

# PANJAB UNIVERSITY, CHANDIGARH

## GREEN AUDIT

### A. INTRODUCTION

Green Audit is an essential process utilized by organizations to identify, measure, document, report and analyze the environmental diversity of their operations. It is an effective tool for colleges to assess their energy, water and resource consumption, as well as the type and volume of waste generated. By doing so, Panjab University aims to make savings and improvements, such as implementing a recycling project or improving their waste minimization plan.

Green Audit not only helps to create awareness and understanding of the PU's environmental impact, but it is also a crucial step towards achieving a sustainable future. As environmental sustainability is becoming increasingly important for the nation, higher educational institutions have a crucial role to play in achieving this goal. Thus, conducting a Green Audit is a necessary measure for any institution that wishes to work towards creating a more sustainable future.

The rapid urbanization and economic development at local, regional and global levels have caused several environmental and ecological crises. In order to combat these issues and promote sustainable development, it is imperative that educational institutions adopt the system of the "Green Campus". This system helps reduce the atmospheric carbon dioxide levels and is a part of the Corporate Social Responsibility of the Higher Educational Institutions.

The aim of the green audit is to identify, quantify, describe, and prioritize a framework of Environment Sustainability in compliance with the applicable regulations, policies, and standards. Thus, it is important that institution measures its contribution towards reducing global warming through Carbon Footprint reduction measures.

Green Auditing is a process that helps to identify and evaluate the potential environmental impacts of an organization's activities, products, and services. It is a critical tool that can be used to promote environmental awareness, improve resource efficiency, and reduce waste and hazardous waste generation. Through Green Auditing, organizations can better understand the environmental consequences of their operations and take necessary steps to reduce their environmental footprint. Green Auditing can help organizations to identify and control pollution, improve safety, and prevent and reduce waste. It also provides performance reviews of operational activities and their potential impacts on the environment. Furthermore, environmental auditing can uncover the weaknesses of the organization's environmental strategy, thereby reducing the risk of unexpected events. By performing a thorough environmental audit, institutions can gain a better understanding of their environmental performance and take meaningful actions to improve their environmental sustainability.

## **B. NEED FOR GREEN AUDIT AT P.U.**

The twentieth century has brought about a great deal of progress in terms of modernization and industrialization which has made life easier and more luxurious. Unfortunately, this has also caused a great deal of harm to our natural environment, such as exploitation of forests and wildlife, air and water pollution, and producing massive amounts of solid waste. This has led to global issues such as global warming, ozone layer depletion, and climate change. It is now time to take action to protect our environment and make it more sustainable. One way of doing this is through the practice of Green Auditing. This involves regularly identifying, quantifying, documenting, reporting, and monitoring environmentally sensitive components of a specified area. **The process of Green Auditing requires a careful monitoring of activities both within and outside of the specified area, which can have both direct and indirect impacts on the environment.** This can become a very effective tool for PU to track their energy and water usage, wastewater, solid waste, and other environmental impacts. In this way, we can help protect our environment and ensure its sustainability.

### **B.1 Goals of Green Audit**

1. To ensure adherence to regulations and submit a report to relevant governing bodies: This entails assessing existing practices, policies and procedures to ensure they are in line with applicable laws and regulations and generating a formal report to be submitted to the relevant governing bodies.
2. To recognize needs, strengths, weaknesses of the educational institute: This involves evaluating the current state of the educational institute and identifying areas of improvement, as well as areas of strength that can be further developed.
3. To review management systems and discover liabilities: This includes assessing the organization's management systems and processes for potential liabilities, such as those related to environmental policies and practices.
4. To measure the environmental performance of the educational institute: This involves conducting direct assessments to determine the environmental performance of the educational institute and identify areas for improvement.
5. To promote environmental awareness among the staff and students: This involves hosting workshops, seminars, and other educational activities to raise awareness among the staff and student body about environmental issues.
6. To conserve non-renewable resources for future benefit: This entails developing and implementing efficient practices to reduce the usage of non-renewable resources, such as water and energy, in order to conserve them for future generations.

## **C. ABOUT PANJAB UNIVERSITY**

Panjab University is a prestigious public research institution located in the heart of Chandigarh, India. Established in 1882, it has earned a great reputation for its academic excellence and is one of the oldest and most eminent universities in the country. The university boasts of a sprawling 550-acre campus with modern amenities such as classrooms, labs, libraries, gyms, and dorms. It is also home to 8 hostels for boys, 9 hostels for girls, a Working Women Hostel and 2 sports hostels. The university has more than 15,000 students from India and other countries in its campus and offers a wide range of courses from undergraduate to doctorate degrees in engineering, science, humanities, social sciences, and management. It is composed of various academic institutes and four Regional Centres, which all fall under different Faculties that include Arts, Science, Languages, Law, Education, Fine Arts, Business Management and Commerce, Engineering and Technology, Medical Sciences, Pharmaceutical Sciences and Dairying, Animal Husbandry and Agriculture. Panjab University has been a leader in research and innovation with numerous research projects, journals, collaborations with leading universities to promote exchange of knowledge and ideas, and seminars and conferences to discuss the latest developments in the field. It has produced many prominent personalities in different fields, including former Prime Minister of India, Manmohan Singh, and Nobel Laureate Har Gobind Khorana. With its top-notch infrastructure and renowned faculty, Panjab University is a premier institution of higher learning in India.

## D. GREEN COVER AT PANJAB UNIVERSITY

The University has taken significant steps to promote the preservation of greenery on campus. To that end, the University has established a dedicated team of personnel to maintain the gardens and ensure that they remain in good condition. This team is overseen by senior University officials and is responsible for monitoring the gardens and ensuring that they remain in a healthy state. The University also holds regular events to promote greenery and its preservation. This includes workshops and seminars to educate staff and students on the importance of preserving green spaces, as well as activities like tree-planting and clean-up campaigns. Additionally, the University has implemented a rewards system to encourage employees to maintain the gardens and a strict set of guidelines to ensure that the gardens are kept in a safe and healthy environment. The University also works with local businesses to promote green initiatives. This includes working with local parks and gardens to create green spaces in the area, as well as working with local businesses to create green initiatives that benefit the community. Additionally, the University holds events such as volunteer days, where staff and students can come together to clean up and help maintain local green spaces. These events serve to not only promote the preservation of greenery but also build community spirit and foster a sense of pride in the University and its commitment to preserving green spaces.

- Planting a variety of species, using therapeutic plants, and identifying plant species.
- Waste disposal facility and waste management strategy.
- Programs to raise awareness of carbon usage.



Every year, the university encourages its students and faculty members, as well as tourists, to join in a planting programme with the goal of creating a greener campus, a healthier ambiance and clean air for everyone. This programme has been a great success, with many trees, shrubs and other plants adding to the lush landscape of the university. To ensure that the trees and other plants are properly taken care of and maintained, the university has set up the Campus Horticulture Committee. This committee is responsible for making sure that the vegetation on the campus is kept in good condition and that the gardens are regularly

maintained. The Horticulture Section, headed by the committee members, carries out these activities and makes sure that the plants are healthy and growing properly. The university also organises regular clean-up drives to ensure that the campus remains clean and free of any debris or litter. Every year, many departmental activities are carried out, including: -

- Landscaping projects and other plantations
- Garden and landscape maintenance
- Plantation maintenance

## **D.1 GREEN CAMPUS**

The University has taken up an ambitious ecological plan to ensure the natural habitat of birds, animals, insects and other species is not disrupted. As part of this plan, various landscaping methods are used to minimise the impact on the environment. The University has also planted various species of trees, shrubs and flowers to preserve the local flora and fauna of the ecosystem.

In order to nurture the insects, especially honey bees, which are essential to maintain the ecosystem, several parks have been set up in the Campus. These parks are home to trees and plants of different species that bloom throughout the year, providing food and shelter to the insects. The parks also serve as a great spot for students, faculty and staff to relax and unwind.

The University's ecological plan is a great step towards preserving and protecting the environment. The University will continue to strive to create a sustainable and eco-friendly environment for its students, faculty and staff. Parks developed in the Campus in recent years are as following: -

### **1. Palm Garden, Sector-14**

The Palm Garden of Punjab University is spread over an area of 4,000 square meters and has various species of palm trees, including Phoenix, Washingtonia, Areca, and Coconut palms. The garden also has a number of other plants and trees such as magnolia, hibiscus, and bougainvillea. It is a great place to appreciate the beauty of nature and the diversity of plants. The garden also serves as a sanctuary for birds and other wildlife.



### **2. Prof. R.C. Paul Rose Garden, Sector-14**

More than 100 different varieties of roses with different colours and shapes available in the parks, the path of garden is made out of waste tiles, obtained from various sites of Panjab University.



### 3. Prof. G.P. Sharma Herbal Park, Sector-14

Different herbs are planted in the park to help in the research work and create awareness in the campus residents and students. Some herbal plants planted in the Herbal Parks are aloe vera, kalmegh, vinca, lemon grass, stevia, tulsi, mint, rati etc.



### 4. Meadows Garden

Meadows Garden, Panjab University is a unique landscape in the heart of the city of Chandigarh. It is a beautiful and peaceful garden spread over an area of 12.5 acres. The garden has an abundance of natural vegetation, including trees, shrubs, herbs and grasses. The garden has been developed in an open land to conserve the existing flora and fauna of the University. The garden has a diverse range of trees and plants, including common and rare species. The garden also has a number of small lakes, which are home to a variety of aquatic animals. The garden is a popular destination for students, faculty members and visitors. The garden is made in the open land to conserve the existing flora and fauna of the University.

## **5. Bougainvillea Park**

The Park comprises of various varieties of Bougainvillea, which grows up to a height of 6-7 feet. They can be seen in the shades of pink, purple, yellow and white. The beauty of these flowers is enhanced by the presence of other colourful flowers like Hibiscus, Jasmine, Mango, Banana, etc. In addition to these, the Park also has a large number of trees like Neem, Eucalyptus, Banyan, etc. The trees are planted in such a way that they provide shade to the visitors while they are enjoying the beauty of the park. The Park also has a small pond where different varieties of fish and aquatic plants can be seen. It also has a bird sanctuary where different species of birds can be seen. The Park is maintained by the University's NSS wing and they have installed benches and dustbins in the Park. They have also made arrangements for the maintenance of the Park by regularly pruning the plants and cleaning the pathways. It also provides a great opportunity for the students to learn about plants and the environment

## **6. Botanical Garden**

The Department also has the "P.N. Mehra Botanical Gardens", spread over 16 acres of land and named after its founder. It is one of the better-known botanical gardens attached to a university of the country. Special attractions in the garden for the visitors are the Arboretum with nearly 225 species of trees; the water garden consisting of lily-ponds and vegetated with species of Nelumbium and Nymphaea. The Cactus-House has more than 100 species of cacti while the Orchid-House has amazingly beautiful orchids collected from different parts of India. In the Fern-House grow nearly 50 species of ferns and fern allies. Of considerable botanical interest is the Bambusetum with over two dozen rare species of bamboos collected and grown during the last 40 years. Several interesting succulent plants collected from different parts of the country further contribute to the beauty of the garden. In order to grow plants under controlled conditions the garden has an automated Greenhouse. There is a well-maintained nursery where plants are raised, multiplied, acclimatized and then transplanted. The botanical garden, besides serving as the repository of the source material for botanical studies, is also geared to cater to the dire need of conserving and enriching plant biodiversity through exchange of plant and seeds.

## **7. Other major parks:**

- a) Fun & Frolic World, Sector-25**
- b) Park opposite T-II type houses, Sector-25**
- c) Park near Mori Gate, Sector-14**
- d) Park between Girls Hostel no. 1 & 2, Sector-14**
- e) Children Park Near Teachers' Flat, Sector-14**
- f) Hibiscus Park, Sector-14**
- g) Mini Rose Garden in front of Biomedical Block-I, Sector-25**

## D.2 GREEN COVER AND PLANTATIONS @ P.U.

Different species and trees and shrubs indigenous to environment have been planted for maintaining the ecology and greenery of Campus. The Horticulture Division has planted approx. 32,000 trees and shrubs in 2019-2020 and more than 28,000 trees and shrubs in 2020-2021. This vegetation comprises of natural plants that provide flowers in all seasons. The rich Biodiversity of birds add to more attraction in the Campus.



### List of species commonly found in Panjab University campus:

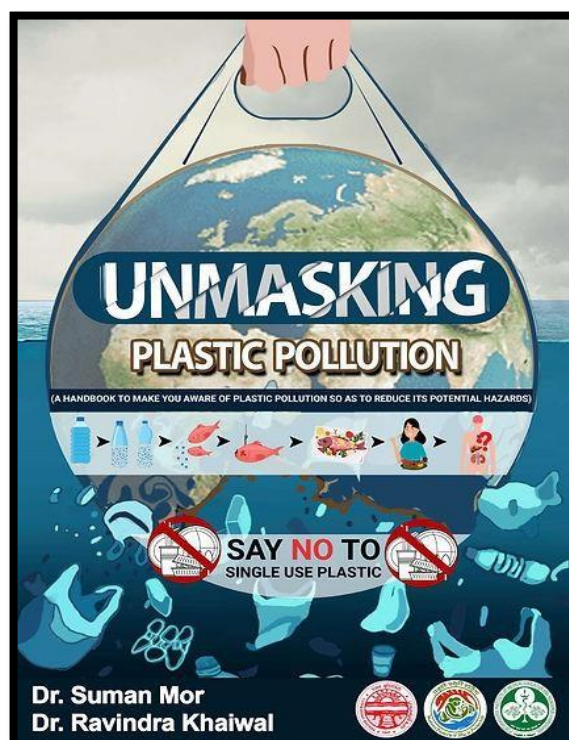
*Acacia arabica*, *Acras sapota*, *Atrocarpus sp.*, *Albizia lebbek*, *Azadirachta indica*, *Barringtonia acutangular*, *Bauhinia variegata*, *Bombax ceiba*, *Callistomon lanceolatus*, *Cassia fistula*, *Cassia nodosa*, *Cassia Javanica*, *Cassia renigera*, *Cassia siemea*, *Casuerinaequisetifolia*, *Dalbergia sisoo*, *Delonix regia*, *Dillenia indica*, *Erithrina indica*, *Eucalyptus sp.*, *Emblica officinalis*, *Eugenia jambolana*, *Ficus benjamini*, *Ficus bangalensis*, *Ficus lacore*, *Ficus glomerata*, *Ficus elastica*, *Ficus religiosa*, *Grevillea robusta*, *Jacrandamimosaeifolia*, *Lagerstroemia flosreginae*, *Michliachampaca*, *Mangifera indica*, *Melia azadearch*, *Morus sp.* *Milletiaovalifolia*, *Mimusopselengi*, *Neonauclea purpurea*, *Nephelium litchi*, *Polialtheapandula*, *Pinus longifolia*, *Photinia japonica*, *Pterospermumacrifolium*, *Popular sp.*

## E. SPECIAL GREEN INITIATIVES @ P.U.

### 1. Plastic free campus

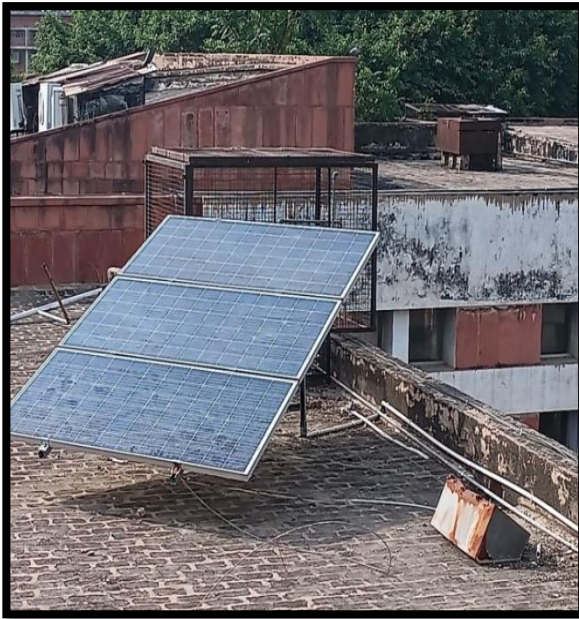
The Horticulture Division has disseminated the notice to discourage the use of single-use plastic to all departments. Moreover, Department of environment studies has been circulating the awareness infographic booklet to discourage the use of single use plastic. The IEC material has been published to aware the public about health impacts of single use plastic.

Further, the office has issued a circular to all departments, institutes, hostels etc. of Panjab University through Computer Centre vide circulars nos. Hort/19/2042-50 dated 14.11.2019, D-Hort/21/1138 dated 27.08.2021, D-Hort/21/1695 dated 01.12.2021 and D-Hort/22/527 dated 22.03.2022 to ban use of single use plastics in accordance with notification no. ED/2019/1648 dated 27.09.2019 of Deptt. of Environment, Chandigarh Administration.



### 2. Renewable source of power:

Panjab University is taking a revolutionary step towards sustainable development, by investing in the generation of electricity from solar power. The university has sanctioned a sum of Rs 1.0 Crore for the installation of a Solar Plant in its Sector – 14 Chandigarh campus. This solar plant will be harnessing the sun's energy to generate electricity, which will be used for providing lighting in the hostels, streets and other areas in the campus.



This initiative of Panjab University is highly commendable as it will lead to a reduction of carbon emissions, which are the primary contributors to global warming. Additionally, the solar plant will prove to be a cost-effective long-term solution for the university. It will also provide a healthier environment for the students and staff of Panjab University, as the electricity produced from renewable energy sources do not cause air pollution. Thus, this initiative of Panjab University will be beneficial to the environment, and will also lead to a lower electricity bill for the university in the long run.

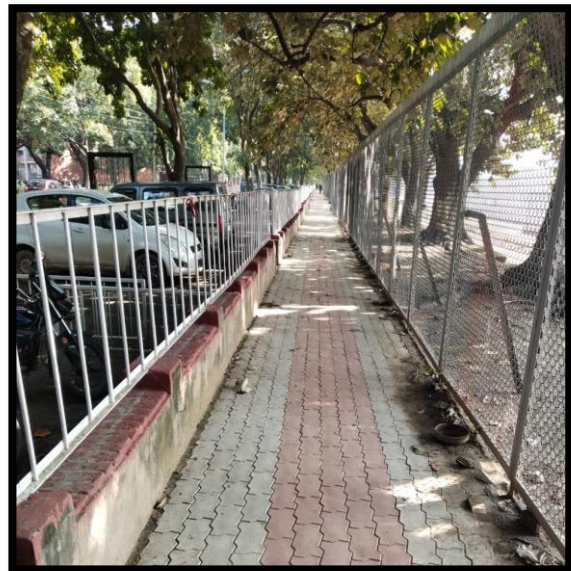
### **3. Providing SmartBike across the Campus**

SmartBike is a new initiative to bring a green and sustainable transportation option to the campus of Panjab University. The SmartBike program is a public bike rental system that will allow students, faculty, and staff to quickly and conveniently access bicycles on the campus. SmartBike will provide an efficient and affordable way to travel across the campus without having to rely on automobiles or public transportation. The program will include the installation of bike racks throughout the campus and the provision of a fleet of bicycles that can be rented for a nominal fee. Bikes will be available for use at any time of the day, and users will be able to return them to any of the designated bike racks. The bikes will be equipped with GPS tracking, allowing users to locate and unlock them using a smartphone application. In addition to the convenience of the service, SmartBike will also provide environmental benefits. The program will reduce the reliance on motor vehicles, resulting in a reduction of greenhouse gas emissions and other pollutants. This will help to improve air quality on campus and reduce congestion. The program will also provide students, faculty, and staff with an opportunity to get exercise and enjoy the outdoors without having to leave the campus. SmartBike will provide a unique and innovative solution to the transportation needs of the Panjab University campus. With its convenient access and environmental benefits, SmartBike will be an important addition to the university's transportation options.



#### **4. Pedestrian friendly pathways**

Free flowing and uninterrupted pedestrian pathways encourage walking routes on the campus linking academic blocks, student centre activities, library, hostels and public spaces. Landscape design has been sensitively introduced in the campus to serve beyond the aesthetics for micro-climate amelioration through green cover, soft landscape and waterfeatures.



#### **5. Installation of LED lights**

The initiative taken by Panjab University in the years 2021-22 and 2020-21 towards energy conservation is commendable. By setting up Solar Plant and Bio-Gas plant, the University has taken a significant step towards reducing its carbon footprint and promoting a sustainable future. The installation of various LED lighting fixtures in different parts of the campus has

further helped in energy and cost savings. This will lead to an overall reduction in the energy consumption of the University and will contribute towards making it a greener and more efficient institution.

Panjab University has sanctioned an amount of Rs 1.00 Crore for setting up a Solar Plant at the PU Campus Sector – 14 Chandigarh. The project includes the installation of Gic 2 Astronomical Timer for Street Light Control, LED Lamp, LED Tube Set Tubelight 4Ft 20 Watt, WLED Luminaire light 120 Watt (40 PCs), LED TubeLight 20 Watt/2000 Lumen Recess Downlighter 18 Watt, Immaculate 58 Watt.

## **6. Open burning of leaf and other waste is strictly prohibited**

In order to preserve campus air quality, burning leaf and other waste is strictly prohibited on campus. Regarding this, notices are also being circulated among all the departments from several years continuously.

## **7. Signs/Display Boards**

Display Boards with slogans mentioning the quotes regarding clean and green campus, slogans of Swachh Bharat Abhiyan has been installed at the strategic locations for giving the messages of cleanliness and environment conservation to masses.



## **8. Promotion of e-rikshaws and e-loader for lifting of waste in campus**

E-Loader being used to lift the waste generated in the Campus in order to reduce the pollution and also makes the process of garbage lifting more efficient as it saves the time spent in refuelling.

The partnership between Panjab University and M/S Exigo Recycling Private Limited, Haryana is an important step in the right direction for protecting the environment. This Memorandum of Understanding (MoU) is aimed at managing E-waste in an efficient and eco-friendly way. E-waste, or electronic waste, is the collection of discarded electronic devices, such as computers, cell phones, televisions, microwaves and other appliances. As technology advances, more and more of these devices become obsolete and need to be properly disposed of. If not managed properly, E-waste can have a significant environmental

impact, as it often contains hazardous materials that can harm the environment if not disposed of properly.



**9. Other institutional initiatives for greening the campus are as follows:**

- a) Preference given to recyclable items while conducting any conferences/workshop/seminars
- b) Green and eco-friendly boutique in conferences/workshop/seminars
- c) Nampkin ban in student centre and other canteens
- d) Time to time anti-dengue drive
- e) Bi-cycles provided in all hostels to discourage their on two-wheelers
- f) Time to time cleaning of water tank, overhead tank
- g) Open gym in residential area, parks and hostels (GH1, GH2)
- h) E-library for remote access to students

## F. SOCIAL OUTREACH ACTIVITIES

- Various Cleanliness drives are being organised from time to time in Campus where NSS volunteers, faculty members, local residents are involved under the banner of Swachh Bharat Abhiyaan.



- Various **plantation drive** were carried out in campus in a specific area with the aim of increasing the forest cover and creating a sustainable environment. Plantation drives are important for several reasons. Trees play a vital role in combating climate change by absorbing carbon dioxide, a major greenhouse gas, from the atmosphere. Trees also help to prevent soil erosion, provide shade, and support wildlife habitats. Additionally, they contribute to the overall aesthetics of an area, making it more attractive and pleasant for humans.



- **Awareness Campaign “Clean Air For Chandigarh”- Chandigarh Rose Festival 2019-2020**

The 48<sup>th</sup> Rose Festival Chandigarh, 2020 was held on 28<sup>th</sup> February, 2020 to 1<sup>st</sup> March, 2020. From many years this Festival has been the centre of attraction for lakhs of people from different cultures and places. Panjab University has taken an initiative towards spreading public awareness on Air Pollution during that event.

Air Pollution is a growing issue in Chandigarh which needs public attention and awareness both. The prime focus of the awareness drive was on the theme of “Chandigarh For Clean Air”.



*“Chandigarh for Clean Air” stall for air pollution awareness under NCAP in 48<sup>th</sup> Rose Festival Chandigarh, 2020*



*Volunteers along with organizers at air pollution awareness stall in 48<sup>th</sup> Rose Festival Chandigarh, 2020*

**• Awareness Campaign “Clean Air For Chandigarh”- Panjab University Rose Festival 2019-2020**

A massive awareness campaign on Clean air quality was being organised in Panjab University, Rose Festival by Department of Environment Studies, Panjab University from 7th to 9th February 2020. The awareness campaign is being supported by Health Care without Harm, USA and Chandigarh Air Pollution Control Committee (CPCC).A special stall having theme ‘Clean Air for Chandigarh’ was inaugurated by the Prof. Raj Kumar, Vice

Chancellor, Panjab University. The clean air stall attracted the attention of hundreds of visitors and they have learned how to contribute in air pollution reduction through fun games and other interactive activities

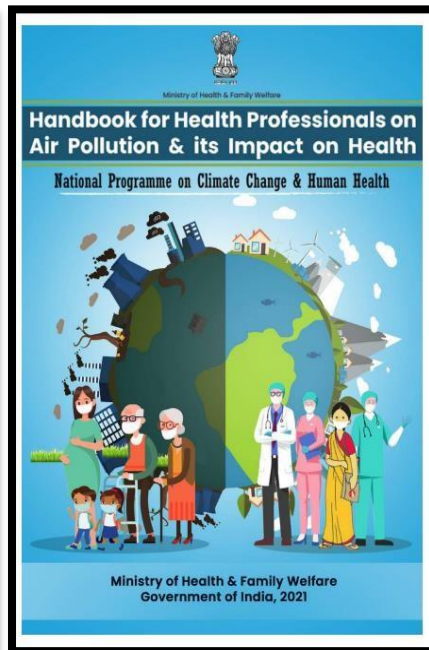
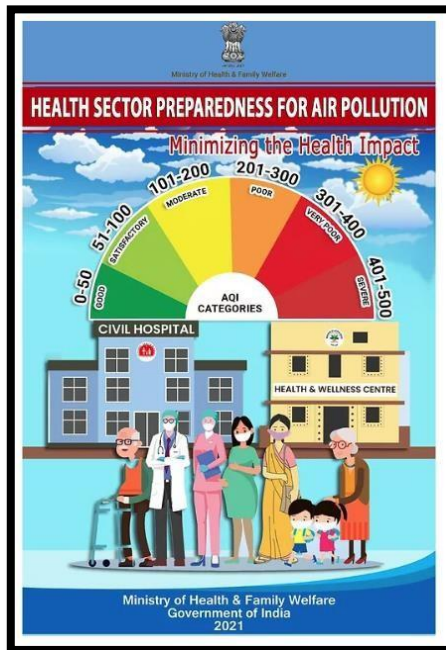


*Our pledge taking selfie point after becoming clean air ambassador during Panjab University Rose Festival*



Visitors at air pollution awareness poster site during Panjab University Rose Festival

- Published more than 40 Information, Education & communication (IEC) awareness material to educate general public on the adverse health impacts of air pollution, its connection to climate change and solutions that for the betterment of public health. The booklets can be freely downloaded from <https://www.care4cleanair.com/awarnessmaterial>.



- Document on Educative Comic Series for COVID Awareness released in booklet as “Efforts from Science Ministries, Departments & Scientific Organisations”. The website (<https://www.care4cleanair.com/>) was created to dissemination of information to public. The booklets can be freely downloaded from <https://www.care4cleanair.com/awarnessmaterial>.

## SCIENCE OUTREACH & POPULARISATION EFFORTS

Ministry of Science and Technology (MoST), Government of India, is striving continuously for reaching to the common people. Since the eruption of COVID-19 pandemic, the Ministry has supported numerous research projects and technology interventions through its various Departments, Autonomous Organisations, Professional Bodies, Statutory Bodies, and Laboratories. In the expedition of science outreach and popularisation, a number of knowledge and information products have been generated and released.

### Efforts from Science Ministries, Departments & Scientific Organisations

#### Kids, Vaayu & Corona, PGIMER-Chandigarh and Panjab University produce an Educative Comic Series for COVID Awareness

COVID has become a nightmare for most of the people around the world. And while some of the adults are busy and could gather data from the common platforms like newspaper, for kids, it really becomes incomprehensible to understand the talks, advisories and other scientific information. To overcome the challenge, Postgraduate Institute of Medical Education and Research (PGIMER, Chandigarh) and Panjab University (PU), have created an educative comic series titled 'Kids, Vaayu & Corona,' for children to make them aware about the threats of Coronavirus and ways to remain safe by taking simple precautionary steps for prevention and control of spread of the infection.



### • Ecosystem Restoration- Know Your City. “Know Your City” Initiative

- Dr. Suman Mor, Department of Environment Studies, Panjab University, Chandigarh in collaboration with PGIMER Chandigarh and media partner Amar Ujala started an initiative for **Ecosystem Restoration- Know Your City**.
- “Know Your City” initiative aim to connect citizens with rich natural diversity around them.
- This initiative is the great step in right direction from the green capital of India.
- The initiative engaged the citizen of Chandigarh to know and share key conservation or ecological sites of a city to admire nature. **CONNECT CONSERVE CARE**.

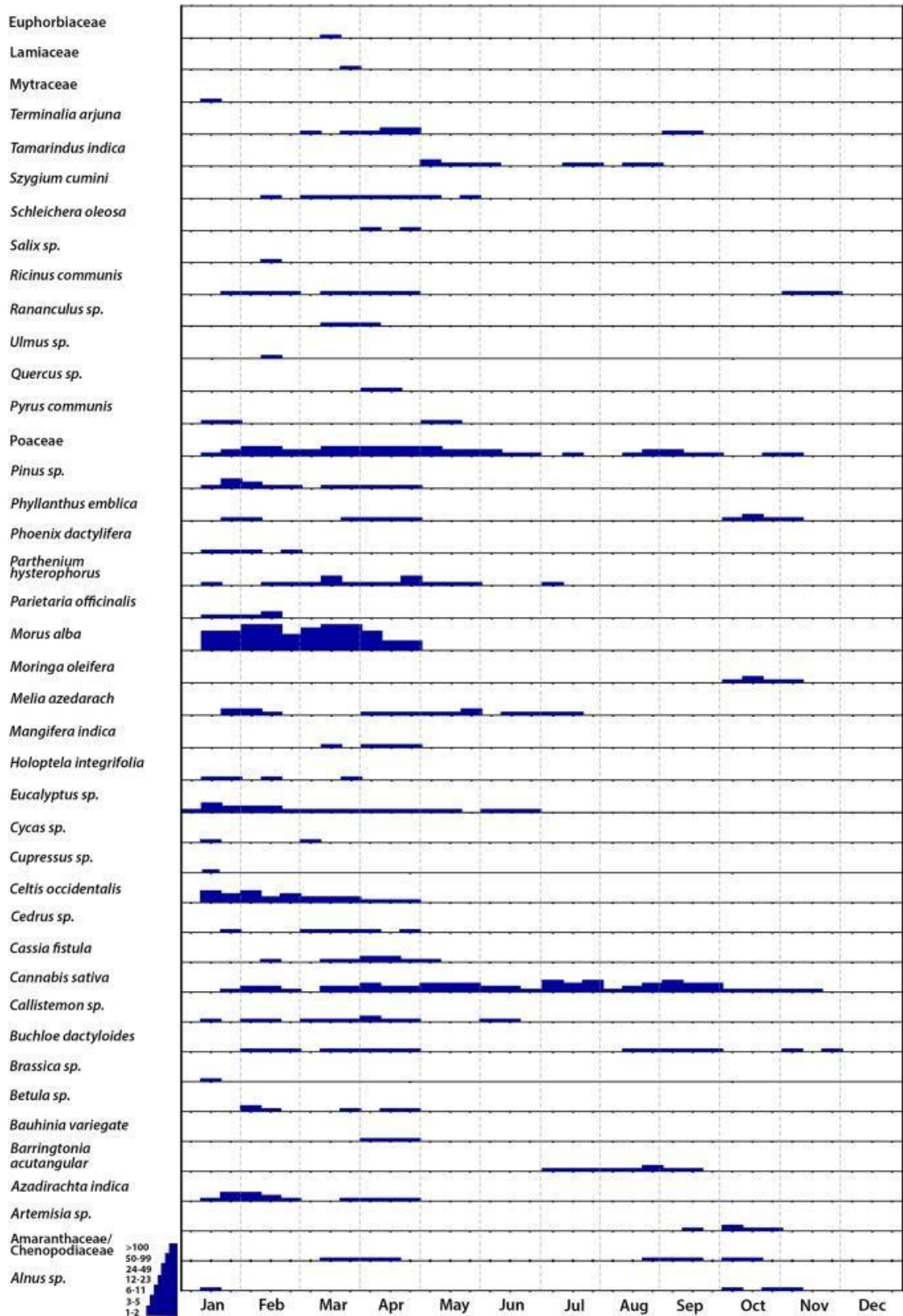


• **Development of Eco-health calendar**

An Eco-Calendar highlighting the important days related to the environment and public health. The Eco-Calendar's purpose is to generate awareness about the environment and public health days and to emphasize on creating mass awareness. This Eco-Calendar will remind us about the important days well in advance so that various activities can be organized to celebrate and engage the public towards a better environment and public health.

• **Airborne Pollen calendar**

Pollen are considered major outdoor airborne allergens responsible for allergic rhinitis, asthma, and atopic dermatitis in humans. The development of First pollen calendar for the city of Chandigarh, to provide up-to-date information and highlight the variability of key pollen types in different seasons. The airborne pollen calendar provides a clear understating for clinicians and allergy sufferers to identify potential allergy triggers and help to limit their exposure during high pollen loads.



Awareness to celebrate various festivals in eco-friendly ways

## PANJAB UNIVERSITY'S CONTRIBUTION TO NATIONAL ACTION PLAN

### 1. Air pollution monitoring

- **National Clean Air Programme (NCAP)** -Panjab University selected as Institutes of Repute (IoRs) National Clean Air Mission. Dr. Suman Mor from Panjab University has been nominated as Nodal faculty of IoR for Chandigarh.
- **Installation Of PM<sub>2.5</sub> Sensors For Air Quality Monitoring**



- **CAAQMS**—The Central Pollution Control Board (CPCB), New Delhi, launched the National Ambient Air Quality Monitoring (NAAQM) programme in 1984 to obtain a spatial and temporal variation of ambient air concentrations for a wide range of pollutants. This programme was later renamed to the National Air Quality Monitoring Program (NAMP) and recognized Sulphur dioxide (SO<sub>2</sub>), nitrogen dioxides (NO<sub>2</sub>), CO and respirable suspended particulate matter(RSPM/PM10) as the three main air pollutants for monitoring inside the campus. The NAMP programme has been instrumental in providing data on air quality in India and has been used to inform strategic management plans for air pollution control. The data obtained from NAMP allows for a comprehensive understanding of air quality, and can be used to identify trends in air pollution levels and to identify areas that are most affected by air pollution.
- Continuous Ambient Air Quality Monitoring Stations (CAAQMS) has been installed on at School of Public Health, Sector 25, Panjab University. The station provides information regarding the ambient air quality along with individual readings of eight parameters and system connected with the display board. Earlier, the UT was collecting data manually. The real time AQI shown by the CAAQMS helps in improving the air quality inside the campus.



- **SAFAR van in Panjab University**

System of Air Quality Forecasting and Research (SAFAR) mobile van laboratory on vehicles do the simultaneous and continuous measurement of various air pollutants and meteorological parameters. The measured air pollutants include particulate matter (PM<sub>10</sub>, PM<sub>2.5</sub> and PM<sub>1</sub>), Black Carbon (BC), carbon dioxide (CO<sub>2</sub>), carbon monoxide (CO), sulfur dioxide (SO<sub>2</sub>), Ozone (O<sub>3</sub>), oxides of nitrogen (NO, NO<sub>2</sub>, NO<sub>x</sub>), ammonia (NH<sub>3</sub>), benzene, ethylbenzene, m-, p-xylene, o-Xylene and toluene. The meteorological parameters monitored were temperature, rain, relative humidity, wind speed wind direction, and ultraviolet radiation(UV).



## 2. LiFE

Panjab University Campus is committed to promoting life for the environment. The university has taken a number of initiatives to make its campus environment-friendly and to reduce its carbon footprint. The university has taken steps to reduce plastic consumption on campus by banning single-use plastic such as water bottles, bags and straws. In addition, the university is encouraging students and staff to use reusable containers and to switch to paper products whenever possible. The university has also implemented energy-saving measures such as switching to energy-efficient lighting, installing energy-efficient air conditioning systems, and using solar panels to generate electricity. The university is also encouraging its students and staff to adopt eco-friendly practices such as carpooling, biking, and walking to reduce their carbon footprint. The university also organizes events and activities to promote environmental awareness among students, staff, and the local community. The university also works with local communities to promote eco-friendly lifestyle choices. The university is also actively engaged in various activities to promote wildlife conservation and protection of natural resources. The university has established a Wildlife Research Center to conduct research on wildlife and its habitats. The university also organizes events such as World Wildlife Day to raise awareness and appreciation of wildlife.

## 3. Solar man in UIET

Solar man of India, also called Solar Gandhi, Professor Chetan Singh Solanki, interacted with the students and teaching staff of Panjab University.



**Figure: Solar man during the interaction in Panjab University.**

Issues by lighting the global warming of 1.5 degree centigrade. Solar Power bus fitted with 3.2kW solar panels and 6kWh of battery storage, has also been demonstrated in the campus. NGT awareness

## **5. Enactus**

- Enactus is an international student organization that brings together students, faculty, and business leaders to create projects that empower people in need. Its unit at Panjab University is undertaking pioneering work.
- Enactus at Panjab University focuses on three main areas: education, health, and gender equality.
- Through their projects, they aim to create a positive impact in the community by providing educational scholarships for underprivileged students, creating health and hygiene awareness programs, and providing equal opportunities for women.
- Enactus at Panjab University helps students gain practical experience in the field of social entrepreneurship.
- The organization also encourages their members to come up with innovative ideas and put them into action.
- Enactus at Panjab University is a great platform for students to make a difference in the community and to hone their skills in the field of social entrepreneurship.

## **4. Ro-tract club**

- The Rotract Club of Panjab University is a student organization that aims to develop the leadership qualities of youth and to provide a platform to the students of the university to be a part of the international Rotract family.
- The main activities of the club involve organizing fund-raising events, conducting workshops and seminars, providing mentorship and guidance to the students, and helping in the community development projects.
- The club has also organized various international trips to countries like Japan, Singapore, Thailand, USA, and Europe.
- The club has also been actively involved in environmental protection initiatives, conducting medical camps, and working for the betterment of the society.
- The club provides the students with an opportunity to explore their potential, work in teams and build networks. The club also helps the students to develop their communication, organizational, and problem-solving skills.

## **5. Swachh Bharat Abhiyan**

- Engaged with the community under the umbrella of “Swachh Bharat –Swasth Bharat mission”
- Preparing baseline of existing sanitation practices in these area
- Promoting hygiene education and sanitary habits
- Promoting sustainable sanitation practices
- Creating awareness on Water quality and health education
- Promoting sustainable waste management



स्वच्छ भारत

एक कदम स्वच्छता की ओर

### PU Campus : Clean Campus - Green Campus KNOW YOUR WASTE, KNOW YOUR BIN Let's be wise, use bin every time

**Wet/ Biodegradable/ Organic Waste**

**KITCHEN WASTE**

- ✓ Cooked food/left over food
- ✓ Vegetable/fruit peels
- ✓ Egg shell/rotten eggs
- ✓ Chicken/fish bones
- ✓ Tea bags/coffee grinds
- ✓ Coconut shells/fibres

**GARDEN WASTE**

- ✓ Fallen leaves/twigs
- ✓ Puja flowers/garlands

**Green Bin**

✓ Yes			✗ No	

**PLASTIC WASTE**

- ✓ Plastic covers
- ✓ Plastic bottles/Boxes
- ✓ Plastic cups /plates
- ✓ Chips/toffee/soap/chocolate wrappers
- ✓ Milk /curd/ juice packets
- ✓ Toothbrush/shampoo bottle/ paste bottles

**PAPER WASTE**

- ✓ Newspaper/magazines
- ✓ Tetra packs
- ✓ Cardboard cartons
- ✓ Pizza boxes
- ✓ Paper cups/plates

**White Bin or Blue Bin**

✓ Yes			✗ No	

**Domestic Hazardous Waste**

- ✓ CFL, Tube light
- ✓ Printer cartridges
- ✓ Broken thermometer
- ✓ CD's and old cassette's
- ✓ Used Batteries
- ✓ Button cells
- ✓ Expired medicines
- ✓ Used odonil box & Mosquito repellent refill bottles

**Black Bin**

✓ Yes				

Do you know?... Chandigarh produces 400 tones of solid waste daily !

**Waste if properly segregated can be used**

**FINES IMPOSED BY NATIONAL GREEN TRIBUNAL**

- ₹ 5,000, if littering on railway property
- ₹ 10,000, if littering in public places
- ₹ 25,000, if burning waste in bulk

**Our Responsibilities**

- ✓ Do not litter on streets/open space/in drain or water bodies
- ✓ Do not burn plastics/ leaf waste
- ✓ Segregate waste at source as per SWM Rules, 2016 in separate bin

To convert organic waste into compost

To run waste to energy plants

SWACHH BHARAT ABHIYAN, PANJAB UNIVERSITY, CHANDIGARH

## **G. VARIOUS TASK FORCE WORKING ON GREEN INITIATIVES AT PANJAB UNIVERSITY**

### **1. NSS**

- The university has a National Service Scheme (NSS) unit which works for the welfare of the students, faculty and staff of the university.
- The main aim of the NSS is to inculcate the spirit of social service and help the students to understand the importance of helping others.
- The NSS unit of Panjab University organizes various activities such as social service camps, health camps, and visits to orphanages and old age homes.
- The NSS volunteers also take part in various activities like tree plantation drives, cleanliness drives, and blood donation camps.
- The NSS unit of Panjab University has also taken part in various other activities such as disaster management, flood relief and relief camps. The NSS volunteers have also taken part in rallies and seminars to spread awareness about social issues.
- The NSS unit of Panjab University also organizes awareness campaigns on various topics such as AIDS awareness, population control, environment conservation etc.
- The NSS unit of Panjab University is dedicated to the welfare of the students and faculty members of the university.

### **2. NCC**

- The university also offers National Cadet Corps (NCC) courses that are affiliated with the Ministry of Defence
- The NCC courses offered by Panjab University are NCC Basic, NCC Advanced and NCC Specialized Courses. The NCC Basic course consists of basic military training, followed by field exercises, map reading, and weapon training.
- The NCC Advanced course consists of training in specialized areas and courses such as infantry tactics, arms and ammunition, intelligence, communication and logistics.
- The NCC Specialized courses include courses such as para-dropping, reconnaissance, mountain warfare, amphibious and jungle warfare. The students enrolled in NCC courses are also expected to take part in various community welfare activities such as tree plantation, blood donation and social service camps, among others.
- The students are also given the opportunity to participate in NCC camps and other activities, such as the Republic Day Parade, Beating the Retreat, etc.

### **3. A Network Of Eco-Clubs In Schools & Colleges**

- A wide network of schools was built to engage with the Principals and the representatives of their Eco-clubs which would continue to promote environment

and climate literacy and motivate learners to become champions for environmental sustainability.

#### **H. ACHIEVEMENTS/CLEAN AND GREEN CAMPUS RECOGNITIONS / AWARDS**

1. Panjab University got 7th Rank out of 147 educational institutes in “Swachhta Ranking National Award for Outstanding Efforts in Science & Technology Communication through Innovative and Traditional methods by DST, Ministry of Science and Technology, Government of India, 2021-22.
2. Panjab University has been awarded the 2<sup>nd</sup> prize in the category of Best Institution for Successful Campus Water Usage in National Water Awards 2018
3. 2017 from Ministry of Human Resource Development, GOI for promoting hygiene & cleanliness under Swachh Bharat Abhiyan.
4. Prof. R.C. Paul Rose Garden has been judged the best garden in the tricity for several years.
5. The Horticulture Division wins many prizes every year in different categories of flower competitions organised by different departments in the Chandigarh.

## CONCLUSION

The audit of Panjab University Chandigarh has revealed that it is taking a number of steps to ensure its compliance with environmental legislation and to conserve natural resources. The university has implemented green computing techniques like online payment systems, online circulars, and examination procedures to reduce the use of paper. It is also making efforts to reduce the use of one-time use plastic bottles, cups, folders, pens, bouquets, and decorative items. Furthermore, biodegradable waste is used efficiently for composting and vermicomposting. The university has also installed LED lamps and Tube Lights to reduce electricity consumption. The audit further revealed that the university is taking steps to conserve water by undertaking regular checkups and maintenance of pipes, overhead tanks, and plumbing systems to reduce overflow, leakages, and corrosions.

In addition, the Science laboratories are following the principles of Green Chemistry to reduce chemical waste. The ambient air quality on the campus is good and the sound levels on the campus are also good. The university is also making efforts to spread environmental awareness among staff and students. In order to further improve the environment at Panjab University, it is recommended that the university should prepare an environmental policy document with all the recommendations and current practices in place. It should also conduct frequent visits to ensure that the generated waste is measured, monitored, and recorded regularly and information should be made available to the administration. Furthermore, the university should install solar panels and rainwater harvesting systems to every terrace of the building and also install solar distillation units in the Science laboratories. Finally, the university should ensure that it keeps the environmental quality at priority in every developmental stage.

The campus of Panjab University is well adapting the sustainable ways to utilize the natural resources. The university campus is well structured to manage the air, water, solid waste management. The green cover of university campus makes it more suitable for fresh resources of nature. The management authorities including other staffs are managing the environmental health of the campus by compliance with the government guidelines for waste management and taking the new initiatives to conserve the eco health.

## Web Links

S. N	Agreement name	Web Link
1.	Lifting of Municipal solid waste	<u><a href="#">MoU Radha Krishan Service Provider and Panjab University, Chandigarh</a></u>
2.	Agreement for E-waste recycling	<u><a href="#">MoU Exigo Recycling Private Limited and Panjab University, Chandigarh</a></u>
3.	Agreement for Bio-medical waste	<u><a href="#">MoU Alliance Envirocare Co Pvt LTD and Panjab University</a></u>
4	Expenditures towards waster structures and their maintenance	<u><a href="#">Invoice and audited statement of expenditure towards the structure establishment and maintenance</a></u>
5	National water award	<u><a href="#">National water awards 2018</a></u>
6	SWACHHTA Ranking	<u><a href="https://iqac.puchd.ac.in/naac-docs/c7/environment/swachh_rank.pdf">https://iqac.puchd.ac.in/naac-docs/c7/environment/swachh_rank.pdf</a></u> <u><a href="https://iqac.puchd.ac.in/naac-docs/c7/environment/swachh_rank.pdf">https://iqac.puchd.ac.in/naac-docs/c7/environment/swachh_rank.pdf</a></u>
7	Activities events under “Swatch Bharat Abhiyan”	<u><a href="https://iqac.puchd.ac.in/naac-docs/c7/environment/1Swachh-Bharat-ReportAug2017.pdf">https://iqac.puchd.ac.in/naac-docs/c7/environment/1Swachh-Bharat-ReportAug2017.pdf</a></u> <u><a href="https://iqac.puchd.ac.in/naac-docs/c7/environment/2Swachh-Bharat-Sep-Dec2017.pdf">https://iqac.puchd.ac.in/naac-docs/c7/environment/2Swachh-Bharat-Sep-Dec2017.pdf</a></u> <u><a href="https://iqac.puchd.ac.in/naac-docs/c7/environment/3Swachh-Bharat-(January2018-March2018).pdf">https://iqac.puchd.ac.in/naac-docs/c7/environment/3Swachh-Bharat-(January2018-March2018).pdf</a></u>
8	SOCIAL OUTREACH ACTIVITIES, AWARDS & GRANTS OF ENACTUS SSBUCET, PANJAB UNIVERSTY	<u><a href="https://iqac.puchd.ac.in/naac-docs/c7/environment/ENACTUS-2018-2022.pdf">https://iqac.puchd.ac.in/naac-docs/c7/environment/ENACTUS-2018-2022.pdf</a></u>
9	DEVELOPED IEC MATERIAL ON AWARENESS OF COVID-19 PANDEMIC: KIDS, VAAYU & CORONA COMIC BOOKLET	<u><a href="https://iqac.puchd.ac.in/naac-docs/c7/environment/Environment-Studies-Report.pdf">https://iqac.puchd.ac.in/naac-docs/c7/environment/Environment-Studies-Report.pdf</a></u>

	SERIES	
10	NSS National Service Scheme Report	<a href="https://iqac.puchd.ac.in/naac-docs/c7/environment/NSS-2020-21.pdf">https://iqac.puchd.ac.in/naac-docs/c7/environment/NSS-2020-21.pdf</a> <a href="https://iqac.puchd.ac.in/naac-docs/c7/environment/NSS-2021-22.pdf">https://iqac.puchd.ac.in/naac-docs/c7/environment/NSS-2021-22.pdf</a>
11	Rose Festival Award by Municipal Corporation, Chandigarh	<a href="https://iqac.puchd.ac.in/naac-docs/c7/environment/Rose-festival-2018.pdf">https://iqac.puchd.ac.in/naac-docs/c7/environment/Rose-festival-2018.pdf</a> <a href="https://iqac.puchd.ac.in/naac-docs/c7/environment/Rose-festival-2020.pdf">https://iqac.puchd.ac.in/naac-docs/c7/environment/Rose-festival-2020.pdf</a>
12	Chrysanthemum Award	<a href="https://iqac.puchd.ac.in/naac-docs/c7/environment/chrys-2019.pdf">https://iqac.puchd.ac.in/naac-docs/c7/environment/chrys-2019.pdf</a>

*Anuradha Sharma*  
Associate Director, IQAC  
Associate Director, IQAC  
Panjab University,  
Chandigarh.

*Sanjay Kumar*  
Director, IQAC  
Director,  
Internal Quality Assurance Cell  
Panjab University,  
Chandigarh

Verified

*Yam*  
28/3/23  
Registrar

Registrar,  
Panjab University,  
Chandigarh