स्वामी राम हिमालयन विश्वविद्यालय
Swami Rama Himalayan University

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

GOAL 12

RESPONSIBLE CONSUMPTION AND PRODUCTION

Swami Rama Himalayan University (SRHU) is committed to advancing Sustainable Development Goal 12: Responsible Consumption and Production by embedding sustainability into its core values and operations. The university actively promotes eco-friendly practices on campus, such as waste reduction, energy efficiency, and the use of sustainable resources. Through its academic programs and research initiatives, SRHU nurtures awareness and innovation, empowering students and faculty to develop solutions for sustainable production and consumption. The University has implemented automated systems to conserve energy and water resources effectively. Stakeholders, including students, faculty, and staff, are encouraged to minimize consumption by using instruments, lights, fans, and ACs responsibly during their time on campus. The campus's clean and green environment, maintained through extensive plantation and landscaping, helps lower temperatures and reduce air pollution, decreasing the need for air conditioning in summer. Additionally, practices such as the efficient use of state-of-the-

art laboratories, solar and biogas energy generation, and sewage treatment plants (STPs) reinforce a culture of responsible consumption and production across the SRHU campus.

Curriculum Enrichment

Out of a total of **1134** courses offered across various disciplines, **58** courses are specifically designed to align with SDG 12: Responsible Consumption and Production. These courses are designed to enhance students' understanding to save resources and foster the culture for responsible consumption for the betterment of environment. The University emphasizes the significance of green practices and environmental conservation through various courses integrated into its academic programs. The Course, in particular, enables students to engage with the community, identify sources of pollution, and propose effective management systems. Additionally, students are encouraged to raise awareness among community members about pollution control measures and the importance of maintaining a clean and green environment.

Research Initiatives

Aligned with Sustainable Development Goal 12, the University undertakes innovative research to ensure the availability and sustainable management of energy, water and waste. Key initiatives include developing advanced water purification technologies and low-cost wastewater treatment solutions to improve water quality and accessibility. Researchers focus on creating efficient water recycling systems and sustainable irrigation practices to optimize water usage in agriculture and urban settings. Studies on the impact of climate change on water resources guide adaptive strategies for conservation and management. The University also explores the integration of smart technologies for real-time water quality monitoring and leakage detection, enhancing the efficiency of water distribution systems. By collaborating with government agencies, industries, and international organizations, the University contributes to innovative solutions that address

water scarcity, pollution, and sanitation challenges, fostering sustainable development and resilience in water management.

Research Projects

The University provides research funds to promote the research for conduction of research (Intramural-Projects-Ongoing-2023.pdf). To name a few intramural projects funded by the university are:

The University actively secures extramural funding from national agencies to support research and initiatives aligned with Sustainable Development Goal 12 (SDG 12). These funds facilitate the development and implementation of projects aimed at improving water accessibility, quality, and sustainability. Extramural funding enables the University to establish state-of-the-art infrastructure, such as advanced water treatment and recycling facilities, and to conduct impactful research on innovative technologies for water purification, wastewater management, and groundwater recharge. Collaborative projects supported by these funds focus on addressing

S. No.	Name of the project	Duration of the project	Name(s) of the teacher(s) working in the project receiving seed money	The amount of seed money provided (INR in lakhs)	Year of receiving the seed money
1.	Demineralized Water Consumption: Unravelling Current Trends and Health Effects (Research article)	06 Months	Dr. Nupur Joshi, Dr. Nikku Yadav, Dr. Ashutosh Kumar Choudhary, Dr. Deep Shika, Ms. Shweta Samant	0.3	Till December 2023
2.	Emerging threats in Aquaculture: Bibliometric Analysis of Aeromonas sps. as an emerging pathogen	04 Months	Nupur Joshi, Dr. Geeta Bhandari, Dr Archna Dhasmana, Dr Vikash Singh Jadon, Dr. Sanjay Gupta	0.15	Till December 2023
3.	Roof Top Rain Water Harvester	09 Months	Dr. H.P. Uniyal	0.3	Till December 2023

pressing issues such as water scarcity, pollution, and sanitation in rural and urban settings. Additionally, funding is utilized to organize community outreach programs, capacity-building workshops, and awareness campaigns that promote sustainable water usage and hygiene practices.

Research Publications:

The University is committed to advancing Sustainable Development Goal 12 (SDG 12) through high-quality research and scholarly contributions. Faculty and researchers regularly publish their findings in peer-reviewed journals, highlighting innovative solutions for water and sanitation challenges. These publications address critical issues such as water purification technologies, wastewater treatment, rainwater harvesting, groundwater management, and the impact of climate change on water resources (Scopus - Swami Rama Himalayan University).

Bhandari, G., Chaudhary, P., Gangola, S., ...Rafatullah, M., Chen, S. A review on hospital wastewater treatment technologies: Current management practices and future prospects, *Journal of Water Process Engineering*, 2023.

Harish, V., Sharma, R., Rana, G., Nayyar, A. Artificial Intelligence in Sustainable Education: Benefits, Applications, Framework, and Potential Barriers, *The Role of Sustainability and Artificial Intelligence in Education Improvement*, 2023.

Gupta, A.K., Pratiksha,, Das, T., ...Ranjan, R., Mishra, S. Novel food materials: Fundamentals and applications in sustainable food systems for food processing and safety, *Food Bioscience*, 2023.

Dhillon, N., Gupta, S., Kumar, V., Bhandari, G., Arya, S. Energy from Waste: Poterioochromonas malhamensis Used for Managing Dairy Effluent and Producing Valuable Microalgal Lipid, *Journal of Pure and Applied Microbiology*, 2023.

Naik, B.S.S.S., Vijay, K., Gupta, A.K. Valorization of tender coconut mesocarp for the formulation of ready-to-eat dairy-based dessert (Kheer): Utilization of industrial by-product, *Journal of Agriculture and Food Research*, 2023.

Bhandari, G., Dhasmana, A., Chaudhary, P., Malik, S., Sláma, P. A Perspective Review on Green Nanotechnology in Agro-Ecosystems: Opportunities for Sustainable Agricultural Practices & Environmental Remediation, *Agriculture (Switzerland)*, 2023.

Bhandari, G., Chaudhary, S., Gupta, S., Gangola, S. Impact of Nanoparticles on Abiotic Stress Tolerance, *Advances in Nanotechnology for Smart Agriculture: Techniques and Applications*, 2023.

Bhandari, G., Gupta, S., Chaudhary, P., Chaudhary, S., Gangola, S. Bioleaching: A Sustainable Resource Recovery Strategy for Urban Mining of E-waste, *Microbial Technology for Sustainable E-waste Management*, 2023.

Rawat, G., Choudhary, R., Kumar, V.R. Microbial Biosurfactants and Their Implication Toward Wastewater Management, *Handbook of Environmental Chemistry*, 2023.

Chandra, S., Kusum, A., Gaur, D.S., Chandra, H. Analytical and post analytical phase of an ISO 15189:2012 Certified cytopathology laboratory-a five year institutional experience, *Journal of Cytology*, 2022.

Reduced Energy Consumption

In the face of climate change and the increasing global concern for sustainable energy sources, the SRHU is taking the lead in adopting eco-friendly practices. One remarkable initiative in this direction is the installation of 1500 KW rooftop solar power plant at the SRHU campus. This eco-conscious move not only demonstrates the institution's commitment to a greener future, but also serves as an educational tool for students and the community. The solar plant significantly reduces

the university's carbon footprint by reducing the reliance on fossil fuels, which in turn reduces greenhouse gas emissions. It also conserves water resources, as solar energy production requires minimal water compared to traditional power generation methods. The solar plant helps SRHU cut down on its electricity bills by producing energy on-site. This cost savings can be reinvested into educational initiatives and further sustainable practices on campus.

SRHU plans to expand its renewable energy initiatives by another 1000 KW. The agreement has been signed with M/S Bakshi Engineering works Dehradun for Roof top solar power plant. The University regularly arranges to reduce the consumption of electricity for lighting, air conditioning, lifts, water mining, instruments and other gadgets through various automated devices and strategies as follows:

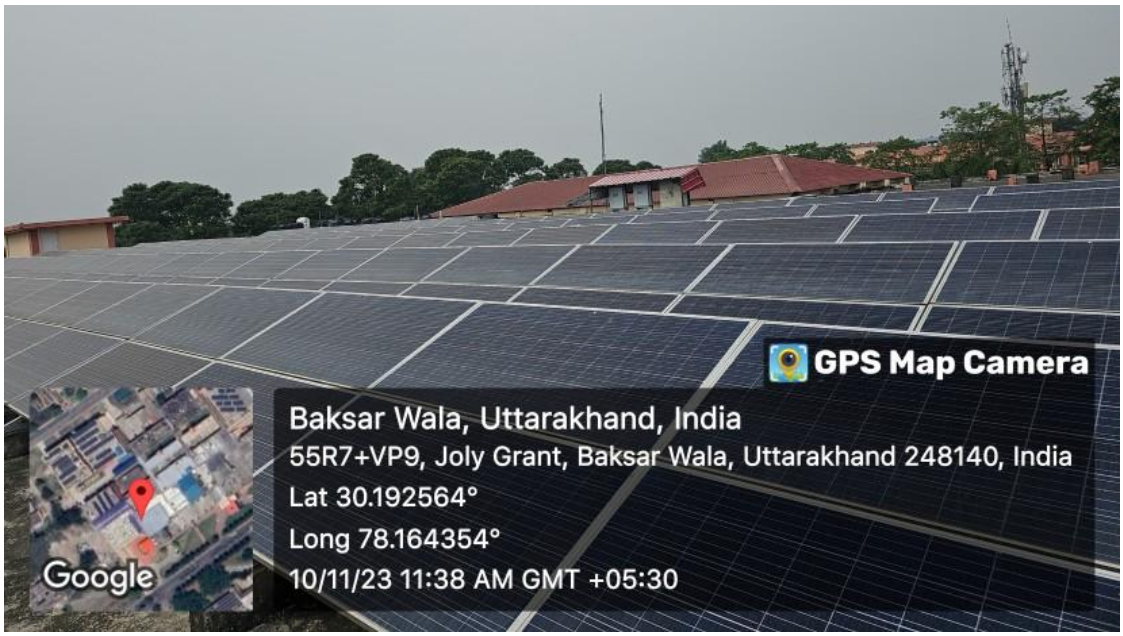
One of the primary reasons for the widespread adoption of LED lights is their remarkable energy efficiency. Compared to traditional incandescent and fluorescent lighting, LEDs consume significantly less energy. In SRHU, this translates into reduced electricity consumption, contributing to lower energy bills and a diminished carbon footprint. LED lights consume up to 80% less electricity, making them an ideal choice for sustainable illumination across the campus.

By replacing conventional lighting systems with LEDs, SRHU has managed to reduce its carbon emissions substantially. The lower energy consumption of LEDs results in fewer greenhouse gas emissions from power plants. This aligns with the university's commitment to environmental protection and sustainability, contributing to the global effort to combat climate change.

SRHU has also implemented smart lighting solutions powered by LEDs. These systems use sensors and automated controls to adjust lighting levels based on occupancy and ambient light conditions. Smart lighting minimizes energy waste by ensuring that lights are only active when and where they are needed. Such efficiency measures align with the SRHU's commitment to sustainability and resource.

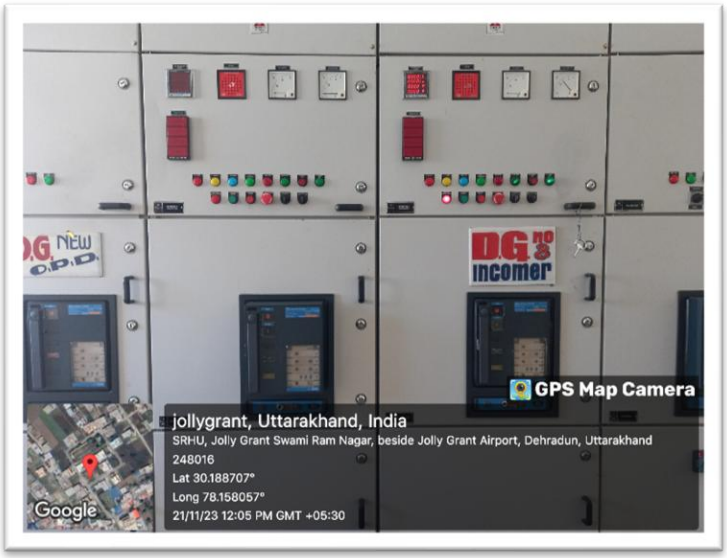
SRHU has embraced modern technology to enhance energy efficiency and comfort across its campus. One noteworthy advancement in this endeavor is the adoption of Brushless Direct Current (BLDC) fans. One of the primary reasons SRHU has chosen to employ BLDC fans is their exceptional energy efficiency. Compared to traditional AC fans, BLDC fans consume significantly less electricity while delivering the same or even superior airflow. This energy efficiency translates

into substantial cost savings for the university, contributing to a more sustainable campus operation. BLDC fans are known for their durability and low maintenance requirements. Unlike traditional fans with brushed motors that may require frequent maintenance and replacement, BLDC fans have a longer lifespan and are less prone to wear and tear. This translates into reduced maintenance costs and less downtime for repairs.

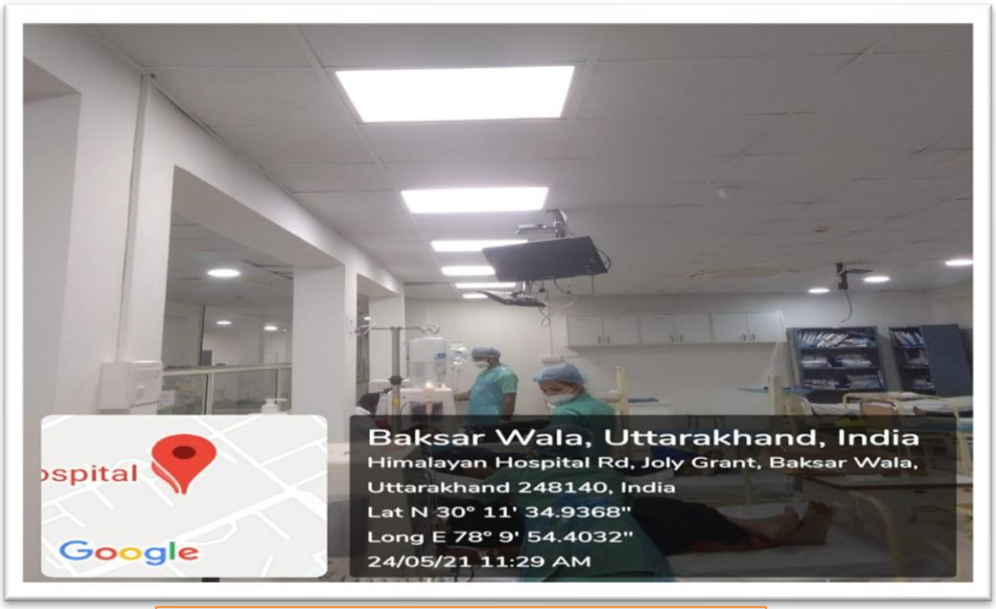


View of solar system in the campus

Motion sensor based sensor LED lights for energy conservation



Diesel Generator Set panels with Automatic mains failure (AMF) and load balancing



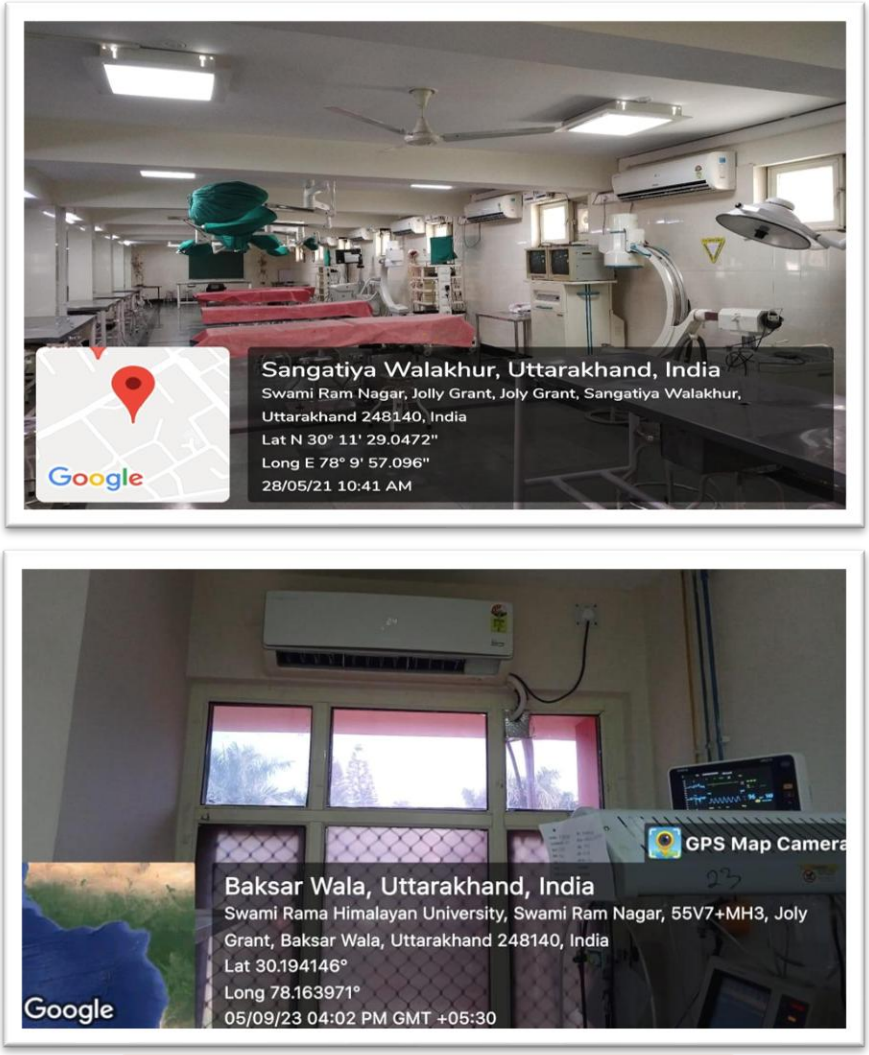
Use LED lights for energy conservation

Use LED lights for energy conservation

Use of LED bulbs/ BLDC Fans

Uses of BEE star-rated Air conditioners

In the pursuit of creating a sustainable and environmentally conscious campus, SRHU has taken a significant step by incorporating BEE (Bureau of Energy Efficiency) star-rated air conditioners. This initiative not only aligns with SRHU's commitment to environmental responsibility but also offers numerous benefits in terms of energy efficiency, cost savings, and improved indoor comfort. The reduced energy consumption of BEE star-rated air conditioners results in lower electricity bills for SRHU. This financial benefit can be redirected toward other campus sustainability initiatives or academic programs.



Use of BEE star rated Air conditioners

Use of Battery-Powered Vehicles

The primary benefit of integrating electric vehicles into the SRHU campus is the substantial reduction in greenhouse gas emissions. By replacing fossil fuel-powered vehicles with EVs, SRHU has significantly decreased its carbon footprint, contributing to a cleaner and healthier environment. Electric vehicles serve as an efficient means of transportation within the campus for faculty, and staff. Campus shuttles, maintenance vehicles. SRHU can provide charging infrastructure at strategic locations to encourage the adoption of EVs.

Battery Powered Vehicle

Water usage and Conservation

Water scarcity is a growing global concern, and as climate change continues to disrupt weather patterns, it is essential to explore innovative solutions to mitigate this issue. Rainwater harvesting is one such sustainable practice that holds the potential to address water shortages and reduce the burden on conventional water sources. Rainwater harvesting is a centuries-old technique that involves collecting and storing rainwater for various purposes, such as drinking, irrigation, and household use. The process typically includes the collection of rainwater from rooftops, followed by filtration and storage. This harvested rainwater can then be used for non-potable purposes, reducing the demand for freshwater sources.

The rainwater is collected through the roof of the medical college building and stored in a 150 KL capacity underground water tank. This water is being utilized in medical college toilets and for cleaning purposes. On the SRHU campus, excess rainwater is allowed to percolate into the ground through infiltration wells located at different places, numbering twelve. This helps replenish underground aquifers, contributing to sustainable groundwater management.

Rainwater harvesting pits with filter bed recharge near Cardiac OPD building

Ground water recharge setup

Waste Management facility in the University

The sewage from the campus, including the hospital, undergoes treatment through an advanced Sewage Treatment Plant (STP) with a capacity of 1 MLD employing MBBR technology and extended aeration-activated sludge process. The treated water meets quality standards set by the state pollution control board and is used for irrigation in parks and green areas on campus, ensuring environmental compliance and sustainability. The university has prioritized sustainability with the establishment of a 90 KLD Effluent Treatment Plant (ETP) on campus. This plant addresses the significant daily wastewater generated from various campus activities, including laboratories and laundry. By treating this wastewater, SRHU mitigates environmental risks and ensures public health and campus aesthetics are maintained. The treated water is efficiently recycled for non-potable uses such as irrigation, conserving valuable freshwater resources and supporting SRHU's commitment to environmental stewardship.

Sewage Treatment Plant (STP)

Sewage Treatment Plant (STP) at SRHU

Effluent Treatment Plant (ETP) at SRHU

Waste to energy production: Biogas plant

Liquid Waste Management Policy: (View Document)

E-Waste Management

Electronic waste, or e-waste, is a rapidly growing global concern. With the ever-increasing rate of technological advancements, electronic devices have a shorter lifespan, leading to more electronic waste being generated. Improper disposal of e-waste can have detrimental effects on the environment, as it often contains hazardous materials such as lead, mercury, and cadmium. To combat this issue, SRHU has taken a proactive approach by introducing the E-Waste Store.

The E-Waste Store at SRHU serves as a dedicated facility for the proper disposal and recycling of electronic devices. Located conveniently on campus, it offers a hassle-free solution for students, faculty, and staff to dispose of their old and unwanted electronic equipment. The e-waste is duly approved by IT experts and issued by ensuring protection of data privacy concerns. The University has its policy to manage the e-waste through government approved vendors. The vendors are invited through store office and e-waste is handed over to dispose as per the rules and regulations

issued by the government. The vendor submits a certificate of e-waste disposal to the University for official records.

Regd. : 140/2014-15

Anmol Paryavaran Sanrakshan Samiti

(Green Solution for E-Waste Management certified by UEPPCB)

Facility of E-Waste Collection, Storage, Dismantling, Recycling, Refurbishing & Disposal

Regd. Off. : 119, Old Nehru Colony, Dehradun-248001

Works at : Kh. No. 85/2, 87/1, Daulatpur, Hajratpur Urf Budhwasahid Tehsil Roorkee, Distt. Haridwar

Email : apssdoon@gmail.com

Membership Certificate

This is Certify that M/s Himalayan Institute Hospital Trust, Swami Ramnagar, Jolly Grant, Dehradun, 248016 is a member of ANMOL PARYAVARAN SANRAKSHAN SAMITI with membership No. (20) dated 15.11.22

Date 15/11/2022

This Certificate is valid upto 31 March 2026

President

Secretary

Tanks for Water Storage

SRHU emphasizes the use of tanks and bunds as an integral part of its sustainable water management practices. These structures are vital for conserving water, preventing soil erosion, and supporting groundwater recharge. Key initiatives include:

1. Water Storage Tanks: Constructing large tanks to store rainwater and treated water for irrigation and other non-potable uses.

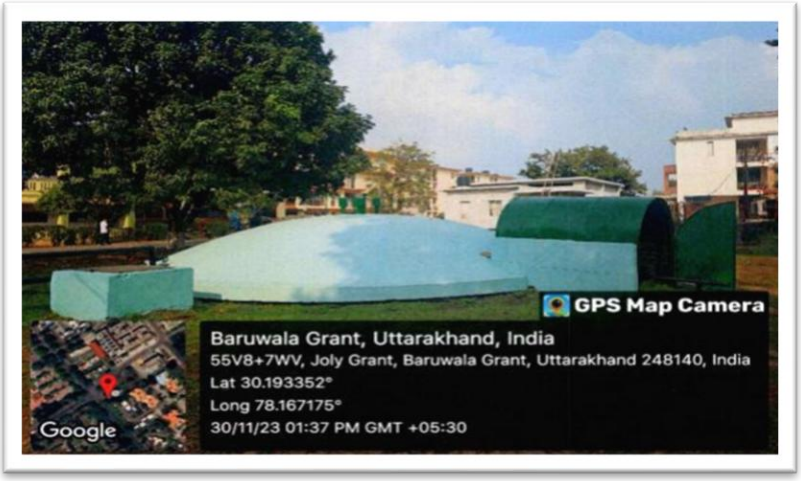
2. Bunding Systems: Establishing bunds in key areas to capture surface runoff and direct it to recharge pits or water bodies.

3. Erosion Control: Using bunds to prevent soil erosion and enhance soil moisture retention in landscaped and agricultural areas.

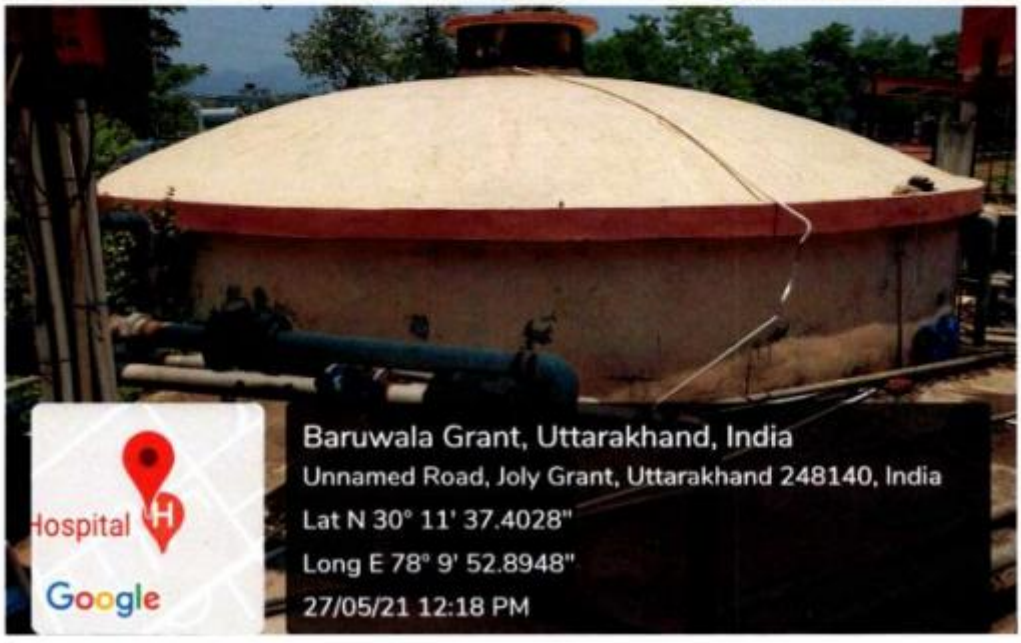
4. Groundwater Recharge: Designing tanks and bunds to channel excess water into aquifers, thereby maintaining groundwater levels.

5. Community Awareness: Educating the campus community on the importance and functioning of tanks and bunds in sustainable water management.

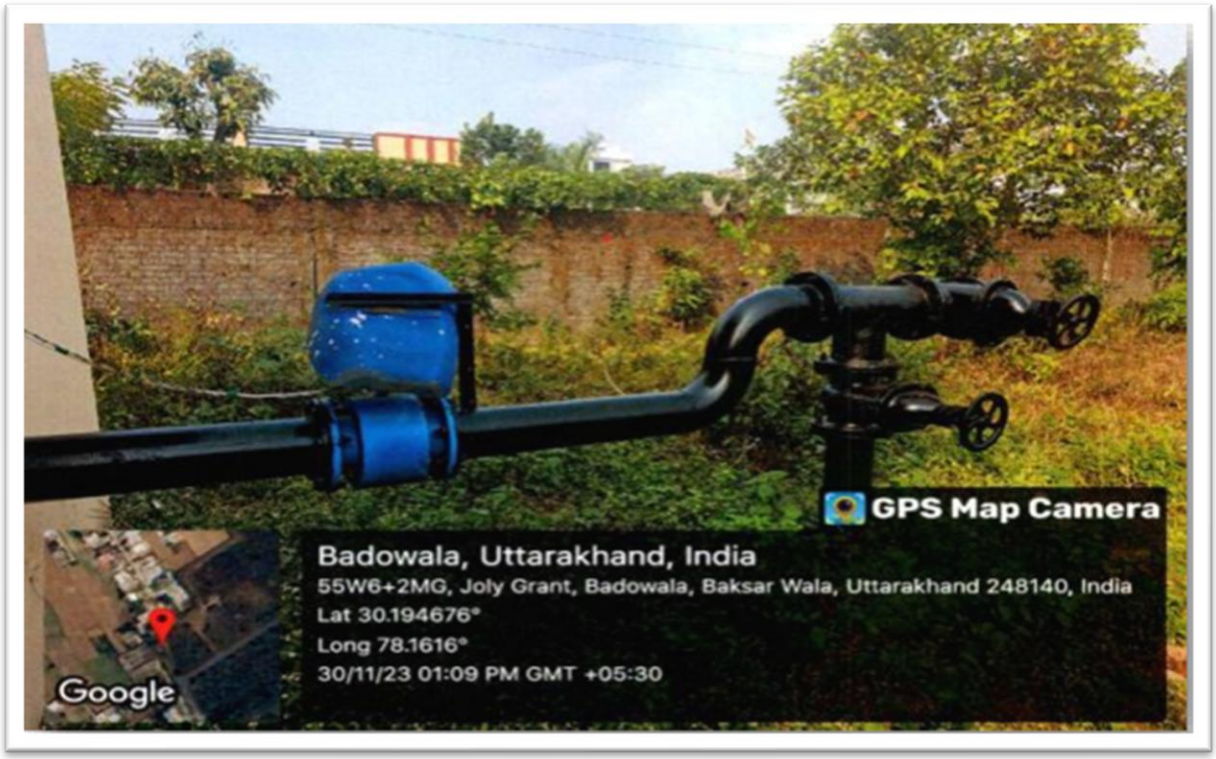
6. Integration with Landscaping: Incorporating tanks and bunds into the campus landscaping plan to maximize water conservation benefits.



Underground water storage tank



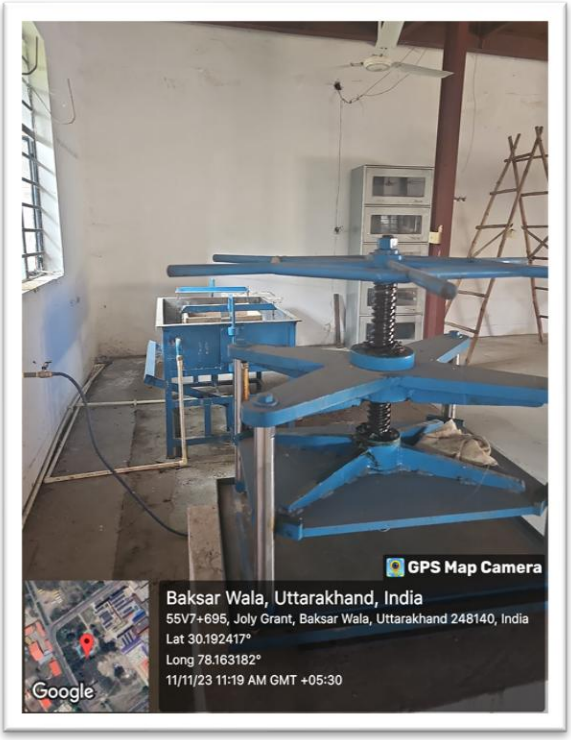
Underground water tanks (Tube well Chowk- 150 KL and behind the main Hospital building- 175 KL)



Chlorination of water and distribution system

Recycling of Paper/ Waste:

SRHU operates an 8 kg per day waste paper recycling plant on campus to manage paper waste from various offices and schools. Recycled handmade paper is used to create envelopes used within university offices. Additionally, biodegradable waste collected across the campus is processed in a compost pit to produce organic fertilizer for the university nursery and gardens. Furthermore, SRHU operates its own Bio-Gas plant near the university guest house, utilizing cow dung from the campus dairy and vegetable waste from the guest house kitchen to produce biogas for cooking and organic waste recycling purposes.



Waste paper recycling unit

Ban on Use of Plastic

Plastic pollution poses a significant threat to ecosystems, wildlife, and human health. By reducing plastic consumption, SRHU is actively contributing to the protection of the environment. The production of plastics consumes valuable resources, including fossil fuels and water. A plastic-free SRHU conserves these resources and minimizes the carbon footprint associated with plastic production and disposal. Plastic pollution can result in various health hazards when plastics break down into microplastics, which may contaminate the food chain. A plastic-free SRHU promotes a healthier and safer campus environment. SRHU's commitment to a plastic-free campus serves as a valuable educational platform, raising awareness about the impacts of plastic pollution and the importance of sustainable alternatives. The SRHU has signed an agreement for the establishment

of a plastic bank on its campus with the NGO “Social Development for Communities Foundation” in Dehradun. The collected plastic from in and around campus is being sent to the “Indian Institute of Petroleum” in Dehradun for recycling into Diesel.

Certificate of recognition for establishment of Plastic Bank

Solid Waste Management Practices

The university effectively manages solid waste by segregating biodegradable and non-biodegradable materials at the source, using green and black bins placed throughout the campus. Housekeeping staff collect the waste daily in color-coded bags and transport it to a central collection site. Biodegradable waste is composted on-site to create manure, while a biogas plant generates biogas from cow dung and organic kitchen waste.

Collection of solid (general) waste from residences and hostels

Pit for organic waste composting

Landscaping for the Green Campus

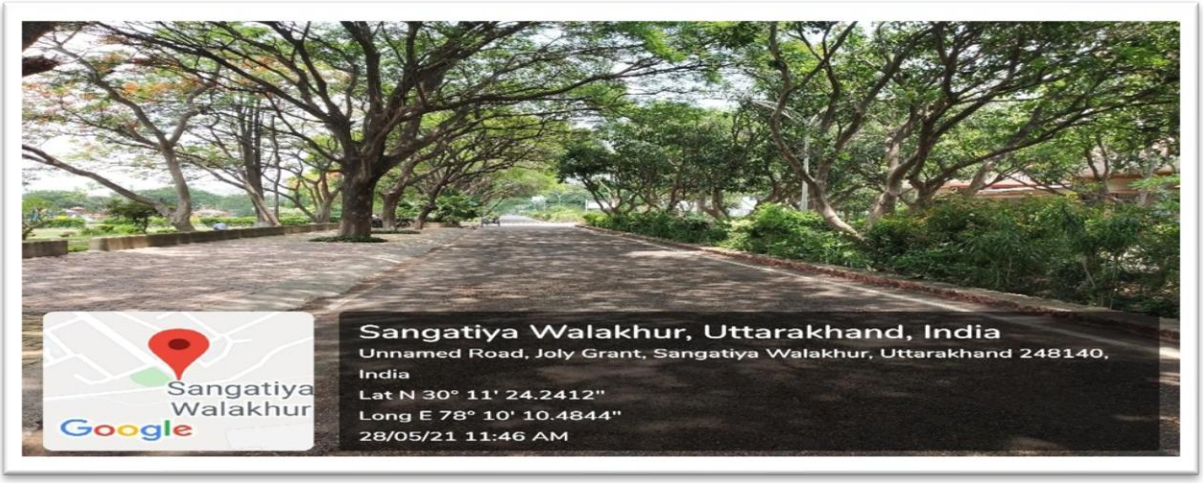
Landscaping plays a pivotal role in fostering a green and sustainable campus at Swami Rama Himalayan University. By incorporating native flora, eco-friendly designs, and sustainable practices, the campus can create an environment that not only enhances its aesthetic appeal but also promotes biodiversity and environmental conservation. Strategically planned green spaces, such as gardens, tree-lined pathways, and water features, contribute to reducing the carbon footprint, improving air quality, and providing a serene atmosphere conducive to learning and well-being. Additionally, the inclusion of organic waste composting, rainwater harvesting systems, and the integration of low-maintenance plants further aligns with the university's commitment to sustainability and ecological responsibility. Such initiatives reflect the institution’s dedication to creating a harmonious balance between development and environmental stewardship.

Landscaping for Green campus

Plantation in the campus

SRHU is dedicated to fostering a sustainable and environmentally conscious campus. One of the most impactful steps taken towards achieving this vision is the extensive tree plantation initiative within the university premises. Trees act as natural air filters, absorbing pollutants and releasing oxygen. This significantly contributes to improved air quality on campus, creating a healthier atmosphere for all. Trees provide shade and reduce the heat island effect, helping to maintain a comfortable and cooler campus environment, especially during hot seasons. SRHU's tree plantation initiative includes a wide variety of indigenous and exotic tree species carefully chosen to thrive in the local climate and conditions.

Plantation drives for Green campus



Green campus @SRHU

Certifications

SRHU consistently adheres to audit procedures for energy, environment, and green campus initiatives. Through these efforts, the University upholds quality standards and ensures compliance with ISO regulations set by government-approved agencies. Notably, the University maintains an active ISO 14001:2015 certification in its records.

Certificate of Registration

This is to Certify that
Environmental Management System of

SWAMI RAMA HIMALAYAN UNIVERSITY (SRHU)

SWAMI RAM NAGAR JOLLY GRANT, DOIWALA, DEHRADUN,
UTTRAKHAND - 248140, INDIA.

has been assessed and found to conform to the requirements of

ISO 14001:2015

for the following scope :

PROVIDING EDUCATION UNDERGRADUATE (UG), POSTGRADUATE (PG) AND DOCTORAL DEGREE PROGRAMS, RESEARCH, PHD AND HEALTH CARE SERVICE.

Certificate No	: **23EELG49**		
Initial Registration Date	: 22/05/2023	Issuance Date	: 22/05/2023
Date of Expiry	: 21/05/2024	Date of Re-Cert	: 21/05/2026

mms
EGAC Accredited
EMS Certification
CAB # 118005
MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT IAF

Director

Magnitude Management Services Pvt. Ltd.
Third Floor, A-60, Sector-2, Noida, Gautam Budh Nagar, U.P.-201301, India
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Certificate is the property of Magnitude Management Services Pvt. Ltd. and shall be ... immediately when demanded

ECOSCIENCE CONSULTANCY

CARBON FOOTPRINT CERTIFICATE 2022-23

PRESENTED TO

Swami Rama Himalayan University

Swami Ram Nagar, Doiwala, Dehradun, Uttarakhand, India

Scope of GHG emissions	tCO_2e	%
Direct emissions to air	724.5	8.67
Indirect emissions from purchased energy	9.2	0.11
Other indirect emissions	7613.9	91.2
Total tCO_2e	**8347.6**	

ECOSCIENCE CONSULTANCY
Lakshmi Vihar Colony, Bahadrabad
Haridwar, Uttarakhand- 249402

Dr. Gurpreet Singh
(Authorized Signatory)
Lead Auditor – Green & Environment Audits
Ecoscience Consultancy, Uttarakhand

Date: 21/07/2023

Swami Rama Himalayan University
(Estd. Under section 2(f) of UGC Act, 1956 vide Uttarakhand State Act)
Swami Ram Nagar, Jolly Grant, Dehradun 248016
Uttarakhand, India

स्वामी राम हिमालयन विश्वविद्यालय
(यूजीसी अधिनियम, 1956 की धारा 2 (f) के अंतर्गत उत्तराखण्ड राज्य अधिनियम द्वारा स्थापित)
स्वामी राम नगर, जौलीग्रान्ट, देहरादून 248016
उत्तराखण्ड, भारत

To whom it may concern

This is to certify that the Material Management Department has successfully participated in the collection and recycling of electronic e-waste and general waste in accordance with environmental standards for contributing towards sustainable waste management and its disposal under environmental conservation efforts.

These wastes are regularly collected from all constituent academic units and Hospitals for storing it in waste collection zone located inside the campus.

The details of e-waste and general wastes collected in year 2022-23 is given below:

S.No.	Weight in Kg	Type of Waste
1	20252	Medical Equipment, Electronic & IT and telecom equipments etc.
2	81010	Paper Scrap, Iron, Tin & Plastic etc.
Total	**101262**	

Roshan Naugain
Manager
(Material Management Department)

Date: 10/07/23

Tel: 91-135-2471102, 2471140 Fax: 91-135-2471141 Email: info@srhu.edu.in Website: www.srhu.edu.in

ECOSCIENCE CONSULTANCY

AUDIT CERTIFICATE

PRESENTED TO

Swami Rama Himalayan University

Swami Ram Nagar, Doiwala, Dehradun, Uttarakhand, India

Has been assessed by Ecoscience Consultancy for the comprehensive study of environmental impacts on institutional working framework to full the requirement of

Green Audit

(2022-23)

The green initiatives carried out by the university have been verified and found satisfactory in the report submitted.

The efforts taken by the management and the faculty towards environment and sustainability are appreciated and noteworthy.

ECOSCIENCE CONSULTANCY
Lakshmi Vihar Colony, Bahadrabad
Haridwar, Uttarakhand- 249402

Dr. Gurpreet Singh
(Authorized Signatory)
Lead Auditor – Green & Environment Audits

Date: 21/07/2023