ANNUAL REPORT

SDG

14

LIFE BELOW WATER

UNIVERSITY OF CHITTAGONG
Chittagong-4331, Bangladesh

SGD 14: LIFE BELOW WATER AND CHITTAGONG UNIVERSITY

Supporting aquatic ecosystems through education

Fresh-water ecosystem (community outreach)

University of Chittagong conducted several community outreach programs highlighting the conservation and ecosystem services of freshwater ecosystems. University of Chittagong is located in the Halda river basin. CU established Halda River research laboratory (https://idfbd.org/halda-river-research-laboratory/), which is the first research center of its kind to study rivers. This research laboratory offers many educational program for local community for awareness building to conserve aquatic biodiversity of the Halda River, which is the crucial carp fish breeding grounds in Bangladesh. Besides the University of Chittagong also promoting awareness development program to save rivers and other aquatic water bodies.

Photo: Celebrating World River Day 2023

Some of those activities are highlighted below:

- CU Halda River Research Laboratory: Country's first research centre to study rivers https://www.thedailystar.net/chattogram/news/countrys-first-research-centre-study-rivers-3021081
- Policy implications based on stakeholders' perceptions for integrated management of the Halda River: Bangabandhu Fisheries Heritage of Bangladesh https://iwaponline.com/wp/article/24/3/517/87706/Policy-implications-based-on-stakeholders
- Conservation of a river for biodiversity and ecosystem services: the case of the Halda – the unique river of Chittagong, Bangladesh https://www.tandfonline.com/doi/abs/10.1080/15715124.2015.1012514
- Salt and pollution hit crucial fish breeding grounds in Bangladesh

https://www.thethirdpole.net/en/livelihoods/salt-pollution-hit-fish-breeding-grounds-halda-river/

- Biodiversity at stake in Halda river
  https://en.prothomalo.com/environment/pollution/biodiversity-at-stake-in-halda-river
- Experts warn over loss of fish species from Halda River

includes research on local fish species, climate change's impact on fisheries, and sustainable fishing practices. The university offers academic programs in zoology, fisheries science and marine biology to educate future professionals in the field. Collaboration with government agencies, NGOs, and international organizations is a key aspect, fostering research partnerships and knowledge sharing. The university also engages in community outreach and extension, working with and providing training to the local communities to promote mariculture, integrated multi-trophic aquaculture practices, responsible fishing practices and resource management. Additionally, it advocates for policies and regulations that protect aquatic ecosystems and fish stocks, all in an effort to contribute to the sustainability of fisheries in Bangladesh.

Fig: Community outreach program for introducing Integrated Multi-trophic Aquaculture by University of Chittagong presided over by the Honorable Vice Chancellor Dr. Shireen Akhter

University of Chittagong (CU) is also promoting sustainable fisheries management and nature-based alternative solutions for robust and climate-resilient coastal livelihoods through field tour and campaign on social media and television broadcasts. Here are some of the activities and initiatives related to community outreach related to sustainable

- News in global media promoting nature based solution by researchers of University of Chittagong- COP26: Could oysters help to save Bangladesh from rising seas? https://web.facebook.com/watch/?v=191347383164323&ref=sharing&_rdc=1&_rdr
- Meeting with scientists of Bangladesh Fisheries Research Institute (BFRI) on technology innovation for Mariculture development in Bangladesh https://shorturl.at/tyJR7
- Study tour and community engagement program on the Sundarbans, Bangladesh https://epaper.protidinersangbad.com/2023/11/09/pages/page05.jpg?v=1.1.2
- Community engagement program of ongoing research at university premises https://web.facebook.com/shafiq.islam.7564/posts/pfbid026x2XSieoWMad2PNLBR8Wnq5V3wKcv4nze28YViheAeY7KAT2wUiwPuBw7aBDB4k6l

Fig: Training and demonstration program on Integrated Multi-trophic Aquaculture for blue economy development in Bangladesh

14.2.3 Overfishing (community outreach)

University of Chittagong is dedicated to the preservation of aquatic ecosystems in Bangladesh by actively working to combat overfishing and illegal and unregulated fishing. Their multidisciplinary approach, combining research, education, policy advocacy, and community engagement, contributes significantly to the sustainable management of coastal resources. The Institute of Marine Sciences at the University of Chittagong offers educational programs and training to fisheries management personnel, fishermen, and local communities. By raising awareness and imparting knowledge, they aim to promote responsible fishing practices and the importance of marine conservation. On the other

organizing various programs, research fairs, rallies, and processions.

Fig: Stopping illegal fishing in Halda River Basin

Working closely with coastal communities during field survey, the researcher of the university empowers local fishermen with alternative livelihood opportunities and encourages sustainable fishing practices. During study tour the undergraduates of the university also collaborate with these communities to report and prevent illegal fishing activities. The university participates in marine conservation and protection efforts, including the establishment of marine protected areas and conservation zones to safeguard critical habitats and vulnerable species.

Some of those activities of different institutes and departments are mentioned below-

- Developing awareness among the fisherman by CU student https://shorturl.at/aI568
- Awareness Raising Movement by Halda Research Laboratory :Stop Illegal Fishing in Halda https://shorturl.at/acgxC

Photo: Ghost fishing awareness raising programme by the students of University of Chittagong.

14.3 Supporting aquatic ecosystems through action

14.3.1 Conservation and sustainable utilization of the oceans (events)

The University of Chittagong has played a pivotal role in fostering awareness and commitment to the conservation and sustainable utilization of the ocean through the celebration of various events such as World Ocean Day, Fisheries Day, and World River Day, Ocean Literacy Campaign. These occasions serve as powerful platforms for students, faculty, and researchers to come together and address pressing issues related to marine ecosystems. By actively engaging in these celebrations, the University of Chittagong not only educates its community but also inspires a collective commitment to safeguarding our precious marine environments for future generations.

Photo: Rally on World Ocean Day

Some of the remarkable activities are as follows-

- World Ocean Day celebration in CU https://web.facebook.com/photo/?fbid=625418912954696&set=a.611438477686073
- Celebration of ocean day to aware community https://shorturl.at/sDHIK
- Procession on university premises with motoClean Ocean: Nurturing Life Below, Preserving Hope Above https://shorturl.at/cnoqQ

14.3.2 Food from aquatic ecosystem (policies)

No information available

14.3.3 Maintain ecosystem and their biodiversity (direct work)

The University of Chittagong has been at the forefront of marine biodiversity research, making significant contributions to the

sustainable practices. The university's commitment extends beyond academia, as it actively involves local communities in its research endeavors, fostering a collaborative approach to marine ecosystem management. By bridging the gap between research and practical application, the University of Chittagong plays a pivotal role in ensuring the resilience of coastal ecosystems and the well-being of those whose lives are intricately linked to the bounty of the sea.

Some highlighted research work are mentioned below-

- Microbiome pattern and diversity of an anadromous fish, hilsa shad (Tenualosailisha) (accepted) *URL: https://shorturl.at/kqFHU*
- Granulometric and geomorphological characteristics of RezuKhal canal, Bangladesh: Inferences for sustainable ecosystem and management *DOI: 10.1016/j.chnaes.2022.10.001*

- Diversity and seasonal succession of resident and migratory macrobenthic fauna of saltmarsh restoration site at SonadiaIsland, Cox's Bazar, Bangladesh *DOI: 10.1016/j.rsma.2022.102460*
- Fish diversity and water characteristics in the Reju Khal River *DOI: 10.26480/wcm.02.2018.11.1*
- Ecological engineering with oysters enhances coastal resilience efforts *DOI: 10.1016/j.ecoleng.2021.106320*
- Oyster aquaculture for coastal defense with food production in Bangladesh *URL:https://shorturl.at/tCJO6*
- Environmental variables and fisheries diversity of the Naaf River Estuary, Bangladesh. *DOI: 10.1007/s11852-010-0130-3*
- Colonization dynamics of periphytic protozoa in a tropical marine ecosystem *DOI: 10.1017/S0025315423000528*
- Preliminary report on tidepool fish diversity from a rocky shore in the Bay of Bengal *DOI: 10.1016/j.rsma.2021.101698*
- Seaweeds farming for sustainable development goals and blue economy in Bangladesh *DOI: 10.1016/j.marpol.2021.104469*
- Oyster breakwater reefs promote adjacent mudflat stability and salt marsh growth in a monsoon dominated subtropical coast OPEN *URL:https://shorturl.at/tuE18*
- Do oyster breakwater reefs facilitate benthic and fish fauna in a dynamic subtropical environment? *DOI: 10.1016/j.ecoleng.2019.105635*

14.3.4 Technologies towards aquatic ecosystem damage prevention (direct work)

Chittagong University is at the forefront of utilizing innovative technologies to prevent damage to the aquatic

environments. Cutting-edge sensor networks and data analytics are harnessed to detect pollution levels and identify potential threats to marine life. The institution also engages in developing sustainable aquaculture practices, leveraging modern technologies to minimize environmental impact. Besides, a group of scientists of Institute of Marine Sciences worked on building oyster reef along the coast of Kutubdia to promote

adjacent mudflat stability and salt marsh growth and to prevent coastal erosion and they became successful. In addition to, Institute of Marine Sciences, University of Chittagong deployed Autonomous Reef Monitoring Structures to monitor coral ecosystem's health at Saint Martin's Island, Cox's Bazar.

Photo: Placing artificial substrates along the beach

Some of the activities are documented here.

- Oyster breakwater reefs and coastal protection URL:https://www.dutchwatersector.com/news/oyster-breakwater-reefs-and-coastal-protection
- Cryptobiota metabarcoding using Autonomous Reef Monitoring Structures at coral reef ecosystem of Saint Martin's Island *DOI: 10.13140/RG.2.2.28542.15685*
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14.4 Water sensitive waste disposal

14.4.1 Water discharge guidelines and standards

University of Chittagong (CU) is going to prepare a policy and guidelines to ensure wastewater treatment from buildings and facilities throughout its campus. Currently CU strictly follows the guidelines as described in the national document 'Bangladesh Standards and Guidelines for Sludge Management' prepared by the Department of Environment.

Important Link:

- Bangladesh Standards and Guidelines for Sludge Management https://doe.portal.gov.bd/sites/default/files/files/doe.portal.gov.bd/publications/2398e6c5_c300_472d_9a0c_0385522748f3/Bangladesh%20Standards%20and%20Guideline%20for%20sludge%20management-%20September%202016.pdf

14.4.2 Action plan to reducing plastic waste

Plastic pollution is becoming an environmental crisis in Bangladesh. University of Chittagong (CU) has been emphasizing scientific research and taking important steps to reduce plastic pollution in nearby aquatic ecosystems. In line with national initiatives including multispectral action plan for sustainable plastic management CU has taken several programs as follows:

- Awareness camping to minimise consumption of single-use plastics
- Installing plastic collecting bins in the campus area for recycling plastic waste and ensuring correct management of waste
- Installing plastics waste collection points, where plastics are trade off with green saplings for plantation
- Encouraging researchers providing grants for research to provide robust evidence about the environmental problems associated with plastic
- Offering seminars, symposium and research fairs to raise awareness within the University as well as externally about the issues associated with single-use plastics and waste generation and promote behavioral change.

Important Link:

- Policy document: Towards a multispectral action plan for sustainable plastic management in Bangladesh (http://www.doe.gov.bd/sites/default/files/files/doe.portal.gov.bd/publications/25a7382d_11cc_4a55_b9d1_b575e843f401/2022-10-18-13-40-3c4c8bb9b9ed8d477a0eac9c653c6d69.pdf)

14.4.3 Reducing marine pollution (policy)

University of Chittagong follow the seven strategies as described in the Bangladesh National Program of Action for Protection (NPA) to protect the coastal and marine environment from land-based pollution. National Environment Policy of 1992 and the Bangladesh Environment Conservation (BEC) act of 1995 are the critical foundation for environmental protection in Chittagong University campus, which are strongly monitored by the Department of Environment under the Ministry of Environment Forest and Climate Change in Bangladesh. Moreover, several academic departments organize beach cleaning programs in association with coastal communities to raise the awareness for reducing marine pollution.

Important Link:

- Bangladesh National Programme of Action for Protection of the Coastal and Marine Environment from Land-Based Activities (https://doe.portal.gov.bd/sites/default/files/files/doe.portal.gov.bd/publications/2686e3bc_b152_44fb_964b_1746bc42092d/NPA%20Final%20Draft.pdf)
- Beach Cleaning Program by the Instititute of Marine Sciences https://shorturl.at/vBL24 and Department of Oceanography https://shorturl.at/ejzTY

Photo: Beach cleaning programme organized by the Department of Oceanography, University of Chittagong

Photo: Beach cleaning programme organized by the Institute of Marine Sciences, University of Chittagong

14.5 Maintaining a local ecosystem

14.5.1 Minimizing alteration of aquatic ecosystem (plan)

University off Chittagong (CU) has formulated a master plan by Planning & Development wing of the university indicating all future infrastructural development highlighting the theme “Green and Living Campus”. Under this theme all aquatic and terrestrial ecosystems are kept at “No Alteration” mode, which compiles an environmental management plan to minimize biological, chemical, and physical changes to the associated aquatic and terrestrial ecosystems. All the water bodies including creeks and canals across the entire catchment areas are kept natural and deducted from any developmental activities to maintain natural flow and ecological integrity.

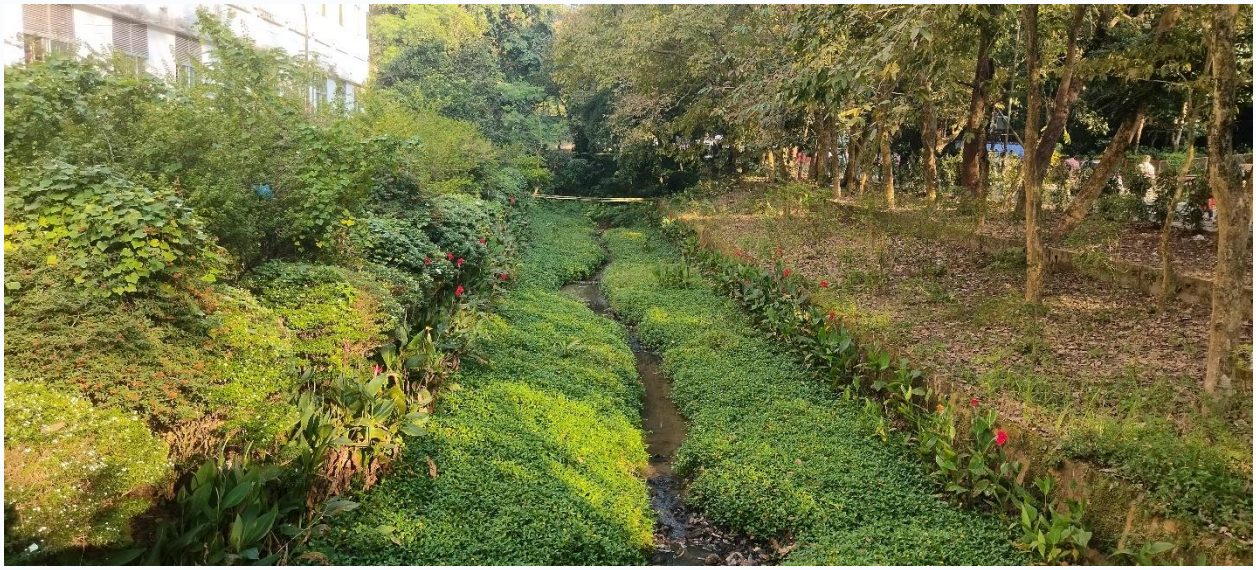

Photo: Natural water canal behind the administrative building of the CU

14.5.2 Monitoring the health of aquatic ecosystem

The University of Chittagong boasts a range of multidisciplinary institutes, departments, and research centers that are dedicated to conducting research aimed at overseeing the ecological well-being of the aquatic ecosystem within the university campus. This research entails not only studying the aquatic environment but also meticulously documenting and reporting on the condition of the various water bodies present on the university grounds. In essence, these academic units are actively engaged in monitoring and maintaining the ecological health of the campus's aquatic ecosystems and ensuring that comprehensive records are kept regarding their status. This proactive approach underscores the university's commitment to environmental conservation and sustainability.
Some prominent research articles related to this section:

- Surface Water Quality of Chittagong University Campus, Bangladesh https://www.iosrjournals.org/iosr-jestft/papers/vol8-issue2/Version-2/A08220104.pdf
- Limnology of Three Ponds in Chittagong University Campus, Bangladesh http://article.sapub.org/10.5923.j.ajee.20201002.01.html
- Plankton species composition, abundance and diversity indices in three ponds of Chittagong University Campus, Bangladesh. https://www.longdom.org/open-access/plankton-species-composition-abundance-and-diversity-indices-in-threeponds-of-chittagong-university-campus-bangladesh-92925.html#:~:text=The%20range%20of%20Simpson%20Diversity,during%202017%20and%202018%20respectively.
- Diversity of phytoplankton and its relationship with physicochemical parameters of three ponds in Chittagong University campus, Bangladesh. URL: https://shorturl.at/ABT03

14.5.3 Programme towards good aquatic steward practices

Chittagong University is dedicated to promoting good aquatic stewardship practices through its comprehensive programs. These initiatives focus on educating communities and stakeholders about sustainable water management, emphasizing responsible fishing methods, and encouraging the conservation of aquatic biodiversity. The university actively engages in outreach programs, workshops, and awareness campaigns to instill a sense of responsibility and environmental ethics among individuals involved in aquatic activities. By fostering a culture of good aquatic stewardship, Chittagong University aims to create a positive impact on the region's water ecosystems, ensuring their long-term health and resilience.

Photo: World Ocean Day celebration to raise awareness among the society

Photo Awareness program: Provide books in exchange of Plastic Bottles to stop dispersion of plastics into the sea (https://fb.watch/lmGJWRYPnJ/?mibextid=Nif5oz)

Some highlighted activities are as follows-

- World ocean day in University of Chittagong https://web.facebook.com/photo/?fbid=2198760573656079&set=pcb.2198760596989410
- Books for Plastics (Awareness Campaign) https://fb.watch/lmGJWRYPnJ/?mibextid=Nif5oz

14.5.4 Collaboration for shared aquatic ecosystems

Information not available

14.5.5 Watershed management strategy

CU serves as a hub where fresh ideas are tested and innovative knowledge is generated. It plays a pivotal role in shaping the future of Bangladesh. The University of Chittagong (CU) has a rich history of dedication to preserving the environment and promoting sustainability. It has established various institutes, departments, and centers that are solely focused on environmental research and education, alongside implementing multiple initiatives to make its campus more eco-friendly and advocate for sustainable practices.

Photo: Sluice Gate of University of Chittagong for watershed management

The University of Chittagong (CU) has crafted a set of guidelines for Watershed Management within its premises, aligning with the environmental conservation regulations of Bangladesh. In the planning and execution of any projects, the university authorities strictly adhere to these guidelines, ensuring the preservation of natural habitats such as ponds, lakes, watersheds, and hills. Besides this the researchers of the university develops some management plant for the natural watershed of Halda River near to the university premises.The faculties of the university also report and documented the environmental condition of the Halda River watershed that creates the way to declare the ecologically sensistive and valuable natural breeding ground as Bangabandhu Fisheries Heritage.

Important link:

- Govt declares Halda 'Bangabandhu Matshya Heritage' https://www.thedailystar.net/news/bangladesh/news/govt-declares-halda-bangabandhu-matshya-heritage-3338541
- Govt declares Halda Bangabandhu Fisheries Heritage https://www.tbsnews.net/economy/agriculture/govt-declares-halda-bangabandhu-fisheries-heritage-175183
- Halda Research Laboratory of CU https://www.thedailystar.net/chattogram/news/countrys-first-research-centre-study-rivers-3021081
- Research Paper: Mapping and GIS Analysis of Small Water Reservoirs in the Hills of the Halda River Watershed
  URL: https://bmj.bsmrmu.edu.bd/details&cid=37
- Water Management facility in University of Chittagong- Sluice Gate https://rb.gy/77kagk