MANAV RACHNA
vidyanatariksha

MANAV RACHNA UNIVERSITY

Declared as State Private University vide Haryana Act 26 of 2014

PROGRESS REPORT 2022-23

SUSTAINABLE DEVELOPMENT GOALS

Manav Rachna University

Declared as State Private University vide Haryana Act 26 of 2014

TABLE OF CONTENTS

Preamble

Sustainable Development Goal 6 (SDG 6) aims to "ensure availability and sustainable management of water and sanitation for all." Water and sanitation are fundamental to human health, well-being, and prosperity. Access to clean water and improved sanitation has a direct impact on reducing the spread of diseases, improving living conditions, and promoting sustainable growth. SDG 6 focuses on ensuring that everyone, everywhere, can enjoy safe drinking water, adequate sanitation, and hygiene, all while protecting water ecosystems and addressing the global water crisis.

Current Scenario on Clean Water and Sanitation

Globally, significant progress has been made in expanding access to clean water and sanitation. As of 2020, 90% of the global population had access to clean drinking water, and 60% had access to safely managed sanitation services. However, disparities remain, particularly in low- and middle-income countries. In sub-Saharan Africa and parts of South Asia, millions still lack reliable access to water and sanitation facilities, contributing to the spread of waterborne diseases such as cholera, typhoid, and diarrhea.

Water scarcity affects over 2 billion people worldwide, with many regions facing the dual challenges of unreliable water sources and rising demand due to population growth and urbanization. Climate change further exacerbates water stress, altering rainfall patterns and increasing the frequency of droughts and floods.

Challenges in Achieving Clean Water and Sanitation

- **Geographical and Economic Inequalities:** Access to clean water and sanitation remains uneven, particularly in rural and underserved urban areas. Poverty, and geographical isolation contribute to the disparity in access.
- **Water Scarcity and Stress:** Increasing demand for water, coupled with climate change, has led to growing water scarcity in many regions. Droughts and changing weather patterns make it difficult for some countries to meet the water needs of their populations.
- **Pollution and Contamination:** Water sources are increasingly polluted by industrial effluents, agricultural runoff, and untreated sewage.

Contaminated water affects millions of people and contributes to the spread of waterborne diseases, especially in developing nations.

- **Inadequate Sanitation Systems:** Many communities still lack proper sanitation facilities, leading to open defecation, poor hygiene practices, and the spread of diseases. Improper waste disposal further worsens the contamination of water resources.

Strategies and Interventions

- **Improving Water Infrastructure:** Expanding and maintaining water supply systems in underserved regions, with a focus on rural areas, is essential. Investments in piped water systems, boreholes, and rainwater harvesting techniques can ensure reliable access to clean water.
- **Enhancing Water Management:** Governments and organizations are working on better management of water resources by implementing integrated water resources management (IWRM) practices. This includes promoting water conservation, efficient use, and reducing wastage.

- **Expanding Sanitation Access:** Providing affordable, sustainable sanitation services, including toilets, waste treatment plants, and sewage systems, is essential to prevent the spread of diseases. Community-based sanitation solutions, such as composting toilets, can also improve access in remote areas.

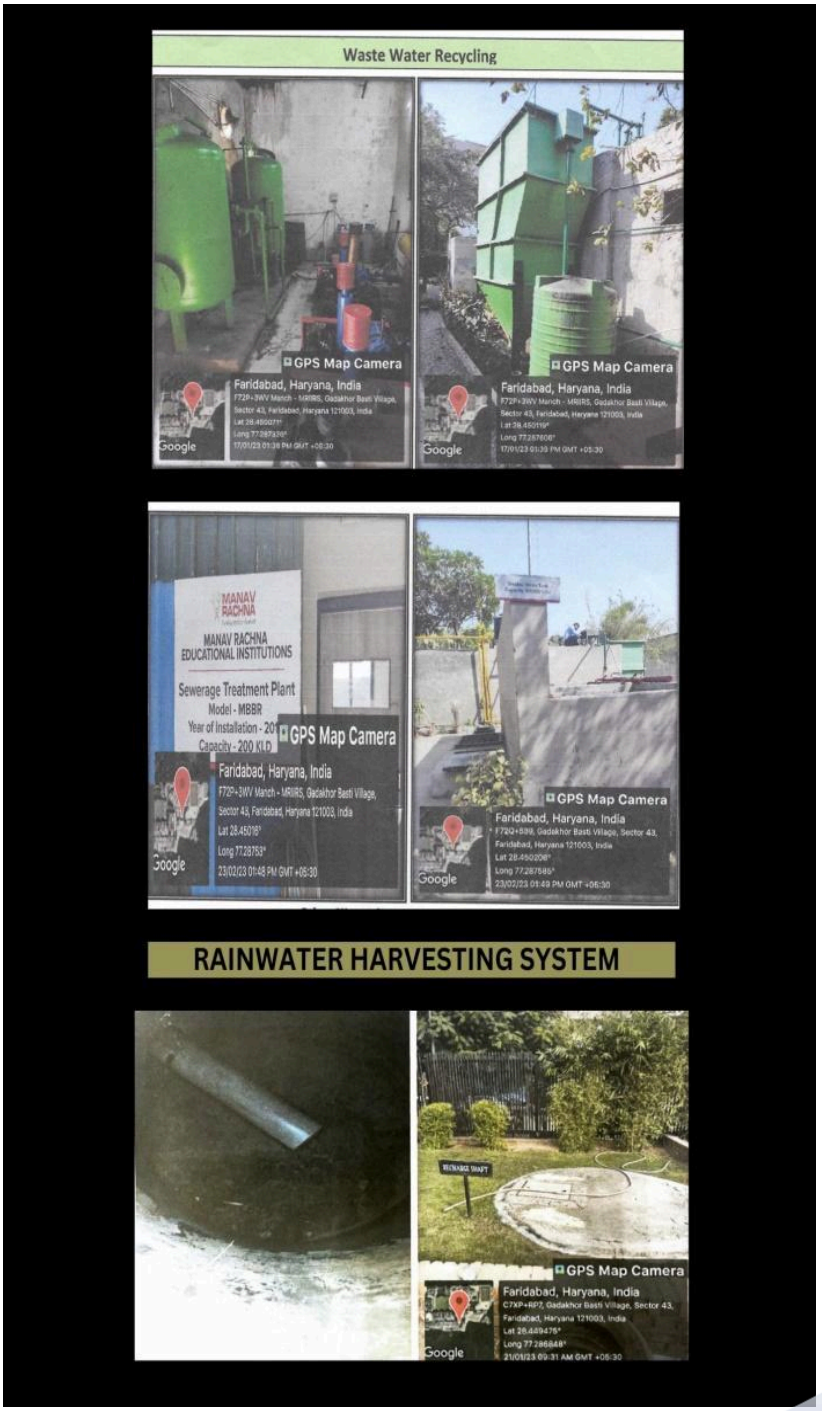
- **Protecting Water Sources:** Strengthening regulations to prevent water pollution from agricultural runoff, industrial discharge, and untreated waste is crucial. Increasing efforts to protect and restore ecosystems like wetlands and watersheds can improve water quality and ensure the sustainability of water resources.

- **Public Awareness and Hygiene Education:** Promoting hygiene practices and water conservation through community education campaigns can significantly reduce waterborne diseases. Teaching proper handwashing techniques and safe water storage practices is vital to improving public health.

1. WATER CONSERVATION

Water conservation is very important at MRU, Faridabad. The aim is to reduce wastage of water. To this end the following measures are being taken:

Rain Water harvesting: Rooftop water collection is practiced on campus and the collected water is stored in underground storage tanks. The underground water storage tank is designed in view of the terrain of the University campus. Rainwater flows through pavements or parking areas collected in the tank. The collected water is used for development of



[6]

green belt in the campus.

Sewage Treatment Plant: STP based on MBBR (Moving Bed Biofilm Reactor) technology is established in the MRU, Faridabad campus. The capacity of STP is 2KLD. The STP receives effluent from various sources inside the campus and the collected untreated effluent is stored in a common collection tank. After the treatment of wastewater, treated water is collected in a storage tank and the water is used for horticulture related work.

The wastewater generated from the chemical laboratory is separately collected in a collection tank and neutralized by dilution methods. The neutralized water is then dumped on a sand bed established at an isolated place in the campus.

2. WATER MANAGEMENT

1. Water is supplied in MRU through bore wells. The present requirement of water may increase in the near future. Conservation of this resource will acquire primacy with the increase in infrastructure and personnel.

Water Calculation

1. Potable water requirement: 68.62 KL/Month

2. Water requirement for Kitchen & Toilets: 451.20 KL/Month

3. Water requirement for Gardening: 307.49 KL/ Month

4. Water requirement in Hostels: 407.70 KL/Month

5. Water requirement in other activities: 162.34 KL/Month

Total water Requirement: 1397. 35 KL/Month

Details of water storage structure in campus:

1. 18 tanks of 5000 litres : 90,000 litres

2. 2 tanks of 4000 litres: 8000 litres

3. 12 tanks of 2000 litres : 24,000 litres

4. 2 tanks of 1000 litres : 2000 litres

Total water storage capacity: 1, 24,000 litres

Water saving techniques adopted at MRU

- To control overflow of water, controlled valves are installed with a water supply system.
- Close supervision of the water supply system.

- Sensor based taps are installed to avoid wastage of water.
- Provision of sprinkler usage for gardening and green cover.
- MRU promotes Research & Development for water conservation and water purification.
- MRU organized various awareness programs for students and staff for conservation of water.

3. EVENTS RELATED TO WATER SUSTAINABILITY

3.1. Awareness drive for Seachh Bharat Harit Bharat Green Pledge

Manav Rachna University in Collaboration with the Hazardous Substance Waste Management Division, MoEF&CC GOI, organized awareness drive on 9th July 2022 to promote Swachh Bharat Harit Bharat Green Pledge & Ban on Single Use Plastic at Brahmakumaris Centre, Sector8, Faridabad (Haryana).

Figure 1: Awareness drive for Swachh Bharat Harit Bharat Green Pledge

3.2. Awareness Campaign "Creating Green and Clean Minds"

The event was organized at Jagriti Sewa Trust at Sector 16, Faridabad (Haryana) on 9th July 2022 by Manav Rachna University in Collaboration with the Hazardous Substance Waste Management Division, MoEF&CC GOI. A total of 65 students participated in various activities related with water conservation, sanitation and plantation. Posters on "Swachh Bharat Harit Bharat Green Pledge" and Ban on Single Use Plastics were also distributed among participants.

Figure 2: Active participation of participants in even "Creating Clean and Green Minds"

3.3. International online Poem Competition

An online Poem competition on "Say No to Plastics" was conducted under the aegis of Hazardous Substances Division, MoEF&CC GOI on 15th August 2022. A total 26 entries were received from various States/UTs. The poems received were based on sanitation, waste management and control of waste dumping in water streams.

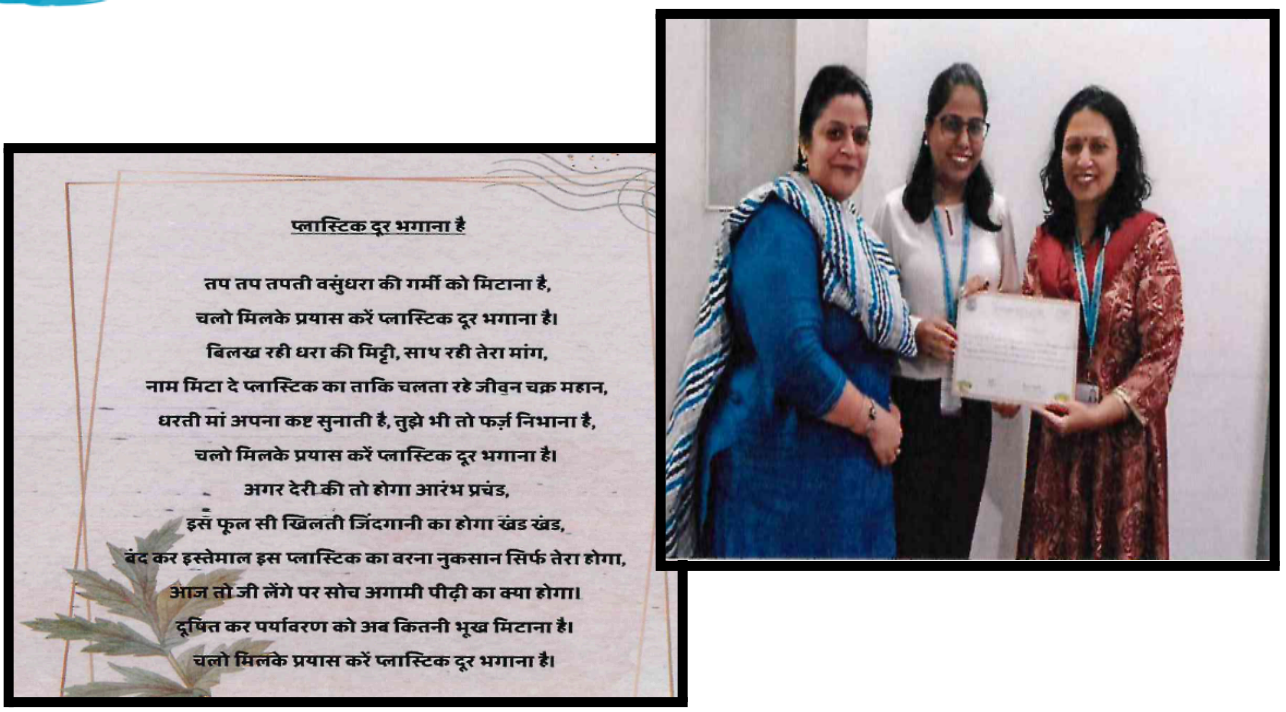


Figure 3: Awarded Poetry in Online Poem Competition

3.4. One day Online International conclave on Sustainable Plastic Waste Management For Green Tomorrow

One-day online International Conclave on Sustainable Plastic Waste Management for a Greener Tomorrow was organized on 8 August 2022 in collaboration with the Hazardous Substances Division, Ministry of Environment, Forest and Climate under the Central Sector Scheme. A total of 100 participants joined the conclave from different places. Participation certificates were awarded to all the participants.

The Honorable Pro Vice Chancellor Prof. D. S. Sengoor highlighted the importance of public participation towards implementation of Environmental law / rules.The recent Govt. mandate regarding banning of single use plastics. Dr. Kantappa Halake, Sr.Manager-R&D, Magaplast India Pvt.Ltd joined the session from Daman & Diu. He discussed plastic based hazardous wastes and various polymer types and the role of packaging. Dr. Bhim Raju, Postdoctoral Researcher at Perovskite Solar Cell Opera Laboratory Chihaya, Adachi Group kyushu University, Japan, discussed about Plastic Waste management for a greener tomorrow, and highlighted the need of Reuse, Reduce, Repurpose, and Recycling.

Figure 4: Flyer and Esteemed Speaker of the event

3.5. Green and Sustainable Chemistry Conference 2022

School of Sciences, Manav Rachna University, hosted a two-day 2nd international conference GSCC2022 which was sponsored by SERB DST, along with DRDO, India and NHPC, Faridabad started on 17th Nov 2022.. The conference has 51 oral paper presentations and 30 poster paper presentations from various researchers. Participants presented their research work on sustainable techniques for water purification, waste management, catalysis,

energy production and polymer synthesis. The conference involved a gathering of renowned scientists: Prof. R. K. Sharma, Department of Chemistry University of Delhi; Prof A.K. Bakhshi, Chairman, National Resource Centre of Chemistry, Ministry of Education; of Prof. Minna Hakkarainen, KTH Royal Institute of Technology, Sweden; Emeritus Prof. Rene Dario Peralta Rodriguez, from Polymer Technology at KTH Royal Institute of Technology, Stockholm; Dr. Shaik Gouse Peera from the Department of Environmental Science, Keimyung University, South Korea and many more.

Figure 5: GSCC 2022 International Conference organized by School of Sciences, MRU

3.6. Cleaning drive at Faridabad Railway Station

On June 22, 2023, the Manav Rachna Centre for Peace and Sustainability organized a cleaning drive at the Faridabad Railway Station, with dedicated participants. The event was aligned with Sustainable Development Goal 6 (Clean Water and Sanitation), aiming to promote cleanliness and environmental responsibility. Volunteers engaged in clearing litter, improving hygiene and proper sanitation, and fostering a sense of community responsibility. By contributing to a cleaner, healthier public space, the drive highlighted MRCPS's commitment to environmental sustainability and the importance of collective action in achieving SDG 6.

Figure 6: Cleaning drive at the Faridabad Railway Station

4. RESEARCH & DEVELOPMENT

Faculty members and students of different departments of MRU are working on innovative projects for water conservation, water treatment and and smart water irrigation techniques. The outcomes of the R&D activities are explained below in terms of Patent, Research Publications and Project work.

4.1. Research Publications

- Gaur, K., Chauhan, S., Ajit, Kajal, G. (2023). Productivity Analysis of Pyramid Solar Still Using Phase Change Material and Hybrid Nanofluid. In: Shukla, A.K., Sharma, B.P., Arabkoohsar, A., Kumar, P. (eds) Recent Advances in Mechanical Engineering. FLAME 2022. Lecture Notes in Mechanical Engineering. Springer, Singapore. https://doi.org/10.1007/978-981-99-1894-2_53.
- Chauhan, S., Gaur, K., Ajit, Sharma, N. (2023). Performance Enhancement of Pyramid-Shaped Solar Still Using Phase Change Material with Porous Material. In: Doolla, S., Rather, Z.H., Ramadesigan, V. (eds) Advances in Clean Energy and Sustainability. ICAER 2022. Green Energy and Technology. Springer, Singapore.

https://doi.org/10.1007/978-981-99-2279-6_32.

- Katiyar, A and Gupta, N.K. (2023) Effect of different aluminum oxide based nanofluid concentrations on the efficiency of solar water desalination system, Journal of Thermal Engineering, 9(1)61-68. https://jten.yildiz.edu.tr/
- Sharma, N., Noushad, S., Siva Ram Kumar Reddy, G., Ajit (2023). Productivity Improvement of Solar Still Using Cemented Blocks. In: Doolla, S., Rather, Z.H., Ramadesigan, V. (eds) Advances in Clean Energy and Sustainability. ICAER 2022. Green Energy and Technology. Springer, Singapore. https://doi.org/10.1007/978-981-99-2279-6_36
- Ajit, Kajal, G., Malik, P., Garg, H., Lamba, R (2023) Thermophysical properties analysis of AL2O3, MgO & Go Nanofluids with water for solar still, Materials Today Proceedings, https://doi.org/10.1016/j.matpr.2023.06.383
- Ajit, Pandey, H., Gupta, N.K. (2023) Analysis of solar water desalination of hybrid nanofluids: an experimental study, Journal of Thermal Engineering, 9(6)1502-1515. https://doi.org/10.18186/thermal.1400984
- Damiri, F., Bachra, Y., Berrada, M., Tuteja, J., Sand, A. (2023). Future

Challenges and Opportunities in the Field of Superabsorbent Polymers. In: Arpit, S., Jaya, T. (eds) Properties and Applications of Superabsorbent Polymers. Springer, Singapore. https://doi.org/10.1007/978-981-99-1102-8_11

- Pathak, V.V., Shukla, S.K., Tuteja, J., Chhabra, B., Sand, A. (2023). Utility of biogenic nanomaterials for rejuvenation of heavy metals, Nanobiotechnology for Bioremediation:Fundamentals & Mechanism , 143-153. Elsevier Science, DOI https://doi.org/10.1016/C2021-0-01165-2 .

4.2. Books

Singh, J.P ., Chae, K.H., Srivastava, R.C & Caltun, O.F. (2023). Ferrite Nanostructured Magnetic Materials : Technologies and Applications, Woodhead Publishing, https://doi.org/10.1016/C2020-0-00253-7.