

**Report on**  
**Sustainable  
Development**

**GOAL 6**



**CLEAN WATER  
AND SANITATION**

Ensure availability and sustainable management of water and sanitation for all



According to a UN report, 'Access to safe water, sanitation and hygiene is the most basic human need for health and well-being. Billions of people will lack access to these basic services in 2030 unless progress quadruples<sup>1</sup>. **SDG Goal 6** has outlined six targets within which it explicitly addresses what needs to be done to achieve the goal by 2030. According to the UN Water for Life Decade, 'Achieving these targets would save 829,000 people annually, who die from diseases directly attributable to unsafe water, inadequate sanitation, and poor hygiene practices.'<sup>2</sup>

At the Shiv Nadar IoE, we have embraced a four-pronged strategy for meeting the water challenge through teaching, research, our core institutional practices, and water partnerships. In what follows, we describe these four aspects of our work.

## 1 Teaching and Learning

### The M.Sc. program in Water Science and Policy

Launched in 2018, we offer a unique multidisciplinary program in Water Science and Policy. Led

by [Dr. Mihir Shah, Distinguished Professor Shiv Nadar University and the Chairperson of the National Water Commission of India](#), this program addresses the critical gap identified and acknowledged by the Government of India for a cadre of 21st-century water professionals.

Supported by Canada's International Development Research Centre (IDRC), this pedagogically innovative program attempts to understand the issue of water from many perspectives, such as local institutions, knowledge systems, and historical, social, and cultural institutional practices. The program has successfully graduated 25 full-time M.Sc. students and 77 students in a one-month certificate program over three years (despite the

disadvantage posed by the pandemic period). Some of these certificate students were technical officers nominated by government agencies, while some were from small non-profit organizations from different parts of the country.

Below are some student experiences, which they have shared to elaborate on what it meant to be a part of the program on Water Science and Policy.



- [Laxmi Sharma](#)
- [Sahil Mathew](#)
- [Nidhi Sehrawat](#)
- [Anirudh Kishore](#)

We are soon launching two new masters' degree programs with water as a core element of the curriculum.



<sup>1</sup><https://www.un.org/sustainabledevelopment/water-and-sanitation/>

<sup>2</sup><https://www.un.org/waterforlifedecade/>

## 2 Research

### Transcending disciplinary boundaries

Research related to water at Shiv Nadar takes place across multiple fields. Here we mention two lines of scholarly work on the topic.

The first is a body of work that developed in relation to our Water Science and Policy program. The approach was distinctly multidisciplinary and connected to human relations with water systems. Dr. A. Dandekar, a historian, and Dr. S. Bhattacharya, a mathematician, jointly undertook a project entitled **'Complexity, Water, Pastoralism and Adaptation: Arid Regions Study of Ramgarh Area in the Thar Region.'** Drawing on mathematics, history, sociology, and ecology, it explores the evolutionary behaviour of pastoral nomadism in the South Asian context, specifically as it sustains today in Indian Thar Desert region.

The second is the work of our **hydraulics and water engineering** researchers in the School of Engineering. This involves areas such as irrigation hydrology, evapotranspiration, emerging technologies in agriculture, disaster management, risk mitigation, and others.

For example, [the Agricultural Water Management field laboratory](#) has



**Core areas of research: Hydraulics structure, River engineering, Use of emerging techniques in agriculture water management**

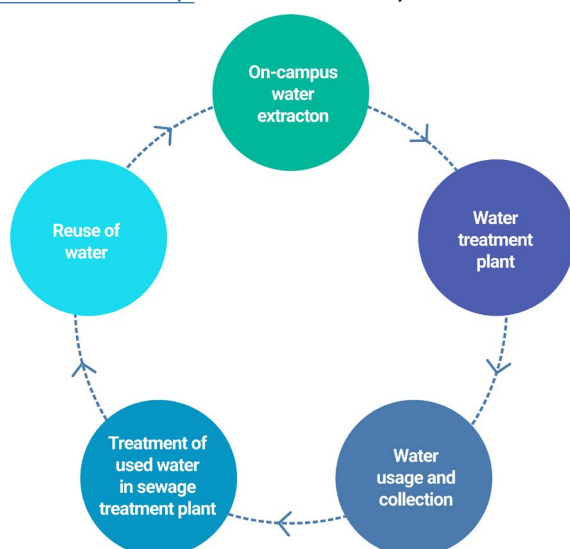
been established by the department of Civil Engineering to address critical issues in agricultural water management and the food and water security nexus. The Ministry of Water Resources and the Ministry of Agriculture & Farmers' Welfare, Government of India, have marked these research areas as of national importance. These areas are also aligned with the focus of the government's national missions on *more crop per drop* (increasing water use efficiency), *har khet ko pani* (increasing the cultivated area under irrigation), and Goal 4 (Improving water use efficiency by 20%) and Goal 5 (promotion of basin level integrated water resources management) of the National Water Mission.

The Government of India and the university co-funded the lab to serve as a state-of-the-art research facility in water management. It has



an extensive crop experimentation facility equipped with a drip irrigation system and research equipment facility for monitoring crop and soil parameters. Currently, four doctoral students and four undergraduate researchers are conducting their research at this lab. The research group has interacted with local farmers to provide knowledge regarding different irrigation methodologies and the benefits with respect to saving water. Work is being undertaken towards developing a farmer lab for soil and irrigation water testing, and dissemination of weather data for use by local farmers.

Also funded by the Government of India, the lead faculty is developing AI-based decision-support systems for improved crop water use efficiency under a regulated deficit drip irrigation regime in the backdrop of climate change. This project will provide water-saving solutions for the two widely grown and consumed crops, rice and wheat.



Components of water use and reuse on campus



discovery in 2018, a faculty isolated the bacterial strains *Exiguobacterium sibiricum* strain DR11 and *Exiguobacterium undae* strain DR14 that can degrade plastic, especially polystyrene. These bacteria have great potential in arsenic removal from wastewater and biodegradation of polystyrene from waste. All efforts are being taken to preserve the lake and its natural ecosystem. During summers, the lake is supported by external water to maintain life underwater, and the water is conserved and rejuvenated through rainwater harvesting. Signages are displayed near the natural and artificial lake, restricting any act which might contaminate the water bodies. The deployed security team also maintains strict vigil to ensure no one pollutes the water bodies by throwing any garbage, entering the water body, or disposing of any chemicals in these lakes.

### 3 University Operations

#### Reinforcing daily our commitment to water

##### Highlights

- We have extensive process for [on-campus water extraction](#); compliance is ensured with the daily extraction limit provided by Central Ground Water Authority (CGWA)
- Water is collected through rainwater harvesting infrastructure installed on campus
- We undertake [extensive documentation system on water usage and reuse](#)
- Water is reused for horticulture purposes through tanks and pipes for irrigation; measurement of reused water is done by recording the number of tanks sent for horticulture purpose and the amount of water sent through pipes
- [Water-conscious planting](#) has resulted in green campus and reduced irrigation requirements. The campus is home to many drought-tolerant plants such as *Acacia auriculiformis* A.Cunn.ex Benth., *Albizia lebbek* (L.) Benth., *Casuarina equisetifolia* L.
- [Majority of university buildings are certified](#) by agencies such as the Indian Green Business Council (IGBC) or Leadership in Energy and

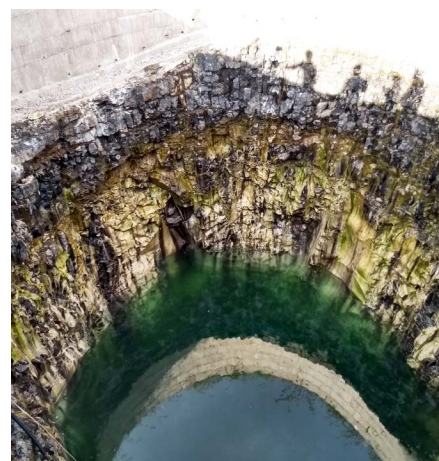
Environmental Design (LEED). IGBC has extensive requirements for water conservation. Two mandatory requirements are rainwater harvesting (roof or non-roof) and water-efficient plumbing. The university meets both these requirements and has obtained IGBC Gold certification. LEED is a holistic system of rating wherein 15% of the credits impact water resources, which the university meets

- [The university is committed to maintaining the rich biodiversity](#) on its campus, including the campus lake. The lake's revival has allowed many fish and aquatic plants to thrive. It is home to many species of birds, which are endangered, near threatened, or vulnerable in the International Union for Conservation of Nature (IUCN) category. In an exciting

- The University regularly holds [sessions](#) with its local support staff in an effort that they can take knowledge and training back to their homes and community. These include workers on campus, farmers from local villages and towns who work on campus. Sessions are held in local Hindi language and include themes like water efficiency, sustainable water management, irrigation, energy efficiency, agricultural practices etc.



Session on October 21, 2022, for our contractual staff



## 4 Partnerships

Shiv Nadar IoE firmly believes that partnerships are key to advancing a cause as critical as this. We have developed deep relationship with many organizations to make this a movement with impact and velocity. For example, our [Water Science and Policy program](#) was supported by the [Government of India, an international body \(the International Development Research Center\), and many NGOs and civil society actors](#). The program had a mandatory training on the field for a semester, so it became an excellent opportunity for students to learn and receive training amidst the local communities and cultures, guided by our partner NGOs, such as:

- [Development Support Center \(DSC\)](#) – Based in Ahmedabad, it provides knowledge-based

support to institutions involved in promoting sustainable livelihood and participatory natural resource management.

- [Gram Vikas](#) – An NGO based in Odisha, works to enable rural communities to lead dignified lives. This is done by building the capabilities of village communities, strengthening community institutions, and mobilizing resources.

The students of Water Science and Policy program produced [water bulletins](#) with the latest news from India and abroad on debates, concerns, and events related to water.

- [Samaj Pragati Sahayog \(SPS\)](#) – One of India's largest grass-roots initiatives working towards women empowerment, water and livelihood security. Its works along with its partners on million acres of land across 72 of India's most backward districts, mainly in the central Indian Adivasi belt.
- [Advanced Center for Water Resources Development and Management \(ACWADAM\)](#) – A not-for-profit organization, aims to establish groundwater management agenda in India with a mission to demystify ground water science and strengthen hydrogeological capacity of institutions working in water sector in India.

A second example of our partnership approach was our participation in [UNLEASH 2022](#), a global SDG platform that was convened in Mysuru, India. It brought together over 1200 participants worldwide to participate in a global hackathon on the thematic area **Source to Sink**. As part of this collaboration, the Shiv Nadar IoE hosted the first-ever campus hackathon in India, bringing together participants from several partner organizations.



Water Science and Policy program students in field

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.**

**SHIV NADAR**

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