### DTIL PROJECT REPORT

### ON

### RAIN WATER HARVESTING SYSTEM

**Submitted By,**

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**(F.Y.BTech CSE(Cyber Security))**

**Guide**

**Dr. Ajit Muzumdar**

**Prof. Pravin Chokakkar**

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**In the academic year 2024-25**

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CERTIFICATE

### This is to certify that

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**(F.Y. BTech Computer)**

**Have successfully completed their DTIL project report on**

**Rain Water Harvesting System**

#### Towards the partial fulfillment of Bachelor’s Degree

#### In Cyber Security

**During the academic year 2024-25**

**Prof. Pravin Chakokkar Dr. Ajit Muzumdar**

**Acknowledgement**

The entire session of seminar completion phase so far was a great experience providing me with great insight and innovation into learning various data security concepts and achievement of it. As is rightly said, for the successful completion of any work, people are the most important asset my seminar would not be materialized without the cooperation of many of the people involved.

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**Report**

**SDG Topic Selection**

The project fits under SDG 6: Clean Water and Sanitation. The goal is to ensure availability and sustainable management of water and sanitation for all. In the context of this project, a primary objective would be the development of an application that helps homeowners monitor and manage rainwater harvesting systems effectively, ensuring proper water conservation and minimizing dependence on municipal supplies. It enables users to track water level, health monitoring of the system, and alerts about maintenance; hence, it supports the sustainable use of water.

**Mindmap**

The mind map is a visual aid, illustrating the important aspects of the rainwater harvesting system and the characteristics of the app. Key elements include:

**Rainwater Collection**: Such collection systems include gutters, downpipes, and catchment rainwater harvesting systems.

**Storage**: Water tanks, pipes, and other collection components to store collected water.

**Water Treatment** : Water purification,chlorination,sand filter to maintain the water neat and clean and be useful to the people around.

**Agriculture** : Drip irrigation,storage ponds ,water harvesting pit for agricultural purpose and be helpful to farmers around.

**Reuse**: we can use water for all other purpose like drinking,non-potable use,farming,washing clothes etc.

**Environment friendly**:Water conservation,sustainable water etc. we can use water by not harming the environment

**Journeymap**

The journey map represents the user's experience with the rainwater harvesting system and app, illustrating their journey from initial setting up to continuous monitoring and maintenance. The stages include the following:

**User Registration**: Users create a profile and input basic information regarding their rainwater harvesting system, such as tank size and location.

**System Setup**: Users configure sensors, set water level thresholds, and adjust monitoring settings according to their preferences.

**Monitoring**: The app continuously monitors water levels, quality, and weather conditions and displays real-time data to the user.

**Maintenance Alerts**: The app notifies for upcoming maintenance such as cleaning filters or checking the system's health.

**Usage Analytics**: The app provides reports and analytics related to water usage, savings, and potential improvement to the system's efficiency.

This journey map shows an ongoing loop of feedback between the user, the rainwater harvesting system, and the app in order to always maintain improvement and increase saved water.

This includes two journeymap

1.Farmer

2.The city people(well educated)

In this it shows the confidence level of the people during the interface of the app and the problems and excitement phase through which they are passing.

**5W1H Activity**

The **5W1H** method provides a structured approach to understanding the project's core elements and helps to work on the project, this tells us in which section we are lacking project and where we have to focus more from this we identify the which question is more problematic.

W-Who

W-What

W-Where

W-When

W-Why

H-How

In this we the questions like:

Who are the beneficiaries from rainwater harvesting?

What is rainwater harvesting?

Where is rainwater harvested?

When should rainwater harvesting systems be used?

Why is rainwater harvesting important?

How is rainwater collected and used?

**Problem Statement**

In urban and rural areas, rainwater harvesting systems are becoming increasingly important as a sustainable way to conserve water, reduce dependency on municipal water supplies, and mitigate the effects of water scarcity. However, one of the biggest challenges faced by these systems is proper management of the tank's water capacity and how can we avoid water by getting contaminated?

**SCAMPER**

SCAMPER as a teaching strategy helps the students to analyze the knowledge in its creative form and using all this techniques we come to now exactly what area should we focus our topic.

S-Substitute

C-Combine

A-Adopt

M-Modify

P-Put to another use

E-Eliminate

R-Reverse

**SUBSTITUTE**- We can use more sustainable materials for rainwater harvesting components (e.g., biodegradable filters, recycled plastic pipes).

**COMBINE**- Combine individual household systems with community-based storage facilities, increasing the scale of rainwater harvesting.

**ADOPT**- Use green roofs that not only collect rainwater but also help with insulation and urban heat island reduction.

**MODIFY**- Increase the storage capacity of rainwater harvesting systems in urban areas to meet growing water demands.

**PUT TO ANOTHER USE**- Use rainwater for non-drinking purposes like cleaning, cooling systems, or industrial uses.

**ELIMINAT**E- Simplify the cleaning, maintenance, and monitoring processes for rainwater harvesting systems to reduce long-term costs and effort.

**REVERSE**- Simplify the cleaning, maintenance, and monitoring processes for rainwater harvesting systems to reduce long-term costs and effort.

**SELECTED TECHNIQUES FROM SCAMPER**

**MODIFY**- Increase the storage capacity of rainwater harvesting systems in urban areas to meet growing water demands.

**PUT TO ANOTHER USE**- Use rainwater for non-drinking purposes like cleaning, cooling systems, or industrial uses

**From scamper we selected two techniques for our project-**

Modify-Increase the storage capacity and add the sensors to the tank.

Put to another use-Instead of using it during the rainy season we can use it for all seasons in daily life

**PERSONA**

In persona we interact with each of the end user ,from this we come to know their condition in exactly what stage they are what should we provide them we include the things like-background, what are challenges faced by the people in society , with what motivation they are living, what fears and doubt they have about their work what are their aspiration .

We include 2 persona:

1.Farmer

2.Urban area people

**Persona 1:Farmer**

**Background:**

1.Ravi is in poor family.

2.He is primary educated.

3.He has medium sized plot of land.

4.He work hard.

5.He lives whole family.

**Challenges faced:**

1.Ravi facing the problem of water storing.

2.Irrigation problem.

3.Pests and diseases.

4.Soil erosion.

**Motivation:**

1.Ravi is interested in making profit ,this motivates he to learn and to make decision how to maintain.

2.Improve the quality life.

**Doubts:**

If the field is not surrounded by compound, people will steal the crops from the field

**Aspirations:**

1.Working towards achieving financial security and profitability.

2.Aspiring to learn continuously about new farming techniques and share this knowledge with other farmer.

**Story**: Ravi is a farmer from a poor family. He is primary educated. He work hard. He faced the challenges like soil erosion, water storing, irrigation. He is full motivated about the farming. He learn continuosly new things, and make a farm greeny.

**Persona 2:Urban Area People**

**Background:**

1.Sanju is in middle class family.

2.He is higher educated.

3. He has big plot of land.

4.He lives with is family

He, wife, son.

**Challenges faced:**

1. Limited Space for Farming.
2. High Cost of Land.
3. Soil Quality and Pollution.
4. Water Scarcity and Management
5. **Motivation:**
6. 1.Access to Fresh, Healthy Food.
7. 2.Educational and Skill Development.
8. **Doubts:**
9. 1.Soil Quality and Contamination.
10. 2.Pests and Disease Management
11. **Aspiration:**
12. 1.Self-Sufficiency in Food Production.
13. 2.Starting an Urban Farming Business.
14. **Story:** Sanju is in middle class family. He is higher educated. He has a big plot of land. He faced the challenges like soil quality, limited space, pollution. He is motivated to learn new technique. His aspiration is is started urban farming business.

**Model Prototype or Design**

The **prototype** consists of the following components:

1. **App Interface**: A mobile app dashboard that displays water levels, quality, and consumption data.
2. **Hardware Integration**: Sensors in tanks monitor water levels, quality, and weather conditions.
3. **Maintenance Features**: Automated reminders for cleaning filters, checking pipes, and ensuring system functionality.

The prototype was designed with **user-centric principles**, ensuring that all features are easily accessible and actionable.

In Detail:

App Interface. The mobile app interface is the central hub users operate in **checking, managing,** and **controlling** their rainwater harvesting system. The app is user-friendly with easy access to the most commonly used features through an intuitive layout.

Key features of the app interface:

Water Level: Real-time water levels in tanks with both current and estimated levels available.

Water Quality Data-It contains data regarding the quality of collected rainwater, including turbidity, pH levels, contaminants etc. The alert system will notify the consumer when the water quality has been impacted or falls below thresholds.

Consumption Tracker: It would track the level of water usage and what is available for storage. This will help in efficient planning on how to use their water, especially during drought or reduced rainfall.

Weather forecast integration: This would be a display of weather forecasts, including expected rainfall, temperature, and humidity. The information helps predict future collection potential in rainwater and lets the consumer know when to collect more.

The maintenance dashboard displays scheduled maintenance tasks, including filter cleaning, inspection of the condition of tanks, and pipes. Users may schedule maintenance based on recommended interval or receive reminders based on actual usage data.

Data Insights & Analytics: This part includes historical data, for example, trends in water usage and collected rainwater over time, that may show consumption patterns and possible continuation of further savings.

The dashboard is designed to be minimalist and simple for users to navigate, showing them only the most needed information at a glance while offering additional detailed data under easy-to-navigate tabs.

**Working Model of the Project**

The sensors in the rainwater collection and storage system collect data that the system then transmits to the application, which processes the data and presents the same to the user in an understandable form. Main functions include:

Water Level Tracking: Sensors monitor the amount of collected water, sending alerts when levels are too low or high.

Water Quality Monitoring: Sensors monitor the quality of water and alert the user when purification is needed.

Weather Forecasting: Weather sensors predict rainfall, optimizing collection schedules.

**Discussion on the Usability of the Model**

The usability of the model is high because it integrates the ease of use with powerful features.

Setup is simple: Users can easily download the system and install the app with relatively minimal technical expertise.

Real-time Monitoring: Users continuously receive water level, quality, and needs for maintenance updates.

Maintenance Alerts: Notifications guarantee the system is always in an optimal condition.

Data Insights: This application gives insights into actionable data so users can better preserve water.