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RAINWATER HARVESTING REPORT

"Rainwater Harvesting System at Annasaheb Dange College of Engineering and Technology, Ashta"

Prepared By:

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CERTIFICATE

This is to certify that the report entitled **"Rainwater Harvesting System at Annasaheb Dange College of Engineering and Technology, Ashta"** has been prepared to document the existing rainwater harvesting infrastructure, assess the rooftop rainwater harvesting potential of the campus, and highlight the institute's initiatives towards sustainable water resource management.

The report has been prepared based on field observations, campus infrastructure details, rooftop catchment measurements, and rainfall data collected from authentic government sources. The findings presented in this report reflect the existing rainwater harvesting practices implemented within the institute campus and are intended to support environmental conservation, groundwater recharge, sustainable campus development, and statutory documentation for quality assurance and accreditation.

I appreciate the efforts taken by **Dr. Manoj H. Mota, IGBC Accredited Professional**, and Head, Deprtment of Civil Engineering, in compiling and preparing this report with due technical diligence and professional responsibility.

I wish that this report will serve as a useful reference for promoting sustainable water management practices and strengthening the institute's commitment towards environmental stewardship.

Place: Ashta, Dist. Sangli, Maharashtra
Date: 30/06/2026

Dr. L. Y. Waghmode
Director
Annasaheb Dange College of Engineering and Technology, Ashta

PREPARED BY

This report has been prepared under the guidance of the institute management to document the existing rainwater harvesting system at Annasaheb Dange College of Engineering and Technology, Ashta. It presents the assessment of the rooftop rainwater harvesting potential, existing recharge infrastructure, rainfall analysis, and water conservation initiatives undertaken by the institute for sustainable campus development.

The report has been compiled based on field investigations, engineering measurements, campus records, and rainfall data obtained from authentic government sources. It aims to serve as a technical document supporting sustainable water management practices, environmental conservation, and quality assurance initiatives of the institute.

Prepared By:

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PREFACE

Water is one of the most valuable natural resources and forms the foundation of sustainable development. Rapid urbanization, increasing water demand, depletion of groundwater resources, and the growing impacts of climate change have intensified the need for efficient water conservation practices. Although India receives substantial rainfall during the monsoon season, a significant portion of this valuable resource is lost as surface runoff due to inadequate harvesting and recharge mechanisms. Therefore, conserving rainwater has become an essential component of integrated water resource management.

Rainwater harvesting is a simple, economical, and environmentally sustainable technique that enables the collection and utilization of rainwater while simultaneously enhancing groundwater recharge. Besides reducing dependence on conventional water sources, it helps mitigate urban flooding, improves groundwater availability, supports landscape irrigation, and contributes to long-term water security. Educational institutions, with their extensive rooftop areas and open spaces, have tremendous potential to adopt rainwater harvesting systems and demonstrate responsible environmental stewardship.

Recognizing the importance of sustainable water management, Annasaheb Dange College of Engineering and Technology, Ashta, has implemented a rooftop rainwater harvesting system to collect and recharge rainwater within the campus. This initiative reflects the institute's commitment towards environmental conservation, sustainable campus development, and responsible utilization of natural resources.

The purpose of this report is to document the existing rainwater harvesting infrastructure of the institute, analyze the regional rainfall characteristics, estimate the rooftop rainwater harvesting potential using recent rainfall data, and present the operational aspects of the system. The report also highlights the environmental benefits of rainwater harvesting and serves as a technical reference for institutional planning, environmental audits, quality assurance processes, and accreditation requirements. It is expected that this document will further strengthen the institute's commitment towards sustainable development and inspire continued efforts in water conservation.

ACKNOWLEDGEMENT

The successful preparation of this report on "Rainwater Harvesting System at Annasaheb Dange College of Engineering and Technology, Ashta" has been possible due to the encouragement, support, and guidance received from the management and administration of the institute.

We express our sincere gratitude to Hon. Ramchandra Mahadev (Annasaheb) Dange, Founder Chairman, Adv. Rajendra R. Dange, Secretary, and Hon. Vishwanath R. Dange, Joint Secretary, Sant Dnyaneshwar Shikshan Sanstha, for their visionary leadership, continuous encouragement, and commitment towards promoting sustainable environmental practices and green campus initiatives.

We place on record our heartfelt appreciation to Dr. Laxman Y. Waghmode, Director, Annasaheb Dange College of Engineering and Technology, Ashta, for his constant guidance, encouragement, and support in documenting the institute's rainwater harvesting initiative as a part of its commitment to sustainable campus development.

We also acknowledge the valuable support extended by the faculty members, technical staff, administrative staff, and maintenance personnel of the institute who assisted in providing campus information, infrastructure details, and technical inputs required for the preparation of this report.

The preparation of this report has also been enriched through the use of authentic technical references and rainfall records obtained from various government and institutional sources. We gratefully acknowledge the information and data made available through the following organizations and official websites:

- India Meteorological Department (IMD) – for climatological and rainfall-related reference information.
- MahaRain Portal, Government of Maharashtra – for district-wise and seasonal rainfall records utilized in rainfall analysis.
- Central Ground Water Board (CGWB) – for technical guidelines and reference material on rainwater harvesting and groundwater recharge.
- Annasaheb Dange College of Engineering and Technology (ADCET), Ashta – for institutional information, campus details, and infrastructure records.
- Google Earth Pro – for preparation of campus location maps, rooftop identification, and layout illustrations.

Finally, we acknowledge all those who have directly or indirectly contributed to the successful preparation of this report. It is hoped that this document will serve as a useful technical reference for sustainable water resource management, environmental conservation, groundwater recharge, and future institutional planning.

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CHAPTER 1

EXECUTIVE SUMMARY

Rainwater harvesting has emerged as an effective and sustainable approach for conserving water resources and enhancing groundwater recharge, particularly in regions experiencing seasonal rainfall variability. Recognizing the importance of responsible water resource management, Annasaheb Dange College of Engineering and Technology (ADCET), Ashta, has implemented a rooftop rainwater harvesting system as part of its commitment towards environmental sustainability and green campus development.

The present report documents the existing rainwater harvesting system of the institute and evaluates its potential for groundwater recharge. The study includes an assessment of regional rainfall characteristics, analysis of rainfall data for the period 2023–24 to 2025–26, estimation of rooftop rainwater harvesting potential, and evaluation of the environmental benefits associated with the system. The report has been prepared using institutional infrastructure records, rooftop catchment measurements, field observations, and authenticated rainfall data obtained from government sources.

Analysis of the three-year rainfall data indicates that the institute receives an average seasonal rainfall of approximately 863 mm, which provides favourable conditions for effective rooftop rainwater harvesting. The total effective rooftop catchment area connected to the rainwater harvesting system is 5347 m^2**.** Based on the average seasonal rainfall and a runoff coefficient of 0.80, the institute has an estimated annual rainwater harvesting potential of 3691.62 m^3**.**

The rainwater harvesting system has been designed exclusively for groundwater recharge. Rainwater collected from the rooftops is conveyed through a network of downpipes and recharge structures, allowing it to percolate into the subsurface aquifer. This practice contributes to groundwater replenishment, reduces stormwater runoff, minimizes localized waterlogging, and promotes sustainable utilization of available water resources. The system also supports climate resilience by improving groundwater availability during periods of reduced rainfall.

In addition to its technical benefits, the rainwater harvesting initiative contributes to the institute's environmental sustainability goals by promoting water conservation, responsible resource management, and sustainable campus development. The initiative also supports the United Nations Sustainable Development Goals (SDGs)**,** particularly SDG 6 (Clean Water and Sanitation)**,** SDG 11 (Sustainable Cities and Communities)**,** SDG 12 (Responsible Consumption and Production)**,** SDG 13 (Climate Action)**,** and SDG 15 (Life on Land)**.**

Overall, the report demonstrates that the existing rainwater harvesting system at ADCET is a technically sound and environmentally responsible initiative. With regular maintenance, periodic monitoring, and future expansion of rooftop connectivity, the system has the potential to further strengthen groundwater recharge and contribute significantly to the institute's long-term water security and sustainable campus development.

CHAPTER 2

INTRODUCTION

Water is an indispensable natural resource that sustains life, supports economic development, and maintains ecological balance. Freshwater resources, however, are under increasing stress due to rapid population growth, urbanization, industrialization, agricultural expansion, and the adverse impacts of climate change. Although India receives substantial rainfall during the monsoon season, temporal and spatial variations in precipitation often result in water scarcity during the remaining part of the year. Consequently, sustainable water resource management has become a national priority.

Rainwater harvesting has emerged as an effective and environmentally sustainable approach for conserving rainwater, reducing dependence on groundwater, and enhancing groundwater recharge. By collecting and utilizing rainwater from rooftops and other catchment areas, institutions can contribute significantly towards water conservation while promoting sustainable campus development.

Recognizing this responsibility, Annasaheb Dange College of Engineering and Technology (ADCET), Ashta**,** has implemented a rooftop rainwater harvesting system to capture rainwater from selected buildings and recharge it into the ground. This initiative reflects the institute's commitment to environmental sustainability, resource conservation, and responsible infrastructure management.

2.1 Water Scenario

2.1.1 Global Water Scenario

Although nearly 71% of the Earth's surface is covered by water, only about 2.5% constitutes freshwater, and less than 1% is readily available for human consumption. Increasing water demand, climate variability, pollution, and unsustainable extraction of groundwater have intensified water stress across many regions of the world. The United Nations has identified access to clean water and sustainable water management as one of the major global development priorities under the Sustainable Development Goals.

2.1.2 National Water Scenario

India receives an average annual rainfall of approximately 1,170 mm, with nearly 75–80% occurring during the southwest monsoon season between June and September. However, uneven rainfall distribution, increasing urbanization, over-extraction of groundwater, and inadequate storage infrastructure often lead to seasonal water shortages. Rainwater harvesting has therefore become an integral component of India's water conservation strategy and is actively promoted through various national and state-level policies.

2.1.3 Water Scenario in Maharashtra

Maharashtra experiences considerable regional variation in rainfall, ranging from very high precipitation in the Western Ghats to comparatively lower rainfall in the rain-shadow regions of the state. Recurring droughts, declining groundwater levels, and increasing demand for water have emphasized the need for efficient rainwater harvesting and groundwater recharge systems. Educational institutions are increasingly encouraged to implement sustainable water management practices as part of green campus initiatives.

2.1.4 Water Scenario in Sangli District

Sangli district lies in the semi-arid region of southern Maharashtra, where rainfall is largely confined to the southwest monsoon season. The district frequently experiences variability in annual rainfall, making groundwater recharge essential for maintaining long-term water availability. Efficient utilization of rooftop runoff through rainwater harvesting can substantially reduce dependence on conventional water sources while improving groundwater sustainability. The institute campus at Ashta receives seasonal monsoon rainfall, providing favourable conditions for rooftop rainwater harvesting and groundwater recharge.

2.2 Importance of Rainwater Harvesting

Rainwater harvesting is a simple, reliable, and cost-effective technique for conserving rainwater by collecting runoff from rooftops and directing it for storage or groundwater recharge. It reduces wastage of rainwater, supplements groundwater resources, and promotes sustainable utilization of available water resources.

The major benefits of rainwater harvesting include:

- Conservation of freshwater resources.
- Enhancement of groundwater recharge and improvement of groundwater levels.
- Reduction in stormwater runoff and localized flooding.
- Decreased dependence on municipal and groundwater supplies.
- Improved water availability for landscaping, gardening, and other non-potable applications.
- Reduction in soil erosion caused by uncontrolled surface runoff.
- Promotion of sustainable campus development and environmental stewardship.

By enhancing groundwater recharge, rainwater harvesting contributes to maintaining aquifer health, improving water availability during dry seasons, and increasing resilience against prolonged periods of low rainfall. Such systems have become increasingly important in the context of climate change, where irregular rainfall patterns and extreme weather events necessitate effective water conservation measures.

Furthermore, rainwater harvesting directly supports the United Nations Sustainable Development Goals (SDGs), particularly:

- SDG 6 – Clean Water and Sanitation: Improving water-use efficiency and sustainable management of water resources.
- SDG 11 – Sustainable Cities and Communities: Promoting resilient and resource-efficient infrastructure.
- SDG 12 – Responsible Consumption and Production: Encouraging sustainable use of natural resources.
- SDG 13 – Climate Action: Strengthening climate resilience through sustainable water management.
- SDG 15 – Life on Land: Supporting groundwater recharge and ecosystem conservation.

2.3 Objectives of the Study:

The present study has been undertaken with the following objectives:

- To assess the rainfall availability over the institute campus using recent rainfall records.
- To estimate the rooftop catchment area available for rainwater harvesting.
- To estimate the quantity of rooftop runoff that can be harvested using standard hydrological principles.
- To assess the groundwater recharge potential of the existing rainwater harvesting system.
- To document the existing rainwater harvesting infrastructure and its operational features.
- To evaluate the institute's contribution towards sustainable water conservation and groundwater management.
- To provide recommendations for enhancing the effectiveness of rainwater harvesting on the campus.

CHAPTER 3

INSTITUTE PROFILE

3.0 Institute Profile

Annasaheb Dange College of Engineering and Technology (ADCET), Ashta, established in 1999, is one of the leading engineering institutions in Western Maharashtra. Managed by Sant Dnyaneshwar Shikshan Sanstha, the institute is committed to providing quality technical education while fostering environmental sustainability through responsible management of natural resources.

The institute offers undergraduate and postgraduate programmes in engineering and management disciplines. Spread over a lush green campus, ADCET houses modern academic buildings, laboratories, workshops, hostels, sports facilities, administrative offices, and other supporting infrastructure. The campus continuously adopts sustainable practices including rainwater harvesting, groundwater recharge, energy conservation, waste management, tree plantation, and environmental awareness initiatives.

Among these initiatives, the rooftop rainwater harvesting system plays a significant role in conserving water resources by capturing monsoon runoff and facilitating groundwater recharge. This system complements the institute's overall water management strategy and contributes towards sustainable campus development.

Location Details:

Particular	Details
Institute Name	Annasaheb Dange College of Engineering and Technology (ADCET)
Managing Trust	Sant Dnyaneshwar Shikshan Sanstha
Location	Ashta, Taluka Walwa, District Sangli, Maharashtra, India
Latitude	16.949° N
Longitude	74.409° E
Total Campus Area	Approximately 24 Acres
Climate	Tropical Monsoon
Average Annual Rainfall	Discussed in Chapter 4

3.1 Campus Layout

The institute campus comprises academic blocks, laboratories, workshops, administrative offices, hostels, central library, sports facilities, landscaped gardens, parking areas, and internal road networks. The rainwater harvesting system has been integrated with selected rooftop catchments to facilitate groundwater recharge within the campus.

A Google Earth satellite image indicating the campus layout, major buildings, rooftop catchment areas, recharge structures, water storage facilities, and water flow directions is presented below.

Figure 3.1: Google Earth Image of ADCET Campus showing the Rainwater Harvesting System.

3.2 Existing Water Infrastructure

The institute has developed an integrated water supply and storage system to meet the domestic, academic, laboratory, horticultural, and sanitation requirements of the campus. The primary water source for the institute is river water, which is lifted and stored within the campus for subsequent distribution and use. The rainwater harvesting system supplements this infrastructure by enhancing groundwater recharge and improving the long-term sustainability of water resources.

Water Source

The institute primarily depends on river water, which is lifted through a pumping arrangement and conveyed to the campus. This ensures a reliable source of raw water for various campus activities throughout the year.

Water Storage Facilities

To ensure uninterrupted water availability, the institute has established two major water storage units:

- Storage Well: A large storage well serves as the primary storage structure for the river water pumped into the campus. This well acts as the main reservoir from which water is further supplied to different parts of the institute.
- Storage Tank near the Central Library: An additional storage tank located near the library building provides supplementary water storage and helps maintain a continuous water supply across the campus during peak demand.

These storage facilities together ensure adequate water availability for academic buildings, laboratories, hostels, sanitation, and landscape maintenance.

Water Treatment System:

To provide safe and potable drinking water, the institute has installed Reverse Osmosis (RO) water purification systems at strategic locations across the campus. The RO units treat the stored raw water by removing dissolved impurities and microorganisms, thereby ensuring a continuous supply of clean and safe drinking water for students, faculty members, staff, and visitors.

Water Distribution System:

Water from the storage facilities is distributed throughout the campus through an internal pipeline network serving academic buildings, laboratories, hostels, administrative offices, sanitation facilities, and landscaped areas. The distribution system has been designed to ensure reliable water availability across the campus.

The rooftop rainwater harvesting system complements this water infrastructure by collecting rainwater from selected buildings and directing it to groundwater recharge structures. This practice helps augment groundwater resources, improves the sustainability of the campus water management system, and demonstrates the institute's commitment to environmental conservation and responsible utilization of natural resources.

CHAPTER 4

RAINFALL ANALYSIS AND RAINWATER HARVESTING POTENTIAL

Rainfall is the primary source of water for rooftop rainwater harvesting systems. The quantity of rainwater that can be harvested depends upon the amount and distribution of rainfall, rooftop catchment area, and runoff characteristics of the roof surface. Therefore, an analysis of rainfall data is essential for estimating the rainwater harvesting potential and assessing the effectiveness of the existing rainwater harvesting system.

For the present study, rainfall data for the last three monsoon seasons (2023–24, 2024–25 and 2025–26) have been considered. Since the objective of the institute's rainwater harvesting system is groundwater recharge, the harvested rooftop runoff is conveyed to recharge structures without any provision for direct storage or reuse.

4.1 Rainfall Characteristics

The institute is situated in the tropical monsoon region of Sangli district, where rainfall is predominantly received during the southwest monsoon season extending from June to September. More than 90% of the annual rainfall occurs during these four months, making the period highly suitable for rooftop rainwater harvesting and groundwater recharge.

Analysis of the available rainfall records indicates that the study area receives an average seasonal rainfall of approximately 863 mm during the study period. The rainfall pattern exhibits normal year-to-year variation while remaining adequate for effective groundwater recharge. The highest monthly rainfall during the study period was recorded in July 2024 (391 mm), whereas the lowest monthly rainfall was observed in August 2023 (72 mm).

4.2 Rainfall Data

4.2.1 Rainfall Data for the Year 2023–24

Table 4.1 Monthly Rainfall (2023–24)

Month	Rainfall (mm)
June	78
July	302
August	72
September	202
Total Seasonal Rainfall	654

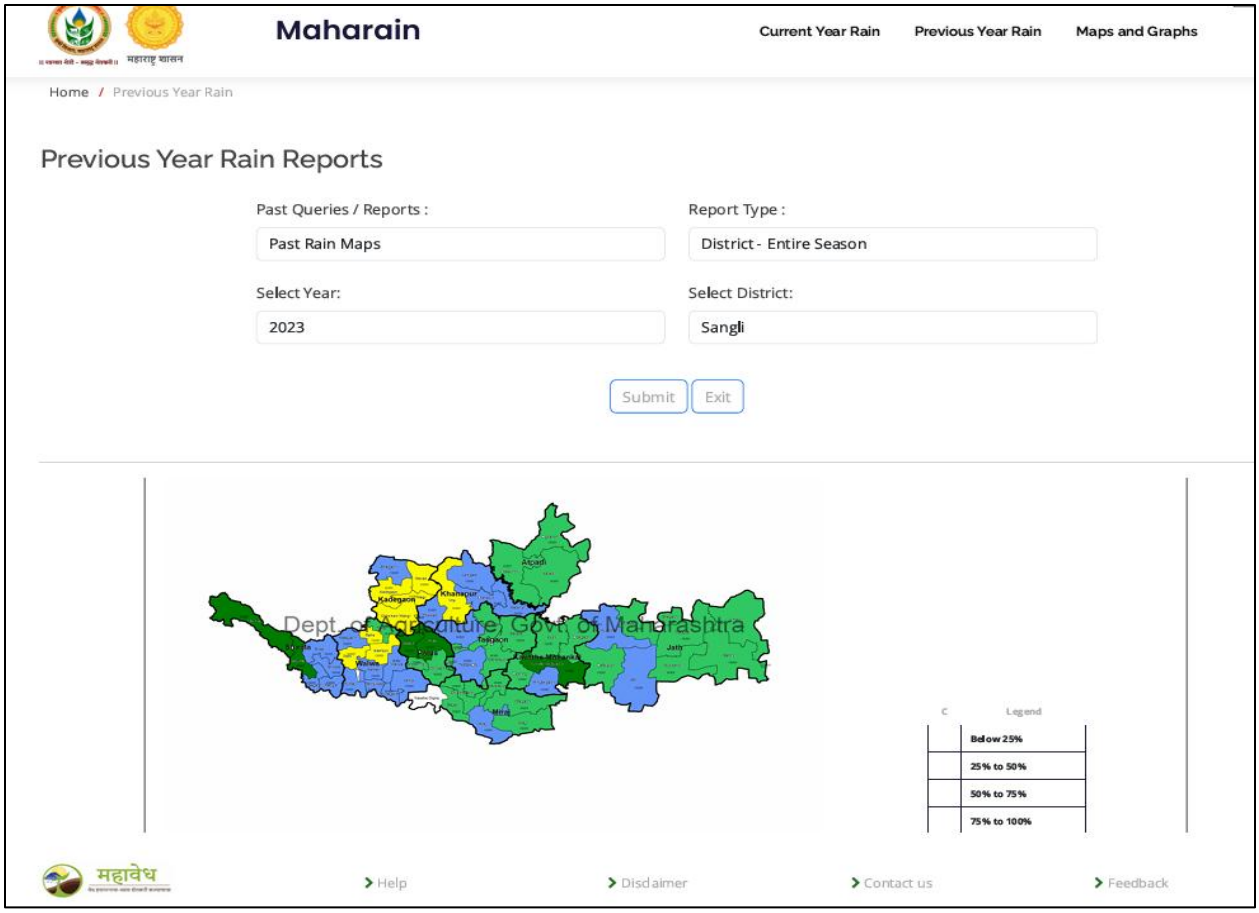

Figure 4.2.1: Sangli District Rainfall Status Map for 2023 (2023–24 Season) (Source: MahaRain Portal, Department of Agriculture, Government of Maharashtra).

4.2.2 Rainfall Data for the Year 2024–25

Table 4.2 Monthly Rainfall (2024–25)

Month	Rainfall (mm)
June	173
July	391
August	308
September	164
Total Seasonal Rainfall	1036

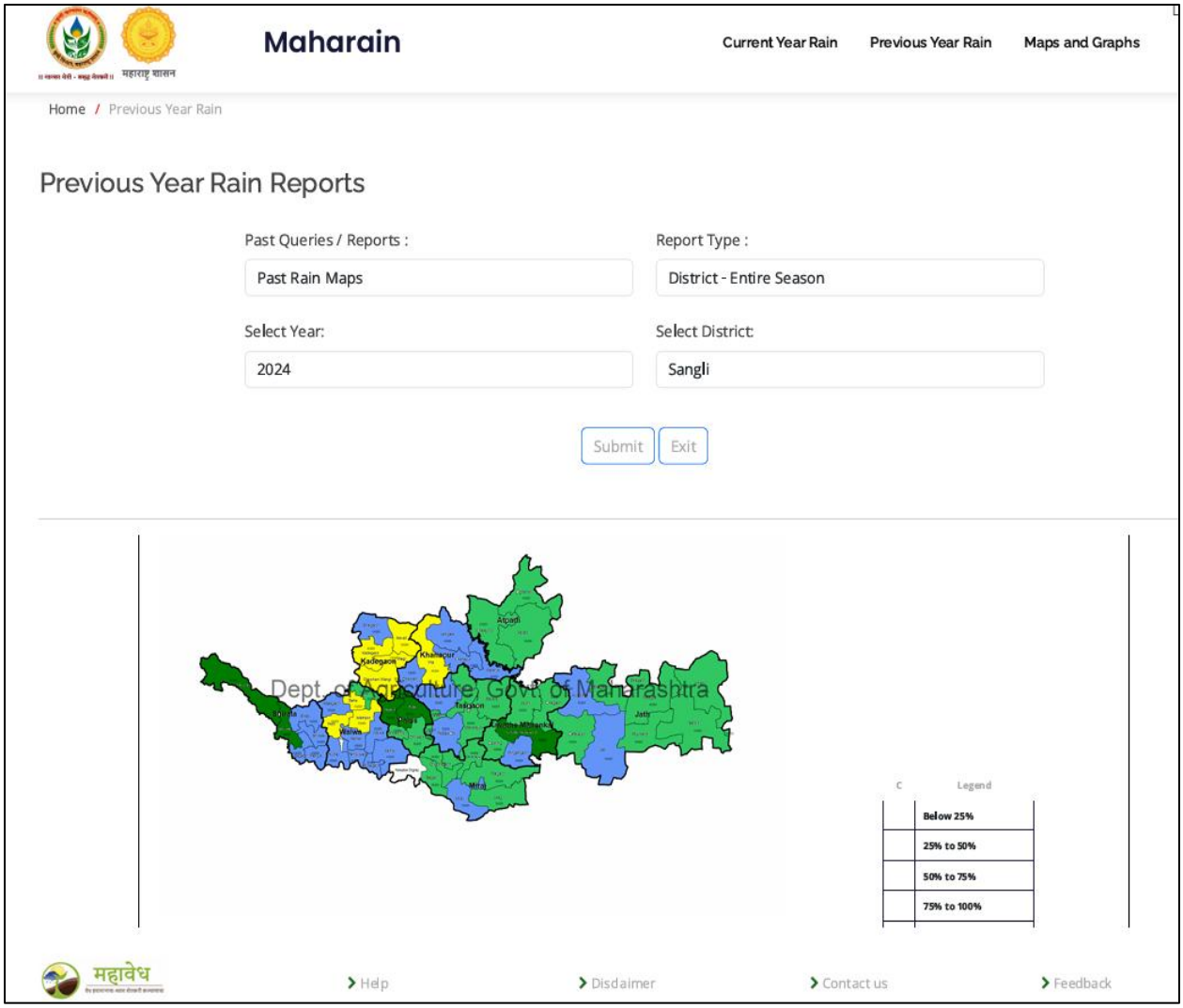

Figure 4.2.2: Sangli District Rainfall Status Map for 2024 (2024–25 Season) (Source: MahaRain Portal, Department of Agriculture, Government of Maharashtra).

4.2.3 Rainfall Data for the Year 2025–26

Table 4.3 Monthly Rainfall (2025–26)

Month	Rainfall (mm)
June	213
July	212
August	218
September	255
Total Seasonal Rainfall	898

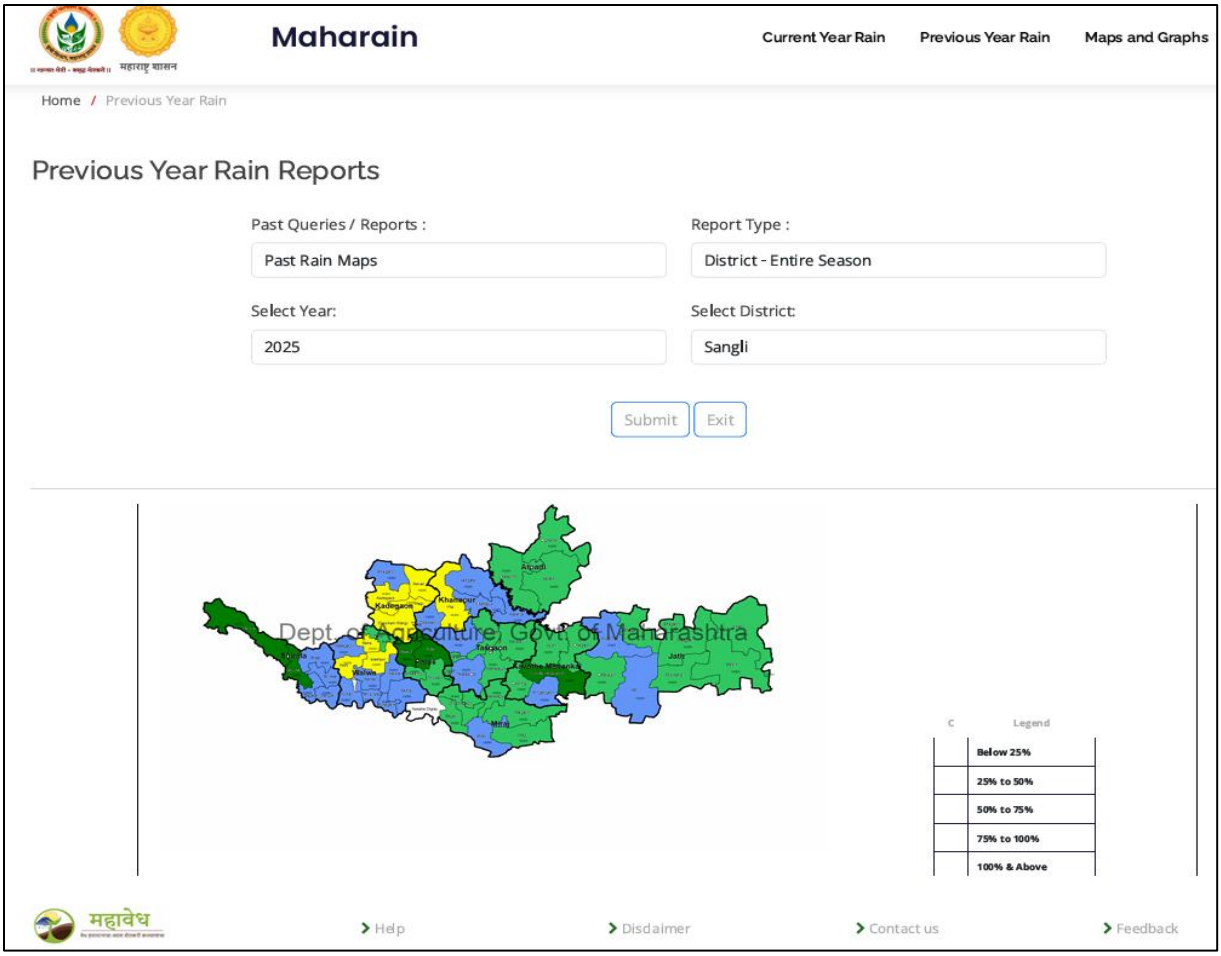

Figure 4.2.3: Sangli District Rainfall Status Map for 2025 (2025–26 Season) (Source: MahaRain Portal, Department of Agriculture, Government of Maharashtra).

4.3 Comparative Rainfall Analysis

The seasonal rainfall received during the three study years is summarized in Table 4.4.

Table 4.4 Seasonal Rainfall Comparison

Academic Year	Seasonal Rainfall (mm)
2023–24	654
2024–25	1036
2025–26	898
Average	863

The comparison indicates that although seasonal rainfall varies from year to year, the study area consistently receives sufficient rainfall to support effective rooftop rainwater harvesting and groundwater recharge.

4.4 Rainfall Trend Analysis

The three-year rainfall analysis indicates moderate seasonal variability, which is characteristic of monsoon-dependent regions. While the total rainfall fluctuates annually, the overall trend demonstrates that the study area consistently receives sufficient rainfall to sustain groundwater recharge through rooftop rainwater harvesting. The analysis confirms the suitability of the existing rainwater harvesting system for long-term water conservation within the institute campus.

4.5 Design Parameters for Rainwater Harvesting

The rainwater harvesting potential has been estimated using standard hydrological principles. The average seasonal rainfall of 863 mm has been adopted as the design rainfall since it represents the normal rainfall condition over the study period and provides a realistic estimate of the annual harvesting potential.

As the rooftops of the institute buildings are predominantly reinforced cement concrete (RCC), a runoff coefficient of 0.80 has been considered to account for minor losses due to wetting, evaporation, and first-flush diversion.

The following design parameters have been adopted for the estimation:

Parameter	Value
Average Seasonal Rainfall	863 mm
Total Rooftop Catchment Area	5347 m²
Runoff Coefficient	0.80
Effective Harvesting Period	June – September

4.6 Estimation of Rainwater Harvesting Potential

The annual rainwater harvesting potential has been estimated using the following equation:

Harvestable Rainwater (m^3) = Rainfall (m) * Catchment Area (m^2) * Runoff Coefficient

Using the above methodology, the rainwater harvesting potential has been estimated for each year as well as for the average seasonal rainfall.

Table 4.5 Year-wise Rainwater Harvesting Potential

Academic Year	Seasonal Rainfall (mm)	Harvesting Potential (m³)
2023–24	654	2798.55
2024–25	1036	4431.56
2025–26	898	3841.39
Average	863	3691.62

Table 4.6 Building-wise Rooftop Catchment Area and Harvesting Potential (Based on Average Rainfall)

Building	Rooftop Catchment Area (m^2)	Harvesting Potential (m^3)
A Building (Main Building)	3396	2344.68
B Building (Library Building)	584	403.08
C Building (Civil Engineering Building)	1367	943.86
Total	5347	3691.62

The above analysis indicates that the institute has the potential to harvest approximately 3691.62 m^3 of rainwater annually under average rainfall conditions. The harvested rooftop runoff is directed to the existing groundwater recharge structures, thereby enhancing groundwater recharge, reducing surface runoff, and contributing to sustainable water resource management within the campus. The year-wise variation in harvesting potential demonstrates the direct influence of seasonal rainfall on groundwater recharge capacity while confirming the suitability of the existing system under varying rainfall conditions.

CHAPTER 5

ENVIRONMENTAL BENEFITS OF THE RAINWATER HARVESTING SYSTEM

The rainwater harvesting system implemented at Annasaheb Dange College of Engineering and Technology, Ashta, contributes significantly towards sustainable water resource management and environmental conservation. By collecting rooftop runoff and directing it to groundwater recharge structures, the institute effectively utilizes seasonal rainfall that would otherwise be lost as surface runoff. This initiative supports groundwater replenishment, improves water security, and reflects the institute's commitment towards sustainable campus development.

5.1 Groundwater Recharge

The primary objective of the institute's rainwater harvesting system is to enhance groundwater recharge. Rooftop runoff collected during the monsoon season is conveyed through a network of downpipes and recharge structures, allowing rainwater to percolate into the subsurface aquifer.

Based on the rainfall analysis presented in Chapter 4, the institute has an estimated annual groundwater recharge potential of approximately 3691.62 m^3 under average rainfall conditions. This significantly contributes to replenishing groundwater resources and improving long-term water availability within the campus.

5.2 Stormwater Runoff Reduction

During the monsoon season, large quantities of rainwater can accumulate as surface runoff, leading to waterlogging and soil erosion. The rainwater harvesting system intercepts rooftop runoff and diverts it to recharge structures, thereby reducing the volume and velocity of stormwater flowing across the campus.

This controlled management of runoff improves surface drainage and minimizes unnecessary loss of freshwater.

5.3 Flood Mitigation

Although the institute campus is not located in a flood-prone urban area, localized flooding and temporary water stagnation may occur during periods of intense rainfall. By capturing rooftop runoff and facilitating infiltration into the ground, the rainwater harvesting system helps reduce peak runoff, thereby minimizing localized water accumulation and contributing to improved stormwater management.

5.4 Sustainable Groundwater Management

The institute primarily depends on river water for its water supply while utilizing rainwater harvesting exclusively for groundwater recharge. Continuous groundwater recharge helps maintain the local aquifer, improves groundwater sustainability, and strengthens the long-term resilience of the campus water resources.This integrated approach reduces stress on groundwater resources and enhances overall water security.

5.5 Water Conservation

Rainwater harvesting is an effective water conservation measure that promotes the optimum utilization of natural rainfall. By allowing rainwater to recharge the groundwater instead of flowing away as runoff, the institute conserves a valuable natural resource and contributes to sustainable water management. The system also supports the efficient use of available water resources by augmenting groundwater reserves for future needs.

5.6 Carbon Footprint Reduction

Groundwater recharge through rainwater harvesting reduces the need for extensive extraction, transportation, and treatment of water from external sources. Consequently, the energy required for water supply operations is indirectly reduced, contributing to lower greenhouse gas emissions associated with water management. In addition, groundwater recharge supports healthier vegetation and green landscapes within the campus, further enhancing environmental sustainability.

5.7 Contribution towards Sustainable Development Goals (SDGs)

The rainwater harvesting initiative directly supports several United Nations Sustainable Development Goals (SDGs) by promoting responsible water management and environmental sustainability.

SDG	Contribution
SDG 6 – Clean Water and Sanitation	Promotes sustainable management of water resources through groundwater recharge.
SDG 11 – Sustainable Cities and Communities	Enhances sustainable campus infrastructure and stormwater management.
SDG 12 – Responsible Consumption and Production	Encourages efficient utilization and conservation of natural water resources.
SDG 13 – Climate Action	Strengthens climate resilience by improving groundwater recharge and reducing runoff losses.
SDG 15 – Life on Land	Supports groundwater conservation and contributes to maintaining healthy terrestrial ecosystems.

5.8 Summary

The rainwater harvesting system implemented at ADCET demonstrates the institute's commitment to environmental stewardship and sustainable campus development. By utilizing rooftop runoff exclusively for groundwater recharge, the system conserves valuable freshwater resources, improves groundwater sustainability, reduces stormwater runoff, and contributes to climate-resilient water management. The estimated annual recharge potential of 3691.62 m^3 highlights the significant environmental value of this initiative and reinforces the institute's contribution towards achieving the Sustainable Development Goals through responsible water resource management.

Fig 5.1: RWH inlets from terrace