

The institution environment and energy initiatives are confirmed through the following

- 1. Green audit**
- 2. Energy audit**
- 3. Environment audit**
- 4. Clean and Green campus recognitions/awards**
- 5. Beyond the Campus environmental promotional activities**



VIKRAMA SIMHAPURI UNIVERSITY

[VSU, NELLORE & VSUPG CENTRE, KAVALI]



GREEN, ENERGY AND ENVIRONMENTAL AUDIT (2017-2021)

Prepared by
HYM INTERNATIONAL CERTIFICATIONS PVT.LTD
Hyderabad



VIKRAMA SIMHAPURI UNIVERSITY

Green, Energy, & Environmental Audit Report

(2017-2021)

Prepared by

Vikrama Simhapuri University Team (Nellore & Kavali)

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Chancellor	His Excellency Sri Biswabhusan Harichandan, Governor of Andhra Pradesh
Vice-Chancellor	Prof. G.M. Sundaravalli Honourable Vice-Chancellor
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has been assessed and found to be in accordance with the requirements of the Energy standards

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for the following scope of certification

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Further information about the scope of this certificate and applicability of ISO 50001 : 2018 requirements may be obtained by consulting the organization.

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1st Surveillance 28/10/2022

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Nellore, Andhra Pradesh - 524 320, India

has been assessed and found to be in accordance with the requirements of the environmental standards

ISO 14001 : 2015

for the following scope of certification

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Further information about the scope of this certificate and applicability of ISO 14001 : 2015 requirements may be obtained by consulting the organization.

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ABOUT THE UNIVERSITY

Vikrama Simhapuri University, Nellore, came into being, fulfilling the long-cherished dream of the people of Nellore district, re-christened Sri Potti Sri Ramulu Nellore district since 2008, by Act No. 29 of 2008 enacted by the Legislature of the State of Andhra Pradesh and published in the Andhra Pradesh Gazette on 24th September 2008. Erstwhile Chief Minister of Andhra Pradesh Dr. Rajesekhar Reddy has laid stone for construction of university buildings at 83.33 acres allotted site on the National Highway No 5. The University is located just 10 KMS from the main town of Nellore. Meanwhile the University Grants Commission conferred recognition on the degrees awarded by Vikrama Simhapuri University under Section 22 of the UGC Act vide its communication No.F.9.2/2010 (CPP-I/PU) dt.20 January 2010. Subsequently, the university is also sanctioned 2(f) and 12 (b) Status by University Grants Commission. The University has 02 Constituent colleges – Vikrama Simhapuri University College, Nellore and Vikrama Simhapuri University College, Kavali. Vikrama Simhapuri University is thus situated in an ambience of great cultural awakening, fascinating journeys of the mind, and rapid economic development.

Biodiversity, the variety of life on Earth, is quite possibly the most amazing thing on the planet. It is the key to sustaining health, wealth, food, fuel and all of the vital services we depend on. Vikrama Simhapuri University has initiated ‘Green, energy and Environmental Audit’ of their institution campuses. In present survey, focus has been given on assessment of present status of diversity in the form of plants, insects and birds from the University main campus, Nellore & PG Centre, Kavali and efforts made by the University authorities for nature conservation. The review is the first stage in the development of a Green Action Plan for the university will contribute towards the implementation of “The strategy for the conservation and enhancement of biodiversity and Green initiatives”. We thank University Officials for giving us the opportunity of preparing Green, Energy & Environmental Audit. We also thank Internal Quality Assurance Cell Team for supporting us. Our special thanks to Dr. A. Madhusudhana Reddy, Associate Professor, Department of Botany, Yogi Vemana University, Kadapa for supporting us for survey and identification of plant species in VSU campus. The team of “Green Energy and Environmental Audit” has been instrumental in the entire process of developing such a huge green space with high biodiversity and helping us with the data required for this report.

EXECUTIVE SUMMARY

There is a major concern towards the environmental degradation due to the rapid industrialization, anthropogenic activities at local, regional and global levels. This leads to a global environmental deterioration. Therefore, for sustainable future and to support natural resources, steps towards the stabilization of human population, adoption of environmentally sound and sustainable technologies, reforestation and ecological restoration are believed to be of paramount importance. To accomplish this task, academic institutions must initiate and support mobilization of internal and external resources and knowledge to meet the needs of environmental challenges. As an academic institution, Vikrama Simhapuri University (VSU) initiated some green initiatives to address fundamental problems associated with the environment deterioration. Further, we believe that as humans it is of profound responsibility to protect the earth's resources in perpetuity. Being one of the premier institutions of Higher Educational Institutes, VSU is aware of its responsibilities towards environmental issues and sustain environmental campaign through extension of activities in terms of education, research, policy formation and information.

This report is based on the approaches and interventions done on part of the University to address the green, energy and environmental concerns of the VSU campus. The current green, energy and environmental audit reflect our sustainable efforts on the campus. The audit was conducted by a team of faculty and students with support from various stake holders of VSU. Further, the VSU Clean and Green Committee and the VSU-NSS teams indeed the reflection of VSU endeavour to exercise leadership in promoting environmental sustainability and inculcate the habit of green initiatives among all students and each of us. This commitment of VSU has lead to actions whose reflection is visible remarkably on ground.

This initiative i.e. green, energy and environmental audit is significant for the institution, and also pave a way for other institutions to emulate and adopt as an audit model and thus, occupy a strategic position in the endeavours of sustainable environment for all.

GREEN, ENERGY AND ENVIRONMENTAL AUDIT

Green, Energy and Environmental Audit are a process of systematic identification, quantification, recording, reporting and analysis of components of environmental diversity of college. This 'Green, Energy and Environmental Audit' aims to analyze the green initiatives at VSU, Nellore and VSUPG Centre, Kavali, which will have an impact on the environment. Several, Green, Energy and Environmental Audit focuses on the utilization of renewable and non-renewable sources, rain water harvesting, Green Campus, Solid waste management, Water Management, & Energy Management etc. being implemented by the University Management.

Green, Energy and Environmental Audit are a valuable means for a University to determine the key element such as utilization of energy, water and plantation aspects. Further, the audit of energy and green or environment represents health consciousness and promotes environmental awareness, values and ethics. It is also one of the means to understand the Green impact on campus. 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. Hence, it is imperative that the University evaluate its own contributions towards a sustainable future.

ABOUT GREEN, ENERGY AND ENVIRONMENTAL AUDIT

Assessment of environmental performance is a measure of Green auditing (Welford, 2002). Green space and well-being are positively correlated. It can be accomplished through the systematic way by considering the points like documentation, periodic assessment, and objective review by regulated entities of facility operations and practices to meet the standards of environmental requirements (EPA, 2003). The university campuses offer an integral environment for learning. Through improved air, water quality, buffering of noise pollution and mitigation of impacts from extreme events, green spaces can reduce environmental health risks associated with lifestyle. In general, it is the systematic examination of the interactions between any operation and its surroundings. Many aspects need to be considered to assess the green audit such as all emissions to air, land and water; legal constraints; the effects on the neighbouring community; landscape and ecology and the public's perception of the operating company in the local area. Further, the environmental components decide what kind of plants and animals are to be sustaining in the specific area. The V.S. University, Nellore & V.S.U. PG

Centre, Kavali has clay loamy soil. During summer season, water scarcity in the region is an adverse factor. But still the efforts of university for the plantation and development of green spaces at both the Nellore and Kavali campuses are commendable. The main green spaces in the campus are medicinal plants garden, social forestry and other lawns which are properly grown conserving biodiversity. Even the construction of the buildings is well planned with plants in the middle of the building allowing enough air and light flow. Overall the distribution of species principally depends on the climatic conditions and presence of specific ecological parameters along with typical land-form and land-type. In the distribution of flora, the topography, rainfall, soil type etc. play crucial role for their distribution.

OBJECTIVES OF THE GREEN, ENERGY AND ENVIRONMENTAL AUDIT

- 1) To assess the green, energy and environmental audit in a systematic way
- 2) To evaluate the evidences for green energy and environmental audit by the auditor
- 3) To evaluate the auditor concerns assertions about economic actions and events
- 4) To ascertain the degree of correspondence between auditor assertions and established criteria.
- 5) To provide the results ascertained by the auditor to interested users

PROCEDURE FOLLOWED

Vikrama Simhapuri University, Nellore and VSU PG centre Kavali were constructed with least distortion to the original topography of the site. The buildings are two storied with enough ventilation and sunlight. The area details of the university main campus and VSU PG Centre are as follows.

Area	VSU Main Campus, Nellore	VSUPG Centre, Kavali
Area of Land	83.3	79.8
Area of Permanent Buildings	7270 m²	3755.8 m²
Area of Administration Block	4331 m²	1217.4 m²
Area of Academic Blocks along with Labs	9856.78 m²	
Area of Library	1426.43 m²	367.9 m²
Area of Hostel Buildings	3656.91 m²	2044.38 m²

GREEN AUDIT FINDINGS

For Green Audit following major areas (including their sub-sections) were covered and compliance/ initiatives under these areas were verified/ validated.

- a) Design of buildings with proper Daylight and Ventilation:
- b) Water Efficiency & management
- c) Wastewater Management
- d) Indoor Air Quality
- e) Energy Management and efficiency
- f) Solid Waste Management
- g) Transportation
- h) Green Belt
- i) Green Programs (Green initiatives)

a. Design of buildings with proper Daylight and Ventilation :

1. All Classrooms, Laboratories, Administrative offices, library, Seminar halls etc. have high ceiling, wide doors and large windows with proper ventilation.
2. Buildings are designed in such a way that corridors and classrooms receive ample sunlight. Curtains are provided for laboratory windows to avoid glare. Natural light in the classrooms was about 70-85 lux.
3. Ventilation in classrooms and laboratories is facilitated by windows and exhaust fans.
4. Cross ventilation is facilitated due to large windows on both sides of all classrooms, labs and administrative sections. Air conditioners are used in offices, seminar halls, research and computer laboratories and computer server rooms etc.
5. Exhaust fans are provided in washrooms, kitchens and sciences department laboratories.

b) Water Efficiency & Management

1. Major water source for university main campus is two big irrigation wells along with bore wells, university post graduate centre have 3 bore wells, also has one bore-well in the campus which is currently not used for water withdrawal.
2. The university main campus is situated very near to the Kakatur village tank with the water spread area of 120 acres. Tank water is used for filling the water in the aquaculture pond facility connected with the university campus area.
3. The daily water consumption for the entire campus when in full operation is 51 KL, which includes 25 KL consumption in academic area and 26 KL for gardening and administrative areas. Water collected in rainwater harvesting pits is used for gardening.
4. As per IS 1172 standards for non-residential institutions, water consumption should be maximum 45 L/person/day. Water consumption of the College works out to be 6.3 L/person/day, which is well under limit.
5. Water is stored in the underground storage tank of capacity 40 KL, and then transferred to 12 overhead tanks of total capacity 21 KL using 5 HP pump and then distributed to washrooms, basins, kitchens, laboratories and water purifiers/coolers installed in the College building.
6. Rain Water Harvesting (RWH) system, comprised of rooftop and surface runoff, is provided in the campus. Through RWH, rain water collected is used for recharging ground water through 2 recharge bores. Rain water collected is also stored in recharge pits which are used for gardening. Installation of rooftop RWH system is also planned for under-construction building which will comprise of an underground tank with a desilting chamber of 60 KL storage capacity.
7. 4 water coolers fitted with RO purifiers are provided in College building as a source of safe drinking water. Third party contractor is appointed by the university for their maintenance and cleaning of the entire campuses of both main campus and PG centre.
8. Hostels, Restrooms, Laboratories of Chemistry, Marine biology, Zoology, Biotechnology and canteen are water intensive areas. Water conservation faucets (nonconcussive taps, aerator taps) are fitted in some washrooms. Dual flushing systems are not provided in the washrooms.
9. Dry and wet mopping is practised for floor cleaning. Floors are mopped once a day. University has appointed third-party contractor, Sulab Enterprises for cleaning activities in both the campuses.
10. As informed by university electrical & water management team, tap water leakage is immediately attended to by the maintenance department for reducing the water wastage.

11. Sprinkler system and drip water irrigation is provided in all gardens which leads to water conservation.
12. Signage boards on water conservation were displayed in washrooms, hostels, canteen, laboratories and near water purifiers.

Water quality of source water in the both campus areas is tested and results are given below table

S. No	Parameter	University Main Campus	University PG Centre
Physical Parameters			
1	Turbidity	1.5 NTU	1.2 NTU
2	TDS	196 ppm	210 ppm
Chemical Parameters			
3	pH	7.3	7.1
4	Total Hardness	132 mg/L	210 mg/L
5	Calcium (Ca)	55 mg/L	49 mg/L
6	Magnesium (Mg)	38 mg/L	29 mg/L
7	Total Alkalinity	86.5 mg/L	97.2 mg/L
6	Chloride	62.5 mg/L	59.8 mg/L
7	Nitrate	0.7 mg/L	0.9 mg/L
10	Sulphate	46.5 mg/L	55.7 mg/L
Elemental Analysis			
11	Iron (Fe)	<0.05 mg/L	<0.05 mg/L
12	Arsenic (As)	<0.01 mg/L	<0.01 mg/L
13	Lead (Pb)	<0.01 mg/L	<0.01 mg/L
14	Zinc (Zn)	<0.05 mg/L	<0.05 mg/L
15	Chromium (Cr)	<0.05 mg/L	<0.05 mg/L



Open well in the university campus



Kakatur Village tank near to University Main campus, Nellore



RO System in the University campus

d) Indoor Air Quality

Indoor Air Quality (IAQ) refers to the air quality within & around buildings and structures, it relates to the health and comfort of building occupants. Common indoor pollutants are listed as below:

1. Carbon monoxide – Sources of carbon monoxide are incomplete combustion of fossil fuels.
2. Volatile organic compounds (VOCs) – VOCs are emitted by paints and lacquers, paint strippers, pesticides, office equipment such as copiers and printers, correction fluids and carbonless copy paper, graphics and craft materials including glues and adhesives, permanent markers, and photographic solutions etc.
3. Carbon dioxide – Due to human respiration, burning of dry waste materials etc.
4. Particulate matter – Due to construction and maintenance activities, vehicular pollution.
5. Nitrogen Oxides- Due to vehicular pollution.
 - Science laboratories and kitchens in hostels and canteen use liquefied petroleum gas (LPG), a clean fuel.
 - In classrooms and laboratories, the mode of ventilation is natural draft (through windows) and is enhanced by fans. Large windows and cross-ventilation are observed in corridors. Air conditioners are used in some offices and computer laboratories. ACs are serviced regularly to ensure indoor air quality.
 - Wash rooms and science laboratories are provided with exhaust fans so that the fumes are safely discharged outside the building.
 - Green belts have been set up in the both the main campus of university & PG Centre Kavali campus area.

Details of CO₂ and CO emitters: Based on our calculation, the different sources of Carbon dioxide (CO₂) and Carbon monoxide (CO) emitters in our college are:

S.No	Item	VSU main Campus	VSUPGC, Kavali
1	Vehicles(Two/Four Wheelers & heavy)	65	38
2	Refrigerators & Deep freezes	21	10

3	Air conditions	29	18
4	Burning Pits	2	01
5	Water Coolers & RO Systems	10	02
6	Ice makers	02	-

On the days of data collection, there were 15 cars, 27 bikes and 20 scooters in the university main campus and 8 cars, 21 bikes and 9, in addition to the vehicles for pick up and drop of visitors and to deliver commodities to the canteen, which in turn proves that these vehicles may contribute moderate to high carbon emission. There are 21 refrigerators along with deep freezers, 29 air conditioners and 10 working water coolers in main campus. The students, teaching and non-teaching staff and the visitors also contribute to carbon dioxide emission. There is a burning pit near the canteen where all the wastes collected from the class rooms and labs which were not suitable for recycling are burnt. Plastic wastes with food particles from the canteen are also burned as it cannot be decomposed.

e. Energy Management and Efficiency:

i. Electricity:

1. Common electricity meter is provided for the entire campus. Electricity is provided by Andhra Pradesh State Power Distribution Corporation Limited (APSPDCL). Electricity bills from 2017-22 were available for review (average consumption 15498 units/ month). Latest bills were available for review.

The areas of major consumption of electricity are mentioned below:

Major Electrical Items used in campus	VS University Main Campus, Nellore	VS University PG Centre, Kavali
Lights & Tube lights	92	46
LED Bulbs	147	115
Solar Lights	15	10
Fans (ceiling fans & wall fans)	247	98
Refrigerators & Deep Freezers	21	10
Air Conditioners	29	18
Computers (desktops & laptops)	275	130
Printers & Scanners & Xerox Machines	47	20
Projectors	10	06
Smart Boards	10	02
Motor Pumps	09	02
Water Coolers	08	03
Water purifiers (RO Systems)	02	01
Major Laboratory Equipments	58	22

2. Conventional tube lights, LEDs & fans are installed in classrooms, laboratories, seminar halls and library. For efficient energy consumption and saving on electric bill, university has initiated the process of replacing incandescent bulbs and tube lights with LEDs.
3. University main campus and PG Centre have 31 air conditioners with two/three/five -star ratings (6 five Star, 11 three star and 14 two star) [Standards set by Bureau of Energy Efficiency (BEE)].

4. An Uninterruptible Power Supply (UPS) system is provided in computer laboratories for computers and servers rooms. The UPS system is typically used to protect hardware viz. computers, data centres, library, internet and telecommunication equipment or other electrical equipment when an unexpected power disruption could cause serious work disruption or data loss.
5. Reflectors are not provided for lights in the library, seminar halls and auditorium. Reflectors can reduce the number of lights required and hence electricity consumption.
6. All computers have LED screens; computers are shut down by turning off the main switch when not in use.
7. Common switches are provided for some tube-lights & fans. To avoid wastage of energy due to common area illumination, it is recommended to have separate switches.
8. Tube-lights and fans are switched off by students and staff when not in use. Instructions regarding switching off the electrical appliance were seen in laboratory notice boards. However, signages are not provided near electrical switch boards. Signage can encourage & help users to switch off lights and fans to save electricity.

ii. On-Site Energy Generation (Usage of LPG/ Natural Gas & Solar Energy):

1. LPG cylinders are used mainly in canteen, hostels kitchens for cooking and in chemistry, botany, zoology, microbiology, marine biology and biotechnology laboratories. Inventory of cylinders usage was not available for review. 1 cylinder of 14 kg generates 649.5 MJ (Mega Joules) of energy. An average of 6 cylinders/week at Hostel and an average of six cylinders per two months at departments.
2. Storage facility for LPG cylinder is located on ground floor. All the commercial LPG gas cylinders were in vertical position with access control; however it is necessary to provide extra support system like chain in order to prevent cylinders from falling, movement or physical damage.
3. University main Campus has a diesel generator (DG) of capacity 100 KVA. DG set is used only in case of emergency when there is power cut-off. DG emissions are not monitored.
4. The university main campus approach roads have solar panel LED street lights for saving on electric bill.
5. Steps towards the installation of on grid Rooftop Solar PV System of 100 KWH capacity has been initiated at VSU. Sembcorp is providing Rooftop Solar PV System at University main campus.



HT/LT Transformer



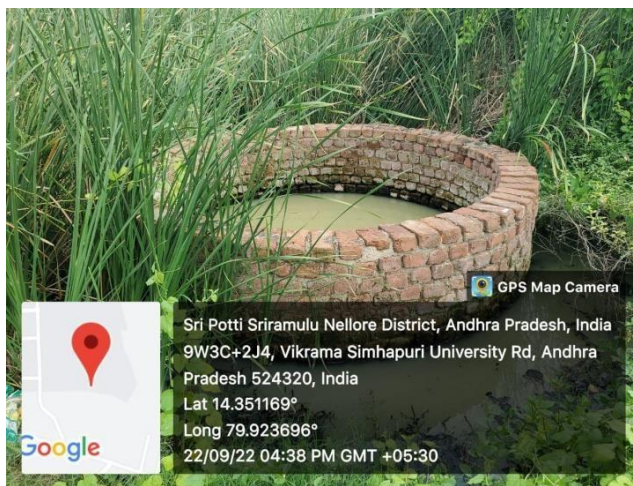
125 KV Generator



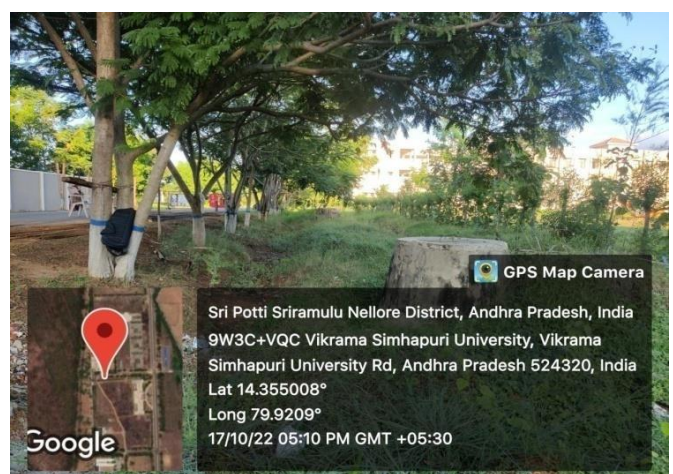
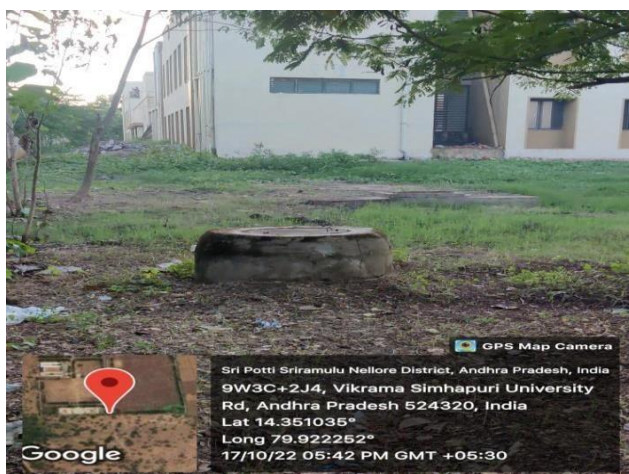
Solar panel LED lights in the common areas and roads in the campus

c) Wastewater Management

1. Wastewater is mainly generated from washing, toilet flushing, kitchens in hostels, canteen kitchen and laboratories. Sufficient washrooms are provided in the university main and PG centre campus admin, academic buildings and hostels.
2. Currently, sanitary wastewater generated is sent to municipal sewer line in both the campuses. Sewage treatment plant of 200 KLD capacity is under planning to construction for the treatment of sanitary wastewater generated in the campus. STP will comprise of primary and secondary treatment (biological treatment) followed by filtration.
3. Waste water generated from the RO systems and water coolers in the drinking water areas connected to near garden/plantation area and kitchen garden maintained in the university campus.



Grey water from Pinakini Boys Hostel and girls are directed through a underground drainage system into a large soak pit constructed at a faraway place from the hostel blocks



Underground drainage system for disposing waste water into soak pits



Waste water channelized to connect plantation/gardens maintained in the university campus

f) Solid Waste Management

Solid waste generated from campus includes mainly paper waste, wet (food/ organic) waste and E-waste.

- Blue and Green covered/ pedal-pushed dustbins are placed in the both main campus and PG centre premises. Waste bins are provided on each floor, in staff rooms, class rooms, laboratories, washrooms, kitchen, hostels & canteen and in campus areas.
- Daily around 50-75 kg organic/ bio-degradable waste is generated in the both campuses which includes vegetable, food waste, horticultural waste. Quantity of horticulture waste varies significantly due to seasonal variation, e.g. around 50-60 kg of horticulture waste is generated daily in February- March due to leaf fall.
- Recently, university main campus had vermin composting unit for the treatment for the treatment of horticulture waste generated in the campus. The unit will be operational in 3-4 months.
- Biodegradable wet waste is mostly generated from the hostels, kitchens, canteen. The university has initiated the process of installing a composting unit of 25-30 kg/ day capacity for the treatment of canteen waste and some horticulture waste. Composting unit will be operational once the classes start working.
- In other areas like classrooms and administrative sections, mostly paper waste and plastic wrappers are generated.
- Segregation of wet and dry waste is practised within the campus. However, there is no signage for promoting segregation of wet and dry waste.
- **Paper Waste Management:** Being an academic institution, waste paper is one of the main solid wastes generated in the premises. College has taken steps to minimise and avoid paper usage.
- Prints and photocopies are taken on both sides of the paper to avoid excess paper usage. Rather than photocopy, digitalisation (scanning) is practised.
- All the internal circulars communicating to teaching and non-teaching staff are through SMS, e-mails and whatsapp messages only.
- University Library has an e-book facility having e-journals, and ebooks available online through different portals such as INFLIBNET, National Digital Library. Two computer room are provided in the library to access online services.
- University has a Learning Management System (LMS) where notices are sent, exam results are displayed in the website and attendance is recorded digitally.

- Paper recycled is used for laboratory work. Remaining paper waste is sent to local vendor for recycling. The dissertation reports, journals and answer papers are stored as per the University rules and it is sent to vendor as and when required.
- The college encourages students to use eco-friendly material and recycle old papers/ scrap for decoration purposes during department functions and festivals.
- **E- Waste Management:** E- waste is broadly comprised of discarded computer monitors, motherboards, Key boards, scanners and chargers, compact discs, headphones, Printed Circuit Boards , Xerox machines etc. E- waste is collected & stored in the campus and sent to authorised vendor for recycling/ disposal under buy-back policy.
- **Plastic Waste:** University main campus and PG centre strictly follows the guidelines regarding plastic usage and has prohibited the use of single use plastic e.g. carry-bags, glasses, spoons etc., in the campus environments.
- As per the university guidelines, Canteen Contractor is prohibited to use plastic carry bags, plastic paper, instead paper plates and wooden spoons are used for packing and serving.

g) Transportation:

- The location of university main campus and PG centre is quite enviable with bus service and public transportation facility. Most of the staff pool cars and university buses few staff members travel by private vehicles.
- University has vehicle-free campus. Dedicated area is available for parking has been allotted near the admin and academic blocks; vehicle movement and parking in the main campus is restricted and prohibited.
- University encourages the students and staff to use the university bus facility or public transport system to reduce carbon emissions in the campus areas.

h) Green Belt:

University main campus has an herbal garden. University has 1.83 acre green belt area, having 382 variety of plants including trees shrubs and potted plants. List of few plants present in the campus is given in Annexure 1 & 2. Plantation improves aesthetics and helps as a buffer in reducing noise level, maintaining temperature of the area. Herbal garden has different specific types of plants planted with respect to their medicinal importance.

Green Spaces

Total green space in the campus has increased to and by the end of the year the lawns were also well planned around various buildings. Therefore, out of the total green space the botanical garden area is 21% and other lawn & green spaces are 79% area. While the allocated space for herbal garden is 2.0 acres, the other green space area has increased by 2% by 2018. This is due to increase in plantation in the surrounding of the buildings.

HERBAL GARDEN

Biodiversity Conservation is very crucial and important for a campus because eventually these spaces become lung spaces of that location or district or state. In the year 2017, Vikrama Simhapuri University with the support of university has set up a herbal Garden in 2.0 acres of extent to promote the herbal medicines through research in this area. This garden is to serve as a national repository of living medicinal plant specimens of Eastern Ghats towards ex-situ conservation and propagation of endemic and threatened species. Further to maintain live plant collections for the purpose of research, educational, display and aesthetics. Moreover it would serve as Centre of Excellence for conservation, research and education.

The Vikrama Simhapuri University Herbal garden is At present, species collected from different parts of Andhra Pradesh and elsewhere are being maintained in the herbal garden and in green house. This garden is currently harbouring indigenous and exotic taxa including endemic and threatened herbal species and spread over 2.0 acres. Being part of an academic institution one of the main objectives of the herbal garden is to impart education through first-hand field experience and every plant introduced in the garden is properly labelled, with its scientific name and the family to which it belongs and this is essential for taxonomic knowledge.

Taxonomy is important for all other allied/natural sciences. Therefore, the University herbal garden strives to impart the taxonomic knowledge through its various display sections and educational programmes. The garden presently represents most of the families that occur in the Eastern Ghats. The important families represented are mentioned in the taxonomic layout.

The existing infrastructural facilities in the herbal garden are net houses (5000 sq ft), Glass house (3000 sq ft), store room, water sump (45000 liters capacity), and power supply facility and 3.5 km long internal roads. The whole garden area has a barbed wire fence. Drip irrigation facility is spread over an area of about 3 acres in the garden. The irrigation facility is provided with underground pipeline system accessible throughout garden. Lilly and lotus ponds are developed for water plants.

All the plants in the herbal garden are properly labelled with botanical names, local name, family to which the particular plant belongs and known uses.

The garden is home for good number of birds and butterflies and many other insects. Snakes is found in the garden which is also a natural habitat for viper, cobra and other reptiles. Some animals such as wild boar, black buck and deer's are regular visitors.

The herbal garden is not only to protect and nurture plants but also to provide inspiration for protecting plant diversity in the world of growing environmental challenges. The garden is now attracting people from all walks of life. The efforts of the garden management are towards development of a range of projects covering science, sustainability, propagation of indigenous fruit crops, seed bank and herbarium. The education programmes are aimed at building awareness for the urgent need to protect our biodiversity from threats of land use changes, climate change, invasive species, over exploitation and pollution. The plant collections serve the purpose of display, education, research, conservation and enjoyment. With the committed efforts of the university administration, members of faculty of department of botany in the PG centre Kavali and department of Biotechnology, VS University main campus, research scholars and students, the dream of developing an excellent botanical garden and herbal gardens for the purpose of research and education has been fulfilled.

Annexure- 1

MEDICINAL PLANTS

It is observed that wide variety of medicinal plant species are gathered and planted in the campus. Few of them are ex-situ species planted in botanic garden. Total medicinal plants contribute 10% of the total plants. The following are the details of species grown here:

SNo	Species Names	Telugu Name
1.	Aegle marmelos (L.) Corr.	Maredu, Bilva
2.	Aloe vera (L.) Burm.f.	Manchi Kalabanda
3.	Aristolochia india L.	Nalla eswari
4.	Arundo donax L.	Kaliveduru
5.	Balanites aegyptiaca (L.) Del.	Gala Chettu
6.	Boswellia ovalifoliolata Bal. & Henr	Konda Sambrani
7.	Callistemon citrinus (Curtis) Skeels	Bottle Brush
8.	Centella asiatica (L.) Urban.	Swarasvathiaku
9.	Cochlospermum religiosum (L.) Alston	Konda Pathi
10.	Commiphora caudata (Wt. & Arn.) Eng.	Konda Mamidi
11.	Costus speciosus (Koen.) Smith	Vanavasa
12.	Cymbopogon citratus (DC.) Stapf.	Nimma Gaddi
13.	Curceligo orchiodes Gaertn.	Nelathati
14.	Decalepis hamiltonii Wt. & Arn.	Nannari Gaddalu
15.	Dioscorea pentaphylla	Yerra teega
16.	Dioscorea oppositifolia L.	Eseru gaddalu
17.	Diospyros melonoxylon Roxb.	Tumki
18.	Euphorbia milli Der.	Kuchu Chettu
19.	Euphorbia nivulia Buch. Ham.	Errakalli
20.	Ficus tirucalli L.	Machikalli
21.	Ficus benghalensis L.	Marri
22.	Ficus hispida L.f.	Kakimedi
23.	Ficus racemosa L.	Madi
24.	Ficus religiosa L.	Raavi

25.	<i>Gardenia gummifera</i> L.f.	Bikki
26.	<i>Gardenia resinifera</i> Roth.	Pedda Bikki
27.	<i>Givotia moluccana</i> (L.) Sreem.	Tella Polika
28.	<i>Gloriosa superba</i> L.	Nabhi
29.	<i>Gymnema sylvestre</i> (Retz.) Schult.	Podapatri
30.	<i>Gyrocarpus americanus</i> Jacq.	Polika
31.	<i>Hemidesmus indicus</i> (L.) R.br	Sugandipala
32.	<i>Holoptelea integrifolia</i> (Roxb.) Planch	Tapase
33.	<i>Hymenodictyon orixense</i> (Roxb.) Mabb.	Dudippa
34.	<i>Justicia adhatoda</i> L.	Addasramu
35.	<i>Leptadenia reticulata</i> Sehult.	Palateega
36.	<i>Limonia acidissima</i> L.	Pilli adugu
37.	<i>Maerua apetala</i> (Roth.) Jacobs	Danthi
38.	<i>Maytenus emarginata</i> (Welld.) Ding.	Battagadapa
39.	<i>Mitragyna parviflora</i> (Roxb.) Nil.	Maddi
40.	<i>Morinda pubescens</i> J.E. Smith	Kukkavelaga
41.	<i>Naringi crenulata</i> (Roxb.) Nil.	Kukkatulsi
42.	<i>Pandanus fascicularis</i> Lam.	Mogali
43.	<i>Pavetta tomentosa</i> Roxb.	Tellapapidi
44.	<i>Pterocarpus santalinus</i> L.f.	Yerrachandanam
45.	<i>Pterocarpus marsupium</i> Roxb.	Yogisa
46.	<i>Pterospermum xylocarpum</i> (Gaertn.) S.W.	Garika musti
47.	<i>Sansevieria roxburghiana</i> Schult.	Marrimamidi
48.	<i>Schefflera stellata</i> (Gaertn.) Harms.	Somidi
49.	<i>Soymida febrifuga</i> (Roxb.) A.Juss.	Mushti
50.	<i>Strychnos nux-vomica</i> L.	Adavibadam
51.	<i>Sterculia foetida</i> L.	Errapolika
52.	<i>Sterculia urens</i> Roxb.	Badham Chettu
53.	<i>Treminalia catappa</i> L.	Nallakaraka

54.	<i>Terminalia chebula</i> Retz.	Tellamaddi
55.	<i>Terminalia arjuna</i> Roxb. Ex.DC.	Thandra
56.	<i>Terminalia bellirica</i> (Gaertn.) Roxb.	Nallamaddi
57.	<i>Terminalia alata</i> Roth.	Tellakaraka
58.	<i>Terminalia pallida</i> brandis	Kukkapala
59.	<i>Tylophora indica</i> (Burm.f.) Merr.	Nemaliadugu
60.	<i>Vitex altissima</i> L.f.	Vavili
61.	<i>Vitex negundo</i> L.	Aswagandha
62.	<i>Withania somnifera</i> (L.) Dunal.	Palvareni
63.	<i>Ximenia americana</i> L.	Konda nakkeru

FLORAL BIODIVERSITY

Wide range of varieties are found in the campus. It observed that high number of Trees i.e., 30% and herbs i.e., 27% are found here. 11% shrubs, 9% grasses & cycads and 7% of medicinal Plants are seen. Though other species are in less number, this counts to high biodiversity of the campus.

Plant type	No. of varieties	No. of species found
Aquatic Plants	3	400
Creepers	4	1010
Climbers	24	4950
Medicinal Plants	29	9350
Flowering Plants	9	8950
Fruiting Plants	9	6500
Grasses & Cycads	38	18750
Herbs	115	52990
Palms	10	6400
Shrubs	45	19450
Trees	127	164290
Vines	2	150
Weeds	9	3700
	424	296890

PLANT HEIGHT:

Based on height the highest number of plants with 50 to 100 cms are 50.2% and more than 12 meters are 30%. Further very less height plants are 8 to 12 meters 0.7%. The following are the details:

Height	No. of species
Less than 50 cms	30
50 to 100 cms	213
Climbers	24
2 to 4 meters	5
4 to 6 meters	7
6 to 8 meters	5
8 to 12 meters	3
More than 12 meters	137
	424

Water Tolerance

It is observed that the water scarcity considered during the plantation. 58% are normal water intake plants and 42% plants can tolerate less water also.

Water Tolerance	No. of species
Can tolerate less water	176
Normal	248

Estimated lifespan

Most of the plants i.e., 40% are very long life span plants, 1% plants lifespan is 1 to 2 years and 33% plants lifespan is 6 to 12 months. Hence the plants are also well planned as per the lifespan.

Lifespan	No. of species
Less than 6 months	91
6 – 12 months	138
1 – 2 years	21
More than 2 years	5
Very long life	169

FAUNAL BIODIVERSITY

Due to the high plantation wide variety of faunal species are found within the campus. Especially high number i.e., 43% varieties of butterflies are found. Similarly 17% varieties of insects are found here. The following are the details:

SNo	Species	No. of varieties
1	Amphibians	6
2	Arthropods	9
3	Aves (Birds)	12
4	Insects	15
5	Butterflies	17
6	Reptiles	14
7	Mammals	8

LIST OF FLORAL SPECIES:

As per the findings of internal green audit conducted by the university, large trees include in the Annexure-2

Annexure- 2

S. NO	NAME OF THE SPECIES	HABIT
ACANTHACEAE		
1.	<i>Asystasia gangetica</i> (L.) T. Anderson	Herb
2.	<i>Andrographis paniculata</i> (Burm.f.) Wall.	Herb
3.	<i>Blepharis repens</i> (Vahl) Roth.	Herb
4.	<i>Indoneesiella echioides</i> (L.) Sreemadh.	Herb
5.	<i>Lepidagathis cristata</i> Willd.	Herb
6.	<i>Rostellularia prostrata</i> R.B. Majumdar	Herb
7.	<i>Ruellia tuberosa</i> L.	Herb
AIZOACEAE		
8.	<i>Trianthema portulacastrum</i> L.	Herb
AMARANTHACEAE		

9.	<i>Achyranthes aspera</i> L.	Herb
10.	<i>Allmania nodiflora</i> (L.) R. Br.	Herb
11.	<i>Alternanthera sessilis</i> (L.) DC.	Herb
12.	<i>Amaranthus spinosus</i> L.	Herb
13.	<i>Amaranthus tricolor</i> L.	Herb
14.	<i>Amaranthus viridis</i> L.	Herb
15.	<i>Celosia argentea</i> L.	Herb
16.	<i>Digera muricata</i> (L.) Mart.	Herb
17.	<i>Gomphrena globosa</i> L.	Herb
18.	<i>Gomphrena serrata</i> L.	Herb
19.	<i>Pupalia lappacea</i> (L.) Juss.	Herb
20.	<i>Trichurus monsoniae</i> (L.f.) C. Towns	Herb
AMARYLLIDACEAE		
21.	<i>Crinum asiaticum</i> L.	Herb
22.	<i>Zephyranthes rosea</i> Lindl.	Herb
ANACARDIACEAE		
23.	<i>Mangifera indica</i> L.	Tree
24.	<i>Semecarpus anacardium</i> L.f.	Tree
ANNONACEAE		
25.	<i>Annona squamosa</i> L.	Tree
26.	<i>Polyalthia longifolia</i> (Sonner) Thw.	Tree
APIACEAE		
27.	<i>Centella asiatica</i> (L.) Urb.	Creeping herb
APOCYNACEAE		
28.	<i>Adenium obesum</i> (Forssk) Roem. & Schult.	Shrub
29.	<i>Allamanda blanchetii</i> A. DC.	Shrub
30.	<i>Boucerosia lasiantha</i> Wight	Succulent herb
31.	<i>Boucerosia procumbens</i> (Gravely & Mayur.) Plowes	Succulent herb
32.	<i>Boucerosia umbellata</i> (Haw.) Wight & Arn.	Succulent herb

33.	<i>Calotropis gigantea</i> (L.) R. Br.	Shrub
34.	<i>Caralluma adscendens</i> var. <i>attenuata</i> (Wight) Grav. & Mayur.	Succulent herb
35.	<i>Caralluma adscendens</i> var. <i>fimbriata</i> (Wall.) Gravelly & Mayur.	Succulent herb
36.	<i>Caralluma bhupinderiana</i> Sarkaria	Succulent herb
37.	<i>Caralluma stalagmifera</i> C.E.C. Fisch.	Succulent herb
38.	<i>Carissa spinarum</i> L.	Shrub
39.	<i>Cascabela thevetia</i> (L.) Lippold	Shrub
40.	<i>Catharanthus pusillus</i> (Murr.) G. Don	Herb
41.	<i>Catharanthus roseus</i> (L.) G. Don	Herb
42.	<i>Hemidesmus indicus</i> (L.) R. Br.	Twiner
43.	<i>Nerium indicum</i> Mill.	Shrub
44.	<i>Oxystelma esculentum</i> (L.f.) Sm.	Twiner
45.	<i>Pentatropis capensis</i> (L.f.) Bull	Twiner
46.	<i>Pergularia daemia</i> (Forssk.) Chiov.	Twiner
47.	<i>Plumeria rubra</i> L.	Tree
48.	<i>Plumeria alba</i> L.	Tree
49.	<i>Plumeria pudica</i> Jacq.	Shrub
50.	<i>Rauvolfia serpentina</i> (L.) Benth. ex Kurz.	Herb
51.	<i>Vincetoxicum indicum</i> (Burm.f.) Mabb.	Twiner
52.	<i>Wattakaka volubilis</i> (L. f.) Stapf	Twiner
APONOGETONACEAE		
53.	<i>Aponogeton natans</i> (L.) Engl. & K. Krause	Herb
ARACEAE		
54.	<i>Alocasia macrorrhizos</i> (L.) G. Don	Herb
55.	<i>Colocasia esculenta</i> (L.) Schott	Shrub
56.	<i>Caladium bicolor</i> (Aiton) Vent.	Herb
57.	<i>Rhaphidophora pertusa</i> (Roxb.) Schott	Shrub
ARAUCARIACEAE		
58.	<i>Araucaria araucana</i> (Molina) K. Koch	Tree

ARECACEAE		
59.	<i>Borassus flabellifer</i> L.	Tree
60.	<i>Caryota urens</i> L.	Tree
61.	<i>Cocos nucifera</i> L.	Tree
62.	<i>Dypsis lutescens</i> (H. Wendl.) Beentje & J. Dransf	Tree
63.	<i>Phoenix sylvestris</i> (L.) Roxb.	Tree
64.	<i>Phoenix dactylifera</i> L.	Tree
65.	<i>Roystonea regia</i> (Kunth) O.F. Cook	Tree
66.	<i>Rhapis excelsa</i> (Thunb.) A. Henry	Shrub
67.	<i>Wodyetia bifurcata</i> A.K. Irvine	Tree
ASPARAGACEAE		
68.	<i>Asparagus racemosus</i> Willd.	Shrub
69.	<i>Chlorophytum laxum</i> R. Br.	Herb
70.	<i>Dracaena marginata</i> Aiton	Herb
71.	<i>Dracaena reflexa</i> Lam.	Herb
72.	<i>Drimia indica</i> (Roxb.) Jessop.	Herb
73.	<i>Sansevieria roxburghiana</i> Schult. & Schult.f.	Herb
74.	<i>Scilla hyacinthina</i> (Roth) J.F. Macbr.	Herb
ASPHODELACEAE		
75.	<i>Aloe vera</i> (L.) Burm.f.	Herb
ASTERACEAE		
76.	<i>Ageratum conyzoides</i> L.	Herb
77.	<i>Blumea mollis</i> Merr.	Herb
78.	<i>Chromolaena odorata</i> (L.) R.M. King & H. Rob.	Shrub
79.	<i>Eclipta alba</i> (L.) Hassk.	Herb
80.	<i>Emilia sonchifolia</i> (L.) DC.	Herb
81.	<i>Glossocardia bosvallea</i> (L.f.) DC.	Herb
82.	<i>Gymnanthemum extensum</i> (DC.) Steetz.	Shrub
83.	<i>Parthenium hysterophorus</i> L.	Herb
84.	<i>Pentanema indicum</i> (L.) Y. Ling	Herb
85.	<i>Pulicaria wightiana</i> (DC.) Clarke.	Herb
86.	<i>Tridax procumbens</i> L.	Herb
87.	<i>Vernonia albicans</i> DC.	Herb

88.	<i>Vernonia cinerea</i> (L.) Less.	Herb
BIGNONIACEAE		
89.	<i>Dolichandrone falcata</i> Seem.	Tree
90.	<i>Millingtonia hortensis</i> L.	Tree
91.	<i>Tecoma stans</i> (L.) Kunth.	Tree
92.	<i>Tabebuia chrysantha</i> (Jacq.) G. Nicholson	Tree
93.	<i>Tabebuia rosea</i> (Bertol.) Bertero ex A. DC.	Tree
94.	<i>Spathodea campanulata</i> P. Beauv.	Tree
BORAGINACEAE		
95.	<i>Coldenia procumbens</i> L.	Herb
96.	<i>Cynoglossum zeylanicum</i> Thunb. ex Brand	Herb
97.	<i>Heliotropium bracteatum</i> R. Br.	Herb
98.	<i>Heliotropium strigosum</i> Willd.	Herb
99.	<i>Trichodesma indicum</i> (L.) R.Br.	Herb
CACTACEAE		
100.	<i>Cereus pterogonus</i> Lem.	Succulent shrub
101.	<i>Opuntia stricta</i> (Haw.) Haw.	Succulent shrub
102.	<i>Opuntia dillenii</i> (Ker Gawl.) Haw.	Succulent shrub
103.	<i>Opuntia stricta</i> (Haw.) Haw.	Succulent shrub
CANNACEAE		
104.	<i>Canna indica</i> L.	Shrub
CASUARINACEAE		
105.	<i>Casuarina equisetifolia</i> L.	Tree
CLEOMACEAE		
106.	<i>Cleome viscosa</i> L.	Herb
CONVOLVULACEAE		
107.	<i>Evolvulus alsinoides</i> (L.) L.	Herb
108.	<i>Evolvulus nummularius</i> (L.) L.	Herb

109.	<i>Ipomoea aquatica</i> Forssk.	Twiner
110.	<i>Ipomoea cairica</i> (L.) Sweet Hort.	Twiner
111.	<i>Ipomoea coptica</i> (L.) Roem. & Schult.	Twiner
112.	<i>Ipomoea marginata</i> (Desr.) Verdc.	Twiner
113.	<i>Ipomoea obscura</i> (L.) Ker.-Gawl.	Twiner
114.	<i>Ipomoea pes-caprae</i> (L.) R. Br.	Twiner
115.	<i>Merremia aegyptica</i> (L.) Urban	Twiner
116.	<i>Merremia tridentata</i> (L.) Hallier f.	Twiner
117.	<i>Rivea hypocrateriformis</i> (Desr.) Choisy	Twiner
COMBRETACEAE		
118.	<i>Conocarpus erectus</i> L.	Tree
119.	<i>Terminalia arjuna</i> (Roxb. ex DC.) Wight & Arn.	Tree
120.	<i>Terminalia catappa</i> L.	Tree
121.	<i>Terminalia mantaly</i> H. Perrier	Tree
COMMELINACEAE		
122.	<i>Commelina benghalensis</i> L.	Herb
123.	<i>Commelina erecta</i> L.	Herb
124.	<i>Commelina ensifolia</i> R. Br.	Herb
125.	<i>Commelina diffusa</i> Burm.f.	Herb
126.	<i>Cyanotis fasciculata</i> (Roth) Schult. & Schult.f.	Herb
127.	<i>Murdannia spirata</i> (L.) G. Brückn.	Herb
128.	<i>Tonningia axillaris</i> (L.) Kuntze	Herb
129.	<i>Tradescantia pallida</i> (Rose) D.R. Hunt	Herb
COSTACEAE		
130.	<i>Costus speciosus</i> (J. Koenig) Sm.	Shrub
CRASSULACEAE		
131.	<i>Kalanchoe blossfeldiana</i> Poelln.	Herb
CUCURBITACEAE		
132.	<i>Coccinia grandis</i> (L.) Voigt.	Climber
133.	<i>Citrullus colocynthis</i> (L.) Schrad.	Climber
CUPRESSACEAE		
134.	<i>Thuja occidentalis</i> L.	Tree
135.	<i>Cupressus sempervirens</i> L.	Tree
CUSCUTACEAE		

136.	<i>Cuscuta reflexa</i> Roxb.	Parasite
CYCADACEAE		
137.	<i>Cycas revoluta</i> Thunb.	Tree
CYPERACEAE		
138.	<i>Abildgaardia triflora</i> (L.) Abeywick.	Herb
139.	<i>Bulbostylis barbata</i> (Rottb.) C.B. Clarke	Herb
140.	<i>Cyperus arenarius</i> Retz.	Herb
141.	<i>Cyperus articulatus</i> L.	Herb
142.	<i>Cyperus corymbosus</i> Rottb.	Herb
143.	<i>Cyperus compressus</i> L.	Herb
144.	<i>Cyperus exaltatus</i> Retz.	Herb
145.	<i>Cyperus flavidus</i> Retz.	Herb
146.	<i>Cyperus rotundus</i> L.	Herb
147.	<i>Fimbristylis cymosa</i> R. Br.	Herb
148.	<i>Fimbristylis dichotoma</i> (L.) Vahl	Herb
149.	<i>Fimbristylis miliacea</i> (L.) Vahl	Herb
150.	<i>Fimbristylis ovata</i> (Burm.f.) J. Kern	Herb
151.	<i>Fuirena ciliaria</i> (L.) Roxb.	Herb
152.	<i>Kyllinga brevifolia</i> Rottb.	Herb
153.	<i>Kyllinga bulbosa</i> P. Beauv.	Herb
154.	<i>Pycneus polystachyos</i> (Rottb.) P. Beauv.	Herb
155.	<i>Schoenoplectiella articulata</i> (L.) Lye	Herb
ELATINACEAE		
156.	<i>Bergia ammannioides</i> Roxb.	Herb
EUPHORBIACEAE		
157.	<i>Acalypha alnifolia</i> Willd.	Herb
158.	<i>Acalypha indica</i> L.	Herb
159.	<i>Croton bonplandianum</i> Bail.	Herb
160.	<i>Codiaeum variegatum</i> (L.) Rumph. ex A. Juss.	Succulent shrub
161.	<i>Euphorbia heterophylla</i> L.	Herb
162.	<i>Euphorbia milii</i> Des Moul.	Succulent shrub
163.	<i>Euphorbia hirta</i> L.	Herb

164.	<i>Euphorbia rosea</i> Retz.	Herb
165.	<i>Jatropha glandulifera</i> Roxb.	Shrub
166.	<i>Jatropha gossypifolia</i> L.	Shrub
167.	<i>Pedilanthus tithymaloides</i> (L.) Poit.	Shrub
168.	<i>Tragia involucrata</i> L.	Shrub
169.	<i>Tragia plukenetii</i> Radcl.-Sm.	Shrub
FABACEAE		
170.	<i>Abrus precatorius</i> L.	Twiner
171.	<i>Acacia aurculiformis</i> A. Cum ex. Benth.	Tree
172.	<i>Acacia leucophloea</i> (Roxb.) Willd.	Tree
173.	<i>Acacia nilotica</i> (L.) Del.	Tree
174.	<i>Aeschynomene aspera</i> L.	Herb
175.	<i>Aeschynomene indica</i> L.	Herb
176.	<i>Albizia lebbbeck</i> (L.) Willd	Tree
177.	<i>Albizia saman</i> (Jacq.) F. Muell.	Tree
178.	<i>Alysicarpus bupleurifolius</i> (L.) DC.	Herb
179.	<i>Alysicarpus hamosus</i> Edgew.	Herb
180.	<i>Atylosia scarabaeoides</i> (L.) Benth.	Twiner
181.	<i>Bauhinia acuminata</i> Vell.	Tree
182.	<i>Bauhinia purpurea</i> L.	Tree
183.	<i>Bauhinia racemosa</i> Vahl	Tree
184.	<i>Caesalpinia pulcherrima</i> (L.) Sw.	Shrub
185.	<i>Canavalia gladiata</i> (Jacq.) DC.	Twiner
186.	<i>Cassia auriculata</i> L.	Shrub
187.	<i>Cassia fistula</i> L.	Tree
188.	<i>Cassia occidentalis</i> L.	Shrub
189.	<i>Cassia senna</i> L.	Herb
190.	<i>Clitoria ternatea</i> L.	Twiner
191.	<i>Crotalaria angulata</i> Mill.	Herb
192.	<i>Crotalaria hebecarpa</i> (DC.) Rudd.	Herb
193.	<i>Crotalaria medicaginea</i> var. <i>medicaginea</i> Lam.	Herb
194.	<i>Crotalaria ramosissima</i> Roxb.	Herb

195.	<i>Delonix regia</i> (Hook.) Rafin.	Tree
196.	<i>Desmodium triflorum</i> (L.) DC.	Herb
197.	<i>Dichrostachys cinerea</i> (L.) Wight & Arn.	Tree
198.	<i>Indigofera linifolia</i> (L.f.) Retz	Herb
199.	<i>Indigofera linnaei</i> Ali	Herb
200.	<i>Leucaena leucocephala</i> (Lam.) Dewit	Tree
201.	<i>Macropodium atropurpureum</i> (DC.) Urb.	Herb
202.	<i>Mimosa pudica</i> L.	Herb
203.	<i>Neptunia triquetra</i> (Vahl) Benth.	Herb
204.	<i>Peltophorum pterocarpum</i> (DC.) Heyne	Tree
205.	<i>Pongamia pinnata</i> (L.) Pierre	Tree
206.	<i>Prosopis chilensis</i> (Molina)Stuntz	Tree
207.	<i>Pterocarpus santalinus</i> L.f.	Tree
208.	<i>Rhynchosia capitata</i> DC.	Twiner
209.	<i>Rhynchosia minima</i> (L.) DC.	Twiner
210.	<i>Saraca asoca</i> (Roxb.) J.J.de Wilde	Tree
211.	<i>Senna uniflora</i> (Mill.) H.S. Irwin & Barneby	Herb
212.	<i>Stylosanthes fruticosa</i> (Retz.) Alston	Shrub
213.	<i>Stylosanthes hamata</i> (L.) Taub.	Herb
214.	<i>Tephrosia pumila</i> (Lam.) Pers.	Herb
215.	<i>Tephrosia purpurea</i> (L.) Pers.	Herb
216.	<i>Vigna radiata</i> (L.) Wilczek	Climber
217.	<i>Vigna trilobata</i> (L.) Verdc.	Climber
GENTIANACEAE		
218.	<i>Enicostemma axillare</i> (Lam.) Rayn	Herb
HYDROCHARITACEAE		
219.	<i>Halophila ovalis</i> (R.Br.) Hook.f.	Herb
220.	<i>Hydrilla verticillapa</i> (L.f.) Royle	Herb
221.	<i>Ottelia alismoides</i> (L.) Pers.	Herb
222.	<i>Vallisnaria spiralis</i> Roxb.	Herb
HYPOXIDACEAE		
223.	<i>Curculigo orchiioides</i> Gaertn.	Herb
LAMIACEAE		

224.	<i>Gmelina arborea</i> Roxb. ex Sm.	Tree
225.	<i>Gmelina asiatica</i> L.	Tree
226.	<i>Hyptis suaveolens</i> (L.) Poit.	Shrub
227.	<i>Ocimum americanum</i> L.	Herb
228.	<i>Ocimum basilicum</i> L.	Herb
229.	<i>Ocimum sanctum</i> L.	Herb
230.	<i>Leonotis nepetiifolia</i> (L.) R. Br.	Shrub
231.	<i>Leucas aspera</i> (Willd.) Link	Herb
232.	<i>Leucas cephalotes</i> (Roth.) Spreng.	Herb
LAURACEAE		
233.	<i>Cassytha filiformis</i> L.	Parasite
LEMNACEAE		
234.	<i>Lemna aequinoctialis</i> Welw.	Herb
LYTHRACEAE		
235.	<i>Ammannia baccifera</i> Roth.	Herb
236.	<i>Lawsonia inermis</i> L.	Tree
MALVACEAE		
237.	<i>Abutilon hirtum</i> (Lam.) Sweet.	Shrub
238.	<i>Abutilon indicum</i> (L.) Sweet.	Shrub
239.	<i>Hibiscus rosa-sinensis</i> L.	Shrub
240.	<i>Hibiscus vitifolius</i> L.	Shrub
241.	<i>Malvastrum coromandelianum</i> (L.) Garcke	Shrub
242.	<i>Sida acuta</i> Burm.f.	Herb
243.	<i>Sida cordata</i> (Burm.f) Borssum	Herb
244.	<i>Sida cordifolia</i> L.	Herb
245.	<i>Thespesia populnea</i> (L.) Corr.	Tree
246.	<i>Urena lobata</i> L.	Shrub
MELIACEAE		
247.	<i>Azadirachta indica</i> A. Juss.	Tree
248.	<i>Melia azedarach</i> L.	Tree
249.	<i>Swietenia mahagoni</i> (L.) Jacq.	Tree
MENISPERMACEAE		
250.	<i>Cocculus hirsutus</i> (L.) Diels	Twiner

251.	<i>Tinospora cordifolia</i> (Willd.) Hook.f. & Thoms.	Twiner
MENYANTHACEAE		
252.	<i>Nymphoides hydrophylla</i> (Lour.) Kuntze	Herb
MAGNOLIACEAE		
253.	<i>Magnolia champaca</i> (L.) Baill. ex Pierre	Tree
MORACEAE		
254.	<i>Artocarpus heterophyllus</i> Lam.	Tree
255.	<i>Ficus benghalensis</i> L.	Tree
256.	<i>Ficus benjamina</i> L.	Tree
257.	<i>Ficus hispida</i> L.f.	Tree
258.	<i>Ficus racemosa</i> L.	Tree
259.	<i>Ficus religiosa</i> L.	Tree
260.	<i>Ficus variegata</i> Blume	Tree
261.	<i>Morus alba</i> L.	Tree
MORINGACEAE		
262.	<i>Moringa pterigosperma</i> Gaertn.	Tree
MOLLUGINACEAE		
263.	<i>Glinus oppositifolius</i> (L.) A. DC.	Herb
264.	<i>Mollugo nudicaulis</i> Lam.	Herb
265.	<i>Mollugo pentaphylla</i> L.	Herb
MUNTINGIACEAE		
266.	<i>Muntingia calabura</i> L.	Tree
MYRTACEAE		
267.	<i>Psidium guajava</i> L.	Tree
268.	<i>Syzygium cumini</i> (L.) Skeels	Tree
NYMPHAEACEAE		
269.	<i>Nelumbo nucifera</i> Gaertn.	Aquatic herb
270.	<i>Nymphaea nouchali</i> Burm.f.	Aquatic herb
271.	<i>Nymphaea pubescens</i> Willd.	Aquatic herb
272.	<i>Nymphaea rubra</i> Roxb. ex Andrews	Aquatic herb
NYCTAGINACEAE		

273.	<i>Boerhavia diffusa</i> L.	Herb
274.	<i>Boerhavia erecta</i> L.	Herb
275.	<i>Bougainvillea glabra</i> Choisy	Herb
276.	<i>Bougainvillea spectabilis</i> (pink)	Shrub
OLEACEAE		
277.	<i>Jasminum flexile</i> Vahl	Shrub
278.	<i>Nyctanthes arbor-tristis</i> L.	Tree
ONAGRACEAE		
279.	<i>Ludwigia adscendens</i> (L.) H. Hara	Herb
280.	<i>Ludwigia octovalvis</i> (Jacq.) P.H. Raven	Herb
281.	<i>Ludwigia perennis</i> L.	Herb
OXALIDACEAE		
282.	<i>Biophytum sensitivum</i> (L.) DC.	Herb
PASSIFLORACEAE		
283.	<i>Passiflora foetida</i> L.	Climber
PEDALIACEAE		
284.	<i>Martynia annua</i> L.	Herb
285.	<i>Pedaliium murex</i> L.	Herb
PHYLLANTHACEAE		
286.	<i>Flueggea leucopyrus</i> Willd.	Shrub
287.	<i>Phyllanthus amarus</i> Schumach. & Thonn.	Herb
288.	<i>Phyllanthus emblica</i> L.	Tree
289.	<i>Phyllanthus maderaspatensis</i> L.	Herb
290.	<i>Phyllanthus reticulatus</i> Poir.	Herb
291.	<i>Phyllanthus rotundifolius</i> Klein ex Willd.	Herb
292.	<i>Phyllanthus virgatus</i> Forst.f.	Herb
293.	<i>Ricinus communis</i> L.	Shrub
294.	<i>Sauropus bacciformis</i> (L.) Airy Shaw	Herb
PLUMBAGINACEAE		
295.	<i>Plumbago zeylanica</i> L.	Herb
PLANTAGINACEAE		
296.	<i>Bacopa monnieri</i> (L.) Wettst.	Herb
PONTEDERIAACEAE		

297.	<i>Eichhornia crassipes</i> (Mart.) Solms	Herb
298.	<i>Monochoria vaginalis</i> (Burm.f.) C. Presl	Herb
PORTULACACEAE		
299.	<i>Portulaca oleracea</i> L.	Herb
300.	<i>Portulaca quadrifida</i> L.	Herb
POLYGALACEAE		
301.	<i>Polygala arvensis</i> Willd.	Herb
POLYGONACEAE		
302.	<i>Antigonon leptopus</i> Hook. & Arn.	Creepers
POACEAE		
303.	<i>Alloteropsis cimicina</i> (L.) Stapf	Herb
304.	<i>Andropogon pumilus</i> Roxb.	Herb
305.	<i>Apluda mutica</i> L.	Herb
306.	<i>Aristida adscensionis</i> L.	Herb
307.	<i>Aristida hystrix</i> L.f.	Herb
308.	<i>Aristida funiculata</i> Trin & Rupr.	Herb
309.	<i>Aristida setacea</i> Retz.	Herb
310.	<i>Brachiaria distachya</i> (L.) Stapf	Herb
311.	<i>Brachiaria ramosa</i> (L.) Stapf	Herb
312.	<i>Brachiaria remota</i> (Retz.) Haines	Herb
313.	<i>Cenchrus biflorus</i> Roxb.	Herb
314.	<i>Cenchrus ciliaris</i> L.	Herb
315.	<i>Chloris barbata</i> Sw.	Herb
316.	<i>Chloris quinquesetica</i> Bhide	Herb
317.	<i>Chrysopogon fulvus</i> (Spr.) Chiov.	Herb
318.	<i>Chrysopogon zizanioides</i> (L.) Roberty	
319.	<i>Coelachyropsis lagopoides</i> Bor	Herb
320.	<i>Cynodon barberi</i> Rang. & Tadul.	Herb
321.	<i>Cynodon dactylon</i> (L.) Pers.	Herb
322.	<i>Cymbopogon coloratus</i> (Hook.f.) Stapf	Herb
323.	<i>Dactyloctenium aegyptium</i> (L.) Beauv.	Herb
324.	<i>Dichanthium annulatum</i> (Forssk.) Stapf	Herb

325.	<i>Dichanthium caricosum</i> (L.) A. Camus	Herb
326.	<i>Digitaria bicornis</i> (Lam.) Roem & Schult.	Herb
327.	<i>Digitaria ciliaris</i> (Retz.) Koeler	Herb
328.	<i>Echinochloa colona</i> (L.) Link	Herb
329.	<i>Echinochloa crusgalli</i> (L.) Beauv.	Herb
330.	<i>Enteropogon monostachyos</i> (Vahl) Schum. ex Engl.	Herb
331.	<i>Eragrostiella bifaria</i> (Vahl) Bor	Herb
332.	<i>Eragrostis nutans</i> (Retz.) Steud	Herb
333.	<i>Eragrostis pilosa</i> (L.) Beauv.	Herb
334.	<i>Eragrostis tenella</i> (L.) P. Beauv. ex Roem. & Schult.	Herb
335.	<i>Eragrostis unioloides</i> (Retz.) Nees ex Steud.	Herb
336.	<i>Eragrostis viscosa</i> (Retz.) Trin.	Herb
337.	<i>Heteropogon contortus</i> (L.) Beauv.	Herb
338.	<i>Imperata cylindrica</i> (L.) P. Beauv.	Herb
339.	<i>Iseilema anthephoroides</i> Hack.	Herb
340.	<i>Iseilema prostratum</i> (L.) Andersson	Herb
341.	<i>Melanocenchris jacquemontii</i> Jaub. & Spach	Herb
342.	<i>Melanocenchris monoica</i> (Rottl.) Fischer	Herb
343.	<i>Oropetium thomaeum</i> (L.f.) Trin.	Herb
344.	<i>Panicum notatum</i> Retz.	Herb
345.	<i>Panicum repens</i> L.	Herb
346.	<i>Panicum trypheron</i> Schult.	Herb
347.	<i>Perotis indica</i> (L.) O. Ktze.	Herb
348.	<i>Saccharum spontaneum</i> L.	Herb
349.	<i>Setaria pumila</i> (Poir.) Roem. & Schult.	Herb
350.	<i>Setaria verticillata</i> (L.) Beauv.	Herb
351.	<i>Sporobolus coromandelianus</i> (Retz.) Kunth	Herb
352.	<i>Trachys muricata</i> (L.) Pers. ex Trin.	Herb
353.	<i>Vetiveria zizanioides</i> (L.) Nash	Herb
RHAMNACEAE		
354.	<i>Ziziphus mauritiana</i> Lam.	Tree
355.	<i>Ziziphus oenopolia</i> (L.) Mill.	Tree

RUBIACEAE		
356.	<i>Catunaregum spinosa</i> (Thumb.) Tirv.	Shrub
357.	<i>Canthium parviflorum</i> Lam.	Shrub
358.	<i>Dentella repens</i> (L.) J.R. Forst. & G. Forst.	Herb
359.	<i>Hedyotis aspera</i> Roth.	Herb
360.	<i>Hedyotis corymbosa</i> (L.) Lam.	Herb
361.	<i>Hedyotis puberula</i> (G. Don.) Arn.	Herb
362.	<i>Ixora arborea</i> G. Lodd.	Shrub
363.	<i>Ixora chinensis</i> Lam.	Shrub
364.	<i>Ixora coccinea</i> L.	Shrub
365.	<i>Spermacoce hispida</i> L.	Herb
366.	<i>Spermacoce pusilla</i> Wall.	Herb
SAPINDACEAE		
367.	<i>Cardiospermum halicacabum</i> L.	Twiner
368.	<i>Dodonaea viscosa</i> Jacq	Shrub
SAPOTACEAE		
369.	<i>Mimusops elengi</i> L.	Tree
SCROPHULARIACEAE		
370.	<i>Sopubia delphinifolia</i> (L.) G. Don.	Herb
371.	<i>Striga angustifolia</i> (D. Don) C.J. Saldanha	Herb
372.	<i>Striga asiatica</i> (L.) O. Ktze.	Herb
373.	<i>Striga densiflora</i> (Benth.) Benth.	Herb
374.	<i>Limnophila indica</i> (L.) Druce	Herb
375.	<i>Lindernia antipoda</i> (L.) Alston	Herb
376.	<i>Scoparia dulcis</i> L.	Herb
SOLANACEAE		
377.	<i>Physalis minima</i> L.	Herb
STERCULIACEAE		
378.	<i>Waltheria indica</i> L.	Herb
TILIACEAE		
379.	<i>Corchorus capsularis</i> L.	Herb
380.	<i>Corchorus olitorius</i> L.	Herb

381.	<i>Corchorus trilocularis</i> L.	Herb
382.	<i>Triumfetta pentandra</i> A. Rich	Herb
383.	<i>Triumfetta rhomboidea</i> Jacq.	Herb
TURNERACEAE		
384.	<i>Turnera ulmifolia</i> L.	Herb
TYPHACEAE		
385.	<i>Typha angustata</i> Bory & Chaub.	Shrub
VERBENACEAE		
386.	<i>Duranta erecta</i> L.	Herb
387.	<i>Lantana camara</i> L.	Shrub
388.	<i>Phyla nodiflora</i> (L.) Greene	Herb
389.	<i>Stachytarpheta jamaicensis</i> (L.) Vahl.	Herb
390.	<i>Tectona grandis</i> L.f.	Tree
VITACEAE		
391.	<i>Cissus quadrangularis</i> L.	Climber
VIOLACEAE		
392.	<i>Hybanthus enneaspermus</i> (L.) F.V. Muell	Herb

LIST OF FAUNAL SPECIES

SNO	Species Type	Common Name	Scientific Name
1	Amphibian	Indian Bull Frog	<i>Rana tigrina</i>
2	Amphibian	Indian pond frog	<i>Euphlyctis hexadactylus</i>
3	Amphibian	Common Indian Toad	<i>Bufo melanostictus</i>
4	Amphibian	Common Tree Frog	<i>Polypedates maculatus</i>
5	Amphibian	Indian Bull frog	<i>Hoplobatrachus tigerinus</i>
6	Amphibian	Jerdons Bull Frog	<i>Hoplobatrachus crassus</i>
7	Arthropoda	Honey Bee	<i>Apis mellifera</i>
8	Arthropoda	Centipede	<i>Scolopendra Hardwickei</i>
9	Arthropoda	Crimson Rose Butterfly	<i>Pachliopta hector</i>
10	Arthropoda	Painted Grasshopper	<i>Poecilocerus pictus</i>
11	Arthropoda	Lychee Shield Bug	<i>Chrysocoris stollii</i>

12	Arthropoda	Cockroach	<i>Periplaneta americana</i>
13	Arthropoda	Ant	<i>Oecophyllas maragdina</i>
14	Arthropoda	House fly	<i>Musca domestica</i>
15	Arthropoda	Mosquito	<i>Anopheles</i>
16	Arthropoda	Mosquito	<i>Culex</i>
17	Arthropoda	Scorpion	<i>Centruroides vittatus</i>
18	Annelida	Earth worm	<i>Lumbricus terrestris</i>
19	Aves (Birds)	Kaki	<i>Corvus splendens</i>
20	Aves (Birds)	Palapitta	<i>Coracias benghalensis</i>
21	Aves (Birds)	Ramachiluka	<i>Psittacula krameri</i>
22	Aves (Birds)	Gudla Guba	<i>Athene brama</i>
23	Aves (Birds)	Vadrangagipitta	<i>Micropternusbrachyurus</i>
24	Aves (Birds)	Pichuka	<i>Passer domesticus</i>
25	Aves (Birds)	Gorinka	<i>Acridotheres tristis</i>
26	Aves (Birds)	Rose ringed Parakeet	<i>Psittaculakramerimanillensis</i>
27	Aves (Birds)	Common Myna	<i>Acridotheres tristis</i>
28	Aves (Birds)	Common Jungle Crow	<i>Corvus macrorhynchus</i>
29	Aves (Birds)	Great Erget	<i>Ardea alba</i>
30	Aves (Birds)	Common tailor bird	<i>Orthotomus sutorius</i>
31	Aves (Birds)	Pigeon	<i>Columba livia</i>
32	Insect	Common Nawab	<i>Polyura athamas</i>
33	Insect	Common Emigrant	<i>Catopsilia pomona</i>
34	Insect	Common Brush brown	<i>Mycalesis perseus</i>
35	Insect	Common Mormon	<i>Papiliopolytes</i>
36	Insect	Common tiger	<i>Danaus genutia</i>
37	Insect	Ant	<i>Solenopsis</i>
38	Insect	Striped Tiger	<i>Danaus genutia</i>
39	Insect	Fruit fly	<i>Drosophila melanogaster</i>
40	Insect	Blue tiger	<i>Tirumala limniace</i>
41	Insect	Crimson Tip	<i>Colotisdanae</i>
42	Insect	Great Eggfly	<i>Hypolimnasbolina</i>
43	Insect	Common Leopard	<i>Phalantaphalantha</i>

44	Insect	Midatha	<i>Caelifera.L</i>
45	Insect	Black Garden ant	<i>Lasiusniger</i>
46	Insect	Danaid Eggfly	<i>Hypolimnasmisippus</i>
47	Insect	Lesser Grass Blue	<i>Zizinaotis</i>
48	Insect	Common Pierrot	<i>Castaliusrosimon</i>
49	Insect	Boddinka	<i>Periplaneta americana</i>
50	Insect	Bee fly	<i>Bombyliidae</i>
51	Insect (Butterfly)	Common jay	<i>G. doson</i>
52	Insect (Butterfly)	Common rose	<i>Pachlioptaa ristolochiae</i>
53	Insect (Butterfly)	Common merun	<i>P. memnon</i>
54	Insect (Butterfly)	The black tail	<i>P. liomedon</i>
55	Insect (Butterfly)	Common albatross	<i>Appias albino</i>
56	Insect (Butterfly)	Common emigrant	<i>Catopsilia crocale</i>
57	Insect (Butterfly)	Common gull	<i>Cepora nerissa</i>
58	Insect (Butterfly)	Common jezebel	<i>Delias eucharis</i>
59	Insect (Butterfly)	Common grass yellow	<i>Eurema hecabe</i>
60	Insect (Butterfly)	Small grass yellow	<i>Eurema brigitta</i>
61	Insect (Butterfly)	Three spot grass yellow	<i>Euremablanda</i>
62	Insect (Butterfly)	Common wanderer	<i>Valeria valeriaanis</i>
63	Insect (Butterfly)	Plain tiger	<i>Danaus chrysippus</i>
64	Insect (Butterfly)	Blue tiger	<i>Tirumala limniace</i>
65	Insect (Butterfly)	Rustic	<i>Cuphaerymanthis</i>
66	Mammal	Monkey	<i>Macaca fascicularis</i>
67	Mammal	Eluka	<i>Mus musculus</i>
68	Mammal	kundelu	<i>Lepus nigricollis</i>
69	Mammal	Gabbilam	<i>Microchirobeta L.</i>
70	Mammal	Adavi Pandi	<i>Wild Boar Herpestes.L</i>
71	Mammal	Pandi Kokku	<i>Field Bandicoot</i>
72	Mammal	Chunchu	<i>Common Shrew</i>
73	Mammal	Squirrel	<i>Funambulus palmarum</i>
74	Mammal	Dog	<i>Canis familiaris</i>
75	Mammal	Deer (Krihna jinka)	<i>Axis axis</i>

76	Reptiles	Wall lizard	<i>Hemidactylus flaviviridis</i>
77	Reptiles	Chameleon	<i>Chameleo zeylanicus</i>
78	Reptiles	House Lizard	<i>Hemidactylus frenatus</i>
79	Reptiles	Garden lizard	<i>Calotes versicolor</i>
80	Reptiles	Termite Gecko	<i>Hemidactylus triedrus</i>
81	Reptiles	Common Garden Lizard	<i>Calotes versicolor</i>
82	Reptiles	Common Skink	<i>Mabuyacarinata</i>
83	Snake	Common Indian Krait	<i>Bungarus caeruleus</i>
84	Snake	Russell's Kukri Snake	<i>Oligodontae niolatus</i>
85	Snake	India Rat Snake	<i>Ptyasmucosus</i>
86	Snake	Indian Cobra	<i>Naja naja</i>

i) Green Programs (Green initiatives)

Due to minimum consideration for environment & sustainability, the world is facing problems of ozone depletion, climate change, water scarcity and sustainable resource management. The university organizes massive plantation programmes, awareness programmes , guest lectures on environmental conservation, biodiversity etc. every year.

List of Programmes:

Green Steps taken by the University:

University campuses were audited with respect to Green Audit Checklist developed by Hym International certifications Pvt. Ltd, Hyderabad Based on the data available for review, it is understood that since 5 years (2017-2021) university is actively taking initiatives in environment related activities. University has taken green initiatives by installing a renewable energy system, rainwater harvesting system, vermi composting, Kitchen gardening, establishing Green Club, recycling process, promoting eco-friendly activities etc.

1. Buildings are specifically designed with wide windows and wide passages to utilise sunlight, and for ventilation.
2. University has more number of trees, shrubs and potted plants present in the campus.
3. University has initiated a rooftop solar PV system of 100 KWH capacity in the main campus.

4. University has e-book facility in the library.
5. Understanding the importance of efficient energy use, university has initiated the process of replacing all incandescent lights with LEDs.
6. Solar panel lights are arranged in the common areas and roads in the campus.
7. For e-waste management, university has tied-up with E-waste recycler/ disposer.
8. University established an 'Green Clubs' and 'Extension activities Committees' in which students and staff arrange different environmental activities such as guest lecture programmes, green awareness camps, conferences, cleanliness drives in association with NSS etc.

OBSERVATIONS

1. Biodiversity: The university campus at Nellore and Kavali comprises of around 424 species of plants and 115 faunal species.
2. Green spaces: From 2017 to 2021, due to huge plantation at the VSU, Nellore and VSUPG Centre, Kavali the area of green space is increased tremendously.
3. Organic manure/fertilizers: One of the best initiatives to improve plantation is through organic farming. Farmers from Buranpur, Nellore district voluntarily supply organic manure to sustain plantation programmes organized by University via Clean and Green initiatives in association with NSS cell of the University.
4. Transportation: The fuel used for transportation of various plantation requirements is 2712 Litres per year. It is observed that the lawn maintenance is properly done and lawn mowing is high in October and November months. The fuel consumption is less than previous year.
5. Wide range of varieties are found in the campus. It observed that high number of Trees i.e., 30% and herbs i.e., 27% are found here. 11% shrubs, 9% grasses & cycads and 7% of medicinal Plants are seen. Though other species are in less number, this counts to high biodiversity of the campus.
6. Based on height the highest number of plants with 50 to 100 cms are 50.2% and more than 12 meters are 30%. Further very less height plants are 8 to 12 meters 0.7%.
7. It is observed that the water scarcity considered during the plantation. 58% are normal water intake plants and 42% plants can tolerate less water also.
8. Most of the plants i.e., 40% are very long life span plants, 1% plants lifespan is 1 to 2 years and 33% plants lifespan is 6 to 12 months. Hence the plants are also well planned as per the lifespan.
9. Biodiversity of fauna: Increase in the plantation from 2017 to 2021 lead to the increase in the biodiversity of fauna. It is observed that a wide variety of butterflies followed by insects have been increased during the assessment year.
10. Water sources: The University at both the campuses has rainwater harvesting systems to avoid scarcity during summer season.
11. Medicinal plants: The University allocated a green space at VSU, Nellore to promote plantation of medicinal plants. So far, 70 species of medicinal plants have been planted at herbal garden and to promote green initiative, the plants are distributed to the local

communities as a part of environmental sustainability.

12. Involvement of students: Students of Clean and Green Committee in association with VSU NSS Cell are regularly involved in the plantation programmes conducted by the university.

RECOMMENDATIONS

1. **Plantation:** Increase the plantation at VSU, Nellore and VSUPG Centre, Kavali. Further, improve the herbal garden at VSU, Nellore and Botanical Garden at VSU, Kavali. Plan for the more aquatic plants in botanic garden.
2. **Water utilization:** Utilize the water facility available in front of the University premises for plantation to avoid water scarcity during summer season. Further, use drip irrigation and sprinklers for watering plants.
3. **Water Management:** Construct more farm ponds for better water management.
4. **Transportation:** Reduce the fuel consumption for plantation and its maintenance.
5. **Organic farming:** Reduce the use of fertilizers and improve organic farming through vermicomposting
6. **Rainwater harvesting units:** Increase number of rainwater harvesting structures near building areas for better conservation of water.
7. **Records:** Campus has to conduct audit every year to track the flora and fauna species
8. **Students activity:** Initiate clean and green activities by involving students. This enables them to understand plant species and their conservation.