SHIV NADAR
INSTITUTION OF EMINENCE DEEMED TO BE
UNIVERSITY
DELHI NCR

Report on Sustainable Development

GOAL 13

CLIMATE ACTION

IS HUMANITY'S "CODE RED" WARNING

The mission statement of sustainable development goal 13 is, 'Take urgent action to combat climate change and its impacts.' The word *urgent* in the message sums up all. With five targets and eight indicators, SDG 13 is considered one of the biggest stories of our times due to the rapidly changing climate-related impact. Hence, it would not be an exaggeration to say that climate action is the most critical action we can take for the sake of current and future generations.

At Shiv Nadar, we are firmly committed to the global framework of Sustainable Development Goals to determine our practices as an institution. These comprise teaching, collaborative research, partnerships, campus practices, including reducing carbon footprint, minimization of wastage, increasing use of alternative energy, water conservation, organic food practices, and many more.

The report highlights some key action areas at Shiv Nadar regarding climate action.

1 Teaching and Learning

The university offers several courses on climate and its impact at the local and global levels. Department of Sociology offers a course on the Anthropology of climate change (SOC305), which introduces students to the new but rich sub-discipline of the anthropology of climate change by questioning how humans have become the center of public debate and international policy precisely as it remains unclear what the future world affected by climate change holds. The Department of Civil Engineering offers a graduate course on Climate and Climate Change (CED660). Many compulsory courses are offered regularly to undergraduate students, such as Atmospheric Aerosols & Climate (CCC 405), Climate Change and Media (CCC 721), Climate Change and Conflict (CCC 719), Environmental Studies (CCC704), Introduction to Climate Change (CCC705), and Environmental Impact Assessment (CCC 406).

Campus as a Living Lab

The School of Management, as part of its three-credit course in Sustainable Business Strategy (STM205), has launched an initiative called *Campus as a Living Lab.* Here, students are challenged with a final project in which they work on sustainability initiatives for

Shiv Nadar campus using *Campus as a Living Lab*. These projects address several key topics in sustainability, such as air quality, solar power, electric vehicles, no plastic, sustainable transport, waste management for a circular economy, and many more. The entire exercise is not just a course in the curriculum but a way students think of *sustainability* as a living reality.

Ph.D. Scholar Work

Gideon Mathson, a Ph.D. scholar at the Department of Sociology is undertaking research exploring a disaster's economic, administrative, and psychic fallouts with reference to landscape deterioration. His study area includes large parts of the district of Rudraprayag, around the township of Ukhimath, 45km by road to Kedarnath. The place was drastically affected due to massive landslides triggered at an unprecedented scale following 2013, leaving noticeable deterioration in land stability in these regions.

The study is significant and particularly pivotal in the state's history since the aftermath of the disaster has witnessed a considerable increase in environmental deterioration. The study presents problems pointing to unformalized areas in climate change conversations, such as region-specific loss, damage compensation mechanisms, and administrative procedures for distributing compensatory amounts.

2 Research

Hazy Clouds: making black carbon visible in climate science

A faculty at the Department of Sociology has conducted exciting research around the *Indian Ocean Experiment*, a multimillion-dollar experiment in 1995, which discovered a dark mass of polluting air hovering above the Indian

Haze over India and the Bay of Bengal. NASA image by Jeff Schmaltz
Source: https://earthobservatory.nasa.gov/images/36158/haze-over-india-and-the-bay-of-bengal.

subcontinent. The mass of air was termed a cloud containing a high amount of black carbon, judged as the second most significant threat to climate change after carbon dioxide. In an attempt to trace the life of black carbon, the research has documented its changing forms since the experiment. The changing forms allow air movement – smoke from traditional cook stoves and vehicular diesel emissions in India lead to cloud formation. Thus, revealing how an ethnography of air can be undertaken.

Bhojvaid, Vasundhara. "Hazy clouds: Making black carbon visible in climate science." *Journal of Material Culture* 26, no. 2 (2021): 162-177.

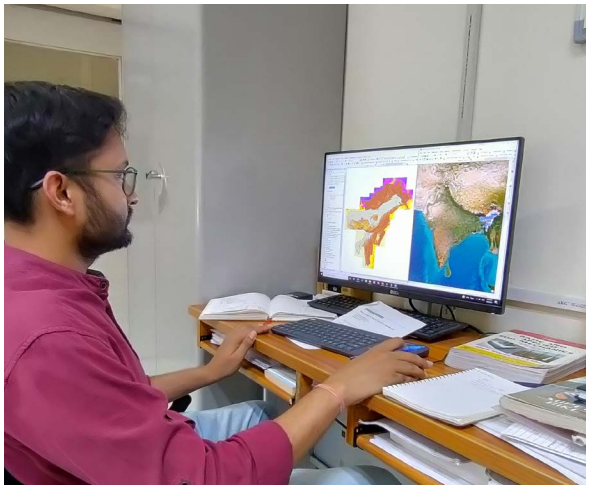
GIS-based landslide susceptibility mapping

Dr. Jagabandhu Dixit and Navdeep Agrawal, at the Disaster Management Laboratory, Department of Civil Engineering, are conducting significant research. Their recent work is on landslides, a common geological hazard causing impairment of public works and loss of lives worldwide and in India, especially in the Himalayan region. This study aims to map the landslide susceptibility for the Shillong Plateau region of India using different machine learning algorithms and provide insights into influential factors, focusing on disaster risk reduction. The landslide susceptibility maps (LSM) have revealed that the south-southeastern portion of Meghalaya, mainly slopes along the southern escarpment, are more susceptible to landslides. The generated LSMs will assist decision-makers and planners in identifying high-risk areas, prioritizing mitigation measures, and guiding regional development.

Agrawal, Navdeep, and Jagabandhu Dixit. "GIS-based landslide susceptibility mapping of the Meghalaya-Shillong Plateau region using machine learning algorithms." *Bulletin of Engineering Geology and the Environment* 82, no. 5 (2023): 170.

Autonomous Paddy Stubble Reaper with Baler

Dr. Ankit Gupta, at the Department of Mechanical Engineering, collaborated with his team to create an Integrated Autonomous Paddy Stubble Reaper with Baler to offer a practical solution to the traditional problem of stubble burning. This is one of the inherent causes of air pollution in North India during the



The Disaster Management Laboratory housed at the Department of Civil Engineering

Paddy stubble reapear

winter months. The mission behind this invention is to have a low-cost alternative to stubble burning that not only helps farmers in clearing the crop residue but also provides additional income generated from crop bio-waste.

This research has produced the world's first fully electric and autonomous agricultural machine with a unique design and mechanisms that cut the crop residue from the desired minimum offset from ground level and compress it into tightly packed cylindrical bundles. The innovative compressing mechanism addresses several mechanical problems with the existing machines and the electric feature reducing the operation cost and minimizing labor to none to operate the machine. Given its feasibility to tackle (and resolve) an ancient menace, the innovation got traction and was received favorably by all stakeholders.

Disaster Management Laboratory

The Department of Civil Engineering houses a Disaster Management Lab dedicated to developing innovative approaches and utilizing advanced computational technologies to revolutionize societal resilience to natural hazards. The research projects focus on fundamental and applied aspects of natural hazards and disaster risk reduction. They focus on GIS-based spatiotemporal multi-hazard risk assessment, mapping, sustainable infrastructure development, and their role in decision-making.

3 University Operations

At the microcosm of Shiv Nadar, we are committed to contributing to the overall socio-environmental sustainability by embarking on a journey to make it a *Carbon Neutral Campus*. We have taken multiple initiatives as part of the structured sustainability framework with specific targets and timelines.

Having achieved EHS certification, the university has a policy that promotes environment-friendly & low-emission practices in water, energy, waste, habitat protection, etc. One such method is assessing the carbon footprint of its activities and undertaking initiatives to reduce the carbon footprint and aim to become carbon-neutral campus.

We have been awarded ISO 14001:2015 and ISO 45001:2018 accreditation[1] without any non-conformance or observation. In 2022, along with carbon footprinting, we also carried out carbon sequestration of the green areas of the campus and found out that 17 per cent of the carbon dioxide gets nullified due to plantation and horticulture practices on campus.

[1]ISO 14001 is an internationally agreed standard that sets out the requirements for an environmental management system. It helps organizations improve their environmental performance through more efficient use of resources and reduction of waste, gaining a competitive advantage and the trust of stakeholders

Other campus-wide initiatives

Energy-efficient appliances

- Solar water heaters and a solar power plant of a capacity of 430kwp is installed to transition from complete captive power generation to solar power
- Battery-operated urinal sensors converted to electrical-operated sensors
- Motion sensors installed in toilets in academic and hostel blocks
- Pressurized Natural Gas instead of LPG (liquid petroleum gas) installed for the campus-wide cooking facilities

Switch to a low-carbon energy provider

Carbon footprinting initiatives are a sustained effort toward becoming a carbon-neutral campus.

- University buildings are IGBC and LEED certified, and measures are taken to increase energy efficiency by installing solar panels and energy-efficient lighting
- Review, analysis, and refurbishment of laboratories for the safety of operations and environmental conservation

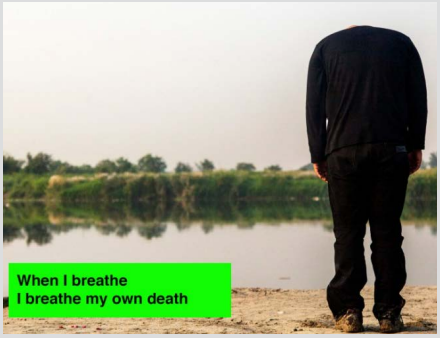
Travel less and wisely

- Students and most of our faculty stay on campus. A well-planned transport system is in place for those who travel to work and for weekly needs
- Within the campus, students and staff use bicycles to commute
- We are committed to transitioning 50% car fleet to electric vehicles. The University currently has 60% CNG, 30% petrol, and 10% diesel cars

4 Partnerships

Mapping climate change through Art

Prof. Atul Bhalla, at the Department of Art, Media, and Performance, has undertaken an initiative titled 'False Clouds and Real Deluges' to collect photographs, videos, and sound footage of weather's history from locations along the 28N Parallel to compile a one-of-its-kind art initiative. This is an interesting collaborative project between artists, writers, and researchers. Commissioned by Khoj International Artists' Association, the project is supported by the British Council's creative commissions for climate action, a global program exploring climate change through art, science, and digital technology. As part of the initiative, participants will undertake walks and treks in areas adjacent to the 28th North Parallel (through Mount Everest, the North Indian Himalayas, Rajasthan, and the Sindh Desert in Pakistan) and share 'weather reports' for one year starting June 21, 2022. These will be shared as observations, stories, images, and imaginings about the changing weather and climate for Khoj's weather station as part of the World Weather Network - a global alliance of 28 art agencies formed in response to the climate crisis and biodiversity loss.



Picture credit: Prof. Atul Bhalla

Improving solar thermal systems

In collaboration with the La Foundation Dassault Systems', Dr. Ankit Gupta, Assistant Professor at the Department of Mechanical Engineering, is working on a significant project to revamp the efficiency of solar thermal systems using advanced composites. The project aims to develop solar thermal system with improved PV panel efficiency and a self-cleaning mechanism. Such systems have several applications in the defense sector.

Celebrating World Environment Day 2022

The University invited Mash Foundation to our Young Thinkers' Forum Summer School Programme on World Environment Day. Mash Foundation held various workshops such as measuring your own carbon footprints making the best out of waste from cans, bottles, and everything that was consumed during their stay on campus. Many creative ideas and solutions were created and discussed related to every sustainable development goal SDG. This was followed by watching and discussing a documentary film about pollution in the sea that impacts coral reefs in our seas and oceans.

Celebrating World Environment Day 2022

Partnering with schools for The Young Environmentalist programme July 2022

The Young Environmentalist program was conducted from July 1-3, 2022. The audience included 20 students from grades 6-11. The students stayed on campus and had three enriching days to learn about biodiversity and sustainability for a healthy environment. They learned how to grow their own microgreens using only a few seeds, a container, and a small amount of water. To make their own eco-bricks and DIY rakhis out of seed paper, which helped them understand the importance of not throwing plastic rappers in the trash and instead re-use them to make beautiful table settings. The students planted trees on the campus, reconfirming their commitment to afforestation and protecting the environment. The three days ended with student presentations on the theme of sustainability and their learning of three days.

The Young Environmentalist programme

Start-ups in climate ecosystems

The University supports start-up ideas through the Atal Incubation Center (AIC) to encourage and create an active entrepreneurship culture. AIC is set up on a 10,000 sq. ft space at the University with the support of the Atal Innovation Mission, NITI Aayog, Government of India. The University and the Government provide 50% of the core funding to a start-up selected through a rigorous process and mentoring through University leadership and professors.

Some examples such as,

Recyclink Pvt Ltd created a fintech application for consumers that provides a comprehensive view of their environmental footprint based on financial transactions. It allows them to offset emissions and curate investment opportunities in the Indian Climate Ecosystem

FarmOn Agristack Pvt. Ltd. is a revolutionary initiative that works towards automating the farm by leveraging smart technologies to make it more profitable, for example, provide alternative energy solution to farmers for stubble burning.

Shiv Nadar Institution of Eminence is fully committed to the UN Sustainable Development Goals (SDGs). We have embraced a four-pronged strategy for SDGs through **teaching, research, our core institutional practices, and partnerships.**

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