☒ 9.7
	☒ 9.8	☒ 9.9					
Land Suitability for Major Crops	☐ 10.1						
Soil Fertility Status	☐ 11.1	☐ 11.2	☐ 11.3	☐ 11.4	☐ 11.5	☐ 11.6	☐ 11.7
	☐ 11.8	☐ 11.9	☐ 11.10	☐ 11.11			
Geology Map	☐ 12.1						
Hydro geomorphology Map	☐ 13.1	☐ 13.2	☐ 13.3	☐ 13.4	☐ 13.5	☐ 13.6	
Water Bodies	☒ 14.1	☒ 14.2	☒ 14.3	☒ 14.4			
Elevation Map	☐ 15.1						
Transport Service	☒ 16.1	☒ 16.2	☒ 16.3				
Agro Climatic Zones	☐ 17.1						
Observation Wells	☐ 18.1	☐ 18.2					
Existing Water Conservation Measures	☒ 19.1						
Climate/ Weather Data	☒ 20.1	☒ 20.2					
Marketing and infrastructural facilities	☐ 21.1	☐ 21.2	☐ 21.3	☐ 21.4	☐ 21.5	☐ 21.6	☐ 21.7
	☐ 21.8	☐ 21.9	☐ 21.10	☐ 21.11	☐ 21.12	☐ 21.13	☐ 21.14

Department Name: Rural Development And Panchayat Raj Department							
Application ID:	**5.1.1**						
Application Name:	**Water Conservations Assets**						
Section Name:	**Rural Development – MNERGA**						
Contact Person:	**Joint Director – MNEREGA & State Project Manager**						
R & D Institutions	☐ 22.1	☐ 22.2	☐ 22.3	☐ 22.4	☐ 22.5	☐ 22.6	
Horticulture Stakeholders	☐ 23.1	☐ 23.2	☐ 23.3	☐ 23.4	☐ 23.5		
Decision Support Systems	☒ Soil and Water Conservation Plan ☐ Crop Selection ☐ Land Capability Classification ☐ Nutrient Management ☐ Estimation of Surface Runoff			☒ Designing the Size and location of Farm Ponds ☐ Crop Water Requirement ☐ Water Balance ☐ Water Budgeting			
Remarks	At present the details of Water conservation measure along with locational data is available with NIC. This needs to be accessed through web service. The Department of Rural Development will coordinate with NIC to get this data/ Web Service for which WDD – Sujala III has to send the request letter address to the Secretory RDPR.						

5.2 Agriculture Department, Govt. of Karnataka

Table 5-2 Agriculture Department Soil Fertility Application Requirement

Department Name: Department of Agriculture	
Application ID:	5.2.1
Application Name:	**Soil Fertility Mapping**
Section Name:	**Soil Health, Section**
Section Head:	**DDA-Soil health and Seeds.**
Purpose/ Description:	1. Soil Health Section is collecting the soil samples which is being collected at 2.5 ha grid for irrigated lands and data at 10 ha grids for rain fed areas. In consultation with KSRSAC application has been developed to computerize the data at grid levels and integrate with Bhoomi data. 2. The Bhoomi data is being consumed as web service from Bhoomi Portal. 3. The Grid wise fertility data is maintained by NIC and the Health cards are being generated through the portal. The fertility data is being displayed percentage wise which is further classified

Department Name: Department of Agriculture	
Application ID:	5.2.1
Application Name:	**Soil Fertility Mapping**
Section Name:	**Soil Health, Section**
Section Head:	**DDA-Soil health and Seeds.**

	as very low, low, medium, high and very high for a given village. But the same is not available in the form of Maps showing spatial distribution of fertility data. Soil Health section expect this data to be accessed by LRI portal and generate maps showing spatial distribution of soil fertility for given Taluka with overlays of Cadastral boundaries and watershed boundaries. This data need to be accessed through web services for creation of thematic maps for each chemical properties with overlays of cadastral boundaries. *(Request has to send to NIC through department for providing web service to access the data).*

Functional Requirement			
	GIS Map View ☒	GIS Query ☒	GIS Geo-processing ☒
	GIS Layer Manager ☒	Reports ☐	Navigation ☒
	Clearing House ☒	Dashboard ☒	Attribute based Mapping ☒
	DSS ☒	Attribute Editing ☐	Data Entry/ MIS Module ☒

Data Requirement (Reference to Table 2-1):

Base Maps	☐ 1.1	☒ 1.2	☒ 1.3	☒ 1.4	☒ 1.5	☒ 1.6	☒ 1.7
	☒ 2.1	☒ 2.2	☒ 2.3	☒ 2.4	☒ 2.5	☒ 3.1	☒ 4.1
Cadastral Maps	☒ 5.1	☒ 5.2					
Watershed Boundaries	☒ 6.1	☒ 6.2	☒ 6.3	☒ 6.4	☒ 6.5	☒ 6.6	☒ 6.7
	☒ 6.8						
Grid Data	☒ 7.1	☐ 7.2					
Land Use /Land Cover	☐ 8.1						
Soil Map	☒ 9.1	☒ 9.2	☒ 9.3	☒ 9.4	☒ 9.5	☒ 9.6	☒ 9.7
	☒ 9.8	☒ 9.9					
Land Suitability for Major Crops	☐ 10.1						
Soil Fertility Status	☒ 11.1	☒ 11.2	☒ 11.3	☒ 11.4	☒ 11.5	☒ 11.6	☒ 11.7
	☒ 11.8	☒ 11.9	☒ 11.10	☒ 11.11			
Geology Map	☐ 12.1						
Hydro geomorphology Map	☐ 13.1	☐ 13.2	☐ 13.3	☐ 13.4	☐ 13.5	☐ 13.6	
Water Bodies	☒ 14.1	☒ 14.2	☒ 14.3	☒ 14.4			

Department Name: Department of Agriculture	
Application ID:	5.2.1
Application Name:	**Soil Fertility Mapping**
Section Name:	**Soil Health, Section**
Section Head:	**DDA-Soil health and Seeds.**

Elevation Map	☐ 15.1						
Transport Service	☐ 16.1	☐ 16.2	☐ 16.3				
Agro Climatic Zones	☒ 17.1						
Observation Wells	☐ 18.1	☐ 18.2					
Existing Water Conservation Measures	☐ 19.1						
Climate/ Weather Data	☐ 20.1	☐ 20.2					
Marketing and infrastructural facilities	☐ 21.1	☐ 21.2	☐ 21.3	☐ 21.4	☐ 21.5	☐ 21.6	☐ 21.7
	☐ 21.8	☐ 21.9	☐ 21.10	☐ 21.11	☐ 21.12	☐ 21.13	☐ 21.14
R & D Institutions	☐ 22.1	☐ 22.2	☐ 22.3	☐ 22.4	☐ 22.5	☐ 22.6	
Horticulture Stakeholders	☐ 23.1	☐ 23.2	☐ 23.3	☐ 23.4	☐ 23.5		

Decision Support Systems		
	☐ Soil and Water Conservation Plan	☐ Designing the Size and location of Farm Ponds
	☒ Crop Selection	☐ Crop Water Requirement
	☐ Land Capability Classification	☐ Water Balance
	☒ Nutrient Management	☐ Water Budgeting
	☐ Estimation of Surface Runoff	

Remarks

1- The location of the soil testing laboratories to be displayed on a map with its address details. This should enable the farmers to find nearby soil test laboratory to get facilities.

2- The above data as required (Lat long of Soil Testing Laboratories and address details) have been provided by the Technical officer which needs to be incorporated in the Digital Library.

3- Provision to be made in the portal to add the data pertaining to beneficiary and subsidy details and also it should check that limit of subsidy should not exceed. (Rs. 700/Ha for Gypsum, Rs. 500/Ha for Micro Nutrients, Rs. 300/Ha for Bio-fertilizers, Rs. 1000/Ha for lime and total subsidy not to exceed Rs. 2500/Ha).

4- The categorization of Nutrient data used in the DSS for Nutrient data to be revised as follows:

Category	Organic Carbon (%)	P_2O_5 (Kg/Ha)	K_2O (Kg/Ha)	N (Kg/Ha)
Very Low	<0.25	<11.45	<72.3	<140
Low	0.25-0.50	11.45-22.90	72.3-144.60	140-280
Medium	0.51-0.75	22.91-57.25	144.61-	281-560

Department Name: Department of Agriculture	
Application ID:	5.2.1
Application Name:	**Soil Fertility Mapping**
Section Name:	**Soil Health, Section**
Section Head:	**DDA-Soil health and Seeds.**

			337.40	
High	0.76-1.00	57.26-91.60	337.41-674.80	561-700
Very High	>1.00	>91.60	>674.80	>700

Recommendations:

Category	Recommendation
Very Low	1.67 times of General Recommended Dose (GRD)
Low	1.33 times of General Recommended Dose (GRD)
Medium	General Recommended Dose (GRD)
High	2/3rd of General Recommended Dose (GRD)
Very High	1/3rd of General Recommended Dose (GRD)

Table 5-3 Agriculture Department Seeds, Fertilizer & Plant Protection application

Department Name: Agriculture Department	
Application ID:	5.2.2
Application Name:	**Seeds, Fertilizer and Plant Protection**
Section Name:	**Plant Protection**
Section Head:	**Deputy Director of Agriculture**
Purpose/ Description:	1. Access the agriculture department website • For registration / License certification by the dealers • To list the licensed Seed, Fertilizer and Pesticides which the public can view • Display the list of insecticide/Fertilizer/Seed Inspectors at Hobli, Taluka, Sub division District and State Level. • Area wise details of the Registered Pesticides (including Insecticides, Fungicides, Herbicides, Acaricides, Rodenticides, Bio pesticides and Botanical Pesticides) with recommended crop, pest/diseases, recommended dose, waiting period etc. to be displayed. 2. Display list of Dealers, RSKS on Map with name, address details. 3. On GIS Map, make provision for the department to mark location of samples

Department Name: Agriculture Department	
Application ID:	5.2.2
Application Name:	**Seeds, Fertilizer and Plant Protection**
Section Name:	**Plant Protection**
Section Head:	**Deputy Director of Agriculture**

	of seeds based on complaint/suspicious about the quality received from the farmers. Provision to be made on Map window to update details of quality testing as remarks. 4. Functionality is required to view the detail information about the common diseases found in the Karnataka state and it's Remedial Measures. Also there shall be provision to upload the photograph along with the information related to diseases. Functionality shall be available to departmental users to respond. 5. Functionality is required to view the Seeds/Fertilizer/Pesticides information about stock and price at RSK and State level. MIS Forms needs to be provided to the farmers/RSKs to provide information about the seeds/Fertilizers/Pesticides before 1 month of Kharif /Rabi/summer seasons. This should enable the agriculture department to plan their stocks of seeds at respective RSKs/Dealers. 6. On GIS map Provision shall be made available to view the RSKs/Dealers location along with Information of Name, Address, Contact Number, stock, price, Brand, Product category. Stock and Price information is expected from web service published by kkisan Application (http://kkisan.karnataka.gov.in/)

Functional Requirement	GIS Map View ☒	GIS Query ☒	GIS Geo-processing ☐
	GIS Layer Manager ☒	Reports ☒	Navigation ☐
	Clearing House ☐	Dashboard ☐	Attribute based Mapping ☐
	DSS ☒	Attribute Editing ☒	Data Entry/ MIS Module ☒

Data Requirement (Reference to Table 2-1):

Base Maps	☒ 1.1	☒ 1.2	☒ 1.3	☒ 1.4	☒ 1.5	☒ 1.6	☒ 1.7
	☒ 2.1	☒ 2.2	☒ 2.3	☒ 2.4	☒ 2.5	☒ 3.1	☒ 4.1
Cadastral Maps	☒ 5.1	☒ 5.2					
Watershed Boundaries	☒ 6.1	☒ 6.2	☒ 6.3	☒ 6.4	☒ 6.5	☒ 6.6	☒ 6.7
	☒ 6.8						
Grid Data	☐ 7.1	☐ 7.2					

Department Name: Agriculture Department							
Application ID:	5.2.2						
Application Name:	**Seeds, Fertilizer and Plant Protection**						
Section Name:	**Plant Protection**						
Section Head:	**Deputy Director of Agriculture**						
Land Use /Land Cover	☐ 8.1						
Soil Map	☐ 9.1	☐ 9.2	☐ 9.3	☐ 9.4	☐ 9.5	☐ 9.6	☐ 9.7
	☐ 9.8	☐ 9.9					
Land Suitability for Major Crops	☐ 10.1						
Soil Fertility Status	☒ 11.1	☒ 11.2	☒ 11.3	☒ 11.4	☒ 11.5	☒ 11.6	☒ 11.7
	☒ 11.8	☒ 11.9	☒ 11.10	☒ 11.11			
Geology Map	☐ 12.1						
Hydro geomorphology Map	☐ 13.1	☐ 13.2	☐ 13.3	☐ 13.4	☐ 13.5	☐ 13.6	
Water Bodies	☐ 14.1	☐ 14.2	☐ 14.3	☐ 14.4			
Elevation Map	☐ 15.1						
Transport Service	☒ 16.1	☒ 16.2	☒ 16.3				
Agro Climatic Zones	☐ 17.1						
Observation Wells	☐ 18.1	☐ 18.2					
Existing Water Conservation Measures	☐ 19.1						
Climate/ Weather Data	☐ 20.1	☐ 20.2					
Marketing and infrastructural facilities	☒ 21.1	☒ 21.2	☒ 21.3	☒ 21.4	☒ 21.5	☒ 21.6	☒ 21.7
	☒ 21.8	☒ 21.9	☒ 21.10	☒ 21.11	☒ 21.12	☒ 21.13	☒ 21.14
R & D Institutions	☒ 22.1	☒ 22.2	☒ 22.3	☒ 22.4	☒ 22.5	☒ 22.6	
Horticulture Stakeholders	☐ 23.1	☐ 23.2	☐ 23.3	☐ 23.4	☐ 23.5		
Decision Support	☐ Soil and Water Conservation Plan			☐ Designing the Size and location of			

Department Name: Agriculture Department		
Application ID:	5.2.2	
Application Name:	**Seeds, Fertilizer and Plant Protection**	
Section Name:	**Plant Protection**	
Section Head:	**Deputy Director of Agriculture**	
Systems	☒ Crop Selection ☐ Land Capability Classification ☒ Nutrient Management ☐ Estimation of Surface Runoff	Farm Ponds ☐ Crop Water Requirement ☐ Water Balance ☐ Water Budgeting
Remarks	The above application is dependent on the web services of K-Kisan for applications which are under development.	

5.3 HORTICULTURE DEPARTMENT, GOVT. OF KARNATAKA

Table 5-4 Integrated GIS and MIS Application for Horticulture

Department Name: Department of Horticulture, Karnataka	
Application ID:	5.2.3
Application Name:	**Integrated GIS and MIS Application for Horticulture**
Section Name:	**Horticulture Department**
Section Head:	**Joint Director of Horticulture, Sujala – III**
Purpose/ Description:	1) Tools to visualize location of FPO's, FIG's and beneficiary details. Currently the FAO's, FIG's are updated based on the inputs being provided from the respective Districts and same is being entered using the limited infrastructure at Horticulture Department, Bangalore. 2) Horticulture crop details and subsidy details. 3) Provide internet based tool to update the data by concerned district officers at their respective locations. 4) Provide the thematic tools to generate the maps for Horticultural crops for a given districts. 5) Maps will be generated at state level by the GIS Specialist based at Horticulture Department. 6) Visualization of the thematic map of various horticulture Crops, FPO's, FIP's wise etc. 7) Provision to upload and download Land Use/ Land Cover and Cadastral Maps.

Department Name: Department of Horticulture, Karnataka			
Application ID:	5.2.3		
Application Name:	**Integrated GIS and MIS Application for Horticulture**		
Section Name:	**Horticulture Department**		
Section Head:	**Joint Director of Horticulture, Sujala – III**		
	Following requirements should be included in the MIS portal 1) Marketing, harvesting and post harvesting: - Provision shall be made available in MIS portal. 2) LRI portal should have a separate section pertaining to Horticultural activities. 3) Online updation of FPO and Beneficiaries data. 4) Online updation marketing and production data. 5) Month wise activities plan for departments to implement various schemes through MIS portal and output in form of Charts. 6) Month wise action plans for farmers for crop production, preservation, storage, processing and marketing. – Provision shall be made available to view Package of Practices 7) Month wise action plans for input agencies, seeds, fertilizers, organic manure, bio fertilizers, growth regulators, herbicides, plant protection chemicals and machineries. 8) Provision to update the details of a. Customized Services b. Output Services c. Input Services The details of the above are yet to be received from Horticulture Department along with digital layer pertaining to marketing infrastructure details. 9) The requirements of input seeds (seed production planning), Fertilizers requirement, organic manure, Bio fertilizers, herbicides, plant protection, growth regulators, Agriculture machineries to be provided before 60 days to 1 year depending upon the crop. This should enable the Horticulture department to plan for production. • For plantation and fruits 1 year before the planting. • For Vegetables and Flowers 60 Days before the Planting.		
Functional Requirement	GIS Map View ☒	GIS Query ☒	GIS Geo-processing ☒
	GIS Layer Manager ☒	Reports ☒	Navigation ☒
	Clearing House ☒	Dashboard ☐	Attribute based Mapping ☒
	DSS ☒	Attribute Editing ☒	Data Entry/ MIS Module

Department Name: Department of Horticulture, Karnataka	
Application ID:	5.2.3
Application Name:	**Integrated GIS and MIS Application for Horticulture**
Section Name:	**Horticulture Department**
Section Head:	**Joint Director of Horticulture, Sujala – III**

							☒
Data Requirement (Reference to Table 2-1):							
Base Maps	☒ 1.1	☒ 1.2	☒ 1.3	☒ 1.4	☒ 1.5	☒ 1.6	☒ 1.7
	☒ 2.1	☒ 2.2	☒ 2.3	☒ 2.4	☒ 2.5	☒ 3.1	☒ 4.1
Cadastral Maps	☒ 5.1	☒ 5.2					
Watershed Boundaries	☐ 6.1	☐ 6.2	☒ 6.3	☐ 6.4	☐ 6.5	☒ 6.6	☒ 6.7
	☒ 6.8						
Grid Data	☐ 7.1	☐ 7.2					
Land Use /Land Cover	☒ 8.1						
Soil Map	☒ 9.1	☒ 9.2	☒ 9.3	☒ 9.4	☒ 9.5	☒ 9.6	☒ 9.7
	☒ 9.8	☒ 9.9					
Land Suitability for Major Crops	☒ 10.1						
Soil Fertility Status	☒ 11.1	☒ 11.2	☒ 11.3	☒ 11.4	☒ 11.5	☒ 11.6	☒ 11.7
	☒ 11.8	☒ 11.9	☒ 11.10	☒ 11.11			
Geology Map	☐ 12.1						
Hydro geomorphology Map	☐ 13.1	☐ 13.2	☐ 13.3	☐ 13.4	☐ 13.5	☐ 13.6	
Water Bodies	☒ 14.1	☒ 14.2	☒ 14.3	☒ 14.4			
Elevation Map	☐ 15.1						
Transport Service	☒ 16.1	☒ 16.2	☒ 16.3				
Agro Climatic Zones	☒ 17.1						
Observation Wells	☐ 18.1	☐ 18.2					
Existing Water Conservation Measures	☒ 19.1						
Climate/ Weather Data	☒ 20.1	☒ 20.2					
Marketing and infrastructural facilities	☒ 21.1	☒ 21.2	☒ 21.3	☒ 21.4	☒ 21.5	☒ 21.6	☒ 21.7
	☒ 21.8	☒ 21.9	☒ 21.10	☒ 21.11	☒ 21.12	☒ 21.13	☒ 21.14
R & D Institutions	☒ 22.1	☒ 22.2	☒ 22.3	☒ 22.4	☒ 22.5	☒ 22.6	
Horticulture Stakeholders	☒ 23.1	☒ 23.2	☒ 23.3	☒ 23.4	☒ 23.5		
Decision Support Systems	☒ Soil and Water Conservation Plan ☒ Crop Selection				☒ Designing the Size and location of Farm Ponds		

Department Name: Department of Horticulture, Karnataka		
Application ID:	5.2.3	
Application Name:	**Integrated GIS and MIS Application for Horticulture**	
Section Name:	**Horticulture Department**	
Section Head:	**Joint Director of Horticulture, Sujala – III**	
	☐ Land Capability Classification ☒ Nutrient Management ☐ Estimation of Surface Runoff	☒ Crop Water Requirement ☐ Water Balance ☐ Water Budgeting
Remarks	The input data for the above requirements (Excluding the data mentioned in Table 2-1) will be provided by Horticulture Department in the digital format (GIS data in Shape File, MIS data in Excel or standard RDBMS) to build the Digital Library.	

5.4 Sericulture Department, Govt. of Karnataka

Table 5-5 Application Requirement Sericulture Department

Department Name: Department of Sericulture	
Application ID:	**5.2.4**
Application Name:	**Mulberry plantation including Tree plantations**
Section Name:	**Department of Sericulture**
Section Head:	**Additional Director, Sericulture.**
Purpose/ Description:	• Display thematic map showing the Mulberry crops grown in the areas. On a click display document showing Integrated farming systems- Models developed by Agri. Universities and the Package of Practice. • Enable farm users and departments to cross check the feasibility of irrigation water requirement for rain fed Mulberry and designing size of farm ponds through DSS pertaining to Hydrology using LRI Geoportal. • Information about Planning Inputs required for raising nursery based on LRI portal (such as maps showing irrigation facilities within the vicinity of silk farms. • Enable planners to select the location of existing/ proposed nurseries and get the details of soil nutrient values and parcel number. • To assess the nutrient required for raising the nursery: Nutrient Management Decision Support System • Display Production centers, place of Availability, Selling rate for the selected bio-fertilizers through web service from kkisan. • Based on location details provided for tree mulberry, run Soil and Water Conservation DSS to assess trenching and also provide Package of Practice for selected plantation areas. • MIS should have provision to enter the schemes details of rearing equipment,

Department Name: Department of Sericulture	
Application ID:	**5.2.4**
Application Name:	**Mulberry plantation including Tree plantations**
Section Name:	**Department of Sericulture**
Section Head:	**Additional Director, Sericulture.**

construction of rearing house, construction of mounting house. The system should have provision to display and link the related document pertaining to quality control and advance technologies details. This should also include details of subsidy provided to farmers.

- LRI Portal should provide the information about
  - Bonus to Mysore and Bivoltine seed cocoons
  - Production and Productivity based seed cocoon incentives
  - Transportation cost for Non-Traditional Bivoltine cocoons
  - Mysore/BV Chawki incentives
  - Subsidy for construction of reeling sheds
  - Subsidy for installation of improved cottage basin
  - Subsidy for installation of Italian cottage/filature basin
  - Subsidy for installation of MERM units
  - Establishment of Automatic reeling unit
  - Subsidy for installation of Generator
  - Subsidy for installation of Solar water heater
  - Subsidy for installation Heat recovery units
  - Pupa processing units
  - Incentive for pierced cocoons
  - Women development programmes
  - Incentive for ARM BV Raw silk
    - Capacity building
    - Economics of Mulberry cultivation
    - Soil, water and leaf analysis

Functional Requirement			
	GIS Map View ☒	GIS Query ☒	GIS Geo-processing ☒
	GIS Layer Manager ☒	Reports ☒	Navigation ☒
	Clearing House ☐	Dashboard ☒	Attribute based Mapping ☒
	DSS ☒	Attribute Editing ☐	Data Entry/ MIS Module ☒

Data Requirement (Reference to Table 2-1):

Base Maps	☒ 1.1	☒ 1.2	☒ 1.3	☒ 1.4	☒ 1.5	☒ 1.6	☒ 1.7
	☒ 2.1	☒ 2.2	☒ 2.3	☒ 2.4	☒ 2.5	☒ 3.1	☒ 4.1
Cadastral Maps	☒ 5.1	☒ 5.2					
Watershed Boundaries	☐ 6.1	☐ 6.2	☐ 6.3	☐ 6.4	☐ 6.5	☒ 6.6	☒ 6.7
	☒ 6.8						
Grid Data	☐ 7.1	☐ 7.2					
Land Use /Land Cover	☒ 8.1						
Soil Map	☒ 9.1	☒ 9.2	☒ 9.3	☒ 9.4	☒ 9.5	☒ 9.6	☒ 9.7
	☒ 9.8	☒ 9.9					

Department Name: Department of Sericulture							
Application ID:	**5.2.4**						
Application Name:	**Mulberry plantation including Tree plantations**						
Section Name:	**Department of Sericulture**						
Section Head:	**Additional Director, Sericulture.**						
Land Suitability for Major Crops	☒ 10.1						
Soil Fertility Status	☒ 11.1	☒ 11.2	☒ 11.3	☒ 11.4	☒ 11.5	☒ 11.6	☒ 11.7
	☒ 11.8	☒ 11.9	☒ 11.10	☒ 11.11			
Geology Map	☐ 12.1						
Hydro geomorphology Map	☐ 13.1	☐ 13.2	☐ 13.3	☐ 13.4	☐ 13.5	☐ 13.6	
Water Bodies	☒ 14.1	☒ 14.2	☒ 14.3	☒ 14.4			
Elevation Map	☐ 15.1						
Transport Service	☒ 16.1	☒ 16.2	☒ 16.3				
Agro Climatic Zones	☒ 17.1						
Observation Wells	☒ 18.1	☒ 18.2					
Existing Water Conservation Measures	☒ 19.1						
Climate/ Weather Data	☒ 20.1	☒ 20.2					
Marketing and infrastructural facilities	☒ 21.1	☒ 21.2	☒ 21.3	☒ 21.4	☒ 21.5	☒ 21.6	☒ 21.7
	☒ 21.8	☒ 21.9	☒ 21.10	☒ 21.11	☒ 21.12	☒ 21.13	☒ 21.14
R & D Institutions	☒ 22.1	☒ 22.2	☒ 22.3	☒ 22.4	☒ 22.5	☒ 22.6	
Horticulture Stakeholders	☐ 23.1	☐ 23.2	☐ 23.3	☐ 23.4	☐ 23.5		
Decision Support Systems	☒ Soil and Water Conservation Plan ☒ Crop Selection ☐ Land Capability Classification ☒ Nutrient Management ☐ Estimation of Surface Runoff			☒ Designing the Size and location of Farm Ponds ☒ Crop Water Requirement ☐ Water Balance ☐ Water Budgeting			
Remarks	The web services and data required (Excluding the data mentioned in Table 2-1) should be made available by Sericulture Department.						

5.5 Animal Husbandry Department, Govt. of Karnataka

Table 5-6 Animal Husbandry Application-Disease Mapping

Department Name: Department Of Animal Husbandry – VS							
Application ID:	**5.2.5**						
Application Name:	**Disease Mapping**						
Section Name:	**Animal Husbandry**						
Section Head:	**The Additional Director, Animal Husbandry – VS**						
Purpose/ Description:	• Disease mapping to show various types of Deceases on density map of Live Stock. • Provision to overlay Admin boundaries. • Provision to search and display selected diseases and map on census village boundaries. • Thematic map showing distribution of demographic on a village boundary map (SC/ST/ Marginal Farmer etc. as per census data). • MIS to create new form for schemes/ programs related to decease control and Pashu Bhagya Yojana to monitor activities.						
Functional Requirement	GIS Map View ☒	GIS Query ☒	GIS Geo-processing ☒				
	GIS Layer Manager ☒	Reports ☒	Navigation ☒				
	Clearing House ☐	Dashboard ☐	Attribute based Mapping ☐				
	DSS ☐	Attribute Editing ☐	Data Entry/ MIS Module ☒				
Data Requirement (Reference to Table 2-1):							
Base Maps	☒ 1.1	☒ 1.2	☒ 1.3	☒ 1.4	☒ 1.5	☒ 1.6	☒ 1.7
	☒ 2.1	☒ 2.2	☒ 2.3	☒ 2.4	☒ 2.5	☒ 3.1	☒ 4.1
Cadastral Maps	☐ 5.1	☐ 5.2					
Watershed Boundaries	☐ 6.1	☐ 6.2	☐ 6.3	☐ 6.4	☐ 6.5	☐ 6.6	☐ 6.7
	☐ 6.8						
Grid Data	☐ 7.1	☐ 7.2					
Land Use /Land Cover	☒ 8.1						
Soil Map	☐ 9.1	☐ 9.2	☐ 9.3	☐ 9.4	☐ 9.5	☐ 9.6	☐ 9.7
	☐ 9.8	☐ 9.9					
Land Suitability for Major Crops	☐ 10.1						
Soil Fertility Status	☐ 11.1	☐ 11.2	☐ 11.3	☐ 11.4	☐ 11.5	☐ 11.6	☐ 11.7
	☐ 11.8	☐ 11.9	☐ 11.10	☐ 11.11			
Geology Map	☐ 12.1						
Hydro geomorphology Map	☐ 13.1	☐ 13.2	☐ 13.3	☐ 13.4	☐ 13.5	☐ 13.6	
Water Bodies	☒ 14.1	☒ 14.2	☒ 14.3	☒ 14.4			

Department Name: Department Of Animal Husbandry – VS							
Application ID:	**5.2.5**						
Application Name:	**Disease Mapping**						
Section Name:	**Animal Husbandry**						
Section Head:	**The Additional Director, Animal Husbandry – VS**						
Elevation Map	☐ 15.1						
Transport Service	☒ 16.1	☒ 16.2	☒ 16.3				
Agro Climatic Zones	☐ 17.1						
Observation Wells	☒ 18.1	☒ 18.2					
Existing Water Conservation Measures	☐ 19.1						
Climate/ Weather Data	☒ 20.1	☒ 20.2					
Marketing and infrastructural facilities	☐ 21.1	☐ 21.2	☐ 21.3	☐ 21.4	☐ 21.5	☐ 21.6	☐ 21.7
	☐ 21.8	☐ 21.9	☐ 21.10	☐ 21.11	☐ 21.12	☐ 21.13	☐ 21.14
R & D Institutions	☐ 22.1	☐ 22.2	☐ 22.3	☐ 22.4	☐ 22.5	☐ 22.6	
Horticulture Stakeholders	☐ 23.1	☐ 23.2	☐ 23.3	☐ 23.4	☐ 23.5		
Decision Support Systems	☐ Soil and Water Conservation Plan ☒ Crop Selection ☐ Land Capability Classification ☒ Nutrient Management ☐ Estimation of Surface Runoff			☐ Designing the Size and location of Farm Ponds ☒ Crop Water Requirement ☐ Water Balance ☐ Water Budgeting			
Remarks	The Geocoded data pertaining to Diseases will be shared by the Department of Animal Husbandry.						

6. OTHER NONFUNCTIONAL REQUIREMENTS

6.1 PERFORMANCE REQUIREMENTS

There is no industry performance benchmark available for GIS applications. To define the performance benchmark, we shall collect the performance data for 6 months after beta go live and based on the data collected performance benchmark can be defined.

The overall response time will be measured as server response time and not rendering of the application/page on the browser, as there are lots of factors which influence the performance e.g. Number of hops, available bandwidth, file Upload/download and also response time may vary from browser to browser.

Maximum concurrent viewing user would be 5000 and 50 editing user.

6.2 SECURITY REQUIREMENTS

User Management: The portal/Mobile app shall comply with a designated policy for the processes of secure data disposal from the system.

Developers are expected to develop the portal security in focus (SQL Injection etc.) while developing the web functionalities. Developer must adopt appropriate architecture and design guideline to avoid such web vulnerabilities.

Application shall have the role-based access control at UI layer and there won't be any special restriction implemented at Database Level like data encryption.

There shall be provision for recording IP Address, User accessing the Software besides the Data and time in a record shall be made.

6.2.1 MANAGEABILITY

The system has to be designed to provide necessary manageability of system to ensure effective monitoring and timely resolution of any issues relating to performance, availability and security of systems.

6.2.2 USABILITY REQUIREMENTS

- The primary browser on which application will be best viewed will be Mozilla, Chrome and Internet Explorer.

- The primary android mobile on which app will be best available on android version higher or equivalent to 6.0.1.
- Comprehensive sitemap details in an easy to browse format.
- The system should ensure that same screen appears each time it is launched
- Consistent and logical navigation flow
- Usage of standard GUI features (e.g., pull-down menus, dialog boxes, toolbar buttons)
- Consistent look and feel
- Data formats are consistent throughout application windows
- Provision for tool tips at each field and also online Help at the field level
- The system should prevent the users from errors and allow error recovery

6.2.3 SCALABILITY

The system architecture has to be highly scalable in order to continue offering services at desired service levels during the entire duration of the contract.

6.2.4 AVAILABILITY

System has to be designed and built in a manner that provides for maximum availability as required to meet the specified service levels.

ANNEXURE 1

K-GIS Metadata Standards for LRI Datasets:

1. Metadata reference - information about metadata.

   1.1 Metadata Date- the date at which metadata was created or last updated

   1.2 Metadata Standard Version – the version of the metadata standard used to document the dataset.

2. Identification Information - basic information about the Content

   2.1 Abstract- a brief narrative summary of the data set.

   2.2 Access (Public/Restricted) - restrictions for accessing the data set.

   2.3 Usage advisory- restrictions for using the dataset after access are granted.

   2.4 Generating Source Agency -list of sources and a short discussion of the information contributed by each Source Originator

   2.5 Date of Generation- time period for which the data set corresponds to the currentness reference.

   2.6 Data Type – Information of Point, Polygon or Line.

   2.7 Contact Person in Source Agency – the contact person responsible for the Feature information.

   2.8 Publisher –Publisher of the dataset

   2.9 Publication Date – Date of Layer published

   2.10 Publisher Contact Person – Person responsible for the Layer information.

   2.11 Publisher Contact Telephone – organization Contact Number responsible for the Layer information.

   2.12 Publisher Contact Fax Number – fax number of organisation responsible for the Layer information.

   2.13 Metadata Contact Email Address - organization Email responsible for the Layer information

   2.14 Metadata Contact Address – Address information of Organization responsible for the Layer information.

   2.15 Completion Status - the completion status and maintenance information for the data set.

   2.16 Update Frequency - the frequency with which changes and additions are made to the

dataset after the initial data set is completed.

2.17 Theme Keyword & Thesaurus - words or phrases summarizing an aspect of the data set.

3. Data Quality Information – a broad assessment of the quality of spatial content – if it has been determined.

3.1. Logical Consistency Report - an explanation of the correctness of relationships in the dataset used.

3.2. Completeness Report - information about omissions, selection criteria, generalization and definitions used and other rules used to derive the dataset.

4. Entity/Attribute Information - information about the coding attribute.

4.1. Entity Definition – Definition of Entity

4.2. Attribute Definition – Definition of Attribute