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File No. IND.B.7.23.21H R1

GREEN CAMPUS AUDIT REPORT

PRESIDENCY UNIVERSITY

ITGALPUR, RAJANAKUNTE, YELAHANKA, BENGALURU 560064

3rd May 2023



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Audited & prepared by:	Validated by:	Revision Status	Date



ACKNOWLEDGEMENT

We are thankful to the Management of Presidency University for their kind co-operation during the Green Audit and appreciate the courtesy and cordiality extended to the Bureau Veritas auditor.

- Bureau Veritas (India) Pvt. Limited.

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GREEN AUDIT

Certificate



This is to certify that **Presidency University, Bangalore** has conducted, Green Audit in the academic year 2022 - 2023 to assess the green initiative planning, efforts, activities, implemented in the college campus like Plantation, Rainwater Harvesting, Plastic ban, Conservation of Energy, Energy Management and various Environmental Awareness activities. Bureau Veritas auditor **has** verified campus data of **Presidency University, Bangalore**. This Green Audit are also aimed to assess impact of green initiatives for maintenance of the campus eco-friendly.

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Save Energy save Nation





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CHAPTER-01

INTRODUCTION

1.1 Introduction of Green Audit

Green Audit is a process of systematic identification, quantification, recording, reporting, and analysis of components of the environmental diversity of an institute. It aims to analyze environmental practices within and outside of the concerned place, which will have an impact on the eco-friendly atmosphere. The green audit is a valuable means for a University to determine how and where they are using the most energy or water or other resources. The University can then consider how to implement changes and make savings. It can create health consciousness and promote environmental awareness, values, and ethics. It provides staff and students a better understanding of Green impact on campus. If self-inquiry is a natural and necessary outgrowth of quality education, it could also be stated that institutional self-inquiry is a natural and necessary outgrowth of a quality educational institution. Thus it is imperative that the University evaluate its own contributions toward a sustainable future. As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more prevalent.

The rapid urbanization and economic development at the local, regional, and global levels have led to several environmental and ecological crises. In this background, it becomes essential to adopt the system of the Green Campus for the institutes which will lead for sustainable development and at the same time reduce a sizable amount of atmospheric CO₂ from the environment. The National Assessment and Accreditation Council, New Delhi (NAAC) has made it mandatory that all Higher Educational Institutions should submit an annual Green Report. Moreover, it is part of the Corporate Social Responsibility of the Higher Educational Institutions to ensure that they contribute towards the reduction of global warming through carbon footprint reduction measures.



Figure 1: Details of Green initiative



1.2 Introduction of University

Presidency University, Bangalore located in Bangalore, Karnataka, India, which Design-Centric Learning at Presidency starts with engaging the learners to confront challenges. The learners will solve these challenges through analysis, reflection, ideation, synthesis, prototyping, and testing the impact. As the academic program progresses, these challenges change in terms of their scale, complexity, and ambiguity involved. Learners invest energy, time, and effort into these tasks. This approach leads them to ask questions and seek answers by reflection, collaboration, and interaction. The faculty members act as facilitators and collaborators in this endeavor, Learning at Presidency is just-in-time and not just-in-case.

Presidency University, Bangalore is a private university located in Itgalpur, Rajanakunte, Yelahanka, Bengaluru 560064 (10 kms from Yelahanka Town) 13.1682°N 77.5354°E. The University established in 2013 and commenced classes in 2015. The University is recognized by the University Grants Commission (UGC).

1.3 Green Steps Taken by University

Today, it's a noticeable fact that environmental science lessons are implemented beyond the classrooms and are practiced in our day-to-day lives. And leading from the front is our university campus. The climate of university is Tropical Wet and Dry. Nestled on a lush, green 64-acre campus in Bangalore, sustainability is a priority at Presidency. Everyone on campus has a part to play in green initiatives for improving our built environment and natural ecology.

Along with educational and technological evolution, Presidency University acknowledges the significance of an inspiring environment and puts in continuous efforts to build a Sustainable Campus. The University has successfully adopted and implemented best practices in the areas of sanitation, hygiene, waste management, water management, energy management, and greenery management.

To instill the values of social, economic, and environmental responsibility and make a meaningful impact, the university takes the following action steps:

- Develop 36 acres of green space within the campus and implement sustainable maintenance
- Promoting the use of a sustainable mode of transportation
- Use of bicycles for commuting within the campus
- Water conservation and rainwater harvesting for use on the campus
- Developing a separate land, 'Presidency Herbal Farm' for 20% of organic food produce
- Combat food waste and improve the overall waste management system focused on recycling
- Use of vermin compost to enhance soil fertility physically, chemically, and biologically
- Raise awareness of plastic pollution

1.4 Objective Of the Green Audit

In recent times, the Green Audit of an institution has been becoming a paramount important for self-assessment of the institution which reflects the role of the institution in mitigating the

present environmental problems. The University has been putting efforts to keep our environment clean since its inception. Therefore, the purpose of the present green audit is to identify, quantify, describe, and prioritize the framework of Environment Sustainability in compliance with the applicable regulations, policies, and standards. The main objectives of carrying out Green Audit are:

More efficient resource management

- 1 To provide a basis for improved sustainability
- 2 To maintained green campus
- 3 To enable waste management through reduction of waste
- 4 Generation, solid- waste and water recycling
- 5 To create plastic free campus and evolve health consciousness among the stakeholders
- 6 Recognize the cost saving methods through waste minimizing and Managing
- 7 Point out the prevailing and forthcoming complications
- 8 Authenticate conformity with the implemented laws Empower the organizations to frame a better environmental performance
- 9 Enhance the alertness for environmental guidelines and duties
- 10 Impart environmental education through systematic environmental Management approach and improving environmental standards
- 11 Financial savings through a reduction in resource use
- 12 Development of ownership, personal and social responsibility for the University and its environment
- 13 Developing an environmental ethic and value systems in youngsters
- 14 Green auditing should become a valuable tool in the management, And monitoring of environmental and sustainable development Programs of the University.

14.2 Pre-Audit Stage

A pre-audit meeting provided an opportunity to reinforce the scope and objectives of the audit and discussions were held on the practicalities associated with the audit. This meeting is an important prerequisite for the green audit because it is the first opportunity to meet the audited and deal with any concerns. It was held at Presidency University, Bangalore on 3th& 4th May , 2023. The meeting was an opportunity to gather information that the audit team can study before arriving on the site. The audit protocol and audit plan was handed over at this meeting and discussed in advance of the audit itself. In Presidency University, Bangalore pre-audit meeting was conducted Successfully and necessary documents were collected directly from the University before the initiation of the audit processes. Actual planning of audit processes were discussed in the pre-audit meeting. Audit team was also selected in this meeting with the help of staff and the University man Presidency University, Bangalore. The audit protocol and audit plan were handed over at this meeting and discussed in advance of the audit itself. The audit team worked together, under the leadership of the lead auditor, to ensure completion within the brief and scope of the audit.



14.3 Management's Commitment

The Management of the University has shown the commitment towards the green auditing during the pre-audit meeting. They were ready to encourage all green activities. It was decided to promote all activities that are environment friendly such as awareness programs on the environment, campus farming, planting More trees on the campus etc. after the green auditing. The management of the University was willing to formulate policies based on green auditing report.

14.4 Methodology

The purpose of the green audit is to ensure that the practices followed in the campus are in accordance with the Green Policy of the country. The methodology includes: collection of data, physical inspection of the campus, observation and review of the documentation and data analysis.

14.5 Duration of the green Audit

The Green audit field carried out the data collection was carried from 03th & 05th may , 2023

CHAPTER-02

GENERAL OVERVIEW OF THE CONCEPT OF LAND USE

2.1 Site Overview of the Land USE

Land use refers to man's activities and the various uses which are carried on and derived from land. Viewing the earth from space, it is now very crucial in man's activities on natural resource. In situations of rapid changes in land use, observations of the Earth from space give the information of human activities and utilization of the landscape.

Remote sensing and GIS techniques are now providing new tools for advanced land use mapping and planning. The collection of remotely sensed data facilitates the synoptic analyses of earth system, functions, patterning, and change in the local, regional as well as at global scales over time. Satellite imagery particularly is a valuable tool for generating land use map.



Figure 2: Presidency University, Bangalore Satellite View

2.2 Methodology Adopted for Land Use Mapping

Three types of data that are GPS points, field survey data and Google earth data for Geo referencing have been used in this study. Land use map of the study area have been prepared using the above three types of data with the help of Arc GIS Pro software.

2.3 Data Processing and Analysis

Land use map preparation is executed through the following steps:

Geo-coding and Geo referencing of satellite imageries by extracting the ground control points. Supervised classification was carried out with the aid of ground truth data collected during field survey. Scanning and digitization of maps and editing of all the Geo referenced maps were done using GIS. Data manipulation and analysis and linking the spatial data with the attribute data for creation of topology was carried out using GIS software. Creation of GIS output in the form of land use map showing various land use have been prepared. Therefore, attempt has been made in this study to map land use for Geography Department of with a view to detect the land consumption in the built-up land area using both remote sensing and GIS techniques.

2.4 Geographical Location with Campus Map is Scale

The University has a sprawling pollution-free campus spread over 64 acres of land in the heart of District. Presidency University is located in the city of Bangalore in India (Karnataka). The University was established in 2015 as a Private University vide Private Universities Act 41 of 2013 and operates from a single campus. The University campus has state of the art infrastructure and modern amenities

The present study revealed that the PU campus has a total of 64 acres of land of which 38.4 acres has green cover. It is found that a total of about 25 acres (~40% of total) are under the built-up category, of which academic departments administrative units and canteen form a significant part



Figure 3: Presidency University, Bangalore

2.5 Total Campus Building



Figure 4: Campus Building image

Table 1: Area Description Campus

Details of Built-up area

Total built-up plinth area **1476000**

Details of Open area	
Particulars	Sq.Ft.
Foot Ball Ground(Proposed)	4358
Volley Ball Court (Proposed)	3960
Basket Ball Court (2) (Proposed)	9716
Garden cum Students Canteen	15456
Garden 1	14563
Garden 2	19740
Garden 3	1937
Garden 4	1657
Garden 5	3993
Paved road.	49065
Garden 6	1872

The Ratio Of Open Space Area To Total Area

Ratio of open space towards total area: 60 %

Table 2: Open space Area Description

Space Name	Total area
Total Land Area 64 Acrs	258999.0 m ²
Green Cover Area 38.4	155399.3 m ²
The built-up category, of which academic departments administrative units and canteen form a significant part	103599.5 m ²

CHAPTER-03 PLANTATION

3.1 Plantation for Sustainability

University was established in the year 2015, has an eco-friendly environment. It has a long legacy of healthy environmental practices including periodic plantation, their preservation and maintenance. Its land use is such that about 60% of the total area is occupied by open land and plantation that generates a better and sustainable campus environment.

3.2 Flora Status of the Institution

The Presidency University is located in around 64 acres of Land in the heart of Clean and green city of Bangalore. Presidency University campus is surrounded by lush green scenic vegetation. Majority area is covered with landscaping and planted vegetation. After deducting the built-up area along with playgrounds, the projected area available to develop various types of flora is 25 acres. Floristic-Diversity is to enlist and enumerate the plant diversity of University campus

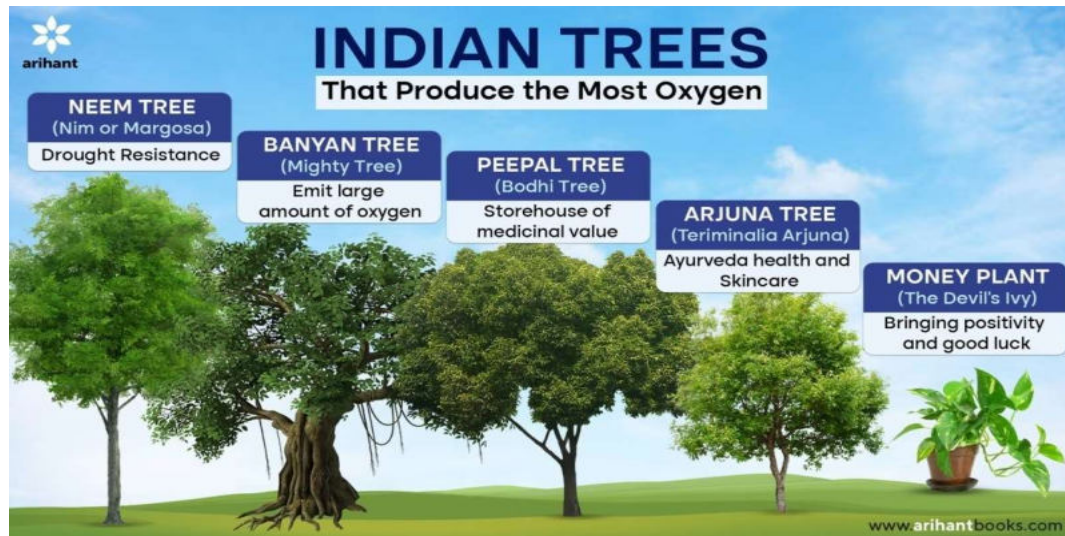


Figure 5: Indian trees for best oxygen generation

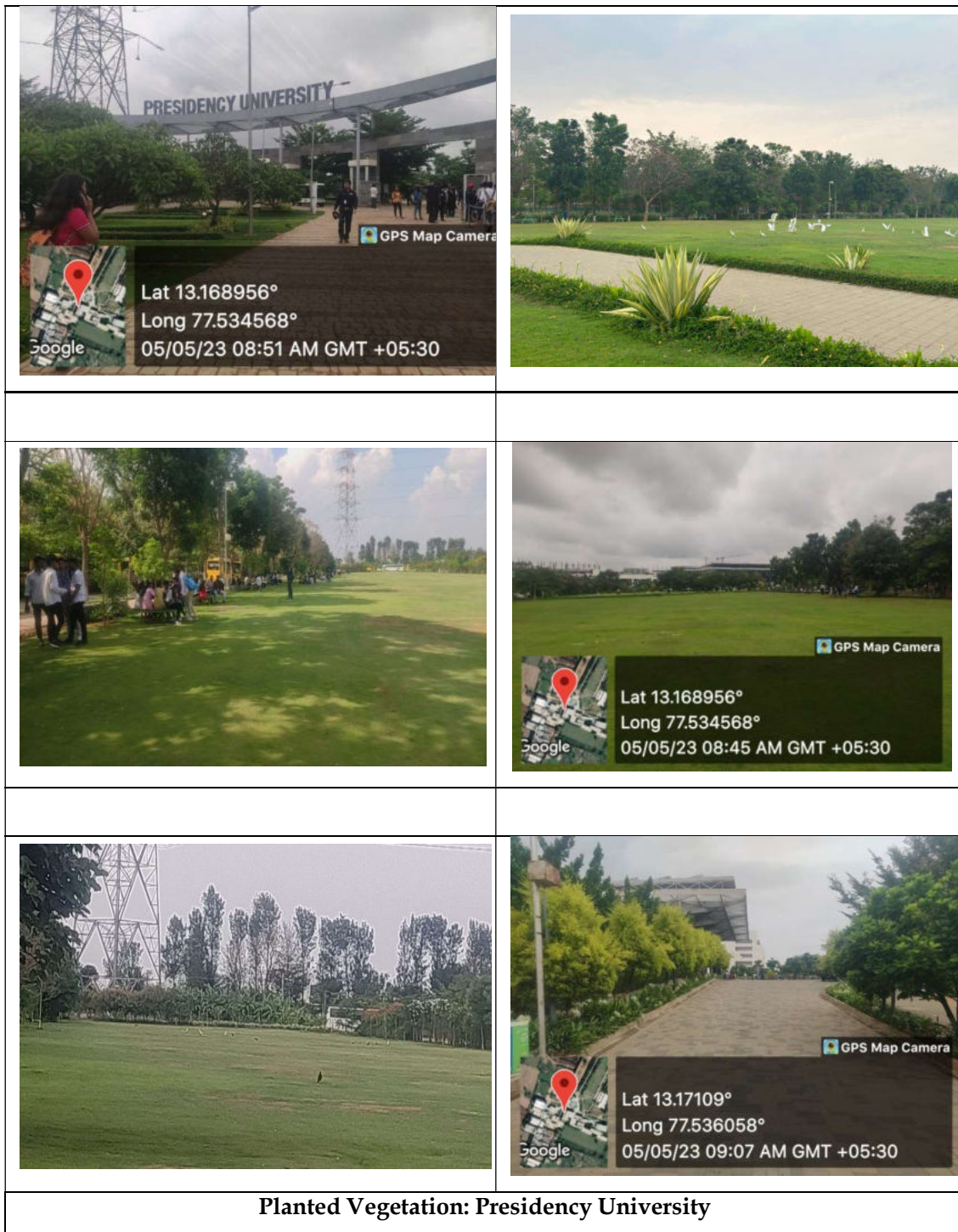







Figure 6: Total Area On Campus Covered In Planted Vegetation

- This is a continuous process and helps in maintenance and conservation of flora of campus.

Many trees, herbs, shrubs and grasses present in the campus which maintain the biodiversity. In addition to angiosperm plants other plant groups as lower plants, pteridophyta and gymnosperm. There are various kind of plantation programs are being organized at University campus. These kind of program helps in developing ecofriendly environment which provides pure oxygen to the nature and institute. The plantation program includes various types of indigenous species of ornamental and medicinal plants. Seed balls were also prepared and planted by students of the University.

a) Floral and Faunal Biodiversity in the Campus

Floral diversity:

		
Tabebuiaavellanadae	SwieteniaMahagani	SpethodeaCompanulata
		
CocosNucifera	Plumeriapudica	Tecomagauduchaudi
		
Milingtoniahortensis	Golden Melaleuca	Delonix regia
		
Peltophorum Pterocarpum	Alstonia scholaris,	



b) Forest And Planted Vegetation.

Example of Total area on campus for water absorption besides the forest and planted vegetation.

	
<p>Main Road</p>	<p>Outside Porch</p>
	
<p>Open area</p>	<p>Outside Porch</p>

Figure 7: Total Area On Campus For Water Absorption Besides The Forest And Nted Vegetation

Total **water absorption** area: Approx 70000 m², which is around Percentage area: 25.00 %

c) Herbal garden with various plant and herbs



Figure 8: herbal garden plant ,

Trees like *Anacardium occidentale*, *Artocarpus heterophyllus*, *Cassia siamea*, *Mangifera indica* and *Sapindus mukorossi* possess interesting qualities like size, high sequestration potential and better aesthetical values, making them good candidates for landscape designing. Overall, tree planting has helped to large transform the area into a verdant green campus. The campus is enriched with various plants of different habitat. The largest collection of trees in the campus may help to reduce the ambient temperature and keep the environment clean.

The floral diversity under different species groups is listed in Table. The list is based on the studies carried out by Horticulture department of Presidency university

Table 3: Nos of plant in the campus

Sl.no	Specifications	Number
1	Agathis robusta plant	10
2	Alstonia scholaris	29
3	Artocarpus integrifolia	3
4	Areca catechu	11
5	Bauhinia blakeana	4
6	Butea Monosperma,	2
7	Brassia actinophylla	8
8	Callistemon Citrinus,	11
9	Cassia marginata	
10	Clusia rosea	8
11	Cordia Sebestena	16
12	Couroubita guiensis	
13	Conocarpus erectus	9
14	Colovelvia racemosa	
15	Delonix regio (Gulmohar)	19
16	Erythrina Varigata,	5
17	Ficus Carica(Fig tree),	1
18	Ficus religiosa	1
19	Ficus Lyrata	6
20	Filicium Decipiens	60
21	Golden Melaleuca,	61
22	Jacaranda mimosifolia	6
23	Kegelia pinnata	5
24	Manikara soapota	10
25	Michello champoka	30
26	Mimusops Elengi,	21
27	Milingtonia hortensis	20
28	Phoenix Sylvestris	6
29	Peltophorum Pterocarpum,	12
30	Pisonia Alba	

Sl.no	Specifications	Number
31	Plumeria Obtusa	107
32	Plumeria Alba Americon dwarf	57
33	Plumeria pudica	77
34	Spethodea Companulata	20
35	Swietenia Mahagani,	48
36	Syzygium cumini	
37	Saraca asoca	6
38	Tabebuea rosea	103
39	Tabebuea impetiginosa	
40	Terminalia Mantaly	110
41	Ptychosperma Macarthurli	90
42	Ticoma	29
43	Caesalpenia pulcherima	81
44	Coconut	80
45	Neem	
46	Ongamare	14
47	Silverok	622
48	Tamarind	
49	Mango	2
50	Ashoka	2
51	Teak	285
Total	2107	

Table 4: Floral diversity

Sl.no	Specifications	Number
1	Bambusa Ventricosa	10
2	Black bamboo	29
3	Golden Bamboo	3
4	Chamaedorea Elegans,	11
5	Licuala Grandis,	4

Sl.no	Specifications	Number
6	Phyllostachys aurea	2
7	Raphis Excelsa	8
8	Yucca	11
9	Ficus Benjamina Prestigious Gold	9
	Total specimen shrubs	87
1	Allamonda nerifolia	197
2	Ficus panda	
3	Furcraea/ Agave angustifiliya	10
4	Hymenocallis speciosa	1044
5	Nerium oleander dwarf	
6	Pennisetum setaceum	102
7	Pennisetum moebeleni	
	Total small shrubs	1353
1	Alpinia zerumbet	
2	Aglaonema nitidum	844
3	Calathea lutea	
4	Cyperus papyrus	
5	Dracena marginata	32
6	Heliconia caribaeana dwarf	336
7	Heliconia psittacorum	110
8	Plumbago auriculata	
	Medium small shrubs	1322
1	Asparagus myyeri	
2	Asystasia gangetica var.	1270
3	Cuphea hyssopifolia	3154
4	Equisetum hyemale	788.4
5	Geranium	
6	Irisine herpsti	
7	Ixora dwarf plant	1740
8	Ophiopogon var.	
9	Peperomia variegated	
10	Pentas lanceolata mix colors	422
11	Philodendron cylon gold	
12	Philodendron selloum	
13	Jatropha dwarf red	2758

Sl.no	Specifications	Number
14	Rhoeo spathacea	
15	Russelia juncea	
16	Spathiphyllum	
17	Syngonium butterfly var.	
18	Yellow daisies	
19	Zephyanthus candida	
20	Altemanthera betzickion (green)	2460
21	Altemanthera betzickion (Red)	2712
22	AB green varicated	2872
23	Ipomea botatas gold	586
24	Ipomea botatas black	
26	Lantana sellowiana pink	1458
27	Pachy sandra terminallis green	
28	Tabernemontana coronaria var	
29	Wadelia trilobata	982
30	Verbeenas	
31	Aptenia cordifolia	424
32	Pandanus variegated	2161
33	Hydrangea	300
32	Pandanus variegated	4656
Total ground cover		28743.4

Table 5 Lawn cover area

Sl.no	Specifications	Area in Sqm
1	Mexican Grass	17117
2	Burmuda Grass	3996
	Total Lawn cover	21113

3.3 Tree Diversity and Carbon Stock In Presidency University Campus

Trees are the prevalent component of a terrestrial ecosystem. They provide benefiting function by accumulating atmospheric carbon. A total of 51 tree species with 2107 individuals were identified from Presidency University campus. The dominant family was silver oak (n=622) followed by Teak (n=285) and Terminalia mantaly (n=110). The total carbon sequestered in the entire area is 63.21 T as 6 T ha⁻¹. Silver oak is emerged as the highest biomass contributor due to its higher number of individuals. The study shows that the tree species found in the

campus make an important contribution in conserving diversity and helps to maintain the carbon stock in the University Campus.

The study concluded that tree species richness of the campus is important as it is playing vital role in carbon management.

Fertilizers and organic sprays used for maintenance of lawn and garden per year is approximately 660 kg and 52.5 l per year, as per the data provided by PU for the year 2020-2021. It is recommended to use Organic compost instead of NPK, Micronutrients, UREA etc as fertilizers.

Observations

- Fascinating characteristic of the Presidency University Campus is its lush green environment with rich floral and faunal diversity.
- Exotic species were observed
- Planted courtyards were observed along the campus
- Water quality for irrigation is to check periodically
- Fully automated irrigation system for entire landscape is done

Suggestions and Recommendations

- Geo tagging of all trees should be done.
- Students should be assigned plants to take care for.
- Each and every tree should be well documented.
- The ecosystem of the campus should be managed properly for a better environment.
- Proper landscape and long-term plan of the vegetational distribution/area is required for sustainable management of the trees and other vegetation in PU campus

3.4 Fauna Status of the university

Biodiversity is the part of the campus. A rich biodiversity not only provides the shelter to many species around the college but also take us closer to the nature and for a student it is very important to connect to nature at every level. The presidency university is home to many different species around the campus. It has a very rich biodiversity. It consists of the following different animals in the campus-

a) Family Bufonidae

- i. Common Toad (*Duttaphrynus Melanostictus*)

b) Family Dicroglossidae

- i. Common Bull Frog (*Hoplobatrachus Tigrinus*)
- ii. Common Skittering Frog (*Euphlyctis Cyanophlyctis*)
- iii. Burrowing Frog (*Sphaerotheca Braviceps*)

c) Family Rhacophoridae

- i. Common tree frog (*Polypedates maculatus*)

d) Lizard Family

- i. House wall lizard (*Hemidactylus flaviviridis*)
- ii. Common Bark Gecko (*Hemidactylus leschenaultia*)
- iii. Brahmini (*Lygosoma punctata*)
- iv. Many keeled grass skink (*Eutrophics carinata*)
- v. Goh or Goyra or Monitor lizard (*Varanus bengalensis*)

vi. Girgit or Garden lizard (*Calottes versicolor*)

e) **Reptiles Family**

i Indian Rat Snake - (*Ptyas Mucosa*)


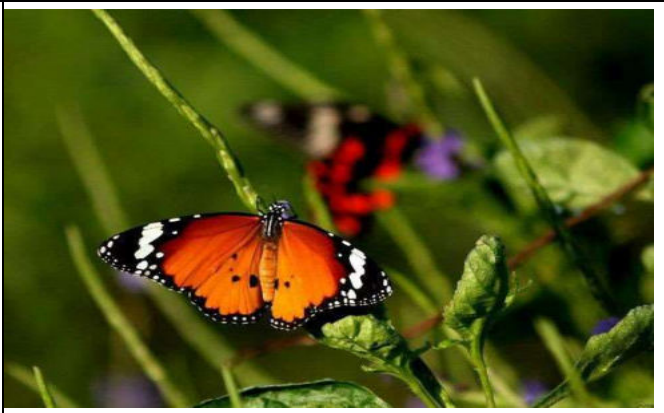
ii Cobra - (*Serpentis*)



f) **Birds in the Campus**




Various type of bird is also present in the campus. List of all the birds in the campus is given below:




The faunal diversity under different species groups



Table 6: List of Fauna

<p>1.</p>	<p>Scientific Name: - <i>Tinea sp.</i> Common Name: - Cloth Moth Classification: Phylum-Arthropoda Class- Insecta Order- Lepidoptera Genus-<i>Tinea</i></p>	
<p>2.</p>	<p>Scientific Name: - <i>Papilio sp.</i> Common Name: - Butterfly Classification: Phylum-Arthropoda Class- Insecta Order- Lepidoptera Genus-<i>Papilio</i></p>	

<p>3.</p>	<p>Scientific Name: - <i>Helix</i> <i>sp.</i> Common Name:- Gardensnail Classification: Phylum-Mollusca Class-Gastropoda Order-Stylommalophora Genus-<i>Helix</i></p>	
<p>4.</p>	<p>Scientific Name: - <i>Rana sp.</i> Common Name: - Frog Classification: Phylum- Chordata Class- Amphibia Order- Anura Genus- <i>Rana</i></p>	
<p>5.</p>	<p>Scientific Name: - <i>Calotes sp.</i> Common Name:- Bloodsucker Classification: Phylum- Chordata Class- Reptilia Order-Lepidoptera Genus-<i>Calotes</i></p>	

<p>6.</p>	<p>ScientificName:- <i>Hemidactylussp. Common</i> Name: - Wall lizard Classification: Phylum- Chordata Class- Reptilia Order- Lepidoptera Genus-<i>Hemidactylus</i></p>	
<p>7.</p>	<p>Scientific Name: - <i>Passer sp.</i> Common Name:-House sparrow or Gauriya Classification: Phylum-Chordata Class-Aves Order-Passeriformes Genus-<i>Passer</i></p>	
<p>8.</p>	<p>Scientific Name: - <i>Columba sp.</i> Common Name:- Bluerock pigeon or Kabutar Classification: Phylum-Chordata Class-Aves Order-Columbiformes Genus-<i>Columba</i></p>	

<p>9.</p>	<p>Scientific Name: - <i>Psittacula sp.</i> Common Name: - Hiramantota Classification: Phylum-Chordata Class-Aves Order-Psittaciformes Genus-<i>Psittacula</i></p>	
<p>10.</p>	<p>Scientific Name: - <i>Corvus sp.</i> Common Name: - Crow or Kag Classification: Phylum-Chordata Class-Aves Order-Passeriformes Genus-<i>Corvus</i></p>	
<p>11.</p>	<p>Scientific Name: - <i>Pteropus sp.</i> Common Name: - Fruit bat or Chamgadar Classification: Phylum- Chordata Class- Mammalia Order- Chiroptera Genus-<i>Pteropus</i></p>	

<p>12. Scientific Name: - <i>Funambulus sp.</i> Common Name: - Gilhari Classification: Phylum- Chordata Class- Mammalia Order- Rodentia Genus- <i>Funambulus</i></p>	
<p>13. Scientific Name: - <i>Rattus sp.</i> Common Name: - Black rat Classification: Phylum- Chordata Class- Mammalia Order- Rodentia Genus- <i>Rattus</i></p>	

Faunal diversity

The faunal diversity under different species groups is listed in Table 7

Table 7: Faunal diversity

Sl no	Particular
Birds	
1	Acridotherestrictis
2	Corvussplendens
3	Spilopeliachinensis
4	Athenebrama
5	Psittaculakrameri
6	Pycnonotusjocosus



Sl no	Particular
7	Halcyon smyrnensis
8	Dendrocittavagabunda
9	Pycnonotuscafer
10	Columba livia
11	Dicrurusmacrocerus
12	Orioluskundoo
13	Eudynamysscolopaceus
14	Milvusmigrans
15	Passer domesticus
16	Ariadne merione
Butterflies	
17	Tirumalalimniace
18	Euthaliaaconthea
19	Mycalesisperseus
20	Melanitiseda
21	Euremahecabe
22	Papiliopolytes
23	Elymniashypermnestra
24	Delias eucharis
25	Euchrysopschejus
26	Danauschrysippus
Ants and wasps	
27	Camponotuswasmani
28	Crematogastersp.
29	Meranoplus bicolor
30	Solenopsisgeminata
31	Plagiolepislongipes
32	Oecophyllasmaragdina
33	Ropalidiaartifex
34	Odynerusfistulosus
35	Scoliaobscura



Observations and Recommendations:

- Biodiversity of the campus is very rich.
- Maximum possible animals should be identified.
- All the identified animals should be well documented.
- Students should be aware about the fauna diversity of the college
- Natural treatment is required for water and wastewater

CHAPTER-04

ENERGY AND CLIMATE CHANGE

4.1 Energy and Climate change

Presidency University aims to utilise energy efficient appliances. All the lights in the University campus are LED lights thereby maximising energy efficiency. Street lights are also energy efficient. Exhaust fans installed at various locations too are energy efficient. Being a green building effort have been taken to maximise use of solar energy. University campus is spread into an area of 64 acres.

4.2 Renewable Energy Sources in Campus

Solar power plant 230 KW has been recently installed in the campus of the University. All building design are very good for natural light in the room and corridor and other area to minimize the energy load. air ventilation is best in all the building and campus.

Table 8: Renewable Sources at Presidency

University



Energy efficient street lights (Presidency University, Bangalore, India)



Solar power plants (Presidency University, Bangalore, India)

1. Solar energy panels are installed over the buildings. .
2. Solar Energy Panels is also Installed at the roof of the building that producing clean energy.

Table 9: Energy Efficient

Appliances

Appliance	Percentage
LED Light	100%
Solar power plant	10%
Energy efficient Street light	100%
HVAC	40%

4.3 Smart building and Implementation

Six requirements for each building:

- 1 Automation
- 2 Safety
- 3 Energy
- 4 Water
- 5 Indoor Environment
- 6 Lighting

Note: One building could be classified as a smart building if it has a minimum of 5 features. Please add the total smart building area from buildings which are classified as smart buildings.

4.3 Electricity Usage per year in kWh

Table 10: Electricity Usage per year in kWh

Eenergy Bill & Solar Power System (230 kW)					
Parameter	BESCOM Units kWh Consumption	BESCOM Billing Amount Rs	Solar Generation kWh	Actual Consumption kWh	Solar Exporting kWh
Total	1153160	12742263	125609.91	1278769.91	5395.5
Unit Cost Rs 10 kWh Maximum Demand (MD) : 600 kW Contract Demand : 400 kVA Solar Export around 4 %					

The total electricity usage of the Presidency Campus is **1153160 kWh**. Electricity is used for cooling and use of appliances/machinery in main building as well as in the workshops/studios.

Presidency University, Bangalore, India has secured “Energy Efficient Building” certification for the construction of energy efficient building in 2015.

Maximum utilisation of solar energy is being done by utilising glass panes for light. Plants are installed at various locations in the University for purification of air. Good wind pressure helps in cooling.

4.4 Green House Gas Reduction Program





	
<p>1. Shuttle Service (Presidency University, Bangalore, India)</p>	<p>2. renewable energy (Presidency University, Bangalore, India)</p>
	
<p>3. Use of Bicycles inside the campus for commuting</p>	<p>4.Solar PowerGeneration</p>

Figure 9: Green House Gas Reduction Program

- Shuttle service for employees and students to reduce usage of vehicles on campus.
- Usage of Solar energy
- Use of bicycle inside the campus for commuting.
- Solar Generation

1.5 Total Carbon Footprint(CO₂ Emission in the Last 12 Months,in Metric tons)

Option 2: Recommended by UI GreenMetric

$$\text{CO}_2 \text{ (electricity)} = \frac{\text{electricity usage per year (kWh)}}{1000} \times 0.84 = \frac{809460\text{kWh}}{1000} \times 0.84$$

$$= 679.95 \text{ metric tons}$$

CO₂ (bus)

$$\frac{\text{number of shuttle bus in your university} \times \text{total trips for shuttle bus service each day} \times \text{approximate travel distance of vehicle each day inside campus only (KM)} \times 240 \times 0.01}{100}$$

$$= \frac{3 \times 3 \times 4 \times 240}{100} \times 0.01$$

$$= 0.864 \text{ metric tons}$$

CO₂ (cars)

$$\frac{\text{number of cars entering your university} \times 2 \times \text{approximate travel distance of vehicle each day inside campus only (KM)} \times 240 \times 0.02}{100}$$

$$= \frac{30 \times 2 \times 3 \times 240}{100} \times 0.02$$

$$= 8.64 \text{ metric tons}$$

CO₂ (motorcycle) =

$$\frac{\text{number of motorcycle entering your university} \times 2 \times \text{approximate travel distance of vehicle each day inside campus only (KM)} \times 240}{100} \times 0.01$$

$$= \frac{110 \times 2 \times 6 \times 240}{100} \times 0.01$$

$$= 31.68 \text{ metric tons}$$

CO₂ (total) =

$$= 679.95 + 0.864 + 8.64 + 31.68$$

$$= 721.134 \text{ metric tons}$$

Carbon footprint in 2022 =721.134 metric tons

At Presidency University we strive to reduce the carbon footprint by using less electricity, Carpooling is done by faculty who commute daily. Bus shuttle facility is available for use of faculty and students thereby minimising the use of private vehicles. Bicycles are provided inside the campus for commuting.

4.6 Number of Innovative Program in Energy and Climate Change

- At Presidency University we use Biometric enabled door opening system which enables us to maintain the indoor temperature efficiently.
- Plants are planted in every floor of the University building to ensure that there is proper oxygenation inside.
- In place of solid walls, glass partitions are available to maximise the use of natural light.



Indoor plants for maintaining the oxygen level and promoting sustainability



Glass partitions throughout building to save energy and maximise natural light resource and natural cooling

Figure 10: Number of Innovative Program in Energy and Climate change

CHAPTER-05

WASTE MANAGEMENT & RECYCLING PROGRAM

5.1 Impactful University Program(s) on Climate change

Waste cannot be avoided in any environment. Wastes can be classified as Biodegradable and No biodegradable wastes. Biodegradable wastes include food wastes; which can be easily decomposed by the bacteria in the soil. But no biodegradable wastes are those which cannot be degraded by any Organism and remain as such for many years. Much amount of waste is generated from the college campus.

- a) **CANTEEN:** The food waste generated from the canteen and Hostel is collected and given to animal's waste is generally less generated from the canteen. The plastic waste generated is collected by staff of IMC
- b) **LIBRARY:** The most generated waste is paper waste. It is taken for recycling.
- c) **OFFICE:** Paper waste generated is recycled and reused.
- d) **GARDEN:** Plastic and paper waste is comparatively less.
- e) **AUDITORIUM:** The wastes are collected after each program to collected and given to M.C.I. Vehicles
- f) **BATHROOM:** The wastes are collected in dust been and collected by M.C.I
- g) **CLASSROOMS:** Paper Wastes are collected in the wastebasket and recycled.
- h) **LABORATORY:** The broken glass wastes and useless instruments are disposed of for recycling after thorough washing.
- i) **COLLEGE PREMISES:** Plastic waste generated is usually less. But paper waste is generated in a larger amount by students.

5.2 Recycling Program for University waste

- Presidency University has an organic waste recycling program, all the organic waste is converted into compost using vermiculture technique.
- Dry and wet waste segregation is done, and the waste is disposed off accordingly.
- At various locations, red dustbins are installed. The e-waste is then disposed appropriately.



Organic Waste Recycling



Separate dustbins for Wet and Dry Waste



dustbin for E-Waste segregation & medical waste

Figure 11: Recycling Program for University Waste

5.3 Program to Reduce the use of Paper and Plastic on Campus

- Presidency University is technology friendly and uses technological interventions in majority of its operations. Attendance is monitored through using Zoho people application thereby reducing the need for maintaining physical attendance registers.
- Presidency University advocates paperless systems. Majority of the communications take place through Slack communication channel and via emails thereby avoiding unnecessary printing and wastage of paper.
- The University strategic plan too has sustainability goals incorporated in it.
- Student enrolment is also done using a in house developed software called “My Presidency”.

5.4 Organic Waste Treatment

At Presidency University, Organic waste is produced in the cafeteria and mess. The organic waste is then segregated and transferred to vermin culture facility. The vermin compost prepared is used for organic farming on campus.

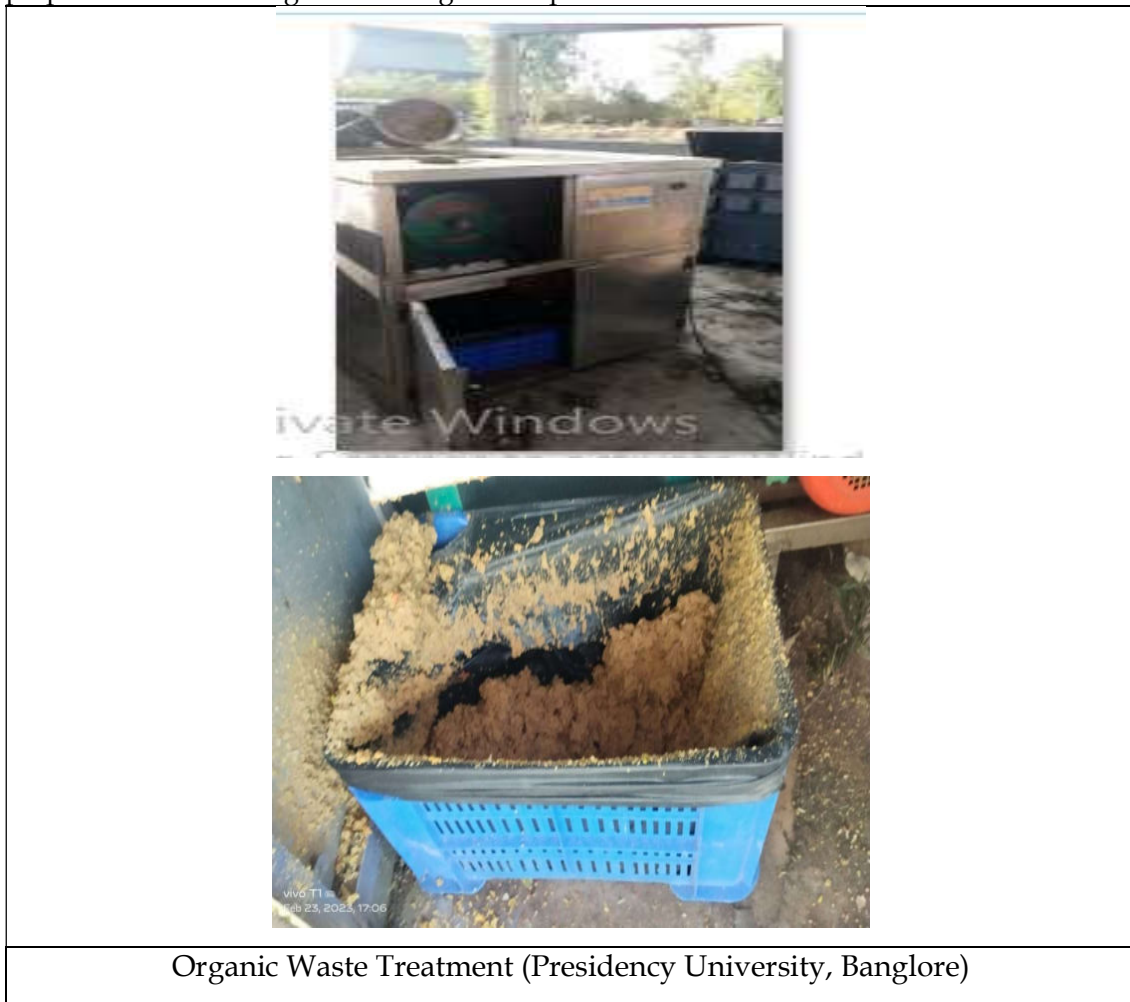


Figure 12: Organic Waste Treatment

5.5 Inorganic and Toxic Waste Treatment

- Red dustbins are used for e-waste segregation at Presidency University. The e-waste is then disposed appropriately.
- Presidency University as such does not produce any toxic waste products, however the waste from power backup unit is collected and handed over to local municipal corporation to be disposed off appropriately.



Inorganic and Toxic Waste treatment

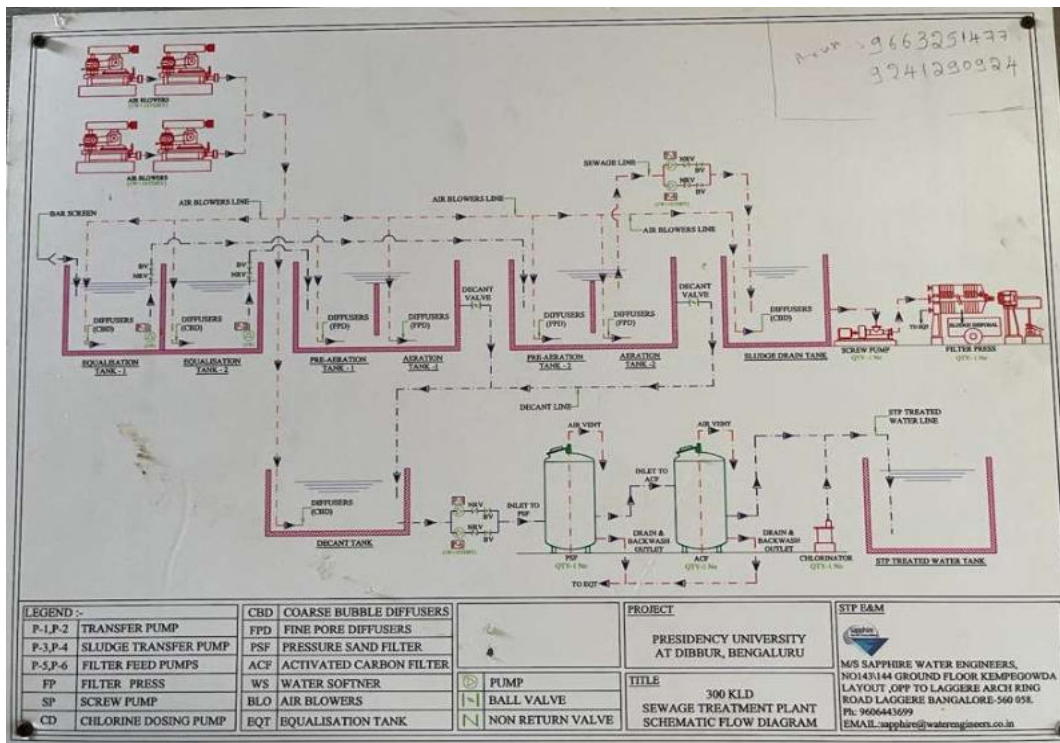
Figure 13: Inorganic Waste Treatment

5.6 Sewage Disposal

Sewage treatment plant is installed at Presidency University, the sewage water is passed through various treatment processes and the treated water is then used for organic farming. It helps to Water Pollution Control at University campus and Recycle the water and used for organic farming and gardening in the university campus.



Sewage Treatment Plant 300 KLD



Sewage Treatment Plant Layout

Figure 14: Sewage Treatment Plant

5.7 Water Conservation Program implementation

- Presidency University is situated in Central India in the state of Karnataka and has ample rainfall. The rainwater thus collected on terrace top is collected in pits with the help of pipe system.
- Presidency University has approximately 07 recharge pits at various locations in the campus for increasing the ground water table.
- At various locations, ponds have been constructed in order to conserve water. These ponds also serve as a water source for migratory birds.

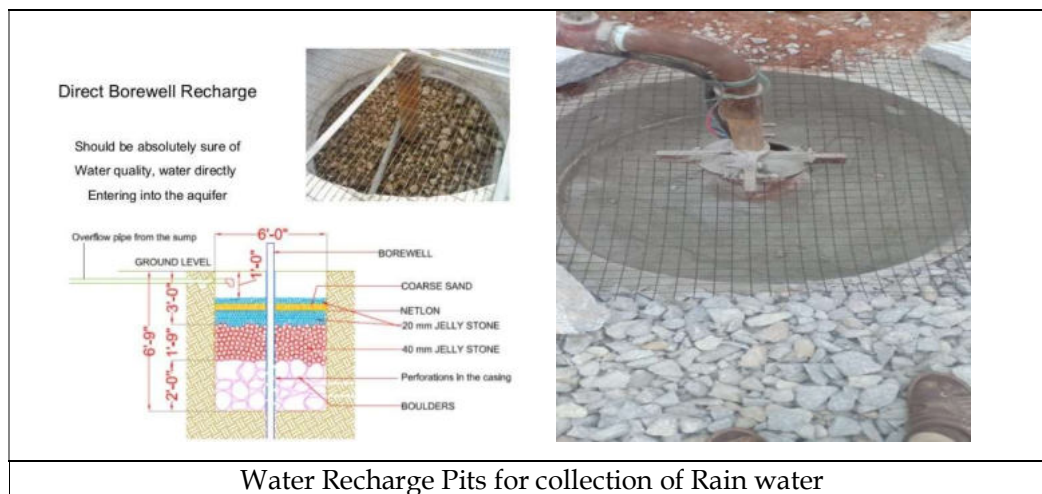


Figure 15: Rain Water Harvesting

5.8 Water Conservation appliances usage

At Presidency University Campus Automatic flush system is installed in the urinals for saving water and hand water taps are also conserve water.

5.9 Consumption of RO Treated Water

- Presidency University has a huge Reverse Osmosis Water treatment plant.
- Treated water is used for drinking purposes by faculty/staff and students.
- Water coolers and tanks are installed on every floor of the University building as well as the hostels and cafeteria.

CHAPTER-06

SUSTAINABLE TRANSPORTATION

6.1 Sustainable Transportations and Carbon Footprint

The release of carbon dioxide gas into the Earth's atmosphere through human activities is commonly known as carbon emissions. An important aspect of doing an audit is to be able to measure your impact so that we can determine better ways to manage the impact. In addition to the water, waste, energy and biodiversity audits we can also determine what our carbon footprint is, based on the amount of carbon emissions created. One aspect is to consider the distance and method traveled between home and University every day. Our University is exposed to various atmospheric pollutants from vehicles as well as by other external means

a) Vehicles

On the days of data collection, there were 34 cars and 110 bikes in our campus, which in turn proves us that these vehicles may contribute to high carbon dioxide emission.

Table 11: Total Number of Vehicles

No.	Vehicle	Total Number
1	Car managed by the university	04
2	Cars entering the university	30
3	Motorcycles entering the university	110
	Total	144

The total number of vehicles (cars and motorcycles) divided by total campus' Population
 $= 144/846 = 0.17$

i. Bicycles:

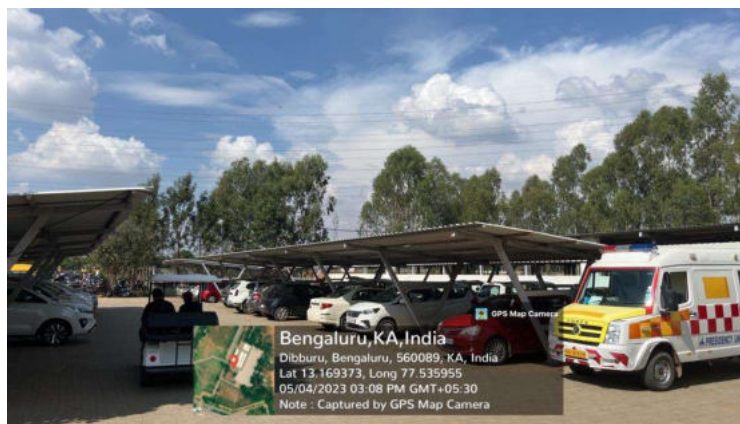
- Presidency University advocates use of bicycle within the campus. This promotes lesser carbon footprint as well as maintains health. All pathways are pedestrian as well as cycle friendly.
- Students use bicycles and a couple of staff members also use cycle as a way of transport. University has provided separate covered parking lot for 2 wheelers and bicycles. Average 110 two-wheelers are seen in University parking which is too low of the entire students remaining come through public conveyance.
- Events such as International Bicycle Day are regularly observed on campus.

6.2 Use of Public Transport

Presidency University campus is 15kms away from the hustle and bustle of the Bangalore city. The University operates 3 shuttle services from the city till the campus. Shuttle service is also available for students to run errands in the city.

Most of the students use conveyance for travelling since the school is well connected by conveyance

secrecies as local bus company use of Bicycles and conveyance is inspired by the institute amongst the scholars, faculty members, office staff residing nearby are encouraged to return by bicycles, or conveyance which helps in reducing the discharge of carbon-dioxide within the campus.



Parking area



Figure 16: Parking Area at Presidency Campus

6.3 Program to Limit or Decrease Parking Area on Campus for the Last 3 Years (2018 to 2020)

- Shuttle service is provided for faculty and students thereby decreasing the use of more vehicles.
- Free Bicycles are provided for in campus commuting thereby promoting good health.
- Carpool facility is there amongst faculty thereby decreasing the use of more vehicles.



Shuttle service



Ele -Bicycles for Campus use



Carpool

Figure 17: Program to limit Parking Area at Presidency

6.4 Pedestrian Path Policies on Campus

- Well developed pedestrian pathway from entrance till all buildings.
- Benches for resting midway.
- walking track for maintaining health.
- Well lit campus with LED street light for night pedestrians.



Entrance track



Pedestrian friendly pathway with benches midway or resting

Well-connected roads and pedestrian pathway



Well lit pedestrian pathway at night

Figure 18: Path ways and Pedestrian at Presidency University

CHAPTER-07

WATER MANAGEMENT

7.1 Details Water Management

A water audit is an onsite survey and assessment to determine the water use and improving the efficiency of water use. Conducting a water audit involves calculating water use and identifying simple ways for saving water in the institution on Home. Details of borewell and storages tank is given below

Table 12: Total Number of borewell

Borewell Details					
Borewell SL No	Location	Capacity	UOM	Quantity	Borewell pipe length in feet
1	Main Gate	20	HP	1	1040
2	Near Admin G Block	20	HP	1	1080
3	Near MBA Block canteen	7.5	HP	1	1000
4	Jungle borewell	17.5	HP	1	1000
5	Near Cicon labour Shed	15	HP	1	1100
6	Ramesh Galappa	NA	HP	1	NA
7	Near Cicon Gate	15	HP	1	500
Tank Details -2022					
S L NO	QUANTITY	CAPACITY	UOM	TYPE	
1	1	750	liters	sintex	
2	3	1000	liters	sintex	
3	4	2000	liters	sintex	
4	18	5000	liters	sintex	
5	5	10000	liters	sintex	
6	1	115000	liters	sump	
7	3	150000	liters	sump	

Presidency university with a student and staff population is estimated to consume 650 KLD or 195 million liters annually (as per NBC guidelines- 45lpcd). As per the data provided by the Presidency university, total water consumption in a campus is 350 KLD for academic and 150 KLD for irrigation. It is reported that the water tanks are filled once a day.

The wastewater generated in the University campus is treated in campus and the treated water is used for watering of garden area . As per the information provided by the University, a 300KLD STP is installed, treated water is used is mostly in garden

irrigation with fully automated irrigation system ,but is RO reject and the some wastewater generated is being drained out into the public sewers. However, this 300 KLD is not sufficient to treat the 650 KLD sewage estimated to be generated in the campus. Hence, there is a gap of 350 KLD, which is untreated sewage which is being let out from the campus,The quantity of wastewater generated in the campus is assessed as per IS standards (IS 9868/1981)which is 45 litres per day per person.

Rain water harvesting project is started by the university by recharge pit is constructed in to borewells , still channelizing is required for borewell. Our recommendation to make complete survey for water recharging design for campus and building
It is observed that the PU installed Drip Irrigation system which is water efficient for gardening/horticulture. **The drip irrigation system will save 30-50% of water.** By installed drip irrigation system, the requirement of water for greenbelt (horticulture) could be met from available recycled / treated wastewater.

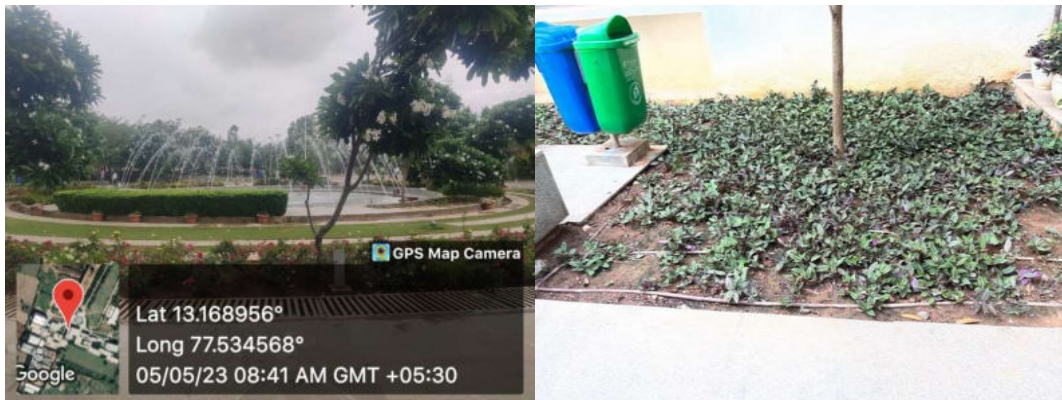


Figure 19: Treated Water Line for irrigation

Ideas regarding Water Saving University is:

- 1 By Tap water leakage control.
- 2 Use of minimum water needed for daily use.
- 3 Open the tap less while washing hands.
- 4 Turn off the taps after use closely & lightly.
- 5 Install rainwater tanks.
- 6 Use of water ball for water tanks to prevent overflow of water.
- 7 Use of solar pumping system so as to save fuel and electricity to save water
- 8 Saving water helps to reassure our environment. It reduces the energy required to process and deliver water which helps in counseling resources.

8.1 Key Finding

Main water uses in the campus

- 1 Garden

- 2 Lab
- 3 Drinking
- 4 Cleaning
- 5 Washing
- 6 Toilets
- 7 Hostel
- 8 Canteen
- 9 Staff Question

Reasons for water wastage

1. Leakages from taps
2. Overuse of water
3. Overflow of water tanks
4. Gardening with pipe instead of sprinkle system
5. Other reasons-

9.1 Observation & Recommendation

- There is no water consumption monitoring system in the University campus.'
- The University does not have sufficient wastewater treatment plant for water waste, generated from laboratories, canteen, Hostels.
- There is no rain harvesting system in building. Need of more system in every building of university.
- Automatic switching system is not installed for pump sets used for overhead tank filling.
- Display board against the misuse of water & water leakage
- It is suggested to install following water efficient fixtures in the buildings to save domestic water consumption. Overall, 15-20% domestic water consumption will be reduced by installing and maintaining suggested fixtures:

Retrofit flow restrictors in hand washing taps and other taps: Retrofit high flow rate hand washing taps with 'aerators and flow restrictors' so as to have 3-5 lpm flow rate in hand washing taps and 7 lpm flow rate in pantry and other taps in the buildings.



Figure 20: Details Analysis Of Water Audit Trap

- **Stop use of filtered water in toilet flushing, instead use recycled, treated wastewater or raw water.** It is suggested to use low quality water for flushing instead of good quality filtered water.
- **Install 'Tank Bank (For Flush Tanks)' or install with Water efficient flushes with dual flush Cistern 3-6 litres capacity flush tanks** - In toilets filtered groundwater is used for flushing and about 7-10 litres of freshwater is flushed per flush. To reduce the flushing water per flush, it is suggested to install scientifically designed easy to install 'Tank-Bank' in the existing flush tanks. By just placing tank bank in the flush tank, we displace and save water equal to the space occupied by the tank bank for every flush. This will save about 20% of flush water in toilets. However, the existing 7-10 litres flush tanks can also be replaced by Water efficient flushes with dual flush Cistern 3-6 litres capacity flush tanks to save water. This will save about 40% of the flush water in toilets.
 - Remove damage taps and install sensitive taps if possible
 - Drip irrigation for gardens and vegetable levitation can be initiated.
 - Water treatment system for Lab water.
 - Awareness program on water conservation to be continue.
 - Install display boards to control over exploitation of water.
 - Sensors should be fitted in all taps.

CHAPTER-08

SOLAR POWER PLANT

9.1 Solar Power Plant:

The survey has been completed there are available sufficient area on main building roof and hostel roof area in premises of institute, and it is suggested to install 230 kW solar plant on building roof area, Details are given below :

Solar Power plant commissioning has been done on Oct 17th 2022				
Month	Solar Units Generation	Solar Exports units	Bescom units used	Bescom bill amount
Oct-22	449.9	NA	68960	1174182
Nov-22	20512	NA	76680	841726
Dec-22	15600	181.5	50400	564991
Jan-23	26264	1840	58540	620033
Feb-23	30120	1454	63220	662582
Mar-23	32664	1920	97140	969460
Total	125609.9	5395.5	414940	4832974

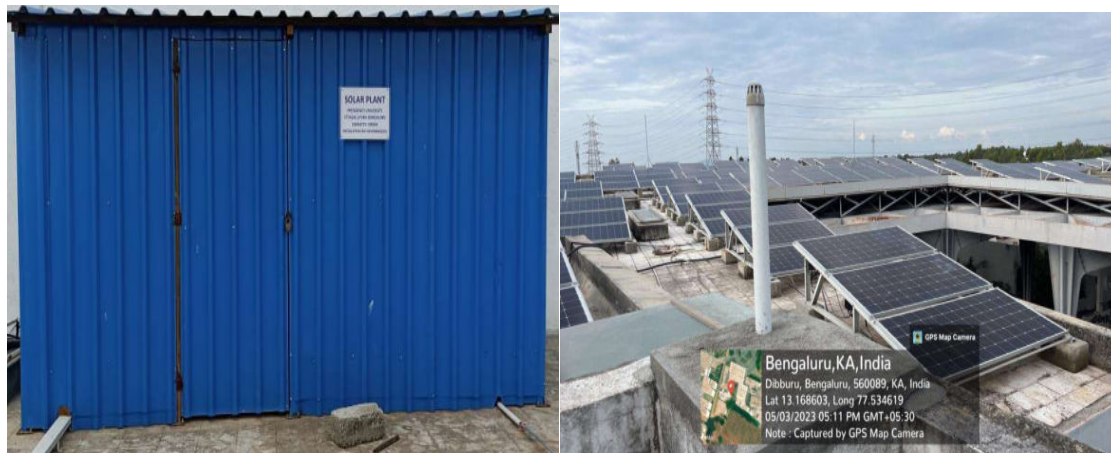


Figure 21: Details of Roof Top Solar Photovoltaic

Currently there is Roof Top Solar provisions at the college campus. The Presidency University has installed capacity is 230 Kw it has generated 1.25 lacs units form oct 22 to March 2023, It contribute 10 % of electric consumption.

The Presidency Universityhas ~138053 Sqm of roof area. Assuming even 7-10 % of the roof is dedicated to SPV, there is a potential to install nearly 1400 kWp of roof top grid connected

SPV. This has a potential to generate about 5400 units every day or nearly 156000 kWh monthly. This can almost bring Presidency University to a net zero consumer, as per demand is increase by almost 40%. The Presidency University make a five-year plan to achieve this, The Presidency University make a next year plan to go for 330 Kw solar power will contribute 25% of exiting use.

Table 13: Available area on building roof for solar plant installation

S. No.	Buildings	Roof top area (m ²)	Recommended PV Solar plants(KW)
01	Total Roof Top Area Required	3300	330

Table 14: 330 kW Solar Power Plant Available area on building roof for solar plant installation

S. No	Parameters	Unit	Value
1	Suggestion to install Capacity of Solar Power Plant	KW	330
2	Available Building roof Area (10 m ² /kW)	m ²	3300
3	Average solar power unit (kWh) generation per day per kW	kWh /kW / day	5
4	Total Average solar power unit (kWh) generation per day per kW	kWh / day	1650
5	Annul Solar Power Generation for approximately 300 day	kWh /Year	495000
6	Electricity Charges as per electricity bill	Rs./KWh	9.68
7	Solar Power plant Costing	Rs /kW	50000
8	Average Total amount of Annual Solar Energy Generation	Rs. Lakhs/Year	48
9	Monthly Monetary Savings	Rs. Lakhs/month	4.0
10	Investment Required @ Rs. 0.50 Lakh/KW	Rs. Lakhs	165
11	Max Depreciation in 1st year @60%	Rs. Lakhs	99
12	Tax Saved through depreciation @ 30% income tax rate	Rs. Lakhs	30
13	Net Cost of Solar PV Plant	Rs. Lakhs	135
14	Simple Payback Period with depreciation	Years	2.8
	Simple Payback Period without depreciation	Years	3.4
15	Estimated Life of proposed system	Years	25
16	Depreciation Cost (Investment/ Estimated life of proposed system)	Rs. Lakhs	7
17	ROI {(Net annual savings - Depreciation cost)/ Investment} x 100%	%	25%
18	Emission Reduction per Year (We take CO2 emission factor =0.85/kWh)	(tonne-CO2 per Year	421
19	Total Emission Reduction during 25 Year life cycle of Solar Power Plant)	(tonne-CO2) for 25 Year	10519

- It is advise to use direct solar pumping at various location like STP , overhead filling , gardening

Figure 22: Solar water pump





PRESIDENCY UNIVERSITY

(Private University Estd. in Karnataka State by Act No.41 of 2013)



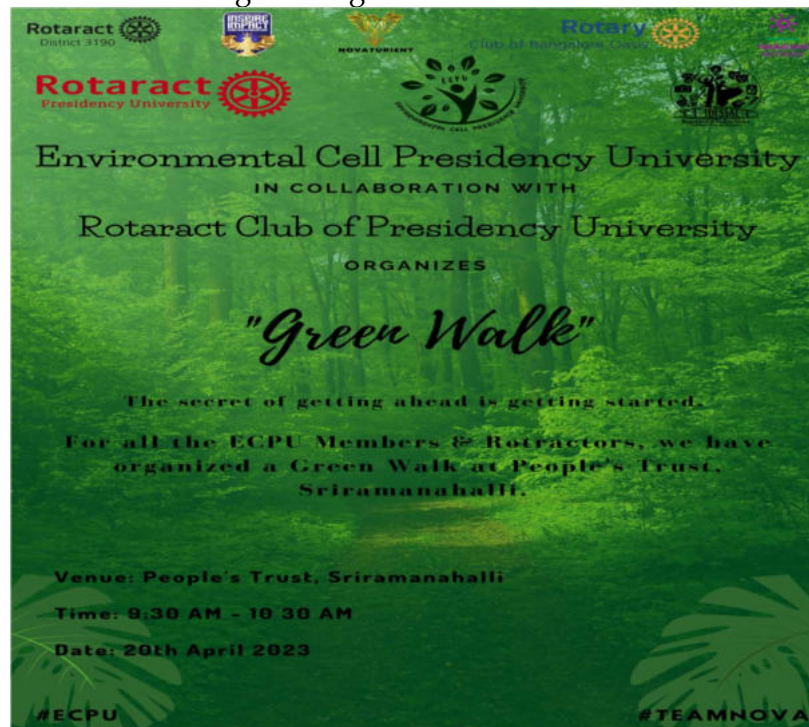
Green Walk

DATE: 20-04-2023

We Environmental Cell of Presidency University in collaboration with Rotaract Club of Presidency University to host an interaction session with the club's members. We then went on a nature walk at the People's Trust in Sriramanahalli, where we enjoyed the scenery and picked delicious fruits. It was a great opportunity for us to get to know one another better, and we also learned how to create a sustainable environment for less money.

HIGHLIGHTS OF THE EVENT:

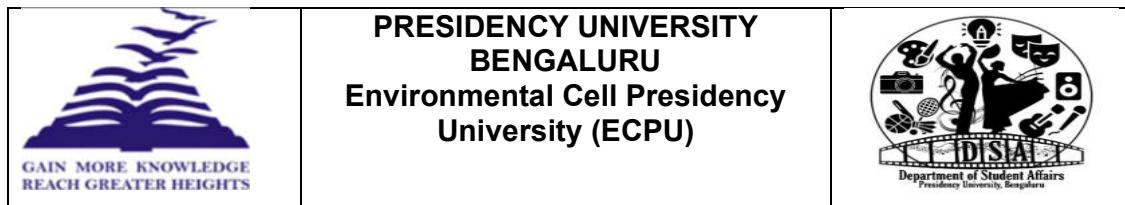
Figure 23: green walk initiation





DRIVE LINK OF THE EVENT:

- 1) Image link: https://drive.google.com/drive/folders/1EuEvKSHc1H43-gl69WSpiVo-w0Ecyi1?usp=share_link



Ref. No. PU/PUEC/21-22/Report/08

DATE: 20 APRIL 2022

A BREIF REPROT ENVIRONMENTAL Cell Of Presidency University (ECPU) In Collabration With NSS Cell Has Organized A Campaign On 20th Of Aprilto Create Awareness About The Disadvantages of Using Plastic .The Campaign Was Named As ‘Say No To Plastic’.

Conveners:

Dr. Saravanan C, Professor, Department of Chemistryand Chairperson – ECPU
Aparna Shukla,Asst.Professor,School of Law,Unit 5 Faculty coordinator
Dr.Venkatesh Raju K, Asst. Professor , Dept .of Civil Engineering

Environmental Cell of Presidency University (ECPU) in Collaboration with NSS club has conducted a campaign on **say no to plastic**

Venue :- Dibbur,

Date:-20-04-2022,Wednesday

Time:- 03:00 PM – 05:00 PM

Mode:-Offline mode

Students of 4CSE 01,4CSE 02,4CSE 03, and 4CSE 04 of SOE has actively participated in the campaign, With faculty and student coordinators of ECPU and NSS they have visited many shops in Dibbur and distributed the paper bags that are been made and collected by the students of above mentioned sections . They made the public aware of destruction caused by usage of plastic, the shopkeepers in the locality were requested to give up the use of plastic bags,The banner saying the negative impacts of plastic was displayed . **Head Student coordinator of ECPU Sunkara Prem Kumar Reddy and Student coordinator of NSS Ashutosh had lead the team.** The campaign was a great success. People of that locality hasgiven the positive feedback and students of different sections has said that they had great experience out side the campus and they were happy for the good work they did .

Dr. Anu Sukhdev
Asst. Dean, DSA PRESIDENCY UNIVERSITY

Figure 24: Environmental Cell of Presidency University (ECPU) in Collaboration with NSS club



PRESIDENCY UNIVERSITY
Private University (Etd) in Karnataka State by Act No. 31 of 2013

OVER 40 YEARS OF WISDOM

ENVIRONMENTAL CELL PRESIDENCY UNIVERSITY
in association with
PRESIDENCY UNIVERSITY NSS CELL
Presenting

Say NO to Plastic

Stop this from becoming THE NEW GLOBAL FLAG

We Environmental Cell Presidency University and NSS Cell conducting a Campaign on Say No To Plastic!
We request everyone to join the campaign and bring atleast two paper bags.

Date: 20/04/2022
Time: 03:00 pm to 05:00 pm
Venue: Dibbur
Contact: 9912557733

Faculty Coordinator:
Dr. Saravanan C, Professor, Department of Chemistry and Chairperson-ECPU
Aparna Shukla, Asst. Professor, School of Law, Unit 5 Faculty Coordinator
Dr. Venkatesha Raju K, Asst. Professor, Dept. of Civil Engineering

Student Coordinator:
Sunkara Prem Kumar Reddy, COM, Head of Student Coordinator-ECPU and NSS Volunteer
Ashutosh Tripathi, Student Coordinator, NSS Cell

