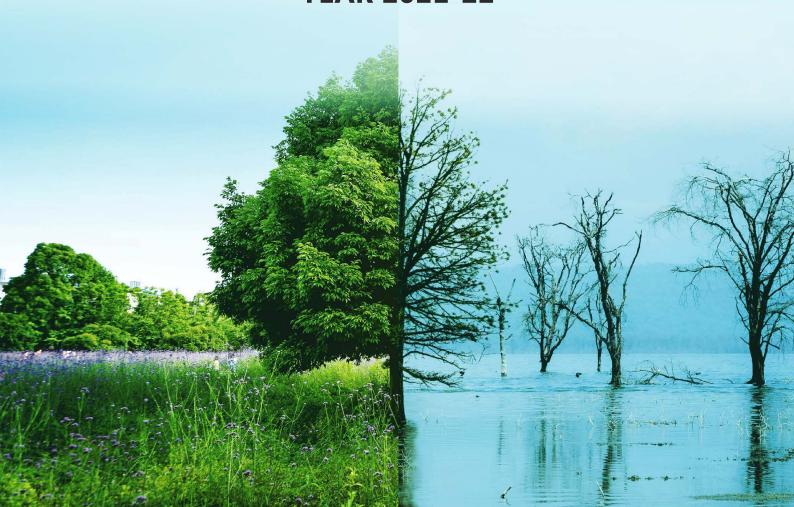




# REPORT ON **SUSTAINABLE DEVELOPMENT GOAL**



**YEAR 2021-22** 



#### I. PREAMBLE

To address challenges of environment and development, UN adopted 'Agenda 2030' to ensure Sustainable Development Goals (SDGs) in line of "quadruple helix model". It entails linkages between government, academia, society, and business. An approach has been devised to develop academic institutions and new universities as living laboratories for sustainability. Amity University Haryana is finest example of such new university which is developing as living laboratory of sustainability by adopting a multipronged approach including Nature Just Development, Green Building, Renewable Energy consumption, sustainability education, 3Rs approach of consumption and many more.

Amity University Haryana is strongly committed to the goal of environmental sustainability and playing an impactful role to ensure compliance in terms of SDGs. The quality and scale of Amity University Haryana's efforts to transform it into a sustainable campus have been duly recognized as India's first University and Asia's 2nd to earn LEED Platinum Certificate from US Green Building Council and among top 200 global campuses in previous Impact Ranking. The University is meaningfully contributing to SDG – 13 i.e., Climate Action, through the following important measures and frameworks:

- Nature Just Development plan of the University to make it a Green Campus
- Low Carbon energy transformation

- Incorporating Environmental and Sustainability components in imparting education
- Integrating climate change measures into university policies, strategies, and planning
- Collaborative education and research to address environmental and climate change impacts, adaptation, impact reduction, and mitigation.
- Promoting environmental consciousness and practices through various outreach programs to the local and regional communities, thus benefiting the society and nation

#### **II. TEACHING & LEARNINGS**

## **Environmental and sustainability education**

SDG13-Climate Action; is a critical goal among other goals as it is networked with many of them. Amity University Haryana is very much impactful to integrate the climate action perspective into its academic programs, research, and extension activities. University has a nodal institute i.e. Amity School of Earth and Environmental Science that design, formulate and implement academic programs, course work, and campus-based projects in the area of Environment and sustainability along with other institutes notably the Department of Renewable Energy, Architecture & Planning, Business School, A core course of 'Environmental Studies' for all UG programs provides a basic understanding of environment and sustainability including the 'climate change and SDGs component' in their very first year, while minor degree programs like environmental management, Climate Science, Renewable Energy provide scope for more specialization, while training in the area of green building (LEED Lab; prestigious capacity building program in collaboration with USGBC and GBCI) and renewable energy (Suryamitra; Skilling programme in solar energy fabrication for rural youth funded by Government of India) further skill up students for green jobs in the sustainability sector. Several campus-based

study engagements like Social Awareness Programme (SAP), Biodiversity Survey, Plantation, and cleaning drives give SDGs mandate and compliance across students.

Recently in collaboration with Presidio Graduate School university offers MBA in Sustainability Management; a unique program in the Indian education landscape with the aim to mainstream sustainability education in professional programs. As per programme and course outcome mapping, all programs and their course work has been mapped with current requirement where environment and sustainability are also the parameters.

Programes	School/Institute
M.Tech (Solar & Alternate Energy)	Amity School of Applied Sciences
M.Sc. (Renewable Energy)	, and senses or rippined selences
B.Sc. (Hons) - Earth Sciences	Amity School of Earth and
M.Sc Environmental Sciences & Management	Environmental Sciences
B.Tech (Civil Engineering)	Amity School of Engineering
M.Tech (Civil Engineering)	and Technology
Bachelor of Architecture #	
Bachelor of Planning	Amity School of Architecture and Planning
Master of Planning (Urban and Regional)	

#### III. RESEARCH CONTRIBUTION

#### **Environmental Quality Monitoring**

Emission: University has robust networking with government and national and international research agencies and developed robust monitoring facilities for environmental parameters including Air Quality along with Green House Gases (GHGs) through 24\*7 online Air Pollution monitoring and display (SAFAR; Government of India SAFAR program) and Optical based monitoring of Aerosols & other parameters (i.e. AeroNet; NASA, USA Network) to understand climate-related issues. The data set generated through continuous monitoring is shared with these agencies where Amity University Haryana is demarcated as field network stations spread across India for SAFAR in India and the globe for NASA Aeronet.

Ecological: Apart from GHGs and Air quality monitoring, the university also conducts monitoring of the ecological health of the landscape where the university is located. University's Physical landscape is developing into an ecologically healthy system, which is more climate adaptive. Extensive plantation of notable native vegetation (Sahtut, Kikad, Lasoda, Neem, Ficus, Amaltash, Chakresia, Tikoma, Pipal along with fruit and nut bearing trees) ensure biodiversity intact and ensure critical ecosystem services including groundwater recharge. Scope of natural vegetation and native species plantation along with nature just development harbours 146 types of bird species and 40 butterfly species. In collaboration with BNHS and ebird; a global citizen science program of bird, regular monitoring is in practice.

#### a. Few of the high impact publications in alignment with SDG 13 are:

Name of Author	Title of the paper Title of Journal		Year	IF
Ghosh S., Yadav S., Devi A., Thomas T.	Techno-economic understanding of Indian energy-storage market: A perspective on green materials-based supercapacitor technologies	Renewable and Sustainable Energy Reviews	2022	14.982
Prof. Atul Thakur, Prof. Preeti Thakur	Visible light assisted photocatalytic degradation of methylene blue dye using Ni doped Co-Zn nanoferrites	Advances in Nano Research	2022	11.43

#### b. Funded Projects with alignment to SDG 13

**Project Title: "Nanotechnology for Healthcare and Environment - Exploring New Horizons"** 

PI: Prof. AK Yadav (ASAS Dept.) Funding Agency: FIST-2018 Sanctioned Amount: 8400000



Project Title: "A nanobionic approach for enhancement of plant photosynthesis and growth by augmenting chloroplast mediated photon absorption"

PI: Dr. Sumistha Das & Dr. Nitai Debnath Funding Agency: DST-Nanomission Sanctioned Amount: 4550000





Project Title: "Fabrication of Realtime in planta biosensors for presymptomatic detection of heavy metal toxicity"

PI : Dr. Ranjita Ghosh & Dr. Kaustav Bandyopadhyay

Funding Agency: DBT,

Sanctioned Amount: 6500000 (Proposed)





### c. Copyrights that comply with SDSG 13

Diary No	Title	Name	Filing date
7029/2022-CO/A	Foldable furniture	Pallavi Sharma, Naveena K, Amity School of Architecture and Planning, AUH	1-Apr-22
16462/2022-CO/L	Design prototype for automated segregation of inorganic solid waste components	Dr. Naveen BP, Mohammed Yassen, Department of Civil Engineering, AUH, Manesar Campus	2-Aug-22

#### d. Publications in alignment with SDG 13

- 1. Punia P, Bharti MK, Dhar R, Thakur P, Thakur A. Recent Advances in Detection and Removal of Heavy Metals from Contaminated Water. ChemBioEng Rev 2022;9(4):351-369.
- 2. Ghosh S, Yadav S, Devi A, Thomas T. Techno-economic understanding of Indian energy-storage market: A perspective on green materials-based supercapacitor technologies. Renewable Sustainable Energy Rev 2022;161.
- 3. Naveen BP, Fard MK. Estimation of Methane Emission and Electricity Generation Potential from Mavallipura Landfill Site, India. Iran J Sci Tech Trans Civ Eng 2022;46(3):2531-2541.
- 4. Maheshwari N, Thakur IS, Srivastava S. Role of carbon-dioxide sequestering bacteria for clean air environment and prospective production of biomaterials: a sustainable approach. Environ Sci Pollut Res 2022;29(26):38950-38971.
- Yadav R, Chundawat TS, Surolia PK, Vaya D. Photocatalytic degradation of textile dyes using β-CD-CuO/ZnO nanocomposite. J Phys Chem Solids 2022;165.

- Kotnala RK, Das R, Shah J, Sharma S, Sharma C, Sharma PB. Red mud industrial waste translated into green electricity production by innovating an ingenious process based on Hydroelectric Cell. J Environ Chem Eng 2022;10(2).
- 7. Kumar N, Koul R, Singh RC. Comparative analysis of ternary blends of renewable Diesel, diesel and ethanol with diesel. Sustainable Energy Technol Assess 2022;50.
- 8. Bhatia S, Al-Harrasi A, Behl T, Anwer MK, Ahmed MM, Mittal V, et al. Unravelling the photoprotective effects of freshwater alga Nostoc commune Vaucher ex Bornet et Flahault against ultraviolet radiations. Environ Sci Pollut Res 2022;29(10):14380-14392.
- 9. Srivastava A, Srivastava AK, Singh A, Singh P, Verma S, Vats M, et al. Biopolymers as renewable polymeric materials for sustainable development an overview. Polim 2022;67(5):185-196.
- 10. Thakur A, Punia P, Dhar R, Aggarwal RK, Thakur P. Separation of cadmium and chromium heavy metals from industrial wastewater by using Ni-Zn nanoferrites. Adv Nano Res 2022;12(5):457-465.

## e. List of PhD recipients whose theses are in alignment with SDG 13

Degree Sl. No.	Name of Scholar	Enrolment No	Programme	Date of issue of Notificatio n	Thesis Title	Year of Comple tion
Ph.D / 0075	Manoj Kumar Mishra	A50030316010	Doctor of Philosophy (Management)	05.01.2021	Developing Innovation Maturity Model for Automotive Component Sector in India	2021
Ph.D / 0077	Sonal Dahiya	A50136414007	Doctor of Philosophy (Engineering)	02.02.2021	A Petri Net Based Approach for Modeling and Simulation of Energy Consumption in Wireless Sensor Networks	2021
Ph.D / 0078	Veeranna Channashettar	A51661014005	Doctor of Philosophy (Environmental Sciences)	24.02.2021	Isolation and characterization of biosurfactant producing bacteria for remediation of petroleum hydrocarbon	2021
Ph.D / 0088	Kudzanayi Chiteka	A50111541600 7	Doctor of Philosophy (Engineering)	25.03.2021	Installation and Cleaning Cycle Optimisation for Fouling Mitigation in Non-Tracking Commercial Solar PV Plants	2021
Ph.D / 0100	Yashpal Singh Sindhu	A50815216001	Doctor of Philosophy (Law)	05.08.2021	Effect of Corporate Social Responsibility on Human Rights of Stakeholders and Sustainability of Corporates in India	2021

#### IV. UNIVERSITY INFRASTRUCTURE

## Amity University Haryana: A Green Campus

Amity University Haryana is in lap of Aravalli range; adopted a 'nature just' development approach without destroying its natural terrain, native vegetation, and natural drainage that ensure maximum groundwater recharge. Within a decade of its formation, the AUH campus is converted into the green hub in this semi-arid region. Amity University Haryana campus is developed in line with natural just development by integrating plans of green building design and regional building codes to minimize consumption and emission scenario.

Based upon innovation in design (passive and active building plan including innovative regional aspects like large sunken courts to minimize heat regime in summer and winter), location & transport (Landscape is developed as per natural gradient and drainage as well as provision of mass transport), water efficiency (Rainwater harvesting & recharge through natural drainage, complete water treatment and reuse in grey water, water recharge and irrigation) energy & atmosphere (Phase wise transition from gird based energy to in-house solar energy plants and efficient LED-based lighting system), material & resources, Amity University Haryana building is accredited with LEED Platinum (highest rating for green building); 1st university building in India and 2nd only in Asia in operation and maintenance category having many passive features that minimize heat regime, reduce energy consumption and efficient utilization of water. University maintains efficient waste management system along with natural vegetation to provide buffer to carbon emission to reduce overall environmental footprint of university operations.

#### V. GOVERNANCE AND MANDATES

#### **Low Carbon energy transformation**

Reduction in university carbon footprint is prime action point for climate action. Amity University Haryana is committed to drive low carbon scenario in all its operations including academic delivery, administration, and maintenance through rationalizing direct and indirect emissions. To ensure low carbon transformation university is mandated by a holistic 'Environmental and Sustainability Policy', to ensure carbon neutrality in phase wise manner. The target is set to achieve carbon neutrality which includes direct emission, indirect emission through purchased energy as well a few items from indirect sources in a phase-wise manner by 2028.

Direct energy consumption through grid electricity is a major portion of energy use, which is under substitution with solar PV and at present 17% of energy is procured through in-house solar PV plants, which is substantial addition in comparison to last year when solar energy contribution was around one-tenth to total energy need of the campus. In-house solar energy systems of 500 kWp of solar rooftop on academic

blocks and a ground solar PV plant, were installed and maintained by CleanMax Solar company under 'OpenX model' commonly known as 'pay as you go' model, which operates with zero breakdowns and generates Solar energy round the year. All the buildings have multiple windows and glass façades increasing the usage of natural light. 51.1 % of lights are LED thus reducing energy consumption in buildings. Over a period of 5 years, it is planned to replace all the lights with LED. To reduce air conditioning energy load during peak seasons, all buildings are provided with sunken areas, which reduces the heat maxima substantially during summer as well as in winter.

At present Amity University Haryana substitutes its more than 10% of its energy consumption by low carbon energy mainly from solar PV installed at rooftop and ground plats. University also strives to valorise its biowaste including kitchen and dairy waste into green energy. At present a pilot scale biogas plant is operational for demonstration purpose with vision to utilize its full potential as per renewable energy policy.

Indirect carbon neutrality (Partial scope III) is also in the agenda and the university works on paperless mode for all possible operations including day to communication, HR management (including leave) through in-house and external Enterprise Resource Planning (ERP) platforms like Amizone and TCSiON. University encourages the use of public transport/university buses and car pool for daily commuting of day scholars, faculty, and staff.

#### Policy support and climate action

Through the Environmental and Sustainability Policy and Climate Action Plan Amity University Haryana is committed to ensuring Campus Carbon Neutrality by 2028 through a series of action points including the reduction of grid energy dependence by switching to Solar PV. The policy covers major areas of climate action and adaptation and provides an opportunity for the inclusion of appropriate aspects which help to achieve carbon neutrality by 2028. The university's Carbon Neutrality goal covers scope 1 and scope 2 completely while scope 3 partially. Scope 3 covers partial as per the ranking framework which includes direct emissions, indirect emissions from purchased electricity (which happens to be a major source of carbon emissions), and a few indirect emissions including travel, waste and water management, and material procurements. University is functioning in compliance with the Environmental and Sustainability Policy having clear guidelines of the climate action working plan, which addresses local (i.e. rainwater harvesting plan to reduce water footprint), regional (i.e. passive building design to overcome heat regime in the semi-arid region) and global (i.e. shifting to low carbon-based energy sources to reduce the carbon footprint of campus) climate concerns.

University is performing better in terms of wastewater treatment (in-house wastewater and sewage treatment, WTP, and STP), solar energy installation, rainwater harvesting, waste management, material procurement

(paperless office and e-governance), transport (community transport for faculty and students). University operates in compliance with the Environmental and Sustainability Policy having clear guidelines of climate action working plan (Evidence 1), which addresses local (i.e. rainwater harvesting plan to reduce water footprint), regional (i.e. passive building design to overcome heat regime in semi-arid region) and global (i.e. shifting to low carbonbased energy sources to reduce carbon foot print of campus) climate concerns. AUH execution of sustainability action plan is dually reflected in university green building ranking (LEED Lab Platinum), NAAC 'A' grade accreditation.

#### VI.EVENTS AND SOCIAL OUTREACH

#### **Capacity building and Skilling**

University conducts LEED Lab program for in-house students in area of green Building design and framework in collaboration with USGBC and GBCI for students of Architecture, Planning, Engineering, and Environmental Science.

Amity University Haryana conducts Suryamitra Skill Development Program, funded by the Ministry of New and Renewable Energy for local community students who have completed ITI or a diploma in electrical, electronic, or related fields to create skilled manpower required for the government's ambitious NDC in solar energy sector by 2030 as Paris Climate Change.

Amity University Haryana houses a dedicated 'AYUSH-Amity Herbal and Medicinal Plant Distribution Centre' in collaboration with Ministry of Ayush, Government of India. The center produces herbal plants and local medicines with a view to create public awareness and boost the scientific efforts to make India, a world leader in Ayurvedic, Unani, Naturopathy, Homeopathic and Siddha health care. This conducts capacity building and skilling programmes for the benefit of local farmers and provides vast opportunities for agricultural growth.

Climate disaster cooperation: Amity University Haryana strives to function as live 'laboratory of sustainability and incorporates all possible sustainability measures in its action including awareness and capacity building for climate changerelated disasters. University is developing robust academic networking with agencies working on climate disasters at regional and global levels and conducted several knowledge sessions, and training programs of regional and global climate disaster issues with the National Institute of Disaster Management (NIDM), the Government of Haryana and the United Nations University on the urban flood, school safety, disaster mitigation etc. Several faculty members conducted sessions on disaster mitigation at NIDM and other locations, notably the capacity building of schoolteachers for protection from natural calamities at school. Notable engagement with local community and stakeholders in terms of capacity building exercises are following:

- 1. Teachers training programme on 'Safety and Security at School Level' Samagra Shiksha' District Hisar, Haryana 24-25 January 2022 (Resource person: Dr. Kushagra Rajendra)
- Invited lecture on Youth and decision making in era of Climate change" at webinar "Youth Empowerment for Climate Change Resilience, National Institute of Disaster Management (NIDM), and Rajiv Gandhi National Institute of Youth Development Government of India, August 20, 2021. (Resource person: Dr. Kushagra Rajendra)
- 3. Invited speaker on "Rivers and its people: Lessons from Floodplains, Bihar" at online training programme on "Geo-Hazard Analysis and Management", Organized by National Institute of Disaster Management (NIDM), and University of Allahabad, 26-28 July 2021 (Resource person: Dr. Kushagra Rajendra)

University also organized several such capacity building programmes, details of some of the programmes are given below:

 International workshop in collaboration with United Nations University on "Scanning the Horizon of Climate Change – Water Crisis - Disasters-Conflicts and Migration Nexus" 21-25 September, 2021.  Workshop on "Urban Flooding in Gurugram: Experiences and Initiatives" organized in collaboration with National Institute of Disaster Management (NIDM), Ministry of Home Affairs, Govt of India at Amity University Haryana, 6 September, 2023.

Tree Plantation Drive: University maintains natural vegetation-dominated green cover in the campus. As per land use planning 2/3rd area is the green cover which includes the open area (lawn, farming land etc) and tree cover while 1/3rd is the build-up area. Tree plantations in collaboration with NGOs are the most celebrated activity here in Amity on every occasion. The two-tier plantation has been done along the campus boundary. University also maintains all support to sustain the plantation including a nursery, a functional greenhouse, a composting unit to provide organic manure, and trained manpower to carry out horticultural work. In collaboration with 'Green Mission,' an NGO two-stage massive plantation drive was conducted with the aim to increase tree cover and increase the carbon sink potential.

#### **WORKSHOP**

The Workshop "Urban Renewal and Conservation" was conducted on 1-3 July 2021 by Amity School of Architecture and Planning. The participants learnt urban renewal/redevelopment approaches at old city and historical sites in the context of having better access to services and sustainable urban development.

#### **ORIENTATION PROGRAM**

- The Orientation Programme "New Challenges and Opportunities in Aerosol Pollution Research: An Indian Perspective" was conducted on 20-24 Sep 2021 by (ACOAST) Amity Centre For Oceanatmospheric Science And Technology The participants learnt and gained knowledge about the utilization of satellite AOD data for health hazard studies.
- The Orientation Programme "New Challenges and Opportunities in Aerosol Pollution Research: An Indian Perspective" was conducted on 21-Sep 2021 by (ASET) Amity Science Engineering and Technology The participants learnt To motivate and guide students about the new and innovative options of power generation in today's era.

#### **PANEL DISCUSSION**

The Pannel Discussion "Harnessing Opportunity of Green Energy in era of Climate Change" was conducted on 24-Sep-2021 by (ASEES) Amity School of Earth and Environmental Sciences. The participants learnt and understood the process of generating energy that produces no greenhouse gas emissions from fossil fuels and reduces some types of air pollution.

#### **WEBINAR**

The Webinar "Innovation Strategy for Universities to Create Opportunities of Entrepreneurship in Mitigating Environmental Issues" was conducted on 02-Dec-2021 by

(ASEES) Amity School of Earth and Environmental Sciences. The participants learnt Helps in spreading awareness about innovative ways of entrepreneurship by motivation students for research and development.

#### **WEBINAR**

The Webinar "Earth Day 2022" was conducted on 22-Apr-2022 by (ASEES) Amity School of Earth and Environmental Sciences. The participants learnt Helped the students to understand how human activities are degrading the earth and about the how helpful concepts of waste management are for a cleaner and green economy and sustainability.

## VII. COLLABORATIONS, AWARDS & RECOGNITIONS

## Stakeholders' engagement and cooperative planning

University engages students, faculty, and other stakeholders for greater environmental and climate awareness through academic networking with all possible stockholders including government agencies, civil service organizations, academic institutions, research organizations and NGOs. The mode of action varies as per need which includes inhouse or onsite operations including capacity building, skilling, training programs, awareness drive, academic seminars, and workshops. Although the COVID lockdown restricted operations substantially, virtual mode gave

### **Faculty Recognitions in alignment with SDG 13**

Institute	Faculty Name	Award	Awarding body	Year
ASET/CIVIL	Sakshi Gupta	'IGBC Accredited Faculty' certificate	IGBC FDP on Green Buildings & Built Environment held during 02 – 06 August 2021	2021
ACOAST/ ACESH	Mr. Shubhansh Tiwari	Environmentalist Award (Copy Attached)	The Award was presented in October 2021 by the NSDA during the Wirld Environment Summit 2021, held at India International Centre, New Delhi during 1-3 October 2021.	2021
ASAS/AUH	Dr. Dipti Vaya	Resource Person in Certification Course	Certificate Course on Industrial Waste Management organized by St Xavier College Mumbai	2022
ACOAST/ ACESH	Prof. (Dr.) P.C.S. Devara	Work Agreement (MoU) between NASA-AERONET, USA and AUH, Gurugram, India	NASA, Greenbelt, MD, USA	2022

## **GLIMPSES OF CLIMATE ACTION AT AMITY UNIVERSITY HARYANA**



**LEED Platinum Campus** 



**LEED Lab Certificate** 



LEED Lab empanelment







SAFAR's Air Quality Monitoring Centre and NASA-AERONET



The IET India Awards 2021 open for nominations

RBI policy quote | JLL

## Inauguration of Bio Lamp at Amity University Haryana

Published on August 6, 2021

### **BIOLAMP INAGURATION AT AMITY UNIVERSITY HARYANA**





## **SOLAR ROOFTOP AND GROUND SOLAR PLANT**



### TREE PLANTATION DRIVE 'MISSION GREEN'

#### STAKEHOLDER ENGAGEMENT FOR CLIMATE DISASTER









#### **EDITORIALS ABOUT THE SUSTAINABILITY AND ENVIRONMENT**

Kushagra Rajendra (2022) पर्यावरणीय अंत्रंबंधों के अंत्रजाल की अनदेखी, हस्तक्षेप, राष्ट्रीय सहारा, 04/06/2022. http://rashtriyasahara.com/imageview\_21193\_131437090\_4\_9\_04-06-2022\_0\_i\_1\_sf.html http://rashtriyasahara.com/imageview\_21194\_131438330\_4\_9\_04-06-2022\_2\_i\_1\_sf.html

Kushagra Rajendra (2021) जलवायु कूटनीति के आईने में भारत, हस्तक्षेप, राष्ट्रीय सहारा, 30/10/2021. http://rashtriyasahara.com/imageview\_14104\_98394556\_4\_9\_30-10-2021\_1\_i\_1\_sf.html http://rashtriyasahara.com/imageview\_14105\_98435264\_4\_9\_30-10-2021\_2\_i\_1\_sf.html

Kushagra Rajendra (2021) नये नजरिए की जरूरत?, हस्तक्षेप, राष्ट्रीय सहारा, 28/08/2021. http://rashtriyasahara.com/imageview\_43635\_98604084\_4\_9\_28-08-2021\_3\_i\_1\_sf.html

Kushagra Rajendra (2021) प्रकृति सम्मत विकास की सीख, हस्तक्षेप, राष्ट्रीय सहारा, 14/08/2021. http://rashtriyasahara.com/imageview\_42307\_91056288\_4\_9\_14-08-2021\_4\_i\_1\_sf.html The United Nations Sustainable Development Goals (SDGs) are the focus of Amity University Haryana of Eminence. The four pillars of our approach to the SDGs are research, teaching, basic institutional practices, and collaborations

