



ASSAM  
DON BOSCO  
UNIVERSITY

2023-2024

# Annual Sustainability Report



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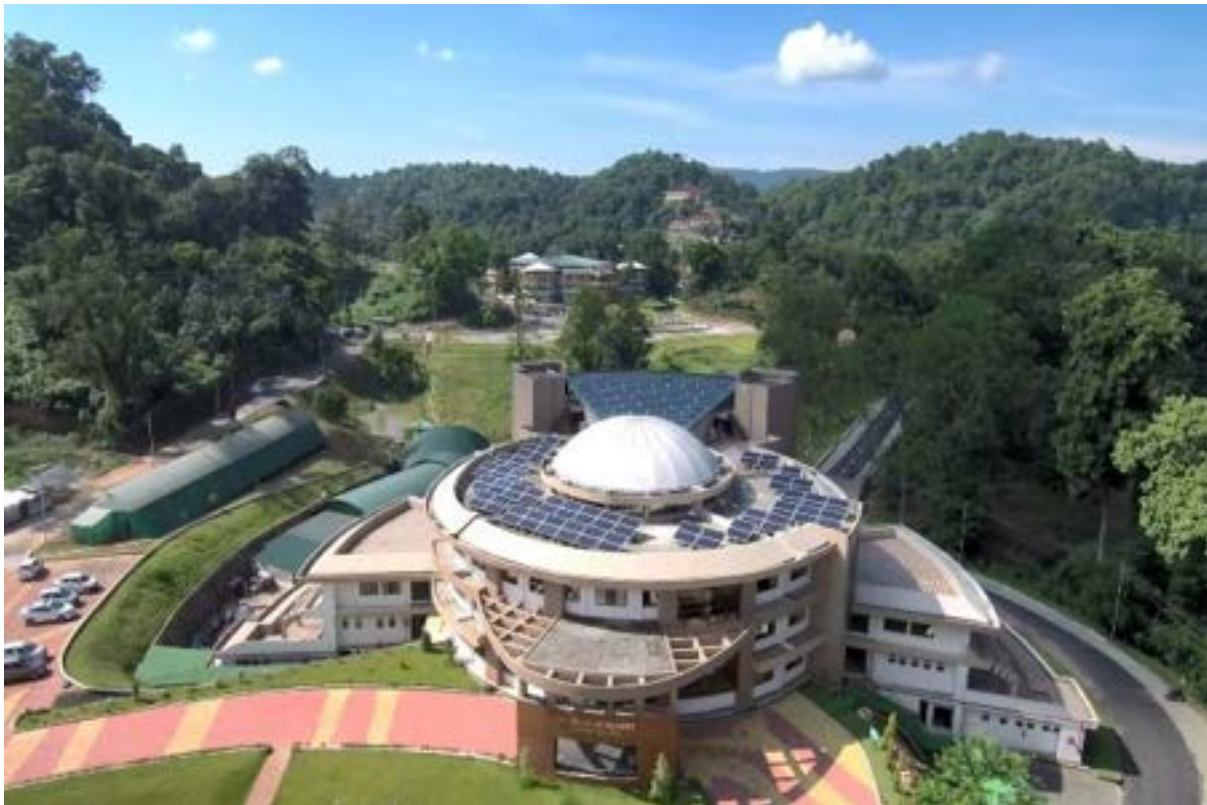
## INTRODUCTION



The Sustainable Development Goals (SDGs) are a set of 17 global goals adopted by the United Nations in 2015 as part of the 2030 Agenda for Sustainable Development. They aim to address pressing global challenges, including poverty, inequality, climate change, environmental degradation, peace, and justice. The SDGs provide a comprehensive framework for countries and organizations to work towards a sustainable and equitable future. Each goal is interconnected, emphasizing the need for collective action across economic, social, and environmental dimensions. Education, innovation, and responsible resource management play a crucial role in achieving these goals. By promoting sustainable practices and inclusive development, the SDGs seek to improve the quality of life for present and future generations.

## SUSTAINABILITY AGENDA OF THE UNIVERSITY

Assam Don Bosco University's sustainability agenda is deeply embedded in its vision, reflecting the University's commitment to all its stakeholders, including students, parents, faculty, staff, alumni, benefactors, and the governing body. This agenda serves as a roadmap for fostering a vibrant, self-sustaining campus community. The University aligns its three campuses with a holistic sustainability vision, setting clear goals in education, clean energy, nature conservation, and ecosystem management. Faculty and staff are encouraged to drive sustainability initiatives through cutting-edge research and technology to address regional challenges. With a strong foundation in values and dedicated faculty, the University nurtures an enriching learning environment. The listed activities showcase the University's ongoing progress in achieving the Sustainable Development Goals (SDGs). Furthermore, the Annual Sustainability Report highlights various activities, publications, and projects undertaken by the University to reinforce its commitment to achieving all SDGs.



## ACTIVITIES



**AUGUST 2023**

### **SWABALAMBAN: SOLAR-POWERED LED LAMP SKILL PROGRAM**



The Department of Electronics and Communication Engineering at Assam Don Bosco University organized a free skill development program on 1st August to train unemployed youth in designing solar-powered chargeable LED lamps. The training covered solar energy utilization, battery charging, and integrating a USB port for mobile charging.

Participants, primarily educated yet unemployed young men and women from surrounding communities, received certificates and the lamps they built. The program aimed to promote self-employment and entrepreneurship, particularly in rural areas with unreliable electricity. By equipping participants with technical skills, the initiative empowered them to produce and sell solar-powered lamps, fostering sustainable livelihoods and innovation in renewable energy solutions.



**SEPTEMBER 2023**

### **WEBINAR ON “GLOBAL UNDERSTANDING OF SUSTAINABILITY”**

A webinar on “Global Understanding of Sustainability” was held on 4 September 2023, organized by the Department of Civil Engineering at Assam Don Bosco University, in collaboration with the UNESCO-Chair on Global Understanding for Sustainability, Friedrich-Schiller-Universität Jena, Germany. Prof. (Dr.) Benno Werlen, Chair holder of the UNESCO-Chair, was the resource person for the event. This webinar marked the first collaborative

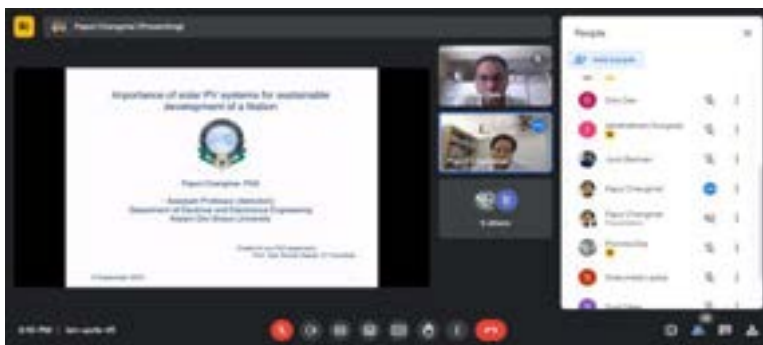
activity following the MoU signing between Assam Don Bosco University and Friedrich-Schiller-Universität Jena. It was attended by 50 faculty members and students from the Department of Civil Engineering and other departments at Assam Don Bosco University, along with faculty from Institut Teknologi Bandung, Indonesia. The session emphasized the importance of international cooperation, knowledge sharing, and collective efforts in achieving global sustainability goals. The webinar concluded with a call for social corporate responsibility in building a sustainable world.



**SEPTEMBER 2023**

**TALK ON "THE GROWING POTENTIAL AND FUTURE TRENDS OF RENEWABLE ENERGY".**

On Engineer’s Day, which falls on September 15, 2023, the Department of Electrical and Electronics Engineering, School of Technology Assam Don Bosco University organized an online academic talk on Engineering Applications of Renewable Energy. All the B.Tech (Bachelor of Technology) and M.Tech (Master of Technology) students including the faculty



members from the Department of Electrical and Electronics Engineering participated in the event. The speakers discussed the potential of renewable energy across the various sources and the trend of greater

reliance on renewable energy sources in the future, which would offer enormous economic, social, and environmental benefits. There were two talks delivered on the occasion, “Introduction to Renewable Energy Systems” and “Importance of Solar PV Systems for Sustainable Development of a Nation.”



### **OCTOBER 2023**

#### **WORLD ANIMAL DAY CELEBRATION**

The Department of Zoology, in collaboration with the Eco-Club of Assam Don Bosco University, celebrated World Animal Day on October 4, 2023, under the theme "Big or Small, Love Them All." The event began with an introduction during the Morning Assembly, followed by a presentation by MSc 1st Semester students on animal



conservation. Dr. Prasanta Kr. Choudhury, Director, School of Life Sciences, emphasized the importance of raising awareness against animal abuse.

Two competitions were held: a Photography Competition and a Selfie Cut-out Stand Competition, with a total of 52 enthusiastic participants. Winners were selected by judges Dr. Vedant Vikrom Borah and Dr. Bikash Borah. The event concluded with a vote of thanks by Dr. Madhurima Das.

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### **FEBRUARY 2024**

#### **TIDE TURNERS PLATIC CHANLLENGE**

The World Wildlife Fund for Nature (WWF), in collaboration with the Department of Zoology and the Eco Club of Assam Don Bosco University, conducted the Tide Turners Plastic Challenge on 13th February 2024 at the university's Tapesia Campus. The program aimed to raise awareness about plastic pollution and encourage students to act.

Ms. Mimansa Jain and Ms. Najuma Yeasmin from WWF, Assam and Arunachal Headquarters, served as resource persons. The session featured a presentation on plastic pollution, its impact

on the environment, and potential solutions. An interactive activity engaged students and faculty in identifying different types of plastics and discussing sustainable alternatives.

WWF Volunteer and BSc Zoology student, Ms. Mrinmoyee Das, delivered the welcome address, highlighting WWF's mission and the Tide Turners



Plastic Challenge. The event concluded with an encouraging message from the resource persons, motivating students to actively participate in tackling plastic pollution. A total of 232 participants from the School of Life Sciences and the School of Fundamental and Applied Sciences attended the program.



### **MARCH 2024**

### **NATIONAL SEMINAR ON RECENT TRENDS IN BIODIVERSITY STATUS AND CONSERVATION**

The Department of Zoology, Assam Don Bosco University, in collaboration with St. Edmund's College, Shillong, and Pragjyotish College, Guwahati, organized a Two-day National Seminar on Recent Trends in Biodiversity Status and Conservation on 27th–28th March 2024. The seminar aimed to bring together researchers, environmentalists, and conservationists to discuss biodiversity evaluation, climate change, conservation policies, and technological advancements in biodiversity conservation.

The seminar was inaugurated by Rev. Fr. (Dr.) Jose Palely, Hon'ble Vice Chancellor, in the presence of distinguished guests and participants. Seven keynote speakers from various universities and organizations shared insights on biodiversity conservation challenges and solutions. The event featured five technical sessions with 26 oral presentations and 53 poster presentations, providing a platform for researchers to showcase their findings. Awards for Best Oral and Poster Presentations were given to Mr. Liston Marbañiang (Assam Don Bosco

University) and Ms. Puja Baishaya (S.B. Deorah College, Guwahati) for their outstanding research contributions.

The valedictory session, led by Dr. Bakhtiar Hussain, summarized key takeaways, including policies for urban biodiversity conservation, biodiversity-based entrepreneurship, taxonomy training, awareness on endocrine disruptors, and strengthening conservation networks.

The seminar saw the participation of 143 attendees, with 79 presenting their research. The event was supported by ICSSR-NERC, ASTEC, DS Enterprise, B&B Associates, and the Zoological Society of Assam. The seminar successfully fostered knowledge-sharing and encouraged collaborative efforts toward biodiversity conservation.



**MAY 2024**

### **SKILL DEVELOPMENT COURSE IN HERBAL PRODUCT TECHNOLOGY**

The Department of Life Sciences at Assam Don Bosco University, under the guidance of Dr. Jayanti Datta Roy, organized a Skill Development Course in Herbal Product Technology on 1st May 2024. A total of eight students successfully developed various herbal products, including

herbal soap, herbal rangoli, herbal tea, and herbal hair powder, with some products refined through repeated trials for further improvement.

This hands-on initiative provided students with practical experience in crafting natural and eco-friendly products, fostering creativity and sustainability. The project also raised awareness about the benefits of herbal solutions, showcasing the potential of traditional herbal ingredients in modern applications.



**MAY 2024**

**WORKSHOP ON PEARL FARMING**

The Department of Zoology, Assam Don Bosco University, in collaboration with IQAC, organized a One-Day Workshop on Pearl Farming on 9th May 2024. The resource person, Dr. Akalesh Kumar Verma from Cotton University, provided insights into entrepreneurship opportunities in pearl farming, particularly in Northeast India.



The workshop had two sessions: a theoretical session covering tools, techniques, and benefits of pearl farming, and a hands-on session where students practiced nucleus preparation and

surgical procedures on mussels. The session concluded with positive feedback from the 35 participants. Dr. Jane Shangliang expressed gratitude to the resource person and presented a certificate of appreciation.



**MAY 2024**  
**INTERNATIONAL DAY FOR**  
**BIOLOGICAL DIVERSITY**

On 22nd May 2024, the Department of Zoology, Assam Don Bosco University, celebrated the International Day for Biological Diversity under the theme "Be Part of the Plan." To

mark this occasion, the department inaugurated its annual wall magazine, highlighting individual efforts in biodiversity conservation.

The event was graced by Rev. Fr. (Dr.) Jose Palely, Hon'ble Vice Chancellor, who officially inaugurated the magazine. This initiative reflects the department's commitment to raising awareness and encouraging collective responsibility in preserving nature. The celebration served as a reminder of the vital role each individual plays in protecting the environment.



**JULY 2024**  
**SWABALAMBAN: EMPOWERING EMPLOYMENT THROUGH SOLAR ENERGY**  
The event "Swabalamban: Empowering Employment through Solar Energy" was held from July 3rd to 5th, 2024, at Assam Don Bosco University's Azara campus. The initiative, conducted in Assamese, aimed to boost youth employability by providing hands-on training in solar energy technology and electrical house wiring. Participants learned about solar system

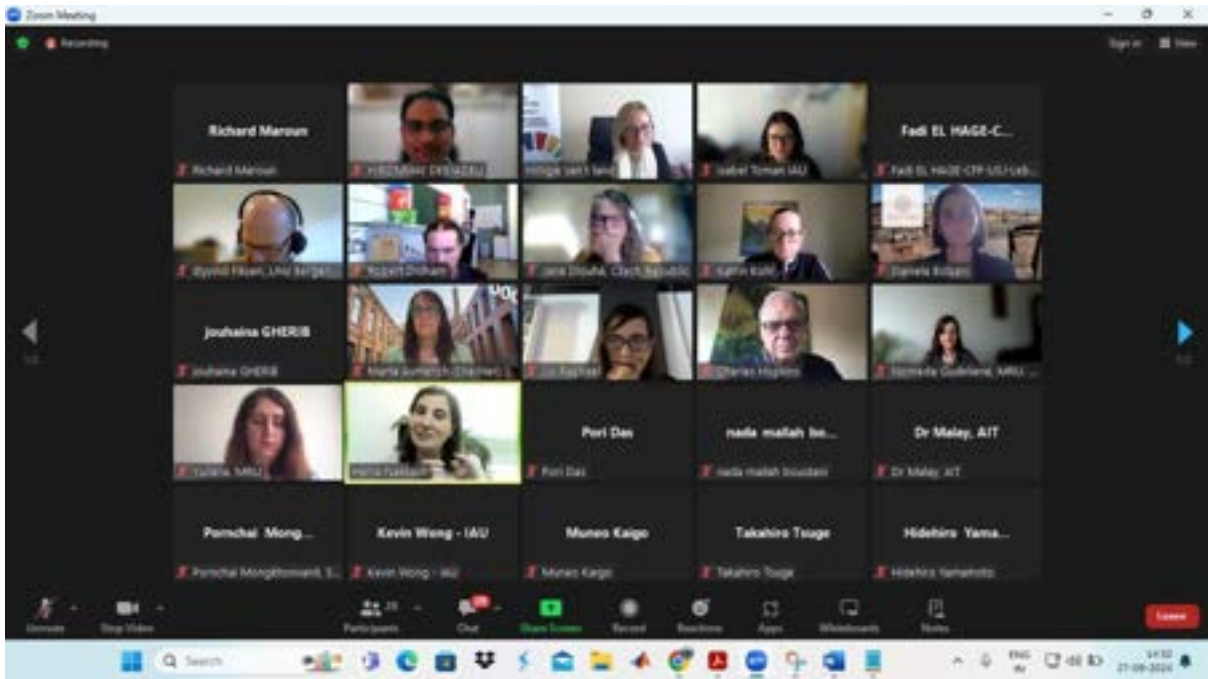
installation, maintenance, and electrical wiring, acquiring skills for self-employment. The program helped them gain practical knowledge in the renewable energy sector. By the end of the training, the participants were equipped to pursue opportunities in solar energy installation and maintenance. This initiative aimed to promote sustainable livelihoods in the community.



**SEPTEMBER 2024  
INTERNATIONAL ASSOCIATION OF UNIVERSITIES (IAU) GLOBAL HIGHER  
EDUCATION AND RESEARCH FOR SUSTAINABLE DEVELOPMENT (HESD)  
CLUSTER MEETING.**

The meeting commenced with a welcome and introduction by Jouhaina Gherib, former Rector of the University of Manouba, highlighting the 2024 SDSN Sustainable Development Report which indicates only 17% of SDGs are on track. Updates from Isabel Toman, IAU HESD Programme Officer, followed, detailing IAU’s ongoing global HESD survey, partnerships, and the Observer status initiative. Hilligje van’t Land, IAU Secretary General, encouraged the Cluster to engage with the Pact for the Future and contribute papers to the SDG Hub. The agenda proceeded with introductions from Cluster Leads, with significant updates from institutions like Assam Don Bosco University on SDG 7 initiatives, and York University on the role of education in sustainable development. Further updates included new member Saint Joseph University of Beirut’s environmental sustainability efforts, and upcoming events like the IAU 2024 International Conference in Japan. Discussions on the Whole Institution Approach (WIA) highlighted the importance of leadership, partnerships, and institutional culture in driving sustainability. The meeting closed with plans to revise the IAU Strategy and

Working Plan for 2024-2026, and the possibility of an in-person meeting during the UN High-Level Political Forum in 2025.



**OCTOBER 2024  
WORLD ANIMAL DAY**

The Department of Zoology, Assam Don Bosco University, in collaboration with the Eco Club, celebrated World Animal Day on 4th October 2024. The theme for this year was "The World is Their Home Too." A drama competition was organized, where five participating groups performed short skits highlighting the theme with creativity and impactful storytelling.



The competition was judged by Dr. Ranjita Chanda (Department of Education) and Dr. Pallabi Borah (Department of Chemistry), who provided valuable insights on drama presentation and

the importance of animal conservation. Prizes were awarded to the top two groups based on concept, script, and performance.

The event concluded with a prize distribution ceremony, where Prof. Prasanta Kumar Choudhury (Director, School of Life Sciences) and Dr. Jane Shangpliang (Head, Department of Zoology) felicitated the winners. The program, coordinated by Dr. Madhurima Das, was attended by 44 participants.

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#### **OCTOBER 2024**

#### **INTERNATIONAL CONFERENCE ICEESRE-2024: PIONEERING PROGRESS IN ENVIRONMENTAL AND ENERGY RESEARCH IN NORTH EAST INDIA.**

The International Conference on Emerging and Environment Sustaining Renewable Energy (ICEESRE-2024) held on October 24-25, 2024, at Assam Don Bosco University (ADBU) marked a significant milestone in the landscape of environmental and energy research in North East India. With ADBU recognized by the International Association of Universities (IAU) as a global cluster lead for Sustainable Development Goal 7 (SDG-7), the university's Department of Electrical and Electronics Engineering organized this prestigious event under the theme "Access to Affordable, Reliable, and Modern Energy Services for All". This collaborative venture, supported by India's Science and Engineering Research Board (SERB), saw five prestigious Taiwanese universities- Cheng Shiu University, National Quemoy University, National Chung Cheng University, Kung Shan University, and Fu Jen Catholic University - join hands with ADBU in advancing sustainable energy innovation.



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## PUBLICATIONS

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### JOURNALS:

- Sahu, H. S., Kumar, S., Changmai, P., & Nayak, S. K. (2024, January). Peak Power Extraction from a PV System for Various DC and AC Loads. In 2024 Third International Conference on Power, Control and Computing Technologies (ICPC2T) (pp. 259-264). IEEE.
- Bora, A., Changmai, P., & Maharana, M. (Eds.). (2024). Critical Approaches to Data Engineering Systems and Analysis. IGI Global.
- Rynjah, D., Browne, R. B., Gogoi, M., & Roy, J. D. (2024). Ethyl acetate fraction of *Rhododendron arboreum* as potential therapeutic against drug-resistant bacterial isolates through experimental and in silico approach. *Proceedings of the Indian National Science Academy*, 90(3), 786-798.
- Shangpliang, K., Lyngkhoi, M. K., Dharewa, R., Das, G., & Barman, J. K. (2024). Design and Development of IoT-Enabled Solar-Powered Waste Bin with Optimal Routing. *Transactions of the Indian National Academy of Engineering*, 1-16.
- Kharmawphlang, I. M., Deka, H., & Hussain, N. (2024). Unravelling the detoxification trail of potential toxic heavy metals: an insight into heavy metal auditing and ecological health upon valorisation by *Lampito mauritii* and *Eudrilus eugeniae*. *Environmental Science and Pollution Research*, 31(55), 64007-64022.

### BOOK CHAPTER:

- Raiyesha, S., & Changmai, P. (2024). Design and Economic Analysis of Grid-Connected PV System in Kamrup Polytechnic. In *Critical Approaches to Data Engineering Systems and Analysis* (pp. 115-142). IGI Global.
- Sabina, R., & Hussain, N. (2024). Mapping of emerging biotechnological advancement in textile and apparel: a sustainable approach towards circular economy and life cycle assessment. In *Dye Pollution from Textile Industry: Challenges and Opportunities for Sustainable Development* (pp. 351-404). Singapore: Springer Nature Singapore.
- Hussain, N., Chauhan, P., Panthi, N., & Sarma, S. (2025). Effect of nanoparticles on soil microbiome and plant symbiosis. In *Nanoparticles Synthesis by Soil Microbes* (pp. 215-252). Academic Press.

## PROJECTS



- **SKILL DEVELOPMENT PROJECT ON EMPLOYMENT OF BANANA STEM FOR PREPARING COASTERS.**

The Department of Biosciences at Assam Don Bosco University has initiated a skill development project focused on utilizing banana stem fibers to create coasters. This innovative project repurposes agricultural waste into practical and sustainable home décor products, aligning with the principles of a circular economy. By promoting the use of biodegradable materials, the initiative contributes to



environmental conservation. The project also opens avenues for future research to enhance the durability of these products and explore commercialization strategies. This initiative not only fosters sustainability but also provides an eco-friendly alternative in home décor.



- **PROJECT ON “GREEN WATER: HARNESSING THE POWER OF FLOATING PLANTS FOR WASTE WATER TREATMENT”**

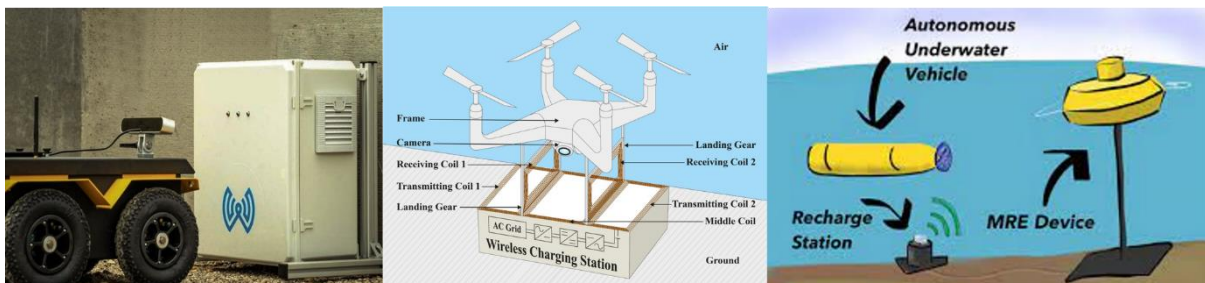
This project focused on the treatment effects brought about by floating plants which has emerged as a boon as it has been widely adopted for treating various kinds of polluted water including agricultural runoff, stormwater, industrial effluents, and other water borne pollutants. Moreover, it has proved beneficial as it can reduce the pollutants in the wastewater leading to a habitat in the aquatic environment as aquatic organisms can survive in the wastewater due to assistance of these plants. Two different plants i.e., Lucky Bamboo and Spider Plant were selected in conducting the project to compare the parameters between them. Parameters used in the study include Alkalinity, Chloride, Hardness and BOD which was conducted over a period of 2-3 months to check the required content of parameters the wastewater possess.

The objective of this study is to improve quality of wastewater by determination of the above parameters and remove nutrients. Moreover, it reduces the eutrophication level of the wastewater and prevents causes of harmful diseases such as cholera, diarrhea, dysentery. The use of these floating plants is one of the most effective ways because they improve the quality of wastewater as it reduces the level of pollution in the water body and makes it suitable for aquatic plants and animals to live in the environment.



• **“ONGOING RESEARCH STUDIES ON SMART RENEWABLE ENERGY SYSTEMS FOR DRONE INFRASTRUCTURE”**

The Department of Mechanical Engineering, School of Technology, Assam Don University in association with the University’s Research & Development Cell (RDC) initiated a fact-finding requirement to be pursued based on the current drone technology available and its ecosystem. The initial study revealed that the drone ecosystem in India and worldwide needs more basic infrastructure to maintain drone systems in all categories, such as land, sea, and air systems. Recently, the surge has witnessed technology upgrades in drone hardware with high computing features. However, there needs to be more focus on energy generation, utilization, and maintenance of drone equipment. Therefore, our study focuses on creating new concepts for bridging the gaps in energy generation, storage, and charging infrastructure. An array of technology sub-domains, such as artificial intelligence, electric propulsion, and Smart Energy storage using IoT and safety systems are being explored in this study.



**PROPOSED TECHNOLOGY**

- ✓ Docking Station with wireless charging station in drone ports, and the charging system will be powered by Methanol/Ethanol Based Fuel cell localised/standalone grid system.

- ✓ The charging device will also use an array of sensors to smartly monitor the health and charge maintenance of the battery system which comprises of a Lithium-Ion cell battery bank.
- ✓ Air vehicles, it would have the same energy system, however the difference would be in the docking mechanism and its rate of charging.
- ✓ The sea and underwater drones would require a complex system of magnetic coupling to ensure mobility across different sea states. The charging will occur through the magnetic coupling.
- ✓ The surface vehicles will have access to floating buoys with hybrid solar and wind energy systems for charging in the middle of the sea.
- ✓ In case of underwater vehicles, the charging will be carried out through the magnetic coupling system. The energy resource will be a floating piston mechanism which generates electricity based on the movement of the sea waves and stores the energy generated in the lithium-ion battery bank which is an additional part of the submerged structure in connection with the floating hybrid energy buoy.



- **A STUDY ON EFFICIENCY IMPROVEMENT OF SOLAR PV PANELS BY COATING USING NATURAL SUBSTANCES.**

A study was conducted on the efficiency improvement of solar PV panels by applying natural coatings, specifically aloe vera gel, to two solar panels. The results showed a slight improvement in the performance of the coated panels compared to the uncoated ones. This study suggests that using natural substances like aloe vera gel could provide a cost-effective and environmentally friendly method for enhancing solar panel efficiency and durability. Future research will focus on refining the coating techniques to achieve better results and further explore the potential of natural coatings in solar energy applications.





- **DESIGN AND DEVELOPMENT OF IOT-ENABLED SOLAR-POWERED WASTE BIN WITH OPTIMAL ROUTING.**

The "Design and Development of IoT-Enabled Solar-Powered Waste Bin with Optimal Routing" project, undertaken by the Department of Electrical and Electronics Engineering, School of Technology, Assam Don Bosco University, aims to revolutionize waste management. The system integrates solar energy with IoT technology to optimize waste collection routes, thereby improving efficiency and reducing energy consumption. The smart bins, equipped with sensors, monitor waste levels and trigger timely collection through optimal routing. This project contributes to sustainable waste management solutions while enhancing operational effectiveness.





- **GREEN WALL AIR-CONDITIONER WHICH USES A GREEN WALL WITH CLAY POTS**

The "Green Wall Air-Conditioner" project, carried out by the Department of Civil Engineering, School of Technology, Assam Don Bosco University, uses a green wall integrated with clay pots to naturally cool indoor spaces. The system leverages the cooling effect of plants and the evaporative properties of water in the clay pots. This innovative, eco-friendly solution helps reduce energy consumption while promoting sustainable cooling methods. It offers a natural and cost-effective alternative to traditional air conditioning systems.



## CONCLUSION & FUTURE GOALS

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### CONCLUSION

Assam Don Bosco University has made remarkable progress in advancing the UN Sustainable Development Goals (SDGs) through education, research, and community engagement in 2022-23. From promoting clean energy solutions and biodiversity conservation to fostering sustainable waste management and skill development, the University has strengthened its commitment to sustainability. These efforts have not only enhanced environmental awareness but have also empowered students and faculty to drive meaningful change. Moving forward, the University remains dedicated to continuous innovation and collaboration, ensuring a lasting impact on sustainability and a better future for all.

### FUTURE GOALS

Moving forward, the University aims to:

- Expanding Renewable Energy Initiatives – Increasing solar energy adoption and exploring innovative clean energy solutions.
- Enhancing Research on Climate Resilience – Promoting interdisciplinary studies on climate change mitigation and adaptation.
- Strengthening Waste Management & Circular Economy Practices – Advancing recycling programs and organic waste utilization to minimize environmental impact.
- Promoting Biodiversity Conservation – Establishing more eco-friendly initiatives to protect and restore local ecosystems.
- Empowering Communities through Sustainability Education – Expanding skill development programs and awareness campaigns on environmental sustainability.
- Encouraging Green Infrastructure Development – Implementing eco-friendly building designs, water conservation systems, and smart campus solutions.