

Chapter 1

Introduction

1.1 PROJECT DETAILS

Organization	: Bhaskaracharya Institute for Space Application and Geo-Informatics (BISAG), Govt. of Gujarat, Gandhinagar.
Project Title	: “Water Resource Management System”
Front-End	: ASP.NET with C#
Back-End	: PostgreSQL
Software	: Visual Studio 2013, GeoServer
Document tools	: Microsoft Office 2007, Umlet
External Project Guide	: Mr. Vishal Patel (Project scientist, BISAG)
Team Member	: 3
Project Duration	: 13 th December 2017 to 31 st March 2018

1.2 PROJECT PURPOSE:

Purpose of creating this system is to make resource management fast as well as easy, which is easily manageable by administrator and to be used in current network efficiently.

Our WATER RESOURCE MANAGEMENT SYSTEM is intended to be used by Government of India Ministries/ Departments their organizations to publish datasets, documents and services collected by them for public use. It intends to increase transparency in the functioning of government and also open avenues for many more innovative uses of government data to give different perspective.

1.3 PROJECT SCOPE:

Three concepts are encompassed by the scope of the Water Resource Management System.

The first pertains to the replacement of paper-based information dataset using a digital format, the second relates to a complementary electronic strategy for the handling of user complains and the third surrounds the Visualization of Dataset in different user-friendly formats.

1.4 PROJECT OBJECTIVE

Water Resource Management System will provide an automate manner of activities right from managing the information of water resources to handling user Complains and Donations.

- System allows Admin to manage resources.
- System allows User to filter resources based on its type and state in which it is located.
- System allows User to download files uploaded by admin.
- System allows User to Register Complain if they find any issue with water.
- System allows User to donate funds for government welfare.

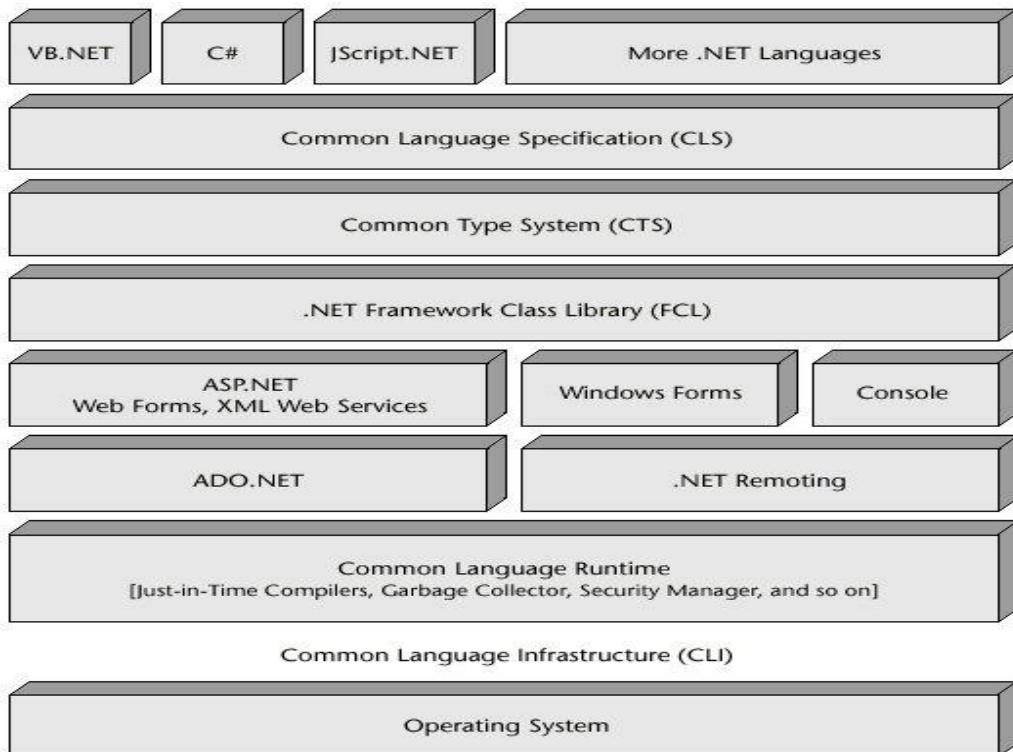
1.5 TECHNOLOGY AND LITERATURE REVIEW

1.5.1 ASP.NET WITH C#

ASP.NET is a mature web platform that provides all the services that you require to build enterprise-class server-based web applications using .NET on Windows.

ASP.NET offers three frameworks for creating web applications: Web Forms, ASP.NET MVC, and ASP.NET Web Pages. Each framework targets a different development style. The one you choose depends on a combination of your programming assets (knowledge, skills, and development experience), the type of application you're creating, and the development approach you're comfortable with.

We have used Web Forms for development of our Project. With ASP.NET Web Forms, you can build dynamic websites using a familiar drag-and-drop, event-driven model. A design surface and hundreds of controls and components let you rapidly build sophisticated, powerful UI-driven sites with data access.



1.5.2 VISUAL STUDIO 2013

Microsoft Visual Studio is an integrated development environment (IDE) from Microsoft. It is used to develop computer programs, as well as web sites, webapps, web services and mobile apps.



Microsoft Visual Studio Community2013 is a very powerful development Environment, essentially a product with something for just about everyone. You can code apps and application in C++, C#, VB, F#,

HTML5, Python, JavaScript and more. Designers, editors, debuggers and profilers help to polish your work. There's web tooling for ASP.NET,Node.js, and JavaScript, and Apache Cordova and Unity tools mean you can target iOS and Android, as well as Windows.

1.5.3 GEOSERVER [version 2.12.1]

GeoServer is a Java-based software server that allows users to view and edit geospatial data. Using open standards set forth by the Open Geospatial Consortium (OGC), GeoServer allows for great flexibility in map creation and data sharing. Geoserver is built based on Geotools, an open source Java GIS toolkit.

A screenshot of the GeoServer web interface. The top navigation bar shows "Logged in as admin." and a "Logout" button. The main content area is titled "Welcome" and displays the following information:

- This GeoServer belongs to The Ancient Geographers.
- 23 Layers (with "Add layers" button)
- 12 Stores (with "Add stores" button)
- 10 Workspaces (with "Create workspaces" button)
- Service Capabilities:
 - WCS: 1.0.0, 1.1.0, 1.1.1, 1.1, 2.0.1
 - WFS: 1.0.0, 1.1.0, 2.0.0
 - WMS: 1.1.1, 1.3.0
 - TMS: 1.0.0
 - WMS-C: 1.1.1
 - WMPS: 1.0.0
- A warning message: "⚠ The master password for this server has not been changed from the default. It is **highly** recommended that you change it now. [Change it](#)"
- A warning message: "⚠ The administrator password for this sever has not been changed from the default. It is **highly** recommended that you change it now. [Change it](#)"
- A warning message: "⚠ No strong cryptography available, installation of the unrestricted policy jar files is recommended"
- A note: "This GeoServer instance is running version 2.12.1. For more information please contact the administrator."

The sidebar on the left contains links to various configuration sections: About & Status, Data, Services, Settings, Tile Caching, Security, Demos, and Tools.

1.5.4 OPENLAYER3 :

OpenLayers is an open source JavaScript library for displaying map data in web browsers as maps.



It provides an API for building rich web-based geographic Applications similar to Google Maps and Bing Maps. OpenLayers makes it easy to put a dynamic map in any web page. It can display map tiles, vector data and markers loaded from any source. OpenLayers has been developed to further the use of geographic information of all kinds.

The shapefile format is simple, it can store the primitive geometric data types of points, lines, and polygons. Shapes (points/lines/polygons) together with data attributes can create infinitely many representations about geographic data. Representation provides the ability for powerful and accurate computations.

1.5.5 POSTGRESQL/ POSTGIS:

PostgreSQL, often simply Postgres, is an object-relational database management system (ORDBMS) with an emphasis on extensibility and standards compliance. As a database server, its primary functions are to store data securely and return that data in response to requests from other software applications.

Along with the above plugins/library the front end will be coded using HTML, CSS and Javascript while the back end will be coded using asp.net with C#.



Chapter 2

About the System

2.1 MAIN MODULES OF THE SYSTEM:

There are two main modules of the system as mention below:

➤ **Users**

- Can Get Information.
- Can Register Complaint.
- Can Donate Fund.
- Can Download Files.
- Can View News.

➤ **Admin**

- Can Manage Resources.
- Can Handle Complaints.
- Can Upload Files.
- Can View Donations.

2.2 MODULE DESCRIPTION:

Sub modules of the system are as below:

1. Display Water Resources

System gives facility to display water resources in three different formats On Map, in Gridview and by Charts. It provides dropdown list according to name of resource and name of state. After applying proper filters, it shows relevant data in selected format.

System gives facility to add new resources in database and load it onto a map through two approaches: By Providing Data and by Drawing through GUI. Also Resources can be deleted if it becomes obsolete.

2. News Feed

System gives facility for admin to add news and policies announced by government which everyone can view on home page.

3. Dataset Files

System provides facility for admin to add files and documents related to system which registered users can download.

4. Complaint Handling

System provides facility for registered users of registering complaints and can also view the status whether the complaint is viewed or not, while admin can handle the status of complaint. At the time when admin views the complain, SMS will be sent to the user as an acknowledgement.

5. Donation

System provides facility to registered users for donating money if they want, which admin can view, how much money user has donated and on which date. System will generate a donation receipt and User can download it.

2.3 CONSTRAINTS:

2.3.1 USER INTERACE

- User is required to have at least one mobile number.
- The user must register their details for login process to access all the functionalities except news feeds.

2.3.2 HARDWARE INTERFACE

- The hardware required for using this system is just personal computer with internet facility.

2.3.3 SAFETY AND SECURITY CONSIDERATION

- As we have payment option for donation, valid credentials are needed.
- Password is stored in MD5 encryption format for security purpose.

2.3.4 DESIGN AND IMPLEMENTATION CONSTRAINTS

- Since this system runs on internet, internet facility for system is needed.
- The system must be reliable enough to run crash and glitch free more or less indefinitely or facilitate error recovery strong enough such that glitches are never revealed to its end-users.

2.4 ASSUMPTION AND DEPENDANCIES

2.4.1 ASSUMPTIONS

- The data retrieved from the shape shows existing water resource.
- Admin have already registered and have valid authentication credentials.

2.4.2 DEPENDANCIES

- All the functions are accessible to User only after login except news feed.

2.5 HARDWARE AND SOFTWARE REQUIREMENTS:

2.5.1 Hardware Requirements:

- Laptop/Personal Computers with 1.8 GHz processor, 2GB RAM and 5GB Hard Disk.

2.5.2 Software Requirements For Development :

- Operating system: Windows
- Visual Studio 2013
- PostgreSQL
- GeoServer 2.12.1

2.6 PROJECT PLANNING AND SCHEDULING:

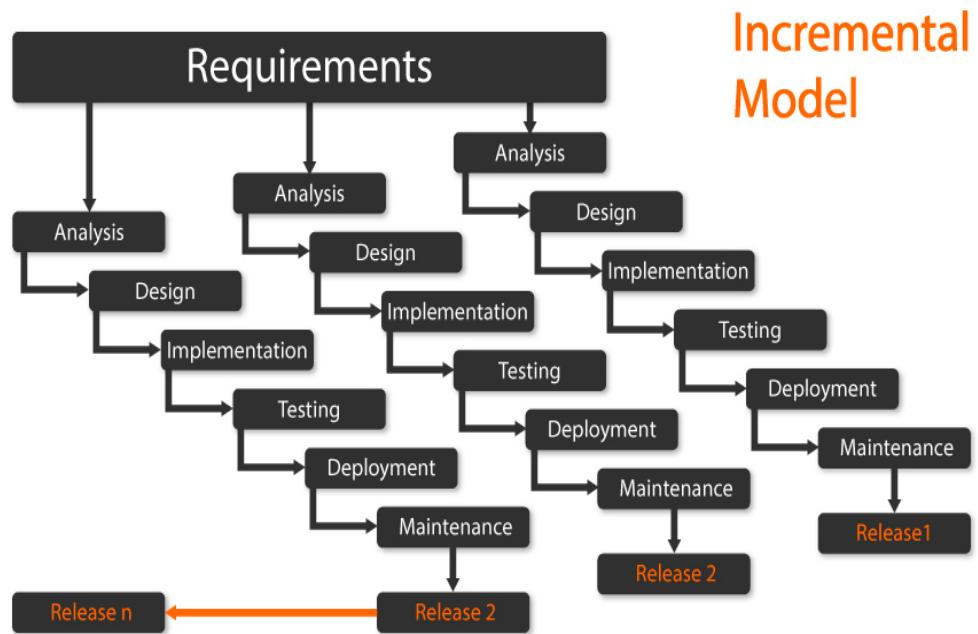
2.6.1 Project Development Approach and Justification

INCREMENTAL MODEL

The incremental approach attempts to combine the waterfall sequence with some of the advantages of prototyping. This approach is favored by many object-oriented practitioners.

It basically divides the overall project into a number of increments. Then it applies the waterfall model to each increment. The system is put into production when the first increment is delivered. As time passes additional increments are completed and added to the working system. This approach is favored by many object-oriented practitioners.

Fig 2.1 Incremental Model



Our **Water Resource Management System** is based on **Incremental software process model**. The Incremental Model combines elements of the linear sequential model with the iterative philosophy of prototyping. The incremental model applies linear sequences in a staged fashion as calendar time progresses.

The incremental model is best suited in our project. As this incremental model diagram that each module are independent and don't interact with each other. Whenever there is a new module needed to be added such as at some time application will have to update then it is independently added without affecting any other module. In this type of project always some changes needed so as the time increase it must be changed so fulfill these types of requirement this model is best suited.

Justification

- If we have small team, we use this structure. Here we have three-person team.
- If customer or user not satisfied with core product then we provide 2nd incremental to them easily.
- Here we have all the requirements of system.

2.6.2 Milestone & Deliverables

Management needs information. As software is intangible, this information can only be provided as documents that describe the state of the software being developed without this information it is impossible to judge progress and schedules can not be updated. Milestone is an end point of the software process activity.

The project was mainly divided into two basic modules which are:

1. Admin Module
2. User Module

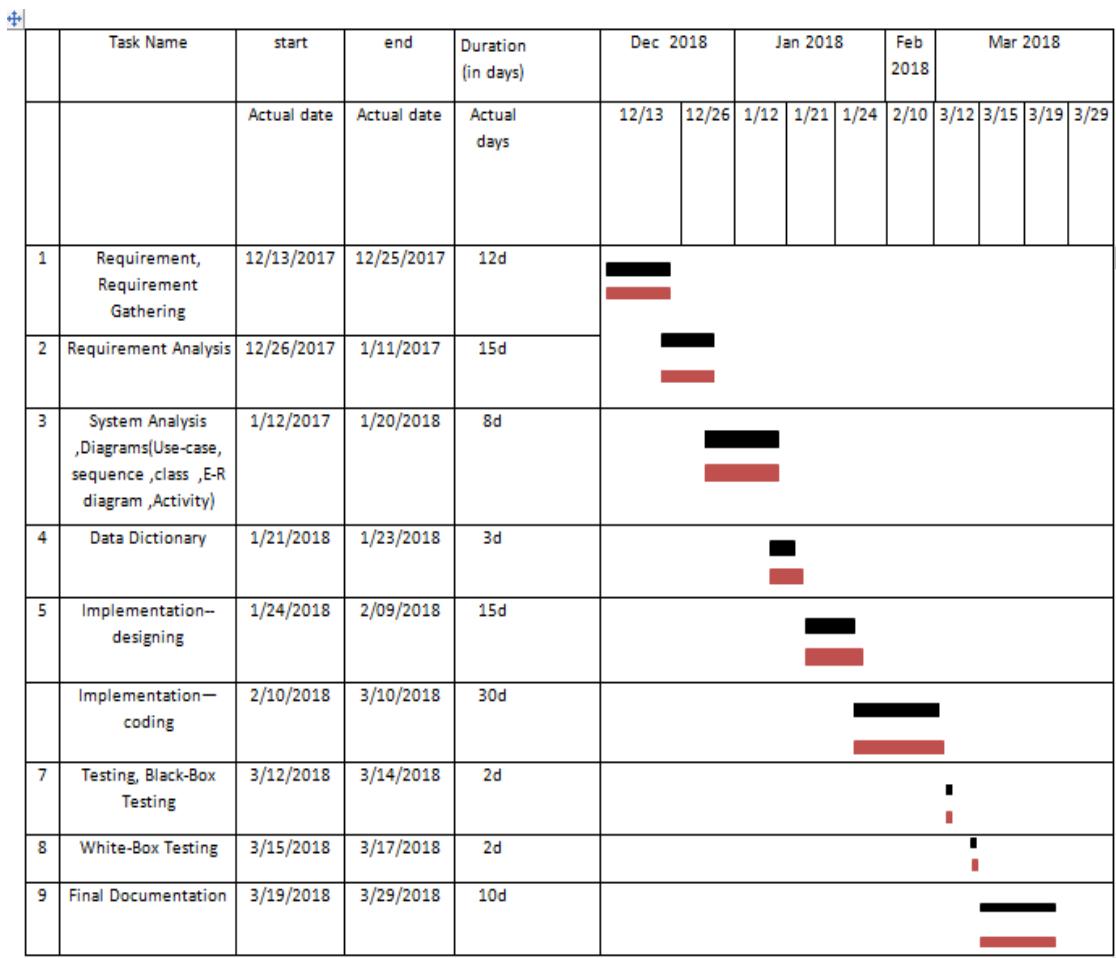
We have divided the software process into activities for the following milestone that should be achieved. At each milestone there should be formal output such as report that can be represented to the management.

- Milestone represents the end of the distinct, logical stage in the project.
- Milestone may be internal project results that are used by the project manager to check progress.

Table 2.2 Milestones and Deliverables

Software Process Activity	Milestone
Project Plan	Project schedule
Requirement Collection	User requirements
Data flow analysis	System flow
Design	System Design Document
1. Database design 2. User Interface design	
Implementation	Access Rights
1. Code for giving security 2. Code for reports	Reports
Testing	Setting validations and error messages

Schedule Representation



Chapter 3

System Analysis

3.1 FUNCTIONAL REQUIREMENTS

Functional requirements define the fundamental actions that must take place in the software in accepting and processing the inputs and generating the outputs

3.1.1 Login

R1: System allows user to login.

R1.1: System authenticates Admin and User based on Email-Id and Password.

Input: Email_id,Password

Processing: System matches the entries in the database. if match is found then set auth_status to Admin or User, else print amessage and allow user to change the password if registered.

Output :auth_status

R1.1.1: if auth_status is 1 then redirect to Admin domain.

Input: auth_status

Processing: System will be redirected to main page of admin.

Output: Admin_Homepage

R1.1.2: if auth_status is 0 then redirect to User domain.

Input: auth_status

Processing: System will be redirected to main page of user.

Output: user_Homepage

R1.1.3: if user has forgotton the Password, System gives the Password.

Input: Security_question, Answer, Email_id

Processing: System matches entered details with the entries in the database. if match is found then provides Password which is visible for 5 Seconds on screen.

Output: Password

R1.2: System offer users to create new account and register.

Input: FirstName, LastName, Email_id, Phone_no, Password, Security_question, Answer, OTP

Processing: System provides interface through which users can enter details and stores it in database after performing validations.

Output :status_successful_registration

3.1.2 Security Question

R2: System allows Admin to view and manage Security Questions.

Input: Sec_id

Processing: System fetches all the Security Questions from database

Output: Security_Questions

R2.1: System allows Admin to add questions for Forgot Password.

Input :Sec_id,Security_Question

Processing : System provides text field for inserting questions and
then store the details in database.

Output :Ques_add_Status

R2.2: System allows Admin to delete Security Questions.

Input: Sec_id

Processing: System removes question from database as per the
selection.

Output :del_Ques_flag

R2.3: System allows Admin to update Security Question

Input: item_id

Processing: System provides textbox to change the question. After
successful update, New details will be stored in the
database.

Output :upd_Ques_flag

3.1.3 Display Water Resources

R3: System allows Admin to manage resources.

R3.1: System allows Admin to add resources.

R3.1.1: System allows Admin to add resource through UI.

Input: name, type, data_object, coordinates.

Processing: System provides textbox to insert data and marker to
draw on Map.

Output :resource_added

R3.1.2: System allows Admin to add resource by providing coordinates.

Input: name,type,data_object, coordinates

Processing: System provides textbox to insert data and Latitude
and Longitude.

Output :resource_added

R3.2: System allows Admin to delete resources.

Input: gid

Processing: System allows user to sort data by state or type and remove
the details from database on selection.

Output: del_Resource_flag

R4: System allows User to filter resources based on its type and the state in which it is located.

Input: resources_bystate/resources_bytype

Processing: System allows user to select state or type in dropdown and fetch data
accordingly from database

Output: resources_detail

R5: System allows Users to view chart based on its type and state.

Input: type or st_name

Processing: System provides dropdown to select state or type, accordingly fetch
data from database and generate charts

Output: details_on_chart

3.1.4 DataSet Files

R6: System allows Admin to upload file

Input: did,filename

Processing: System allows admin to browse and upload a file.

Output: file_added_status

R7: System allows User to view and download uploaded files.

Input: datasetfiles_show

Processing: System allow users to select file, fetches its data from database
and download file

OutPut: File_downloaded_successfully

3.1.5 Complain Handling

R8: System allows User to register complain if they find issue with waterresources.

Input: uid.city_name,state_name,Message

Processing: System provides facility to select state & city from dropdown and
textarea for registering complain and store all details in database.

Output: Complain_status

R9: System facilitates Admin with Handling Complain module.

R9.1 System displays complain details to the Admin with complain count of same
city and City name.

Input: Complain_show

Processing: System fetches details of complains from database.

Output: Complain_details

R9.2: System allows Admin to view each Complain and give acknowledgement.

Input: complain_id

Processing: System gives facility to select complain and give
acknowledgement message to user on single click.

Output: Complain_status

3.1.6 Donation

R10: System allows User to donate funds for government welfare.

Input: payment_details

Processing: System takes Details and payment is processed via payumoney, on
successful payment System generates challan receipt which can be
downloaded in pdf format and stores donation details in database.

Output: Donation_Challan

R11: System facilitates Admin to view donations.

Input: view_donation

Processing: System fetches donation details from database

Output: show_donation_List.

3.2 NON-FUNCTIONAL REQUIREMENTS

Nonfunctional requirements define the needs in terms of performance, logical database requirements, design constraints, standards compliance, reliability, availability, security, maintainability and portability.

3.2.1 Performance Requirements

As Performance requirements define acceptable response time for system functionality,

- The load time for user interface screens shall take no longer than two seconds.
- The log in information shall be verified within five seconds.
- Queries shall return results within five seconds.
- The server shall be capable of supporting no less than 100 concurrent connections.

3.2.2 Safety Requirements

- There shall be consistency in variable names within the system.
- The graphical user interface shall have a consistent look and feel.
- Passwords are stored in encrypted format in database.
- System must be reliable and have good mechanism of recovery for database failures.

3.2.3 Security Requirements

The identified non-functional security requirements that directly relate to the entire project are:

System use recovery protocol for database as transaction is one of the major aspect. Also provide safe login for both User as well as Admin using network protocols.

3.3 SYSTEM ARCHITECTURE DESIGN:

3.3.1 USE-CASE DIAGRAM

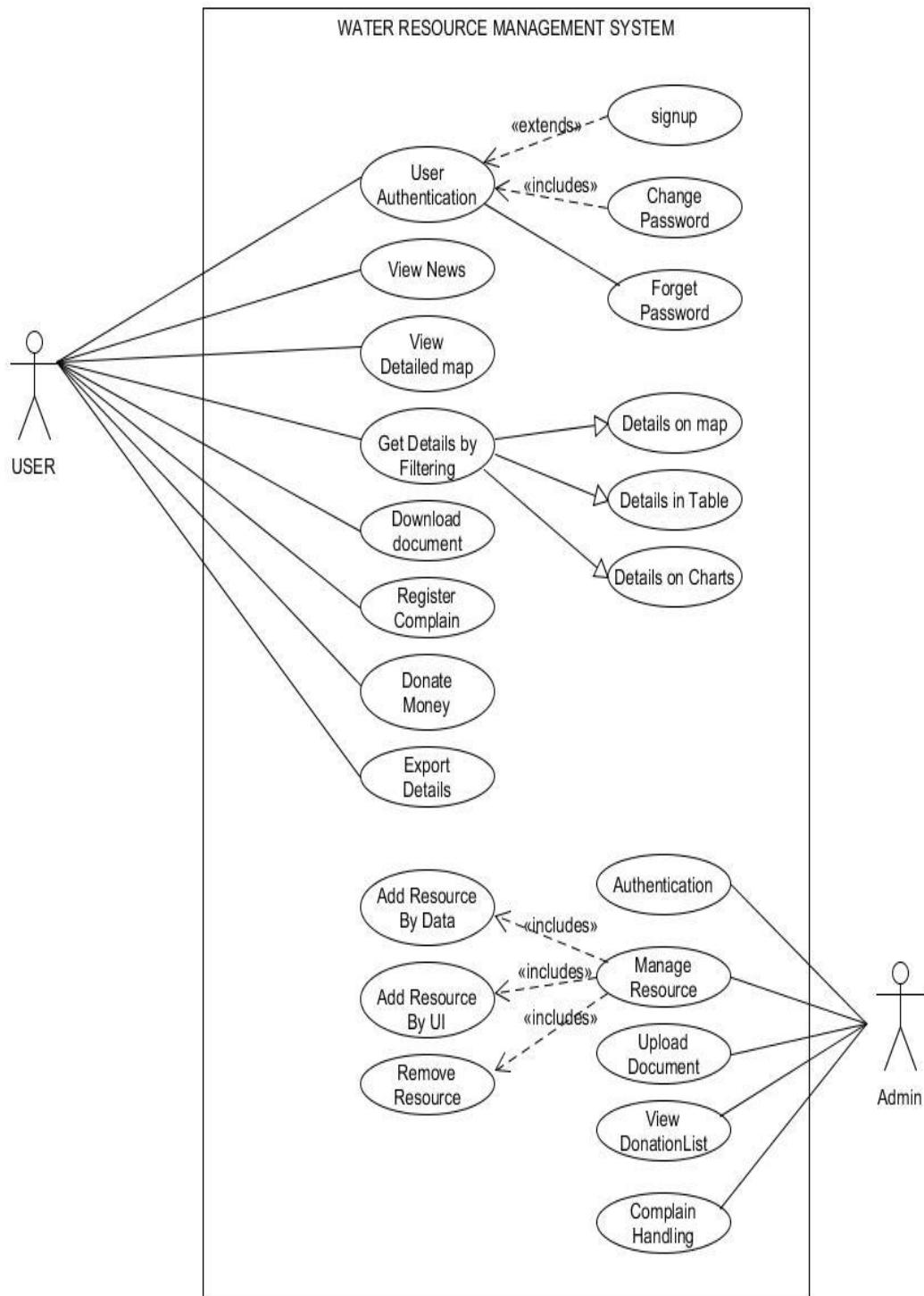


Figure 3.3.1

3.3.2 CLASS DIAGRAM

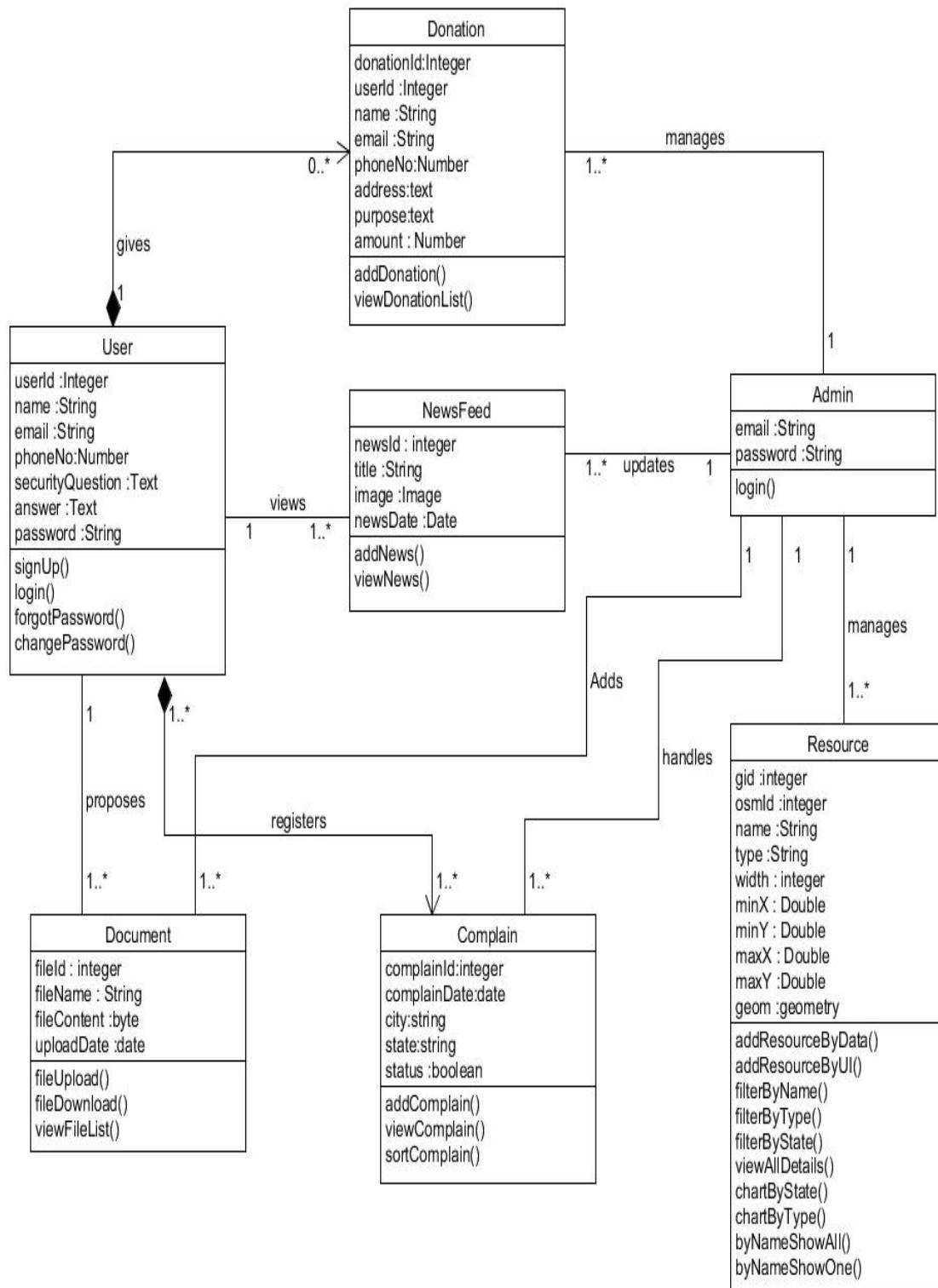


Figure 3.3.2

3.3.3 ACTIVITY DIAGRAM

➤ **Activity diagram for Showing Resource based on state/type**

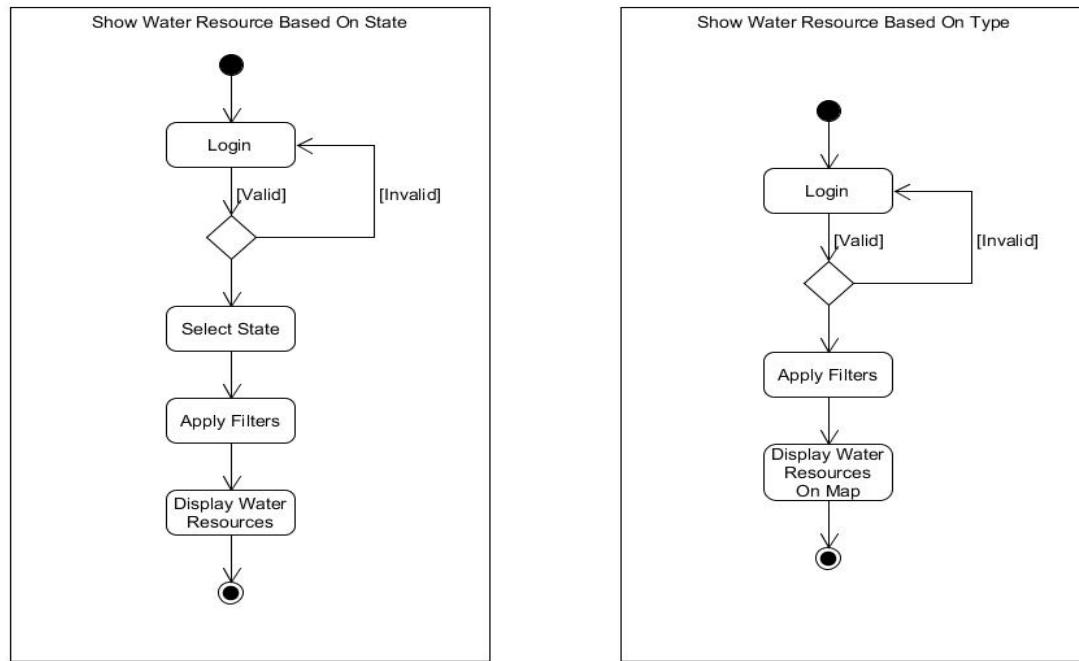


Figure 3.3.3(a)

➤ **Activity diagram for file Download and Upload**

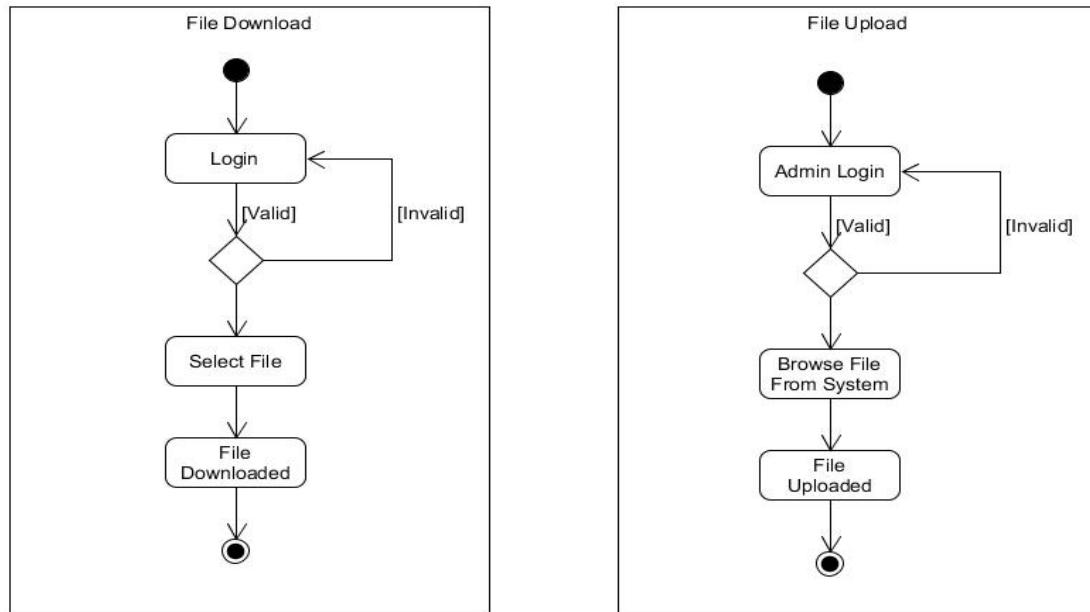


Figure 3.3.3(b)

➤ Activity diagram for delete Resource

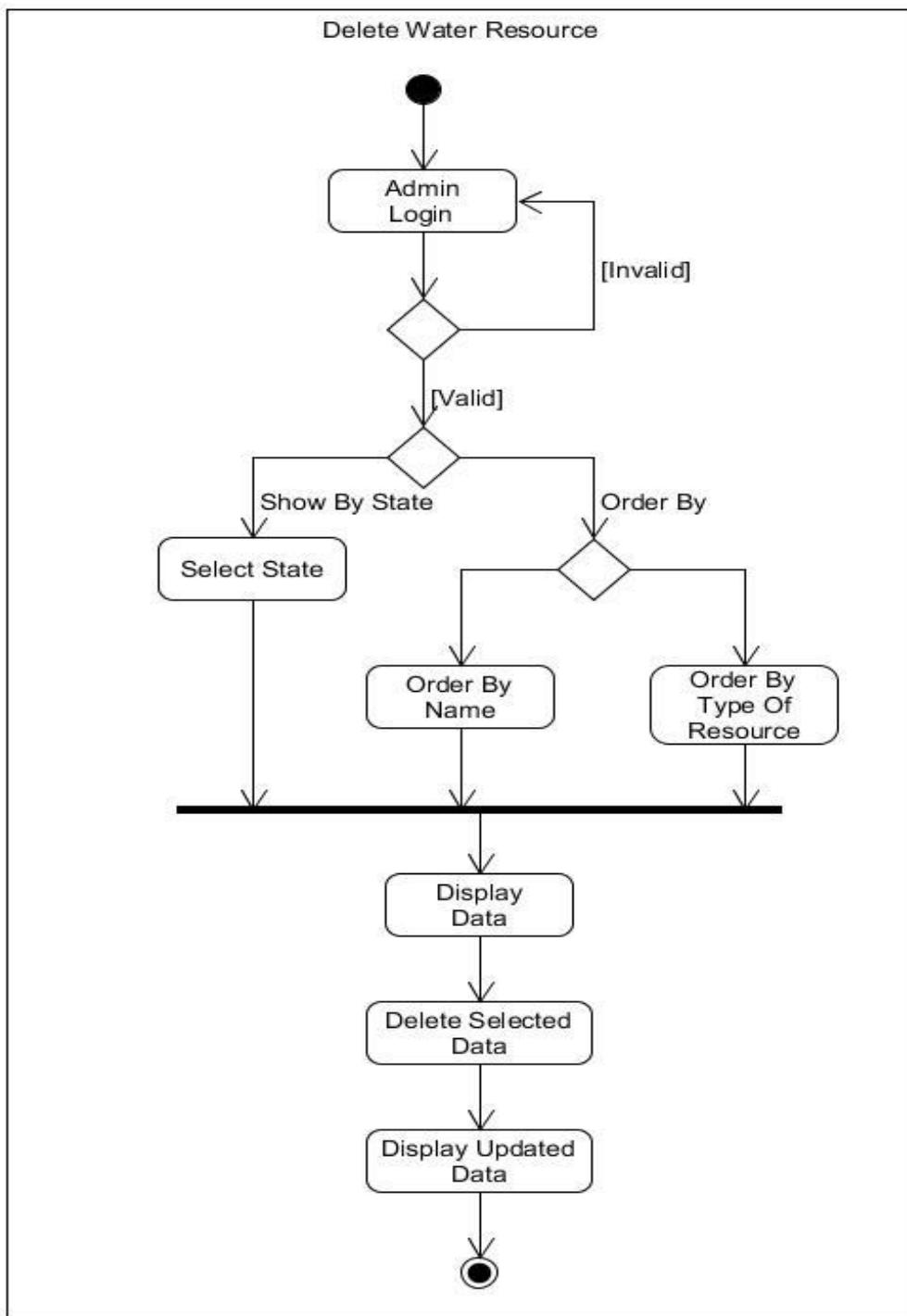


Figure 3.3.3(c)

➤ **Activity Diagram for Complaint Box**

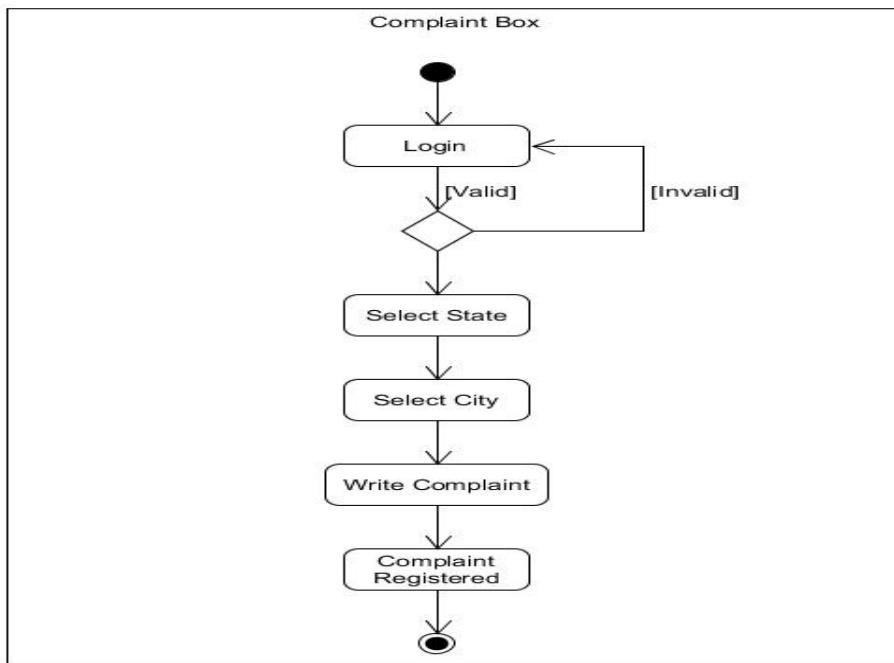


Figure 3.3.4(d)

➤ **Activity Diagram for Forgot Password**

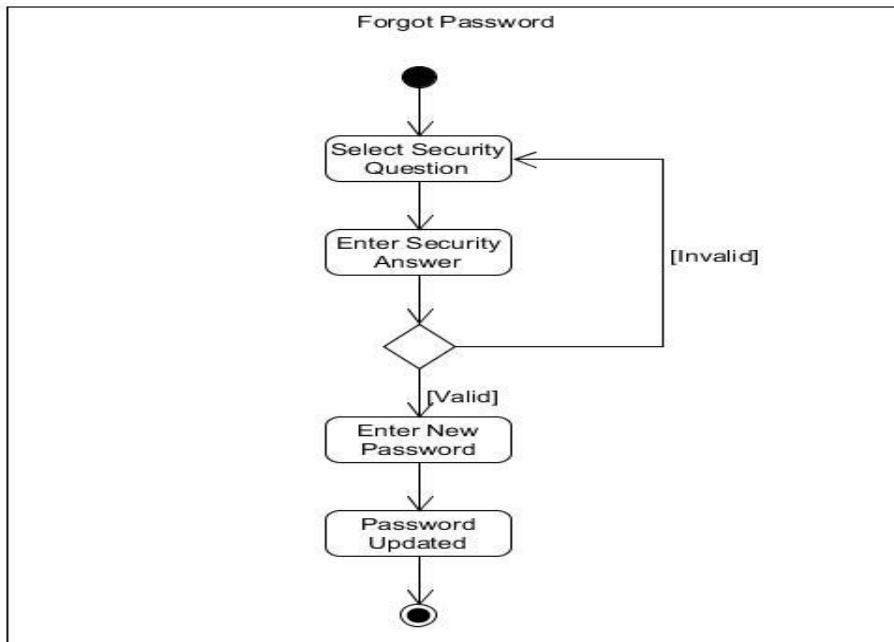


Figure 3.3.3(e)

3.3.4 SEQUENCE DIAGRAM

➤ Sequence Diagram for Show by Type

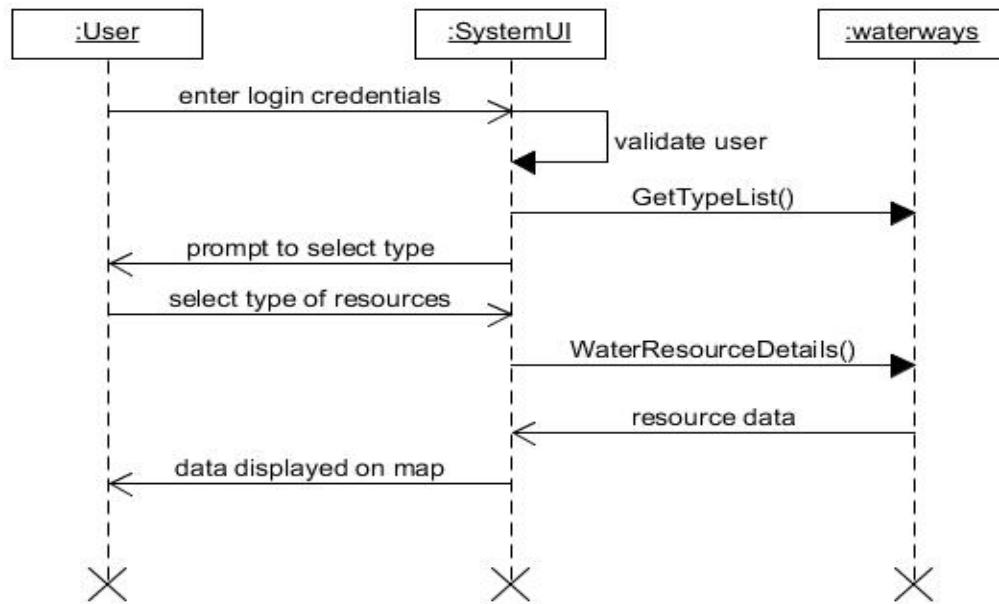


Figure 3.3.4(a)

➤ Sequence Diagram for Show by State

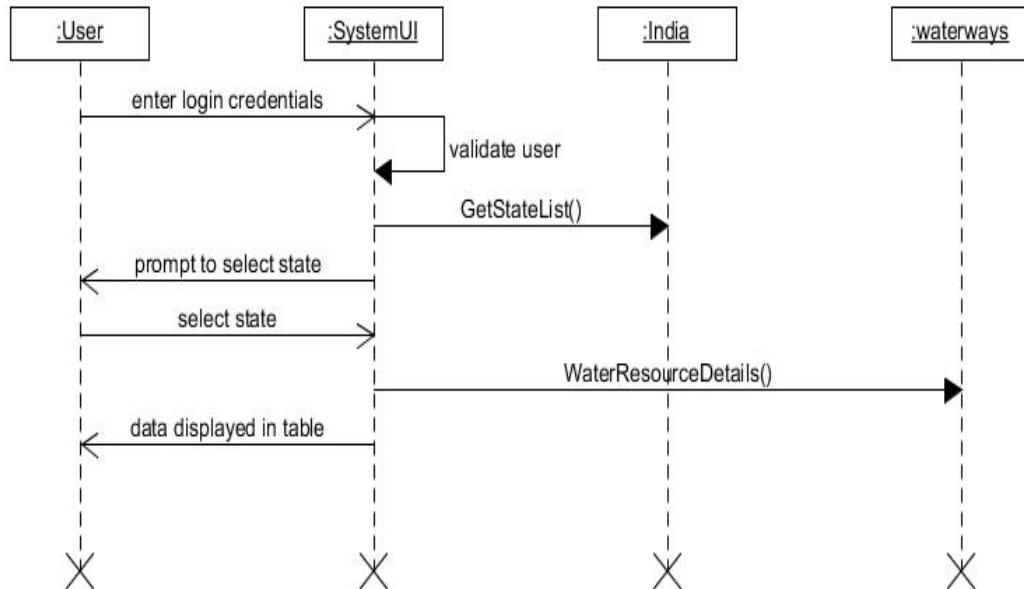


Figure 3.3.4(b)

➤ **Sequence Diagram for Delete Resource**

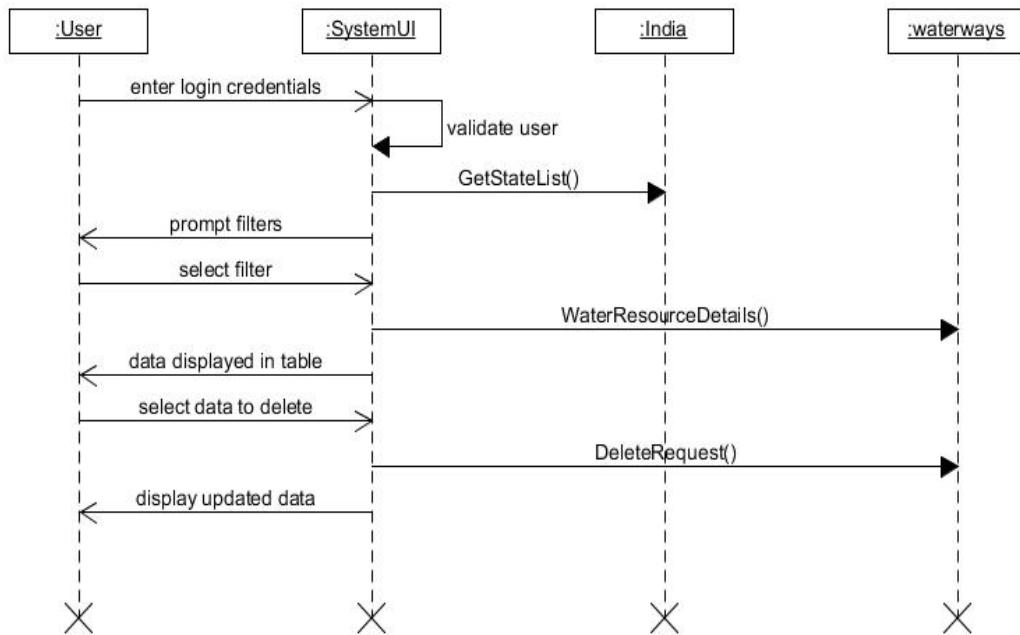


Figure 3.3.4(c)

➤ **Sequence Diagram for Forgot Password**

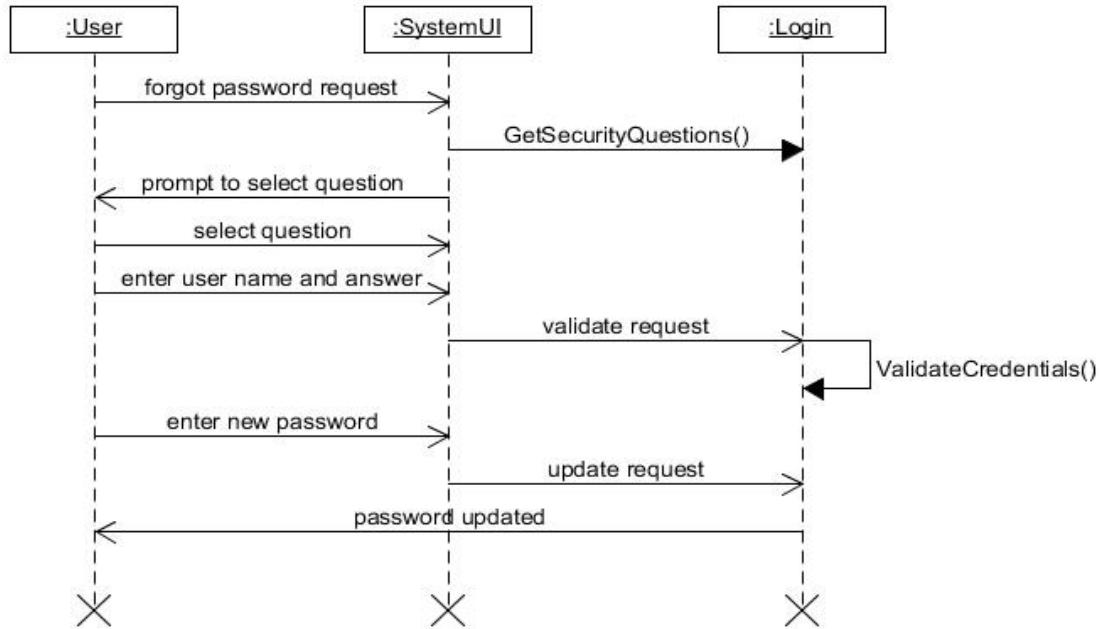


Figure 3.3.4(d)

➤ **Sequence Diagram for Complaint Box**

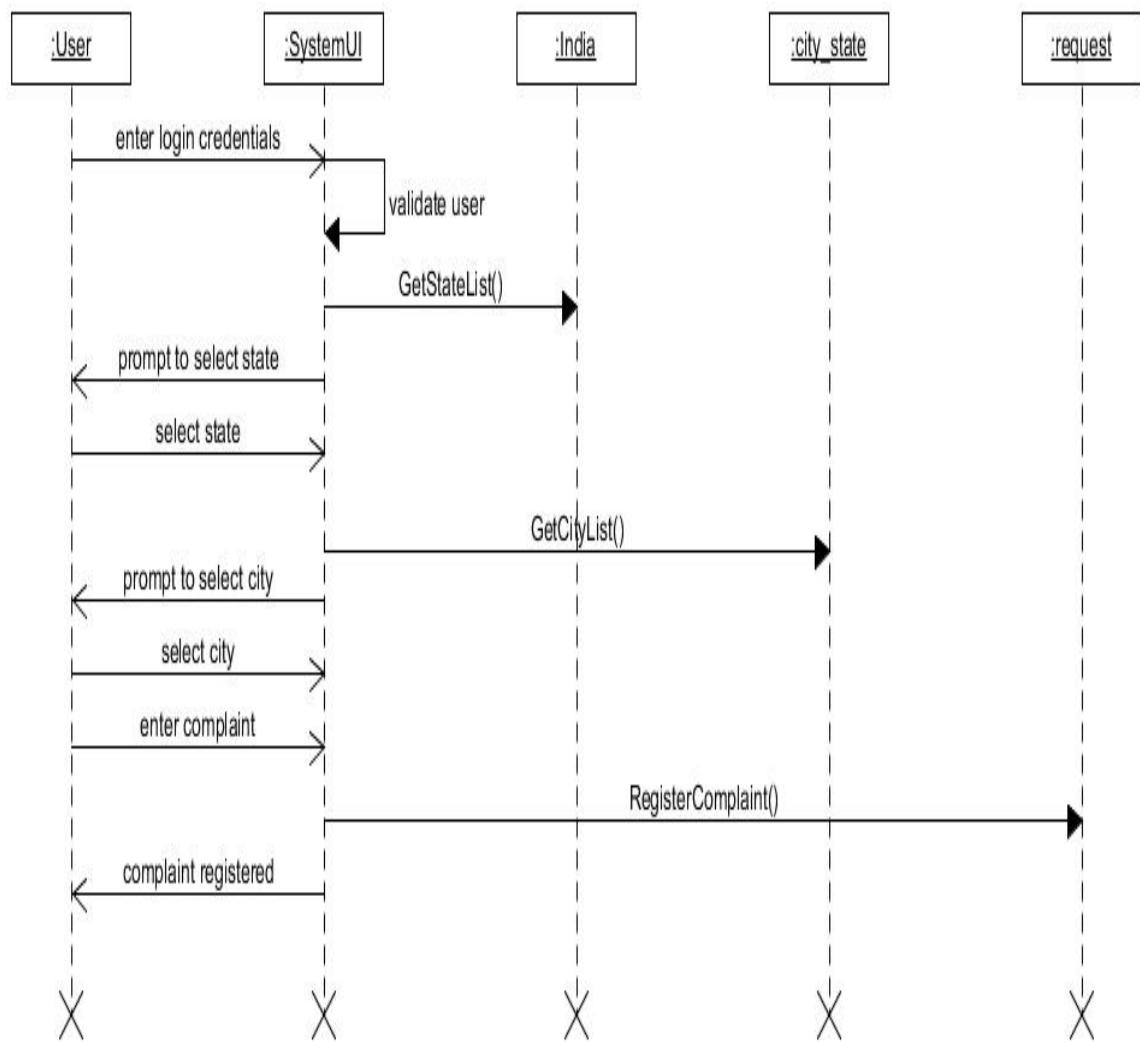


Figure 3.3.4(e)

3.3.5 ER DIAGRAM

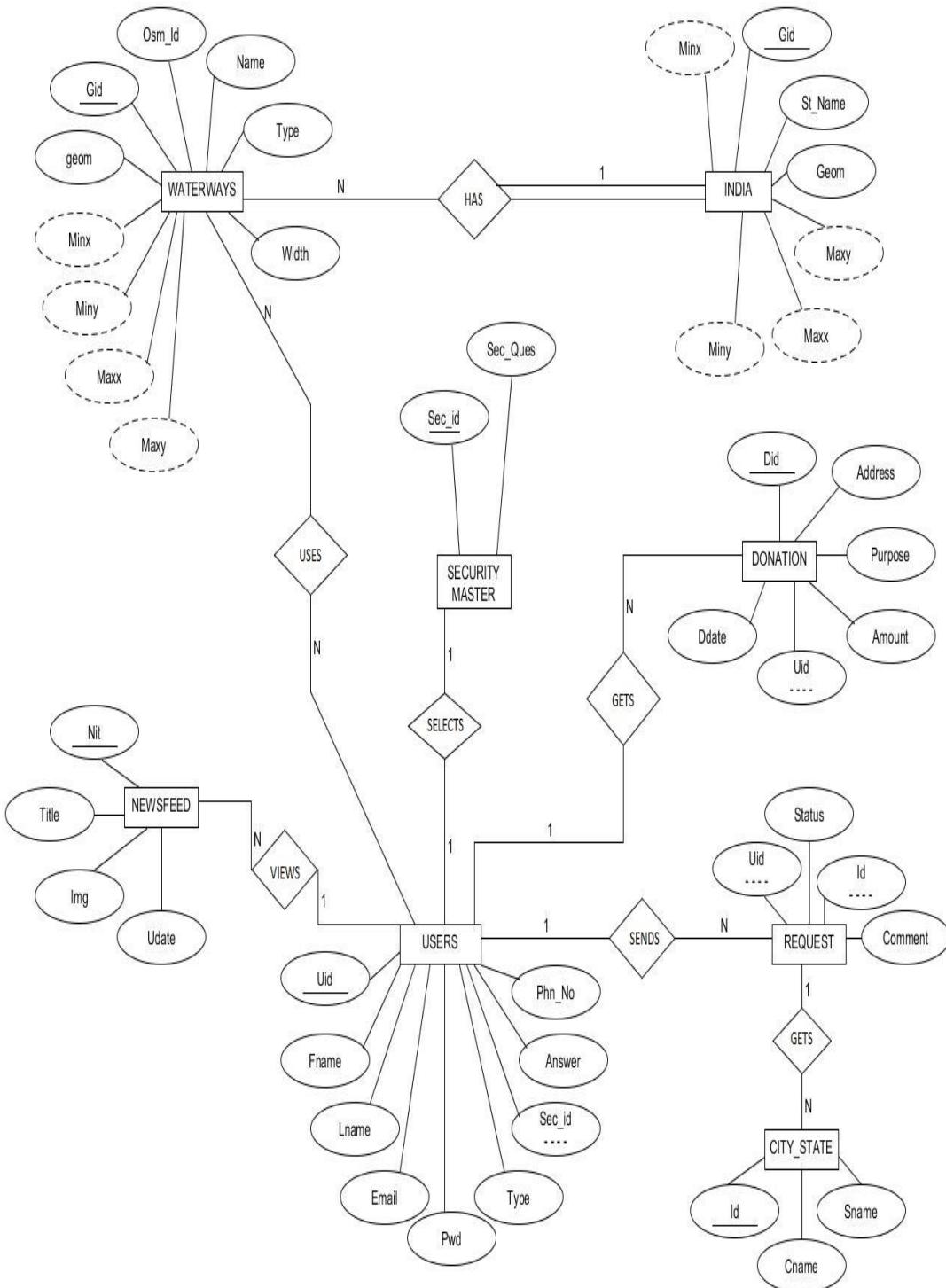


Figure 3.3.5

3.3.6 DEPLOYMENT DIAGRAM

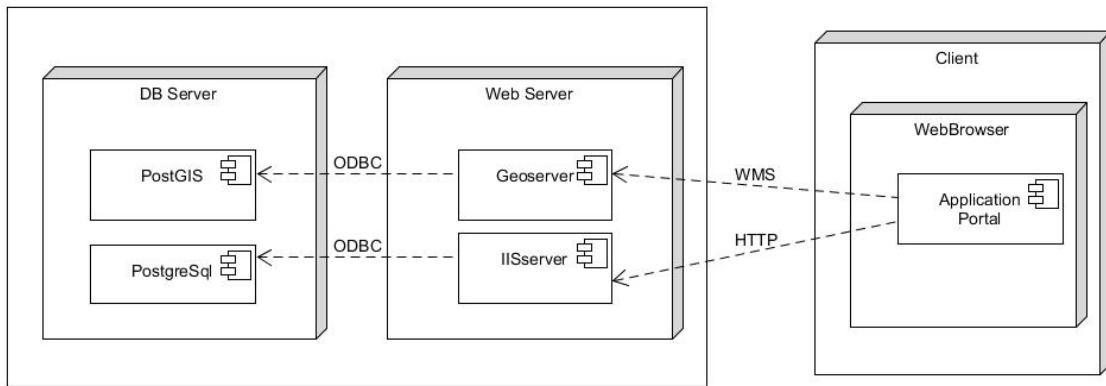


Figure 3.3.6

Chapter 4

System Design

4.1 DATA DICTIONARY

Data dictionary is a set of database tables used to store information about a database's definition. The dictionary contains information about database objects such as tables, indexes, columns, data types, and views.

1. Table Name : Users

Table Description: defines the details of Users who are registered.

Primary Key: id

Foreign Key: sec_id

Table 4.1.1(a) Users

Column Name	Type	Constraints
Uid	Int	Primary Key
Fname	Text	Not Null
Lname	Text	Not Null
Email	Text	Not Null
Phn	Number(10)	Not Null
Type	Text	Not Null
Pwd	Text	Not Null
Sec_id	Int	Foreign Key
Answer	Text	Not Null

2. Table Name : India

Table Description: Contains the information of state of India.

Primary Key:gid

Foreign Key:

Table 4.1.1(b) India

Column Name	Type	Constraints
Gid	Int	Primary Key
st_name	Text	Not Null
Geom	Geometry	Not Null
Minx	Double	Not Null
Maxx	Double	Not Null
Miny	Double	Not Null
Maxy	Double	Not Null

3. Table Name : Waterways

Table Description: Contains the information of different water resources.

Primary Key: gid

Foreign Key:

Table 4.1.1(c) Waterways

Column Name	Type	Constraints
Gid	Int	Primary Key
osm_id	Character(11)	Unique
Name	Character(48)	Not Null
Type	Character(16)	Not Null
Width	SmallInt	
Geom	Geometry	Not Null
Minx	Double	Not Null
Maxx	Double	Not Null
miny	Double	Not Null
maxy	Double	Not Null

4. Table Name : Newsfeed

Table Description: Defines the details of news

Primary Key :nid

Foreign Key:

Table 4.1.1(d) Newsfeed

Column Name	Type	Constraints
nid	Int	Primary Key
title	Text	Not Null
img	Byte	Not Null
update	Date	Not Null

5. Table Name :Security_Master

Table Description: Contains Secutiry Questions with unique id.

Primary Key :Sec_id

Foreign Key:

Table 4.1.1(e) Security_Master

Column Name	Type	Constraints
Sec_id	Int	Primary Key
Sec_Ques	Text	Not Null

6. Table Name :City_State

Table Description: Contains Details of Cities in state.

Primary Key :id

Foreign Key:

Table 4.1.1(f) City_State

Column Name	Type	Constraints
Id	Int	Primary Key
Cname	Text	Not Null
Sname	Text	Not Null

7. Table Name : Request

Table Description: Defines the information of registered Complains

Primary Key :

Foreign Key: id,Uid

Table 4.1.1(g) Request

Column Name	Type	Constraints
Id	Int	Foreign Key
Uid	Int	Foreign Key
Comment	Text	Not Null
Status	Boolean	Not Null

8. Table Name : Donation

Table Description: Contains Details of donation done by user.

Primary Key :Did

Foreign Key: Uid

Table 4.1.1(h) Donation

Column Name	Type	Constraints
Did	Int	Primary Key
Uid	Int	Foreign Key
Address	Text	Not Null
Purpose	Boolean	Not Null
Amount	Number(10)	Not Null
Ddate	date	Not Null

Chapter 5

Implementation

5.1 SNAPSHOT

➤ Home Page

The screenshot shows the homepage of the Water Resource Management System. At the top, there's a navigation bar with links for 'Home', 'Recents', and 'Login'. Below the header is a large image of a waterfall. To the right of the image, the text 'Integrated Water Resources!!' is displayed above a video player showing a man speaking. Further down, there's a section titled 'About Us:' with contact information, including an address near CH 0' Circle, Gandhinagar, and an email address info@bisag.gujarat.gov.in. At the bottom of the page, there's a footer with copyright information and a link to the design credits.

Figure 5.1(1)

➤ News Feeds

The screenshot shows the news feed section of the Water Resource Management System. It features a grid of nine news items, each with a thumbnail image, a brief description, and a timestamp. The news items cover various topics related to water resources and management, such as OGC-compliant Web Map Services, IMGEOS software, and the Water Bodies Information System (WBIS). Each news item includes a 'Posted on' date of 21/02/2018.

Figure 5.1(2)

➤ Login Page

The screenshot shows the login interface for the "WATER RESOURCE MANAGEMENT SYSTEM". At the top, there is a navigation bar with links for "Home", "Recents", and "Login". The main area contains a login form with fields for "Email Id" (containing "kshah@gmail.com") and "Password". Below the form are "Log In" and "Forgot Password?" buttons. A message at the bottom states, "You have not registered yet...?? [SignUp here...!!](#)". The footer of the page includes copyright information: "Designed By Bisag,Gandhinagar" and "Copyright © 2018 - All Rights Reserved Bhaskaracharya Institute For Space Applications And Geo-Informatics".

Figure 5.1(3)

➤ Forgot Password

The screenshot shows the password recovery interface for the "WATER RESOURCE MANAGEMENT SYSTEM". At the top, there is a navigation bar with links for "Home", "Recents", and "Login". The main area displays a message: "Your Password is : vs123". Below this, there is an "Account Recovery" section with a sub-instruction: "This helps show that this account really belongs to you". It contains fields for "Email Id", "Security Question" (set to "what is your college name?"), and "Answer". A "Get Password" button is located at the bottom of the form. The footer of the page includes copyright information: "Designed By Bisag,Gandhinagar" and "Copyright © 2018 - All Rights Reserved Bhaskaracharya Institute For Space Applications And Geo-Informatics".

Figure 5.1(4)

➤ **Registration Page**

The screenshot shows a registration form titled "Registration". The fields filled in are:

- First name: Zinal
- Last name: Sagathiya
- Mobile No.: 9726082277
- Email: zsa@gmail.com
- Security Question: what is your college name?
- Answer: vgec
- Password:
- Confirm Password:
- OTP: 6536

Below the form, there is a "Send OTP" button and a "Submit" button. At the bottom of the page, there is a footer with the text "Designed By Bisag.Gandhinagar Copyright © 2018 - All Rights Reserved Bhaskaracharya Institute For Space Applications And Geo-Informatics".

Figure 5.1(5)

➤ **OTP Message**



Figure 5.1(6)

➤ **User Home Page**

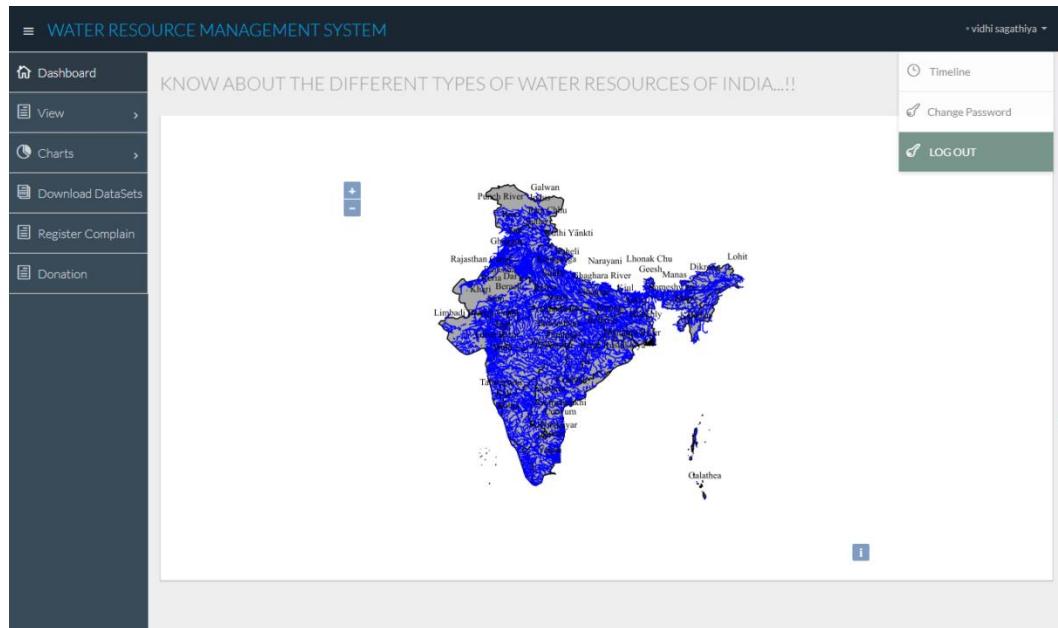


Figure 5.1(7)

➤ **View By Type:** User selects a particular type of resource from the dropdown list.

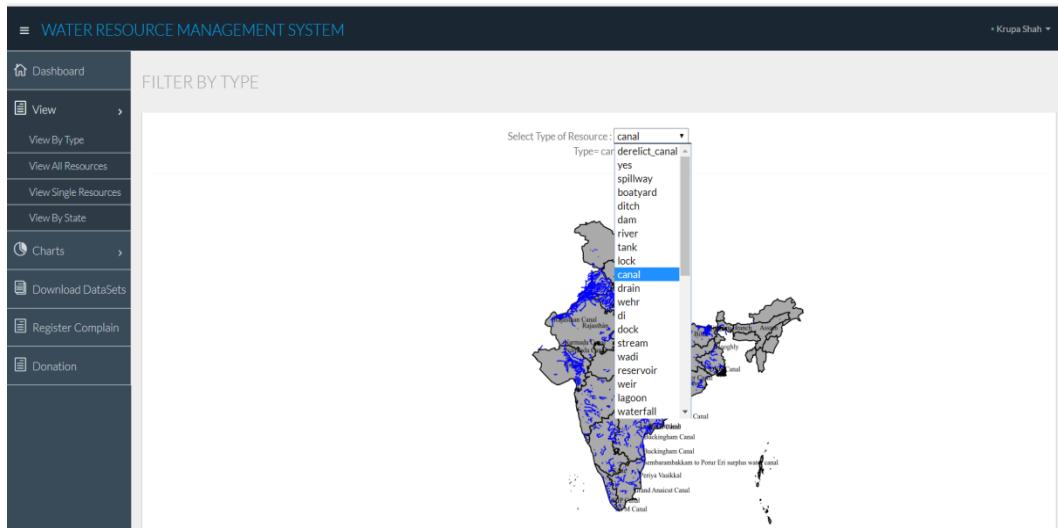


Figure 5.1(8)

Output of Figure 5.1(8):Shows the output of selected type

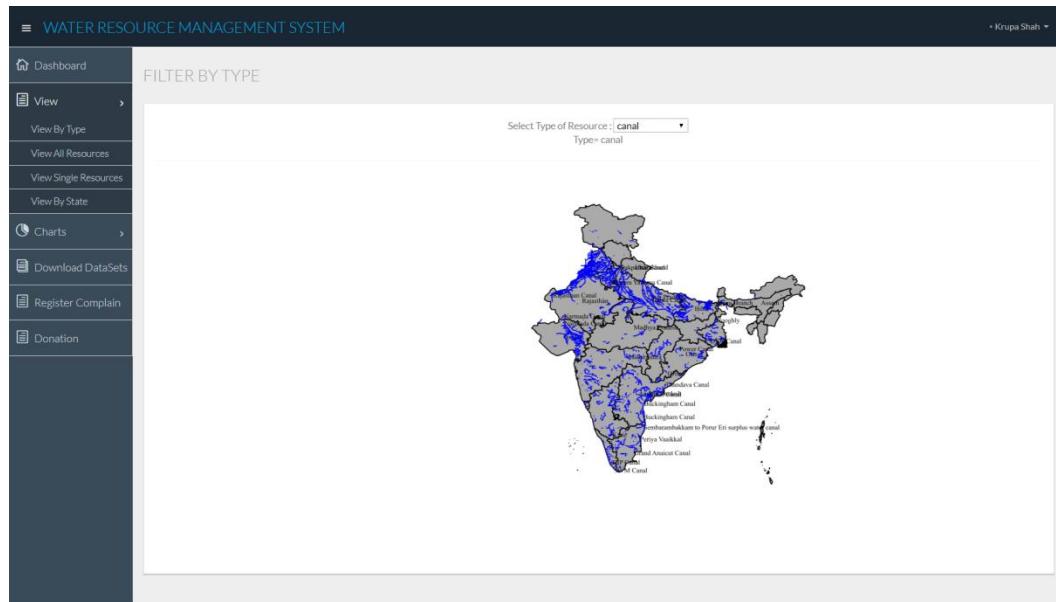


Figure 5.1(9)

- **View All Resource:** User selects a particular type of resource from the dropdown list.

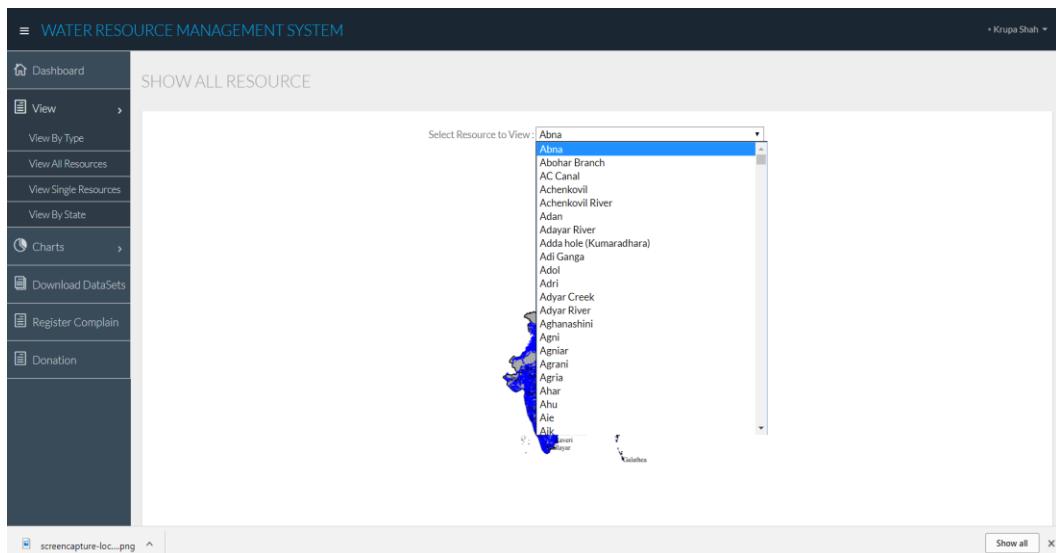


Figure 5.1(10)

Output of Figure 5.1(10):Shows the output of selected resource.

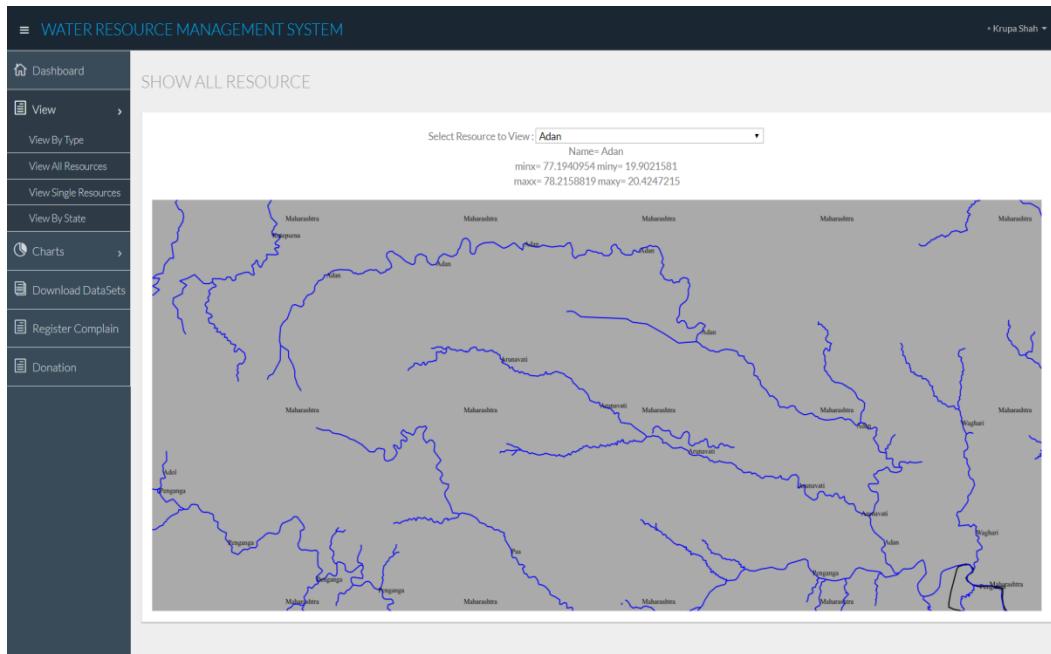


Figure 5.1(11)

- **View Single Resource:** User selects a particular type of resource from the dropdown list.

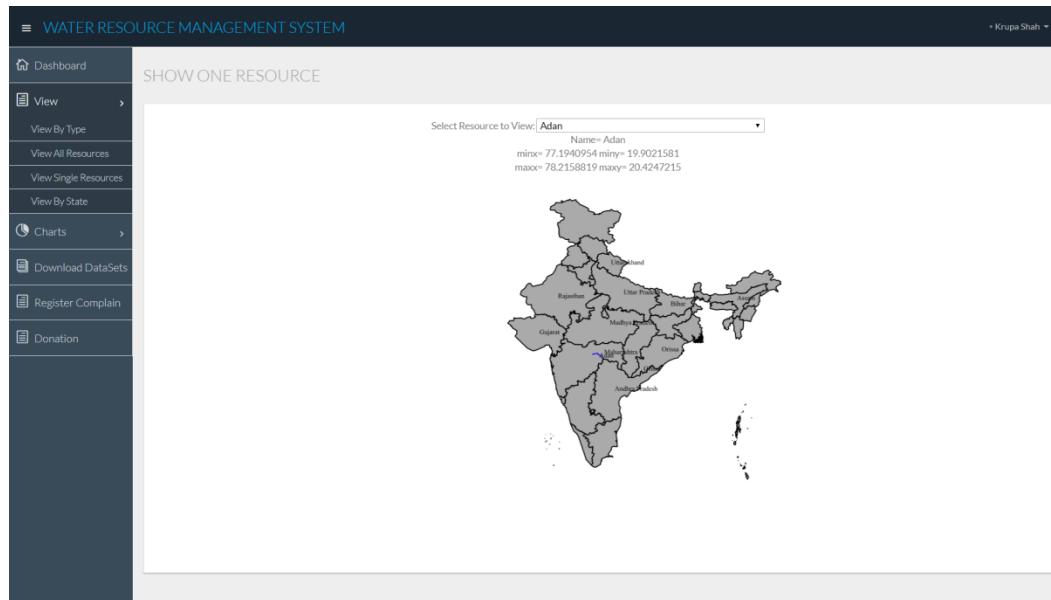


Figure 5.1(12)

- **View By State:** User selects a particular state from the dropdown list.

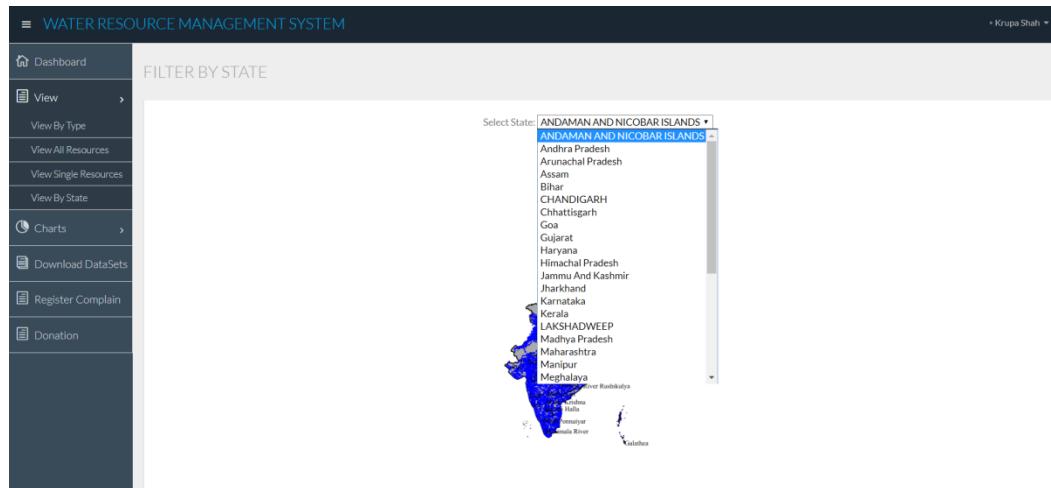


Figure 5.1(13)

The selected state is focused

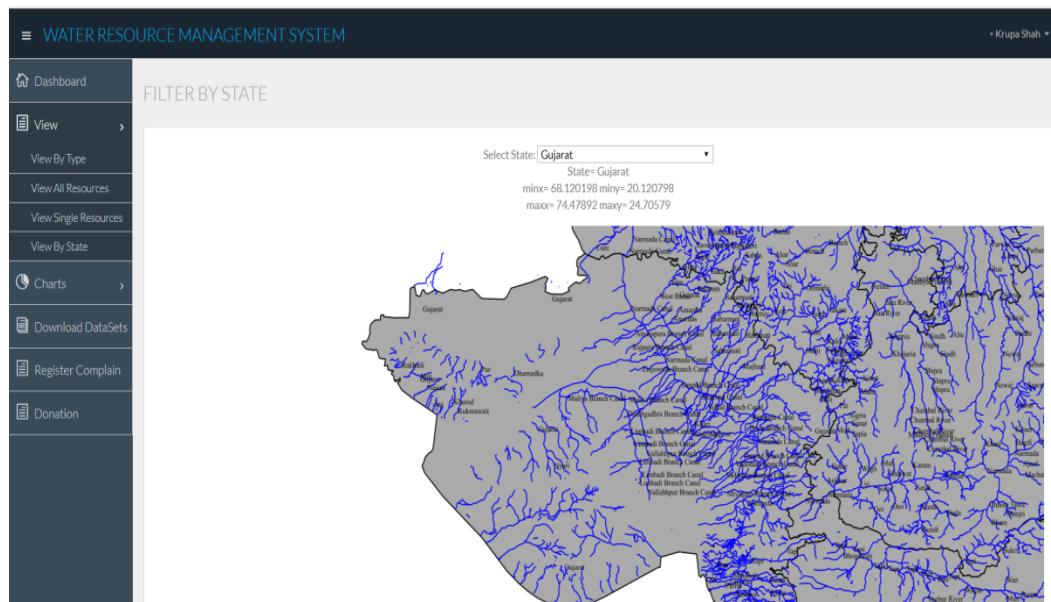


Figure 5.1(14)

The data of selected state is represented in gridview.

A screenshot of a web application titled "WATER RESOURCE MANAGEMENT SYSTEM". The left sidebar contains navigation links: Dashboard, View (View By Type, View All Resources, View Single Resources, View By State), Charts, Download DataSets, Register Complaint, and Donation. The main content area displays a gridview of water resources. The columns are "Name" and "Type". The data includes:

Tapi	river
Tilakwada Branch Canal	canal
Tiri	river
Tokri	river
Ukal Reservoir	dam
Untia Branch Canal	canal
Vadodara Branch Canal	canal
Vallabhpur Branch Canal	canal
Vehal Branch Canal	canal
Vejapur Branch Canal	canal
Vengdi	river
Virangam-I Branch Canal	canal
Virangam-II Branch Canal	canal
Vishwamitry	stream
Wada Branch Canal	canal
Wakal	river
Walri	river
Watrak	river
West Banas	river
Zirjuwada Branch Canal	canal
Zumikha Branch Canal	canal

A "Filter Data" button is located at the bottom right of the gridview.

Figure 5.1(15)

➤ **View By State Filtering:** Page to apply filters to selected data

A screenshot of the "WATER RESOURCE MANAGEMENT SYSTEM" showing a "FILTER BY STATE" interface. The left sidebar has the same navigation as Figure 5.1(15). The main area is titled "FILTER BY STATE" and contains the following fields:

- State: Gujarat
minx= 69.120198 miny= 20.120798
maxx= 74.47892 maxy= 24.70579
- Select Type:
 canal
 dam
 river
 stream
- Sort By:
 Name
 Type
- An "Apply Filter" button.

Figure 5.1(16)

Output of Figure5.1(16)

The screenshot shows a sidebar menu with options like Dashboard, View, Charts, Download DataSets, Register Complain, and Donation. The main area is titled 'FILTER BY STATE' with a sub-section for 'State= Gujarat'. It displays a table of water bodies with columns 'name' and 'type'. The table includes entries such as Hirneshwar Check Dam (dam), Madhuban Dam (dam), Mazum Dam (dam), Ukai Reservoir (dam), Dhamadka (stream), Harnav (stream), Kalari (stream), Kikurwa (stream), Purna (stream), Sukli (stream), and Vishwamitry (stream). There are also sections for 'Select Type:' (canal, dam, river, stream) and 'Sort By:' (Name, Type).

name	type
Hirneshwar Check Dam	dam
Madhuban Dam	dam
Mazum Dam	dam
Ukai Reservoir	dam
Dhamadka	stream
Harnav	stream
Kalari	stream
Kikurwa	stream
Purna	stream
Sukli	stream
Vishwamitry	stream

Figure 5.1(17)

➤ Download File

The screenshot shows a sidebar menu with options like Dashboard, View, Charts, Download DataSets, Register Complain, and Donation. The main area is titled 'FILE DOWNLOAD' and displays a table of files with columns 'File Name' and 'Download'. The table includes entries for style_india.txt, style_water.txt, and waterways.dbf, each with a 'Download' link.

File Name	Download
style_india.txt	Download
style_water.txt	Download
waterways.dbf	Download

Figure 5.1(18)

- **Chart By Type:** On selection of particular type of resources, there are 4 different charts representing the same data.

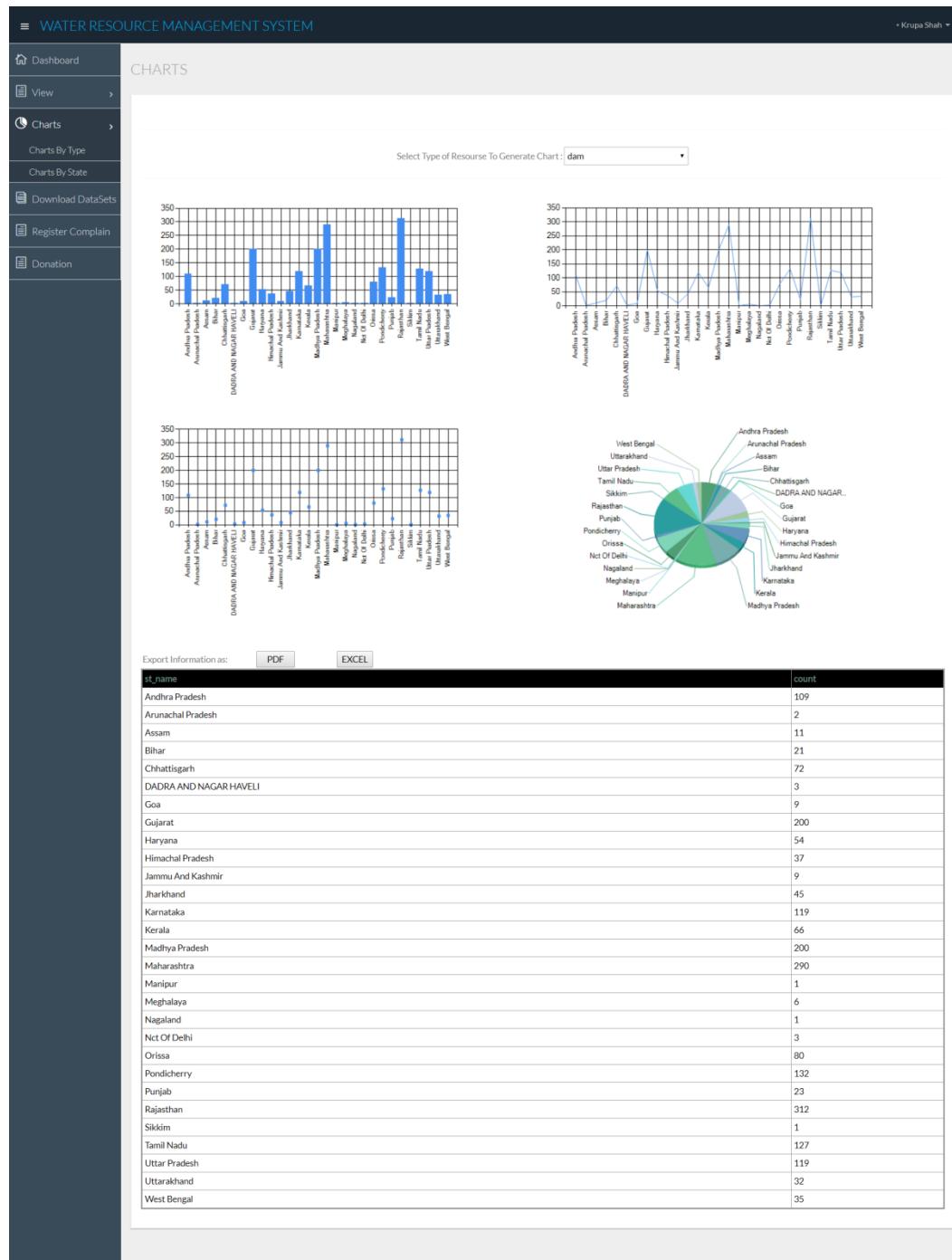


Figure 5.1(19)

Free Bootstrap Templates by BootstrapMade

- **Chart By State:** On selection of particular state, there are 4 different charts representing the same data.

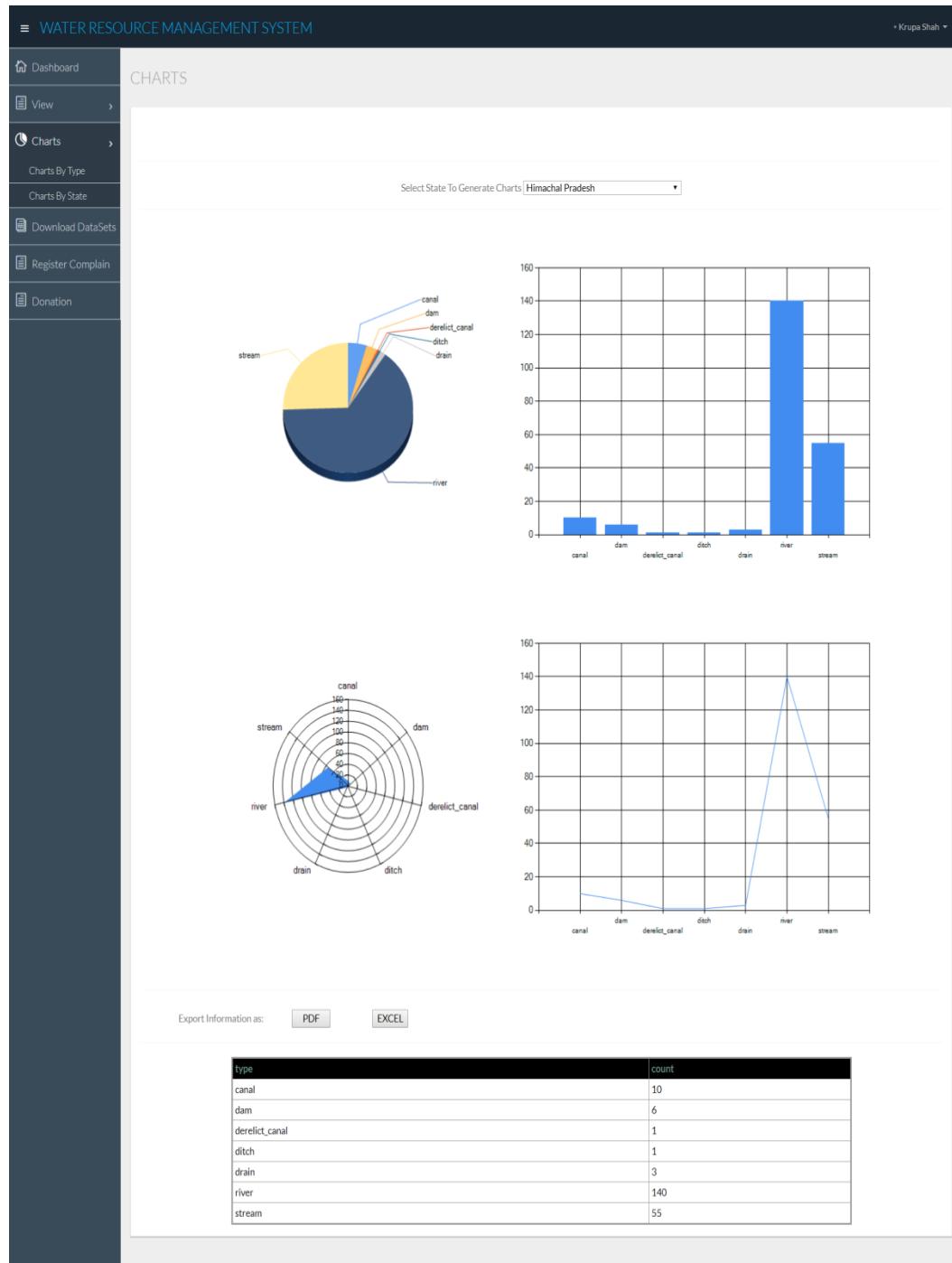


Figure 5.1(20)

➤ PDF and EXCEL Button

+

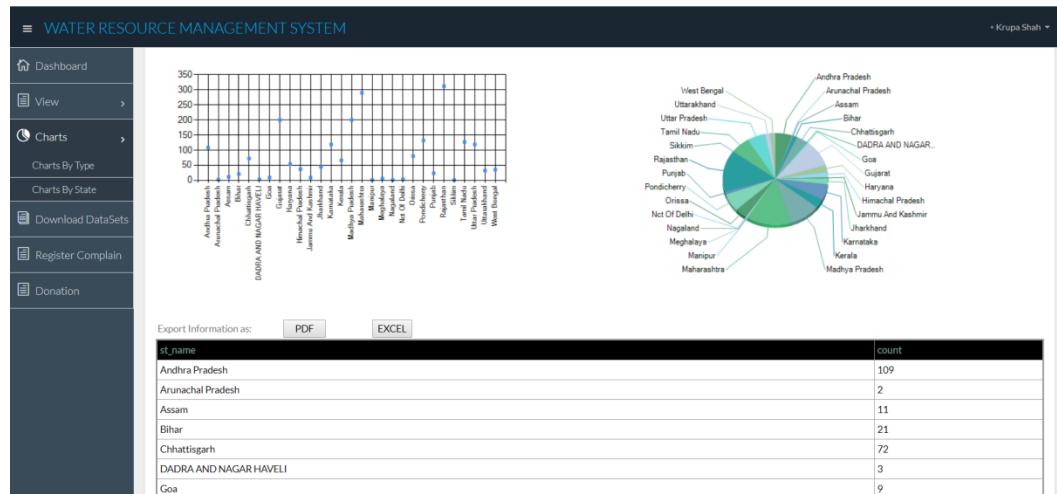


Figure 5.1(21)

➤ Downloaded Data in EXCEL File

The screenshot shows an Excel spreadsheet titled 'GridViewExport - Excel'. The data is presented in a table with two columns: 'st_name' and 'count'. The data corresponds to the information shown in Figure 5.1(21).

st_name	count
Andhra Pradesh	109
Arunachal Pradesh	2
Assam	11
Bihar	21
Chhattisgarh	72
DADRA AND NAGAR HAVELI	3
Goa	9
Gujarat	200
Haryana	54
Himachal Pradesh	37
Jammu And Kashmir	9
Jharkhand	45
Karnataka	119
Kerala	66
Madhya Pradesh	200
Maharashtra	290
Manipur	1
Measures	6
Nagaland	1
Net Of Delhi	3
Odisha	80
Pondicherry	132
Punjab	23
Rajasthan	312
Sikkim	1
Tamil Nadu	127
Uttar Pradesh	119

Figure 5.1(22)

➤ Downloaded Data In PDF File

GridViewExport (1).pdf		1 / 1
Andhra Pradesh	109	
Arunachal Pradesh	2	
Assam	11	
Bihar	21	
Chhattisgarh	72	
DADRA AND NAGAR HAVELI	3	
Goa	9	
Gujarat	200	
Haryana	54	
Himachal Pradesh	37	
Jammu And Kashmir	9	
Jharkhand	45	
Karnataka	119	
Kerala	66	
Madhya Pradesh	200	
Maharashtra	290	

Figure 5.1(23)

➤ Register Complaint Page

☰ WATER RESOURCE MANAGEMENT SYSTEM • Krupa Shah •

Dashboard View Charts Download DataSets Register Complaint Donation

COMPLAINT

Register Complaint

State * Gujarat

City * Ahmedabad

Ahmedabad
Ahmedabad
Amreli
Anand
Ankleswar
Bharuch
Bhavnagar
Bhuj
Cambay
Dahod
Deesa
Dholka
Gandhinagar
Godhra
Himatnagar
Idar
Jannagar
Junagadh
Kadi
Kalavad
Kalol

Figure 5.1(24)

The screenshot shows the 'WATER RESOURCE MANAGEMENT SYSTEM' interface. On the left, a sidebar menu includes 'Dashboard', 'View', 'Charts', 'Download DataSets', 'Register Complain', and 'Donation'. The main content area is titled 'COMPLAINT' and contains a 'Register Complaint' form. The form fields are: 'State*' (Gujarat), 'City*' (Bharuch), and a text area containing 'Water Shortage Problem'. Below the form is a message 'Complaint Registered!' and a blue 'Complaint' button.

Figure 5.1(25)

➤ Donation Page

The screenshot shows the 'WATER RESOURCE MANAGEMENT SYSTEM' interface. On the left, a sidebar menu includes 'Dashboard', 'View', 'Charts', 'Download DataSets', 'Register Complain', and 'Donation'. The main content area is titled 'DONATION' and contains a 'Donation' form. The form fields are: First name (Krupa), Last name (Shah), Mobile No (9726082277), Email (kshah@gmail.com), Address (maninagar, Ahmedabad-382443), Purpose of Donation (For helping in water sanit), Amount (50000), and a blue 'Submit' button.

Figure 5.1(26)

➤ Payment Page

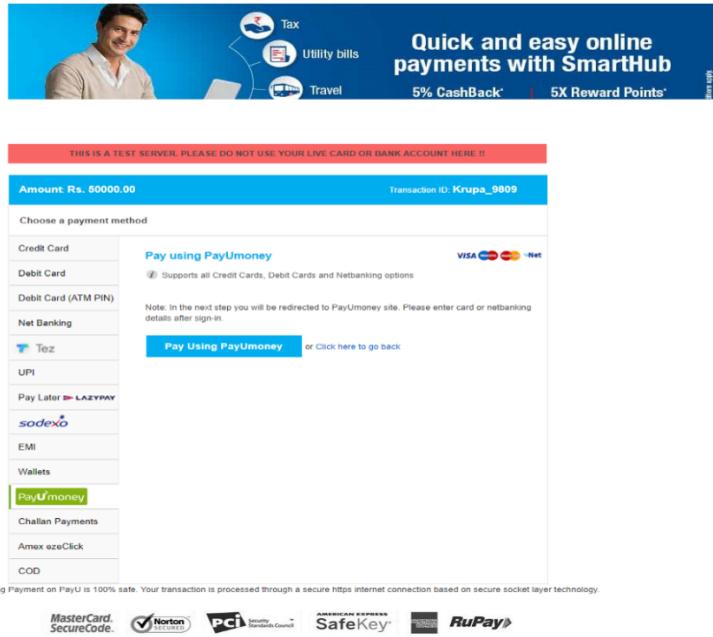


Figure 5.1(27)

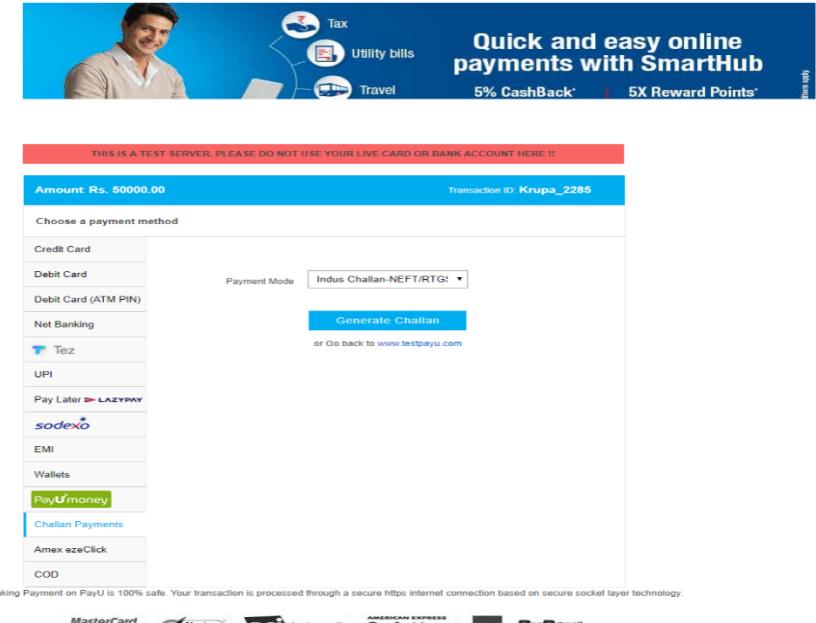


Figure 5.1(28)

➤ Challan Receipt



Figure 5.1(29)

➤ Change Password

A screenshot of a web-based application titled 'WATER RESOURCE MANAGEMENT SYSTEM'. The top navigation bar includes a user profile 'vidhi sagathiya'. On the left, there is a sidebar with links: 'Dashboard', 'View', 'Charts', 'Download DataSets', 'Register Complain', and 'Donation'. The main content area is titled 'CHANGE PASSWORD' and contains three input fields: 'Enter Old Password', 'Enter New Password', and 'ReEnter New Password'. Below these fields is a blue 'Change Password' button. A success message 'Password Changed SuccessFully' is displayed at the bottom of the form.

Figure 5.1(30)

➤ Admin Home Page

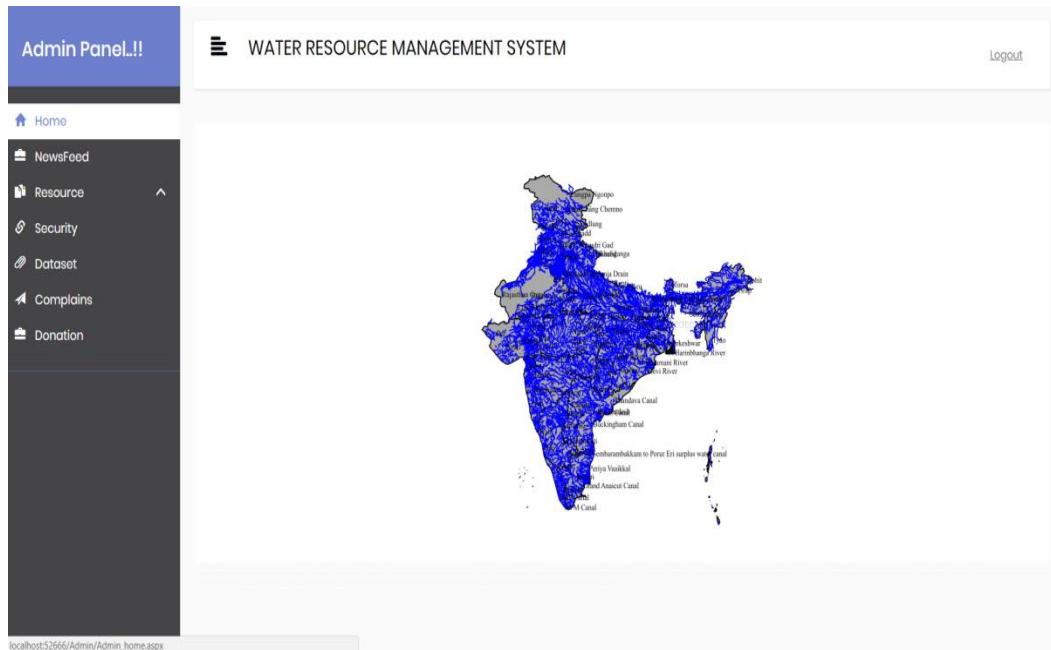


Figure 5.1(31)

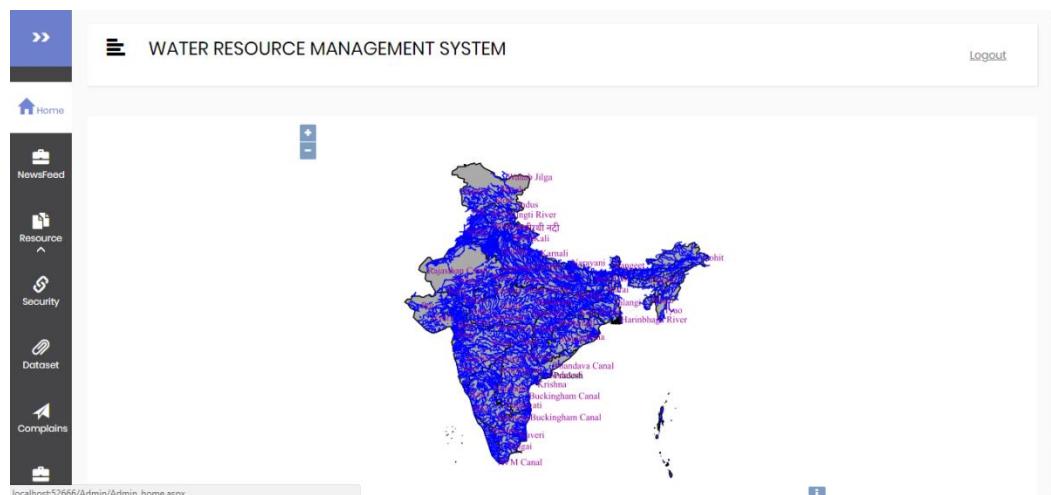


Figure 5.1(32)

➤ Add News Feed Page

The screenshot shows the 'WATER RESOURCE MANAGEMENT SYSTEM' interface. On the left is a vertical sidebar menu with icons for Home, NewsFeed, Resource (with sub-options Security, Dataset), Complains, and Donation. The 'NewsFeed' option is selected. The main content area has a title 'NewsFeed'. It contains fields for 'Add Title For News:' (containing 'Water Resource Policy by Government which helps rural area in resources') and 'Upload Relevant Image For News:' (with a 'Choose File' button). A large 'Add' button is at the bottom right.

localhost:52666/Admin/add_news.aspx

Figure 5.1(33)

➤ Add Resource By UI

The screenshot shows the 'WATER RESOURCE MANAGEMENT SYSTEM' interface. The sidebar menu is identical to Figure 5.1(33). The main content area features a map of India with state boundaries. A yellow line is drawn across the map from the west coast to the east coast. To the right of the map, there are input fields for adding a resource: 'Name' (shah), 'Type' (boatyard), 'Width' (0), 'Interaction type' (draw), 'Geometry type' (LineString), 'Data type' (GeoJSON), and a 'Delete all features' button. Below these is a code editor containing GeoJSON coordinates: [{ "coordinates": [62.4783158879395, 9.40533746477755] }]. An 'ADD' button is at the bottom, and a 'Check On Map' button is below it.

localhost:52666/Admin/AddResource.aspx#pageSubmenu

Figure 5.1(34)

Figure 5.1(35) shows that the data entered in Figure 5.1(34) is successfully entered.

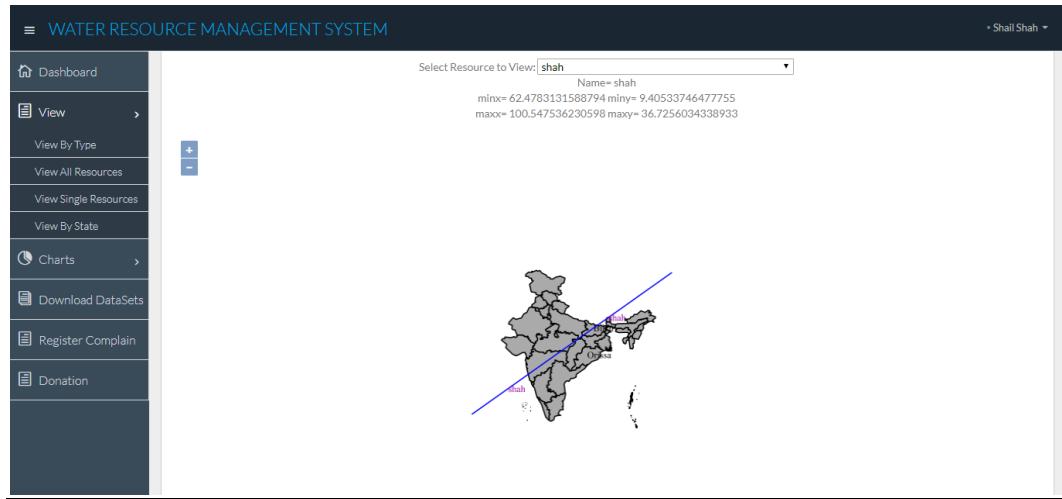


Figure 5.1(35)

➤ **Add Resource By Latitude and Longitude**

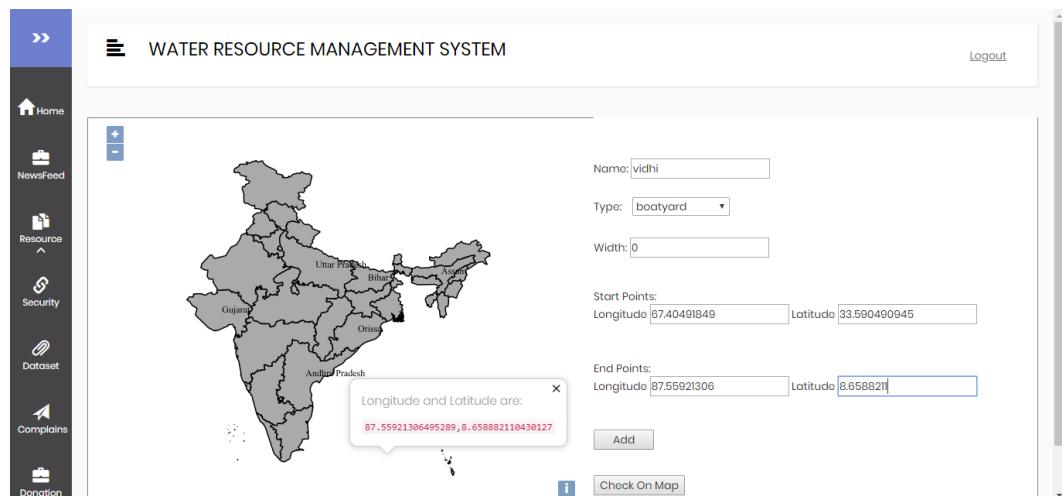


Figure 5.1(36)

Figure 5.1(37) shows that the data entered in Figure 5.1(36) is successfully entered.

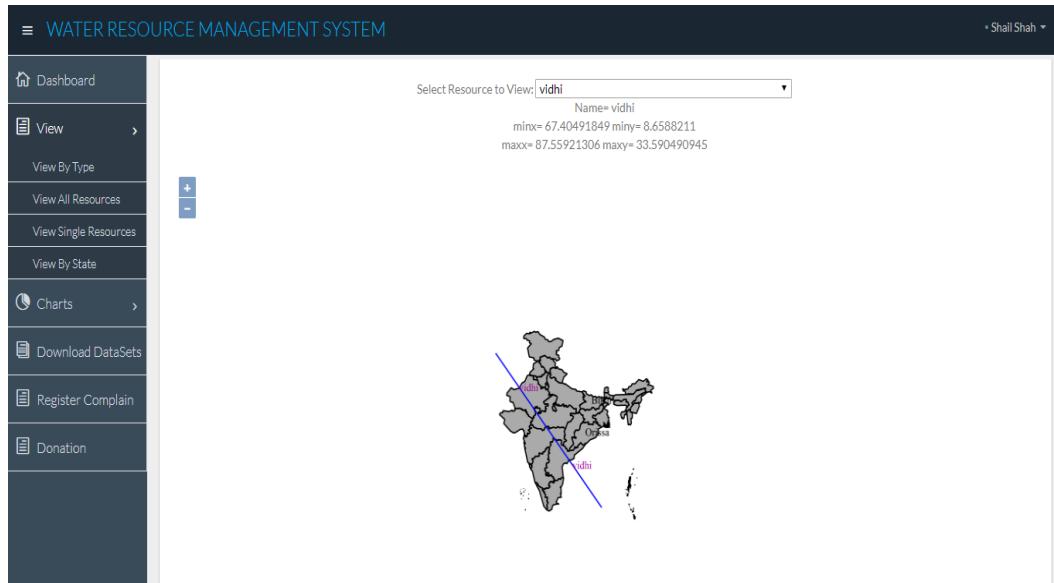


Figure 5.1(37)

➤ Delete Resource

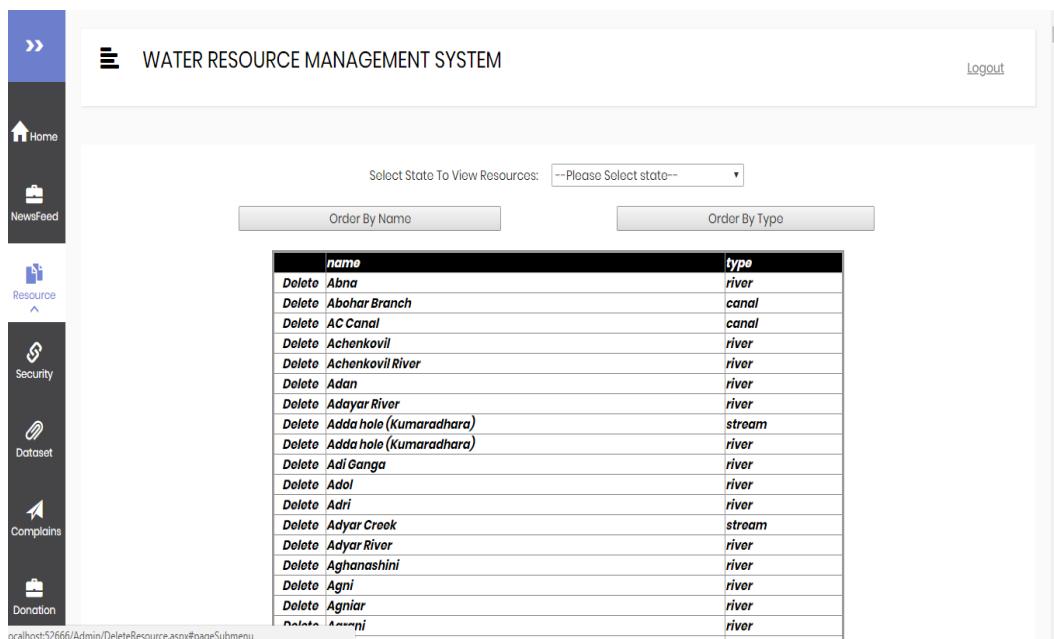


Figure 5.1(38)

Output after deleting first entry from Figure 5.1(38)

The screenshot shows a web application interface for the "WATER RESOURCE MANAGEMENT SYSTEM". The left sidebar contains navigation links: Home, NewsFeed, Resource (with a dropdown arrow), Security, Dataset, Complaints, and Donation. The main content area displays a table of resources with columns "name" and "type". A dropdown menu "Select State To View Resources:" is set to "Please Select state--". Two buttons at the top right are "Order By Name" and "Order By Type". The table data is as follows:

	name	type
Delete	Abhar Branch	canal
Delete	AC Canal	canal
Delete	Achenkovil	river
Delete	Achenkovil River	river
Delete	Adan	river
Delete	Adayar River	river
Delete	Ada hole (Kumaradhara)	stream
Delete	Ada hole (Kumaradhara)	river
Delete	Adi Ganga	river
Delete	Adol	river
Delete	Adri	river
Delete	Adyar Creek	stream
Delete	Adyar River	river
Delete	Aghanashini	river
Delete	Agni	river
Delete	Agniar	river
Delete	Agrani	river
Delete	Anni	river

localhost:52666/Admin/DeleteResource.aspx#oaoeSubmenu

Figure 5.1(39)

➤ Add Security Question

The screenshot shows a "Security Question" page within the "WATER RESOURCE MANAGEMENT SYSTEM". The left sidebar includes the same navigation links as Figure 5.1(39). The main content area features a "Security Question" header and a form with a text input "Add Security Question: who is ur best friend?" and a "Add" button. Below this is a table listing existing security questions:

	sec_ques	sid
Delete	What is ur school name?	1
Delete	What is ur favoutite food?	2
Delete	What is ur college name?	3
Delete	What is ur favoutite dish?	4
Delete	What is ur favoutite book?	5
Delete	What is ur favoutite color?	8

localhost:52666/Admin/Sec_ques.aspx

Figure 5.1(40)

Security Question added successfully.

The screenshot shows the 'WATER RESOURCE MANAGEMENT SYSTEM' interface. On the left, a vertical sidebar menu includes options like Home, NewsFeed, Resource, Security (selected), Dataset, Complains, and Donation. The main content area is titled 'Security Question' and contains a table of security questions. At the top of the table is a form with fields for 'Add Security Question:' and a 'Add' button. The table has columns for 'Delete', 'Edit', 'sec_ques', and 'id'. The data in the table is as follows:

		sec_ques	id
Delete	Edit	What is ur school name?	1
Delete	Edit	What is ur favourite food?	2
Delete	Edit	What is ur college name?	3
Delete	Edit	What is ur favourite dish?	4
Delete	Edit	What is ur favourite book?	5
Delete	Edit	What is ur favourite color?	6
Delete	Edit	who is ur best friend?	9

Figure 5.1(41)

➤ **File Upload and Delete Feature**

The screenshot shows the 'WATER RESOURCE MANAGEMENT SYSTEM' interface. The sidebar menu is identical to Figure 5.1(41). The main content area is titled 'DataSet Files' and contains a file upload form and a table of uploaded files. The form includes a 'Choose File' button, a 'No file chosen' message, and an 'Upload' button. Below the form is a table with columns for 'File Name', 'Download', and 'Delete'. The data in the table is as follows:

File Name	Download	Delete
3.jpg	Download	Delete
4.gif	Download	Delete
IMG_8898.JPG	Download	Delete
INDIA.dbf	Download	Delete
waterways.dbf	Download	Delete

Figure 5.1(42)

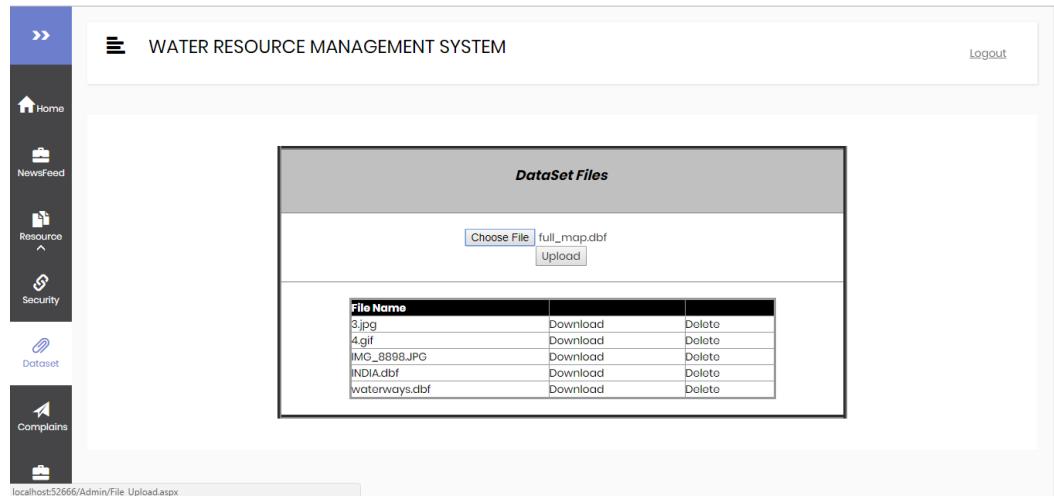


Figure 5.1(43)

➤ **View and Update Complaint Status**

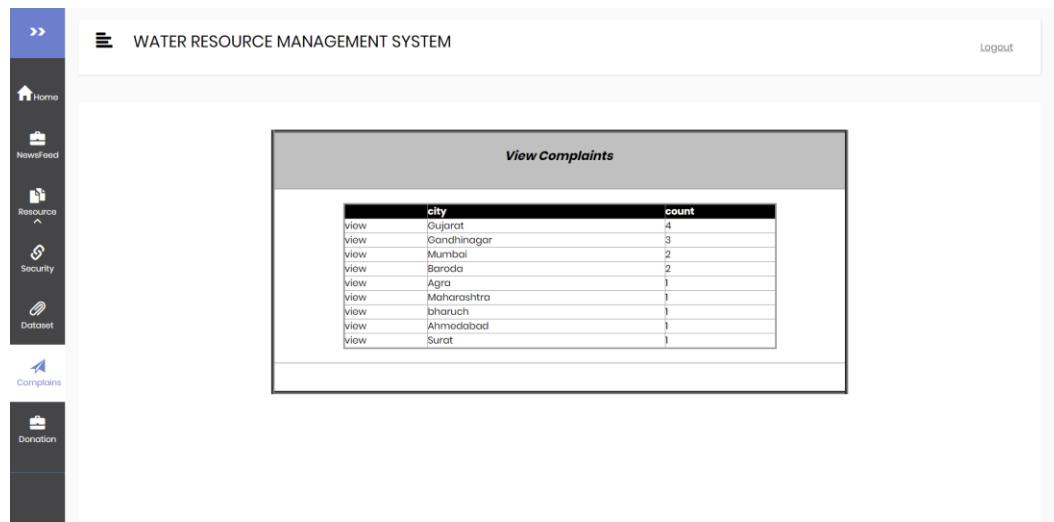


Figure 5.1(44)

On selection of particular city from Figure 5.1(44) new table is generated showing complaints from that particular city.

The screenshot shows the 'WATER RESOURCE MANAGEMENT SYSTEM' interface. On the left, a vertical sidebar menu includes 'Home', 'Newsfeed', 'Resource', 'Security', 'Dataset', 'Complaints' (which is currently selected), and 'Donation'. The main content area is titled 'View Complaints'. It displays two tables. The first table, titled 'city', has columns 'view', 'city', and 'count'. It shows data for Gujarat (count 4), Gandhinagar (3), Mumbai (2), Baroda (2), Agra (1), Maharashtra (1), Bharuch (1), Ahmedabad (1), and Surat (1). The second table, titled 'Accept', has columns 'Accept', 'u_name', and 'comments'. It shows two entries: 'Select Shall flood problem' and 'Select Shall Water Shortage Problem'. The 'Water Shortage Problem' entry is highlighted with a blue background.

Figure 5.1(45)

The highlighted complaint shows that the complain is viewed and status has been changed.

This screenshot is identical to Figure 5.1(45), showing the 'View Complaints' page for the city of Gujarat. The 'Water Shortage Problem' row in the 'Accept' table is now fully highlighted in blue, indicating it has been selected or accepted.

Figure 5.1(46)

➤ View and Donations

The screenshot shows a web application interface for a Water Resource Management System. On the left, there is a vertical sidebar with a blue header bar containing two arrows pointing right. Below this are several menu items with icons: Home (house), NewsFeed (newspaper), Resource (database), Security (key), Dataset (chart), Complaints (arrow), and Donation (suitcase). The URL at the bottom of the sidebar is `localhost:51665/Admin/view_donation.aspx`. The main content area has a white header bar with a menu icon, the text "WATER RESOURCE MANAGEMENT SYSTEM", and a "Logout" link. Below this is a "Donation List" section with a grey header and a table. The table has columns for Name, Address, Purpose, Amount, and Date of Donation. The data in the table is as follows:

Name	Address	Purpose	Amount	Date of Donation
Vidhi	Jivraj park	For helping rural areas	200000	26-03-2018 00:00:00
Shail	gandhinagar	For betterment of gandhinagar	300000	26-03-2018 00:00:00
Krupa	maninagar, Ahmedabad-382443	For helping in water Sanitation	50000	26-03-2018 00:00:00

Figure 5.1(47)

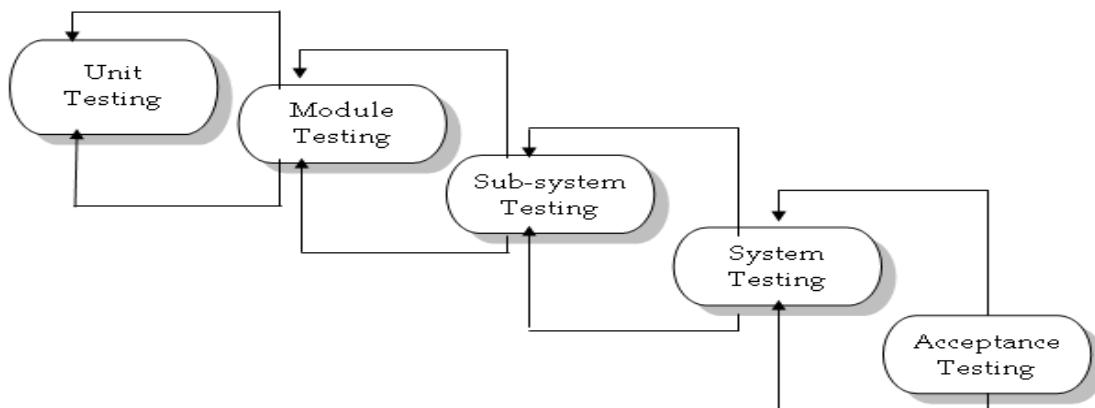
Chapter 6

System Testing

6.1 TESTING STRATEGY

Analyze and check system representations such as the requirements document, design diagrams and the program source code. They are applied at all stages of the process.

The following diagram shows different types of testing applied to the project:



6.2 TESTING METHODS

There are several models for testing module some of them are as follows:

Black-box Testing

6.2.1 Test Cases

Test Case	Module Name	Input	Expected Result	Test Result
1	Login	1. Enter valid email and password	Site should display Dashboard	As expected
		2. Enter invalid email and valid password	Site should display Error Message Invalid credentials	Error Message Shown
		3. Enter invalid email and invalid password	Site should display Error Message Invalid credentials	Error Message Shown
		4. Enter valid email and invalid password	Site should display Error Message Invalid credentials	Error Message Shown
		5. Without entering login information	Site should display Error Message Please enter email and password	Error Message Shown

Your username or Password is incorrect

Welcome, Sign in here....!!

Email Id:

Password:

[Log In](#)

[Forgot Password?](#)

You have not registered yet...?? [SignUp](#) here...!!

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Figure 6.2.1(1)

Welcome, Sign in here....!!

Email Id:

Password:

[Log In](#)

[Forgot Password?](#)

You have not registered yet...?? [SignUp](#) here...!!

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Figure 6.2.1(2)

2	Sign Up	1. Enter valid information	Site should display Dashboard	As expected
		2. Enter invalid mobile number	Site should display Error Message Invalid mobile number	Error Message Shown
		3. Enter invalid Email id	Site should display Error Message Invalid email id	Error Message Shown
		4. Without entering few/any information	Site should display Error Message field is required	Error Message Shown

WATER RESOURCE MANAGEMENT SYSTEM

Home Recents Login

Registration

First name :	<input type="text"/>	*
Last name :	<input type="text"/>	*
Mobile No :	<input type="text"/> sssss78542	Invalid Mobile Number
Email :	<input type="text"/> abdbdefg	Invalid Email-id
Security Question :	<input type="text"/> what is your college name? *	
Answer :	<input type="text"/> ddu	
Password :	<input type="text"/>	
Confirm Password :	<input type="text"/>	
OTP :	<input type="text"/>	<input type="button" value="Send OTP"/>
<input type="button" value="Submit"/>		

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Figure 6.2.1(3)

3	Change Password	1. Enter valid old password and new password	Site should display Success Message	As expected
		2. Enter invalid old password and new password	Site should display Error Message Enter valid password	Error Message Shown
		3. Without entering few/any information	Site should display Error Message field is required	Error Message Shown

The screenshot shows the 'CHANGE PASSWORD' form. The 'Enter Old Password' field contains '*****'. The 'Enter New Password' field contains '*****'. The 'ReEnter New Password' field contains '***'. A red error message 'Password doesn't Match' is displayed below the fields. A blue 'Change Password' button is at the bottom.

Figure 6.2.1(4)

The screenshot shows the 'CHANGE PASSWORD' form. The 'Enter Old Password' field contains '*****'. The 'Enter New Password' field is empty. The 'ReEnter New Password' field contains '*****'. A red error message 'Entered Old Password is incorrect' is displayed below the fields. A blue 'Change Password' button is at the bottom.

Figure 6.2.1(5)

4	Forgot Password	1. Enter valid email id and security question	Site should display Password.	As expected
		2. Enter invalid email id and security question	Site should display Error Your credentials are incorrect	Error Message Shown
		3. Without entering few/any information	Site should display Error Message field is required	Error Message Shown

The screenshot shows a web application interface for 'WATER RESOURCE MANAGEMENT SYSTEM'. At the top, there is a navigation bar with links for 'Home', 'Recents', and 'Login'. Below the navigation bar, a central content area displays a modal window titled 'Account Recovery'. The modal has a red header bar with the text 'Your credentials are incorrect'. The main body of the modal contains the following text: 'This helps show that this account really belongs to you'. Below this text are several input fields: 'Email Id' with the value 'vs@gmail.com', 'Security Question' with the dropdown value 'what is your college name?', and 'Answer' with the input field empty. At the bottom of the modal is a 'Get Password' button. The background of the page is light yellow, and at the bottom, there is a dark footer bar with the text 'Designed By Bisag.Gandhinagar Copyright © 2018 - All Rights Reserved Bhaskaracharya Institute For Space Applications And Geo-Informatics'.

Figure 6.2.1(6)

5	Complaint	1. Enter valid Information	Site should display Success Message	As expected
		2. Without entering complaint	Site should display Error Message complaint field required	Error Message Shown

The screenshot shows the 'WATER RESOURCE MANAGEMENT SYSTEM' interface. The left sidebar includes options like Dashboard, View, Charts, Download DataSets, Register Complain, and Donation. The main content area is titled 'COMPLAINT' and contains a form for 'Register Complaint'. It has fields for 'State' (Bihar) and 'City' (Amarpur). Below these is a large text area labeled 'Enter your Complain Here (Mandatory Field)' with a 'Complaint' button at the bottom.

Figure 6.2.1(7)

6	Donation	1. Enter valid data	Site should display payment receipt	As expected
		2. Without entering few/any information	Site should display Error Message field is required	Error Message Shown

The screenshot shows the 'WATER RESOURCE MANAGEMENT SYSTEM' interface. The left sidebar includes options like Dashboard, View, Charts, Download DataSets, Register Complain, and Donation. The main content area is titled 'DONATION' and contains a form for 'Donation'. It has fields for First name (Knapa), Last name (Shah), Mobile No (9726082277), Email (kshah@gmail.com), Address (Required), Purpose of Donation (Required), and Amount (Required). A 'Submit' button is at the bottom.

Figure 6.2.1(8)

7	File Upload	1. Select file with size less than 100 Mb	Site should Upload the file	As expected
		2. Select file with size more than 100 Mb	Site should Upload the file	Error Message Shown

The screenshot shows the 'DataSet Files' section of the system. A message at the top says 'Choose File: waterways.shp' and 'Upload'. Below it, a red error message states 'File size is more than 100 Mb'. A table below lists various files with their names, download, and delete options.

File Name	Download	Delete
INDIA.dbf	Download	Delete
INDIA.prj	Download	Delete
INDIA.sbn	Download	Delete
INDIA.sbx	Download	Delete
waterways.dbf	Download	Delete

Figure 6.2.1(9)

8	News feed	1. Enter valid data	Site should display Success Message	As expected
		2. Without entering few/any information	Site should display Error Message field is required	Error Message Shown

The screenshot shows the 'NewsFeed' addition form. It has fields for 'Add Title For News:' (with a red error message 'Title for News Required'), 'Upload Relevant Image For News:' (with a red message 'Choose File No file chosen'), and a 'Add' button.

Figure 6.2.1(10)

9	Add Resource	1. Enter valid data	Site should display Success Message	As expected
		2. Without entering few/any information	Site should display Error Message field is required	Error Message Shown

WATER RESOURCE MANAGEMENT SYSTEM

Name:

Type: bootyard

Width:

Interaction type: draw

Geometry type: LineString

Data type: GeoJSON

Features:

ADD

Check On Map

Logout

Figure 6.2.1(11)

10	Security	1. Enter valid Question	Site should display Success Message	As expected
		2. Without entering any information	Site should display Error Message field is required	Error Message Shown

WATER RESOURCE MANAGEMENT SYSTEM

Security Question

Add Security Question: Add

field is required

Delete	Edit	aid	sec_ques
Delete	Edit	4	what is your favorite food?
Delete	Edit	9	what is your favorite dish?
Delete	Edit	5	what is your college name?
Delete	Edit	12	which is your favorite book?
Delete	Edit	2	what is your school name?
Delete	Edit	15	what is your pet name?
Delete	Edit	1	what is your hobby?
Delete	Edit	7	what is your favorite color?
Delete	Edit	10	what is your favorite movie?
Delete	Edit	14	what is your favorite song?
Delete	Edit	3	what is your favorite place?
Delete	Edit	8	what is your favorite animal?
Delete	Edit	11	what is your favorite game?
Delete	Edit	6	what is your favorite sport?
Delete	Edit	13	what is your favorite flower?

Logout

Figure 6.2.1(12)

White-box testing:

White-box Testing is used as an important primary testing approach. Here code is inspected to see what it does; tests are designed to exercise the code. Code is tested using code scripts, driver etc., which are employed to directly interface with and drive the code.

The tester can analyze the code and use the knowledge about the surface of a component to derive the test data.

The disadvantages are that exhaustive path testing is infeasible and the logic might not conform to specification. Instrumentation techniques can be used to determine the structural system coverage in white box testing.

Code Coverage

The way to make sure that you have got all the control flow covered is to cover all the paths in the program during the testing (via white-box testing). This implies that both branches are exercised for an „if“ statement, all branches are exercised for a case statement, the loop is taken once or multiple times as well as ignored for a while statement, and all components of complicated logical expressions are exercised. This is called Path Testing. Additionally, it includes coverage of switch statement cases, exception handlers and interrupts handlers.

Chapter 7

Conclusion and future extension

7.1 LIMITATIONS:

- It can run only on the windows servers. It is not possible with LINUX servers.
- The size of the database increases day-by-day, increasing the load on the data maintenance activity.
- No facility of a Blog/Forum where the general discussions could be maintained.
- Admin cannot upload dataset file more than of size 100 MB.
- System doesn't provide any information about the type of water available in different water resources.

7.2 CONCLUSION:

We conclude that we have successfully implemented all the modules and functionality that were mentioned in the system requirements. All the objectives mentioned earlier in the document have been fulfilled. We learned many new things like SMS facility and the data export facility using the pdf and excel creator code. This project will be used by Government Departments to publish datasets, documents and services for public use and can increase transparency in the functioning of Government.

7.3 FUTURE EXTENSIONS:

- This System provides security with verifying phone number which further will be verified by Aadhar-card.
- Further the system may have various other types of government modules like water resource conservation and sanitation, promotional events held by government and different government policies and contest.
- Currently the system takes data from database. In future we can take data from satellite images by using image processing.

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