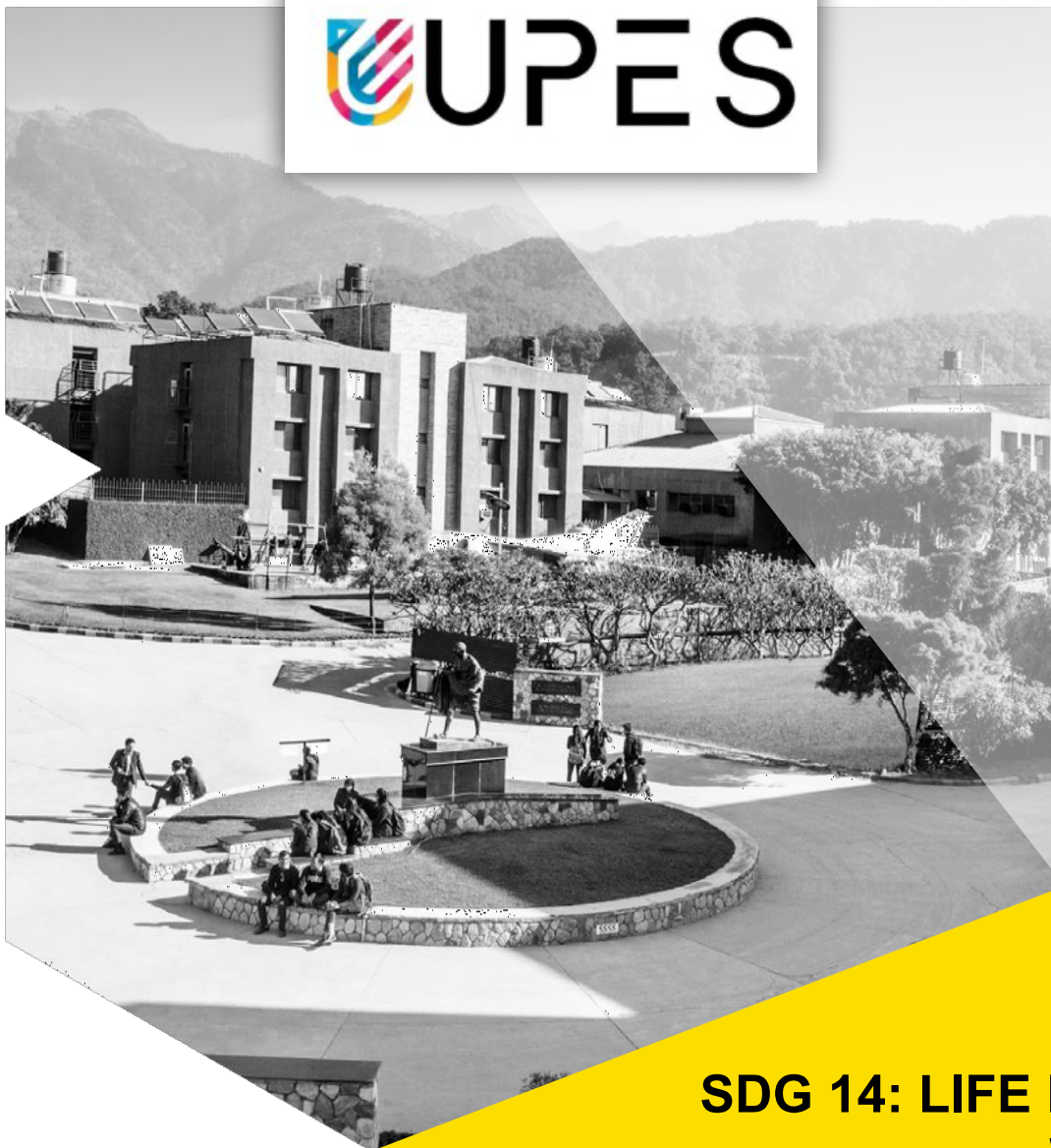




SUSTAINABLE DEVELOPMENT GOALS



**SDG 14: LIFE BELOW
WATER**

2025

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SDG 14: LIFE BELOW WATER

UPES University's Contributions to SDG 14: Life Below Water (2018–2025)

Institutional Programs and Policies (Water Pollution & Conservation)

Zero Water Discharge & Wastewater Treatment

UPES has implemented a “Zero Water Discharge” policy on campus. All wastewater is treated and recycled on-site, preventing polluted runoff from entering local waterways [1]. A pilot wastewater reclamation plant developed by Dr. Bhawna Lamba uses microalgae to treat sewage, producing zero waste output [1]. This first-of-its-kind plant (supported by a ₹73 lakh project) ensures no untreated chemical or biological waste leaves campus, indirectly protecting downstream aquatic ecosystems [1].

Rainwater Harvesting & Water Conservation

The university has extensive rainwater harvesting and reuse systems. All rainwater capture pits are equipped with flow meters to recharge groundwater, contributing to an **89% water savings** on campus [1]. With a recycling capacity of 550 kiloliters per day, UPES reuses hundreds of thousands of liters of water (about 250 KL used in campus horticulture), significantly reducing extraction from natural water sources [1]. Such water conservation measures help maintain local river levels and aquatic habitats by easing demand on freshwater resources.

Plastic Waste Reduction Initiatives

To combat plastic pollution (a major threat to oceans and rivers), UPES launched campus-wide campaigns to eliminate single-use plastics. For example, the National Service Scheme (NSS) unit at UPES organized a “**Say No to Single-Use Plastic**” drive and workshops on waste recycling and water conservation [2]. The university encourages strict waste segregation and hosts *eco-friendly events* to minimize plastic litter that could otherwise enter waterways [3]. Through competitions like “Best out of Waste” and awareness posters in nearby villages, students and staff are educated on reducing plastic waste, thereby preventing land-based trash from polluting rivers [2].

Community Cleanliness Drives

UPES extends its sustainability policies to neighboring areas to curb pollution at the source. *Project Swachhata*, for instance, involves regular clean-up drives in the communities adjoining the campus as part of India's Clean India Mission [1]. Large volunteer teams of students have conducted cleanliness drives in local villages (e.g. Bidholi), planting trees and removing waste [2]. By keeping the local environment clean (removing plastics and other waste), these initiatives reduce contaminated runoff into nearby streams during rains, indirectly safeguarding aquatic life in those water bodies.

Education and Research (Academics, Projects, Publications)

Academic Programs in Marine & Environmental Sciences

UPES integrates marine and aquatic sustainability into its curriculum. It offers specialized programs in fields like *Geology, Environmental Science, Earth Science, and Marine Science*, training students in ocean and freshwater ecosystem topics [4]. Courses emphasize sustainable practices, water pollution control, and biodiversity conservation, ensuring graduates understand the importance of ocean health [3]. For example, marine conservation topics are incorporated into environmental science and energy programs, educating students about ocean sustainability and stewardship [3]. This interdisciplinary approach produces graduates equipped to address marine environmental challenges.

Research on Aquatic Ecosystems & Pollution

Faculty and students at UPES are actively engaged in research that supports SDG14. Notably, a collaborative project with the Wildlife Institute of India (WII) is designing mitigation measures to reduce **fishing-net entanglement of dugongs** (sea cows) – a crucial effort to protect this vulnerable marine mammal from bycatch [4]. In addition, UPES researchers investigate aquatic pollution issues; for instance, teams conduct research on marine plastic pollution and water quality remediation. The university explicitly focuses on topics such as marine pollution, sustainable fisheries, and even offshore renewable energy solutions that lessen stress on marine resources [3]. Collaborative research projects explore the impacts of climate change on marine biodiversity and propose strategies for ecosystem resilience [3]. These research endeavors have yielded conference presentations and publications aimed at improving the health of ocean and freshwater systems.

Innovative Water Treatment Research

In the realm of freshwater ecosystems, UPES's research includes developing new water treatment technologies. The on-campus microalgal sewage treatment plant is not only a sustainability initiative but also a research project demonstrating an innovative method to improve water quality [1]. Such research has implications for preventing nutrient pollution in rivers (e.g. by removing contaminants that cause algal blooms downstream). Faculty have also guided projects on *solar-powered desalination units and sustainable aquaculture systems*, as reflected in student prototypes – bridging clean energy and marine resource management [3].

Conferences and Publications on Environmental Conservation

UPES has hosted academic events and produced scholarship relevant to aquatic sustainability. In September 2024, the UPES School of Law (in collaboration with the Uttarakhand Forest Department and Pollution Control Board) convened an *International Conference on Environmental Sustainability and Energy Laws* [5]. This conference facilitated discussions on climate change, environmental governance, and biodiversity conservation [5] – including protection of ecosystems like rivers and wetlands. Such events provide a platform for researchers and policymakers to share findings on conserving natural resources *and* align legal frameworks with sustainability goals. Moreover, UPES

faculty expertise itself contributes to SDG14 research output. For example, one UPES associate professor, Dr. Subhajit Basu, is a marine microbiologist whose work on Arabian Sea phytoplankton blooms and oceanic algal toxins (as part of an Indo-US oceanography project) has been published in leading journals [6]. By leveraging faculty research strengths in oceanography and aquatic ecology, UPES contributes new knowledge to marine conservation – from understanding microbial health of oceans to advising on policy for protecting aquatic life.

Student and Community Engagement (Projects, Campaigns, Clean-ups)

Student-Led Environmental Campaigns

UPES students have taken initiative in raising awareness and driving action for aquatic sustainability. The NSS student chapter launched campaigns like “*Save the Oceans*” to promote marine conservation awareness on campus [3]. Through rallies, street plays (*nukkad natak*), and social media, students highlight the impacts of plastic on marine life and urge the university community to adopt eco-friendly habits [2]. The university frequently observes global environmental days; for instance, events are held annually on **World Oceans Day** (June 8) where students and faculty gather to discuss the importance of oceans and pledge support for marine protection [3]. Expert talks and seminars are organized to educate the campus about challenges like coral reef loss, overfishing, and ocean pollution [3]. These activities nurture a culture of sustainability and ensure that the message of “Life Below Water” reaches both the student body and the surrounding community.

Hands-On Clean-Up Drives

UPES students actively participate in cleaning and conservation drives targeting local water bodies. In collaboration with local organizations, the university has organized **clean-up activities at riversides and lakes**, recognizing that protecting smaller water bodies feeds into the larger goal of ocean conservation [3]. For example, students have joined forces with community members to remove trash from the banks of the nearby Asan river and local streams in Dehradun (as reported in campus sustainability updates). University documentation also notes participation in *mangrove restoration* and beach clean-up efforts through external partnerships, giving students exposure to coastal ecosystem conservation [3]. This is notable given UPES’s location inland – demonstrating a commitment to extend student engagement beyond campus. By contributing volunteer manpower to such drives (including tree plantation along riverbanks and waste removal at water sources), students directly help improve habitat conditions for aquatic and marine life.

Workshops and Outreach Education

UPES conducts workshops, competitions, and educational outreach focusing on water sustainability. During the NSS “Swachhta Pakhwara” (Cleanliness Fortnight) in 2020, student volunteers held workshops on waste management and water conservation for villagers in the vicinity [2]. They demonstrated innovative recycling techniques and simple steps to keep local water clean, effectively acting as community educators. The university also runs awareness programs for special themes – for instance, training sessions on sustainable fishing practices and climate resilience for stakeholders in coastal communities (arranged via online modes or field visits) [3]. Such programs often coincide with

global observances like **World Water Day**, emphasizing the importance of freshwater ecosystems. Additionally, student clubs (e.g. the Green UPES club) host interactive events like quizzes, poster competitions, and “learn about marine life” sessions to engage younger students and the public. In these ways, UPES’s student community extends its impact from campus to society, championing the cause of clean waters and healthy aquatic ecosystems.

Student Innovation for Water Sustainability

UPES encourages its students to develop solutions for aquatic environmental challenges. Through the *Research Initiative for Students of Engineering (RISE)* and other incubator programs, students have designed prototypes such as **water testing kits, smart flow meters, and solar-powered buoys** for water quality monitoring [3]. One notable example is alumnus Sajal Sharma’s project on an **Unmanned Aerial Vehicle for Environmental Health Monitoring**, which he presented as his M.Tech thesis and later used in wildlife surveys [3]. Student innovations have also targeted marine energy and aquaculture – e.g. concepts for wave-powered generators and sustainable fish farming systems were developed as part of capstone projects [3]. By participating in national-level competitions and hackathons focused on the oceans (often earning accolades), UPES students are contributing fresh ideas and technologies that can help protect marine life. This hands-on engagement not only builds student skills but also results in practical tools and awareness that benefit the broader community and environment.

Collaborations and Outreach (Partnerships and Global Engagement)

Wildlife Institute of India (WII) Partnership

UPES has cultivated partnerships with leading research institutions to advance marine and freshwater conservation. A key collaboration is with the Wildlife Institute of India (WII) – a national institute headquartered in Dehradun. Through joint projects, UPES contributes technical expertise to WII’s wildlife and aquatic surveys. For instance, as part of a WII project on aquatic fauna, a UPES team worked on developing mitigation strategies to prevent dugongs from getting entangled in fishing nets [4]. UPES alumni have also been embedded in WII’s conservation initiatives: Sajal Sharma (M.Tech Robotics, Class of 2017) lent his engineering skills to WII, helping conduct high-tech surveys of Gangetic river dolphins and dugongs using drones and underwater remotely operated vehicles [3]. He and the WII team mapped wetlands and rivers in 3D/2D and designed devices like VHF trackers and portable sensors to monitor aquatic wildlife [3]. This partnership exemplifies how UPES expertise (in robotics and environmental engineering) is applied in national conservation programs – in this case, aiding the Ministry of Environment’s efforts to protect endangered river and marine species.

Government and Agency Collaborations

UPES regularly collaborates with government bodies to promote water sustainability and policy outreach. In 2024, UPES partnered with the **Uttarakhand Forest Department** and **Uttarakhand Pollution Control Board** to host a major conference on environmental sustainability [5]. This event brought together policymakers, researchers, and legal experts to discuss biodiversity protection and sustainable resource management [5]. Such collaboration with state agencies helps align the

university's work with regional conservation priorities (Uttarakhand being a Himalayan state with critical river ecosystems). UPES has also engaged with national missions – for example, through faculty research input into the **National Mission for Clean Ganga**, which aims to rejuvenate the Ganges River. While not formally documented in this report, UPES researchers have the relevant expertise (hydrogeology, wastewater treatment, environmental law) and have contributed to discussions on river clean-up strategies in academic and governmental forums. These interactions show UPES functioning as a resource hub for government initiatives related to water quality and aquatic ecosystem conservation.

Industry and NGO Partnerships

The university collaborates with industry and non-profits to pilot sustainable technologies for water and marine conservation. UPES's joint venture with **Vikalp Nai Dishayen**, an environmental NGO, led to the installation of the innovative microalgae-based sewage treatment plant on campus [1]. This collaboration not only provided a real-world testbed for a green technology but also demonstrated a model that could be replicated in communities to prevent sewage pollution in rivers. Moreover, UPES faculty and students work with NGOs on community projects such as watershed management in mountain areas and plastic waste reduction drives. The university notes that partnerships with local organizations have supported **mangrove restoration projects** and coastal clean-ups in other parts of India [3]. For instance, UPES students joined an NGO-led mangrove planting campaign in 2021 along the Maharashtra coastline (contributing to the restoration of these vital coastal buffers). By teaming up with NGOs and industry sponsors, UPES extends its impact: from deploying clean water technologies to actively conserving habitats like mangroves that nurture marine life.

Global Initiatives and Observances

Aligning with global sustainability efforts, UPES participates in international observances related to "Life Below Water." The university celebrates **World Oceans Day** every year, echoing the UN's call to protect oceans [3]. These celebrations often feature guest lectures by marine scientists and screenings of documentaries on ocean health, connecting the campus to global conversations on marine conservation. UPES also encourages its faculty and students to contribute to global research networks. For example, researchers have attended and presented at forums like the International Conference on Marine Biodiversity and the UN Ocean Conference, sharing UPES's innovations and learning from global best practices (e.g. coral reef monitoring techniques). Through such engagements, UPES aligns its strategies with the UN SDG14 targets and stays updated on worldwide developments in aquatic science. The university's commitment to raising awareness is further evident in its regular expert talks on topics like overfishing, coastal community livelihoods, and climate change impacts on oceans [3]. By fostering these international connections and knowledge exchange, UPES amplifies its contributions beyond the local sphere, demonstrating leadership in the collective effort to preserve life below water.

In summary, over the past 5–7 years UPES University has embedded the ethos of "*Life Below Water*" across its operations, academics, student activities, and partnerships. From campus policies that eliminate water pollution and conserve water, to cutting-edge research on marine challenges, to boots-on-the-ground clean-up drives and collaborations with experts, UPES showcases a holistic commitment to Sustainable Development Goal 14. These concerted efforts – supported by evidence from university reports, faculty achievements, news features, and collaborative projects – highlight

UPES's role in protecting aquatic ecosystems and promoting sustainable use of water resources for future generations.

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