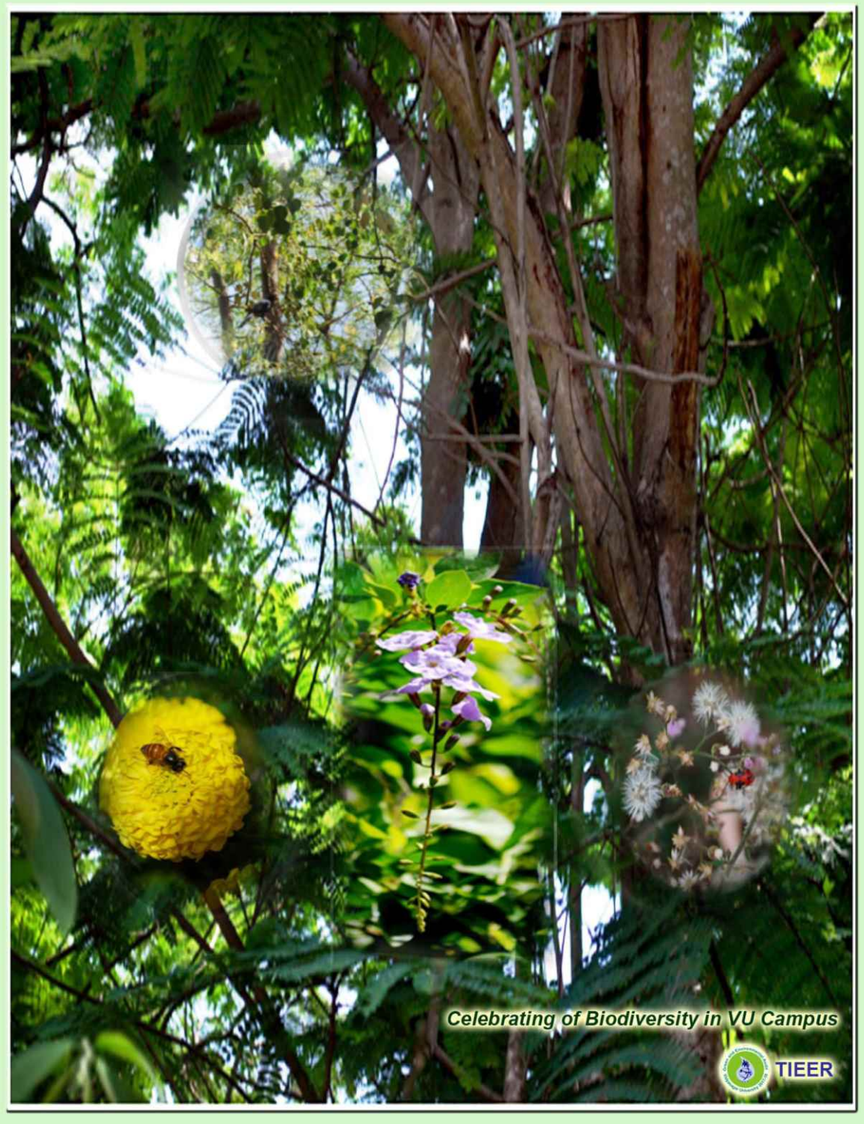

GREEN & ENVIRONMENTAL AUDIT REPORT

(2017-18)

VIDYASAGAR UNIVERSITY, MIDNAPORE, WEST BENGAL

CONSULTRAIN MANAGEMENT SERVICES, LAKE ROAD, KOLKATA

TROPICAL INSTITUTE OF EARTH, & ENVIRONMENTAL RESEARCH (TIEER), MIDNAPORE

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CHAPTER-1

1.0 INTRODUCTION

Green and Environmental Audit is a process of systematic, documented, periodic and objective evaluation of components of environmental diversity with the aim of safeguarding the environment and natural resources in its operations. The process starts with systematic identification, quantification, recording, reporting and analysis of components of environmental diversity of the university. Green auditing is a means of assessing environmental performance (Welford, 2002). It is as systematic, documented, periodic, and objective review by regulated entities of facility operations and practices related to meeting environmental requirements (EPA, 2003).

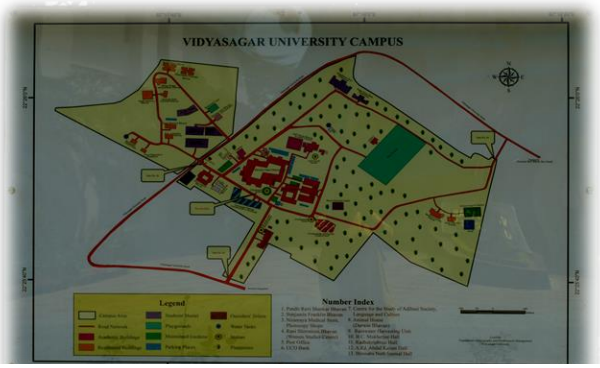
1.1 Goals and Our Mission

It aims to analyse environments within and outside of the concerned area, which will have an impact on the eco-friendly atmosphere. Green and Environmental 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 better understanding of Green impact on their area of work.

Entrance of the University Campus

This includes all emissions to air; land and water; legal constraints; the effects on the neighboring community; landscape and ecology; the public's perception of the operating company in the local area. Green audit does not stop all compliance with legislation. Nor is it a 'green washing' public relations exercise. Rather it is a total strategic approach to the organisation's activities (CBI, 1990).

Vidyasagar University seeks to become a centre of excellence by providing its students a comprehensive education with special emphasis on responsible citizenship, secular outlook, moral values and abiding faith in Environmental ethics expressed inactive concern for others.



Map of the University Campus

The University strives to become a seminal centre for the promotion of the all round development of the students of this region, especially the women students who are socially marginalized and those from a rural background who are economically disadvantaged. The main objectives of carrying of green audit :

- To map the Geographical location of the University – aerial view
- To record the waste disposal system
- To estimate the Energy requirements of the Institution
- To report the expenditure on green initiatives, carbon foot print
- To record the air, water quality
- To conserve the natural resources

1.2 About the University

Vidyasagar University, named after one of the most illustrious sons of Bengal as well as one of the doyens of Indian Renaissance, Pandit Iswar Chandra Vidyasagar, has grown out of a long cultural and educational movement in West Bengal in general and in the undivided district of Midnapore in particular. The idea of founding a University in the district was mooted by the various organizations, notably by the Regional Education Association, Midnapore, headed by Professor A.K.Gayen of IIT, Kharagpur. The Ghani Committee appointed by the U.G.C. also suggested, among others, for the setting up of a University in Midnapore on the ground of its 'having a compact area and a manageable number of colleges' (at that time there were 36 colleges with an enrolment of about 42,000), and also of its 'having the great advantage of co-operation of the IIT, Kharagpur. The Committee was also of the opinion that the new University would develop on the lines suited to the needs of this backward area.

VC Office & Administrative Building

Academic activities started when through a Notification [no. 983-Edn (U), dated Calcutta the 23rd May] issued by the State Government, 30 colleges of the District of Midnapore were affiliated to the Vidyasagar University with effect from 1st June 1985.The foundation stone of the main campus at Tantigaria mouza of Midnapore Sadar Town for post graduate teaching and central administration of the University, was laid on 18th July 1983 by the then Hon'ble Chancellor of the University and Governor of West Bengal, Late B.D.Pande. On 15th January 1986, it was inaugurated by Shri Jyoti Basu, the then Chief Minister of West Bengal. From the next day (16th January) classes commenced in six post graduate departments: Anthropology, Applied Mathematics with Oceanology and Computer Programming, Commerce with Farm Management, Economics with Rural Development, Library and Information Science, Political Science with Rural Administration.

Green Corridor

1.3 History and Heritage

To give honour and respect to these pious intentions and proposals, the Government of West Bengal decided in 1978 to establish Vidyasagar University. The U.G.C. approved the proposal and on the advice of, and in consultation with the U.G.C., the State Government appointed a Planning Committee in March 1979 to lay down the lines of development and to take initial steps to found the University. The Committee submitted its report in October. Then the Vidyasagar University Act, 1981 (West Bengal Act XVIII of 1981) was passed; some of its sections were brought into operation on 24th June 1981. Finally, Professor Bhupesh Chandra Mukherjee joined as the first Vice Chancellor of the University on 29th September 1981.

The U.G.C. accorded recognition to the University in terms of Section 12B of the U.G.C. Act, on 1st March 1990.The University presently houses 27 PG departments (apart from this course – MBA - being run under the Department of Commerce with Farm Management), 12 in Humanities and 15 in Science while 46 undergraduate colleges apart from 11 courses in yet 11 other colleges / institutes are affiliated to it. Fourteen vocational subjects and six other specialized courses are also offered at the UG level. The overall emphasis of the university is not to perpetuate the traditional nature of the other universities of West Bengal but to merge as a distinctive entity with a special nature of its own. The National Assessment and Accreditation Council (NAAC) awarded Vidyasagar University with a 3-star status. The campus has a picturesque background within which afforestation programmes are being under taken.The Vidyasagar University thus began its journey to sail through many trials and tribulation.

1.4 Campus Area and Infrastructure

Total area of the university campus – 138.78 acres,
Main campus – 103.74 acres,
Residential campus - 35.04 acres.

MAIN CAMPUS CONSISTING	RESIDENTIAL CAMPUSCONSISTING
Administrative building	Vice Chancellor Bungalow
DDE Building with Guest House	V.I.P Guest House
Science building	Student Amenities Center
Humanities Building	P.G Girls Hostel (2 Blocks)
Silver Jubilee Building	Teacher & Officers Hostel (2 Blocks)
Central Library	Teacher Quarter (2 Blocks)
P.G Boys Hostel(2- Blocks)	Non Teaching Staff Quarter (2 Blocks)
Non-teaching Staff hostel (2 Blocks)	
Women Infrastructure	
Sports complex with Pavilion	
Tribal cultural Building	
Electrical Sub Station	
Over Head Water Reservoir with deep tube well (4 Nos) & Pump House	

1.5 Core value of the University

Named after Pandit Ishwar Chandra Vidyasagar, the 19th century messiah of social and educational reform in Bengal, this university engages in an unrelenting Endeavour to realize the goals and objectives he has set for the country's progress. We esteem the uncompromising grit and fortitude with which he strove to overcome the hurdles on the path to progress.

- This university believes in holistic progress of students through right education and attainment of right knowledge.
- Education, knowledge and progress is a composite leitmotif that governs the activities and plans of this varsity.
- We focus on an organic fusion of curricular and extra-curricular activities, the substantial part of which is based primarily on the principles of moral uplift and ethical dispensation. We take special care in addressing both the material and spiritual needs of the students.
- In the process the educators are advised to upgrade themselves in a manner that takes care not only of the disciplinary progress of the students but also the psychological and mental health of the learners.
- The care givers are taught regularly by the best specialists in respective disciplines and also by trained psychologists. The students are given adequate scope to develop their bodies and minds by inspiring them to engage in sports and athletic activities along with subject based learning and research pursuits.
- The university takes care in sustainable development and considers the environment as one of the major planks for security and holistic development of the whole institution.

Administrative Building

We also believe in auto-learning so that the students here are encouraged to learn from experience gained both in formal and informal settings. They are motivated to appraise the formative benefits that they reap from everyday experiences. We intend them to grow to become independent learners faster than the average student of this country. Our motivational programmes steer clear of any discriminatory practices and focus on creating more convenient space for the development of less privileged and differently-abled learners. Above all, we believe in an everlasting process of reforming ourselves and to that effect look forward to formative advices and suggestions from anyone who happens to visit this site and our sacred premises. Your good wishes will act as grist in our Endeavour to make this planet a better place to live in.

Aerial View of DDE Building & Guest House

Aerial view of the Green Campus

1.6 Academic Department and Research Centre

Academic Departments		Research Centre
Bengali	Anthropology	Centre for Environmental Studies (CES
Business Administration	Applied Mathematics with Oceanology and Computer Programming	Centre for Life Sciences
Commerce with Farm Management	Aquaculture management & Technology	Gandhian Studies Centre
Economics with Rural Development	Bio-Medical Laboratory Science & Management	Women's Studies Centre
English	Botany and Forestry	Centre for Adivasi Studies and Museum
Hindi	Chemistry & Chemical Technology	
History	Computer Science	
Library and Information Science	Electronics	
Philosophy& Life world	Geography & Environment Management	
Political Science with Rural Administration	Human Physiology with Community Health	
Sanskrit	Microbiology	
Santali	Physics & Technophysics	
Sociology	Remote Sensing and GIS	
	Zoology	

1.7 Previous NAAC Grading:

The National Assessment and Accreditation Council (NAAC) awarded Vidyasagar University with a 3-star status. The campus has a picturesque background within which afforestation programme are being under taken.

CHAPTER – 2

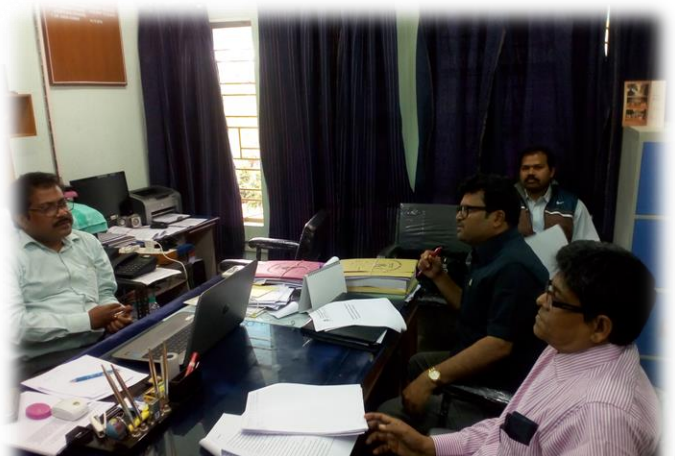
2.1 Affiance and commitment of the University:

Meeting between IQAC & Auditing Authority

The Management of the IQAC Cell in the University has shown the commitment towards the green auditing during the pre-audit meeting. They were ready to encourage supporting 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, biodiversity management on the campus etc., after the green auditing. The management of the University was willing to formulate policies based on green auditing report.

2.2 Objectives of Green & Environmental Auditing:

The objectives of Green & Environmental Auditing are to assess a clean and healthy environment aids effective learning and provides a conducive learning environment. Green Audit is the most efficient and ecological way to manage environmental problems. It is a kind of professional care which is the responsibility of each individual who are the part of economical, financial, social, environmental factors. It is necessary to conduct green audit in university campus because students become aware of the green audit, its advantages to save the planet and they become good citizen of our country. Thus Green audit becomes necessary at the University level. It comes with a series of questions to be answered on a regular basis. This innovative scheme is user friendly and totally voluntary. The aim of this is to help the institution to set environmental examples for the community, and to educate the young learners.



Interview with DSW

- To study of interrelationship between beneficiary and environment in the University campus
- To Establish to provide basis for improved sustainability

- To create a Eco and Green campus
- To enable waste management through reduction of waste generation, solid-waste and water recycling
- To create plastic free campus and evolve health consciousness among the stakeholders
- Recognize the cost saving methods through waste minimizing and managing
- Point out the prevailing and forthcoming complications
- Authenticate conformity with the implemented laws
- Empower the organizations to frame a better environmental performance
- Enhance the alertness for environmental guidelines and duties
- Impart environmental education through systematic environmental management approach and Improving environmental standards
- Benchmarking for environmental protection initiatives
- Financial savings through a reduction in resource use
- Development of ownership, personal and social responsibility for the University and its environment
- Enhancement of university profile developing an environmental ethic and value systems in youngsters.
- Green auditing should become a valuable tool in the management and monitoring of environmental and sustainable development programs of the University

2.3 Advantages of Green and Environmental Audit:

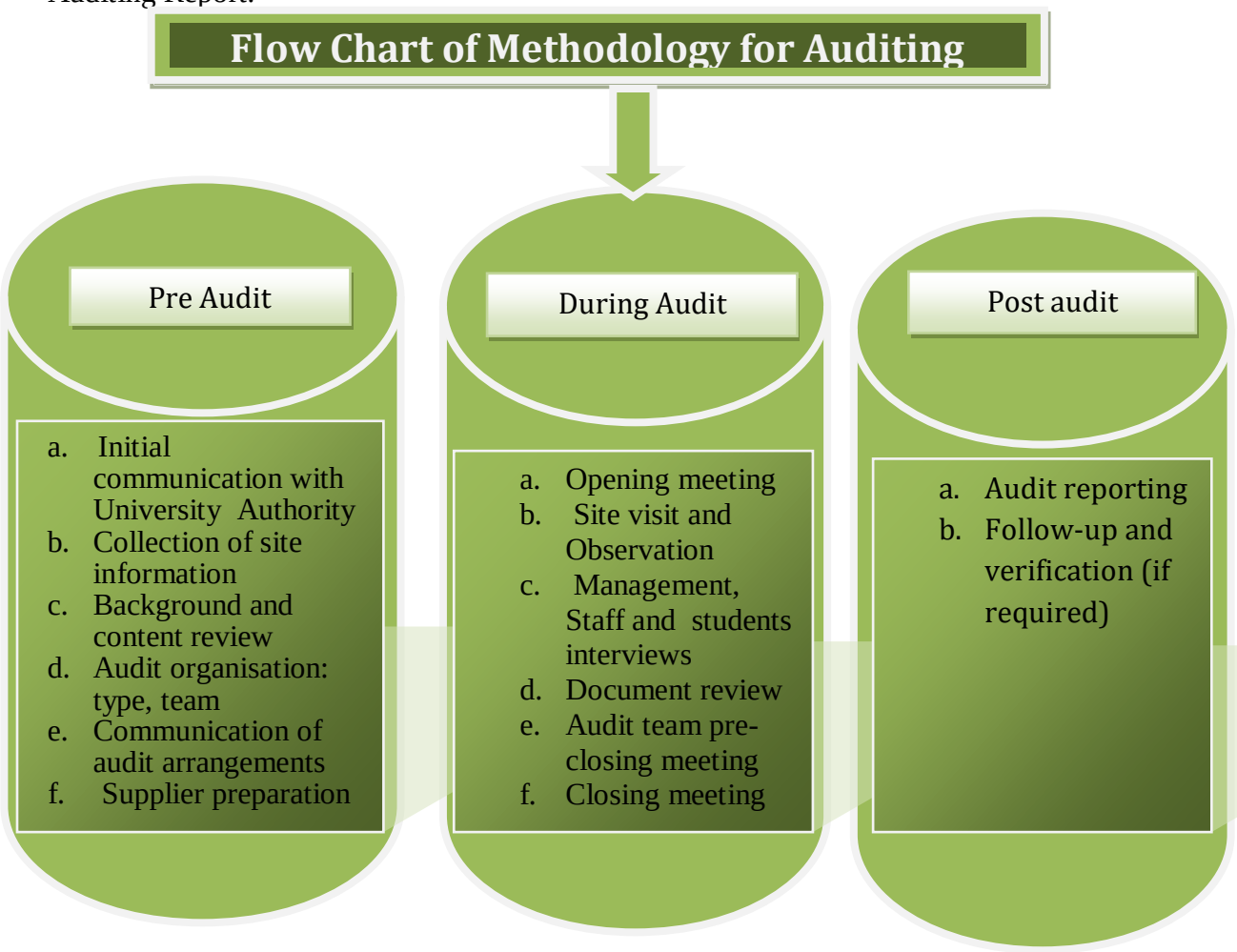
- To develop to more efficient resource management
- To provide basis for improved sustainability
- To create a green campus
- To enable waste management through reduction of waste generation, solid- waste and water recycling
- To create plastic free campus and evolve health consciousness among the stakeholders
- Recognize the cost saving methods through waste minimizing and Managing
- Point out the prevailing and forthcoming complications
- Authenticate conformity with the implemented laws
- Empower the organizations to frame a better environmental performance
- Enhance the alertness for environmental guidelines and duties
- Impart environmental education through systematic environmental
- Management approach and Improving environmental standards bench marking for environmental protection initiatives
- Development of ownership, personal and social responsibility for the University and its environment
- Developing an environmental ethic and value systems in youngsters.
- Green and Environmental auditing should become a valuable tool in the management and monitoring of environmental and sustainable development programs of the University

➢ 2.4 Purpose of Green and Environmental Auditing:

The Green and Environmental Audit of is essential requirement of NACC Committee to the University. It is necessary to conduct a green audit in University campus because student aware of the green audit, its advantages to save the planet & they become good citizen of our country. The green audit practically involves use of renewable sources, conservation of the energy, rain water harvesting program, and efforts of carbon neutrality, plantation of trees, E-waste management and hazardous waste management. The national & local governments keeping lots of efforts for maintaining a planet green. Also Environment is a compulsory subject to all batcher student and arrange various programme so that student are much aware of the save planet, keep it green & also save energy.

2.5 Methodology and Survey Schedules

The methodology is adopted for this Assessment by collecting the information by Onsite visit, group discussion, Campus survey, Enquiry, Observation, Perception study and opinion also included in the Auditing Report.



The Audit team started the audit at the University Campus on 6th July, 2017

Site Visit :

SL.NO	PURPOSE	DATE	REMARKS
1.	Communication with university authority	6th July,2017	Discuss about term and condition
2.	Opening Meeting	24th July,2017	Submitted the survey schedule
3.	Collection information about the University	16th Agust,2017	Introduced to Administrative Officer
4.	Campus visit and observation	28th August,2017	Outdoor observation with Drown camera& Photo camera
5.	Campus enquiry	13th September, 2017	Physically enquiry with expert
6.	Departments visit and enquiry	17th November.,2017	Laboratory enquiry
7.	Departments visit and enquiry	27th November,2017	Laboratory enquiry
8.	Interview with Students	14th December,2017	Meet with students union , students & Researchers
9.	Interview with staff	11th January,2018	Collected different information
10.	Interview with others Stakeholders	23th February ,2018	Collected different information
11.	Review data and Assessment	24th February, 2018 -15th April, 2018	Data generate and drown figures
12.	Pre Closing meeting	5th May, 2018	Meeting with IQAC
13	Closing Meeting	20th May, 2018	Pre-submission of report
14.	Submit audit report	14th June,2018	Submit of the Report

University and its premises were visited and analyzed by the audit-teams several times to gather information. Campus trees were counted and identified. Medicinal garden, play grounds, canteen, library, All Department, office rooms, Hostels, DDE Building, Guest House, Staff Quarter and parking grounds were also visited to collect data. Number and type of vehicles used by the stakeholders were counted and fuel consumption for each vehicle was verified with the user. Number of LPG cylinders used in labs, canteen and hostel kitchen were also counted. Leakage of a few water taps and over flow tanks were noticed during the site inspection.

The key focus was on assessing the status of the green cover of Institution including Carbon footprint in view of the followings:

1. Compliance: Verifying compliance with standards or best available techniques.
2. Identifying problems: Detecting any leakage, spills or other such problems with the operations and processes.
3. Formulating environmental policy: Formulating the Vidyasagar University's environmental policy if there is no existing policy.
4. Measuring environmental impact: Measuring the environmental impact of each and every process and operation on the air, water, soil, worker health and safety and society at large.
5. Measuring performance: Measuring the environmental performance of a University against best practices.
6. Confirming environmental management system effectiveness: Giving an indication of the effectiveness of the system and suggestions for improvement.
7. Providing a database: Providing a database for corrective action and future plans.
8. Developing the organization's environmental strategy: Enabling management to develop its environmental strategy for moving towards a greener corporate and performance culture.
9. Communication: Communicating its environmental performance to its stakeholders though reporting will enhance the image of the Institution.

Interview with Student Union

Group Discussion

The Discussion was focused on identifying the attitudes and awareness towards environmental issues at the institutional, district, national and global level. From the Group Discussion we gathered information on office-based environmental impacts like built-up area, utility bills, reuse of water, waste management energy-saving devices and IT equipment/e-waste was collected. This information was added to the carbon footprint data, generating a fairly clearer picture of the emissions and impact of the reduction measures undertaken.

Chapter 3.0 : AUDIT STAGE

3.1 Campus Survey and Enquiry

Green audit forms part of a resource management process. Although they are individual events, the real value of green audits is the fact that they are carried out, at defined intervals, and their results can illustrate improvement or change over time. Eco-campus concept mainly focuses on the efficient use of energy and water; Minimize waste generation or pollution and also economic efficiency. All these indicators are assessed in process of "Green Auditing of educational institute". Eco-campus focuses on the reduction of contribution to emissions, procure a cost effective and secure supply of energy, encourage and enhance energy use conservation, promotes personal action, reduce the institute's energy and water consumption, reduce wastes to landfill, and integrate environmental considerations into all contracts and services considered to have significant environmental impacts. Covered areas included in this green auditing are water, energy, air quality & carbon footprint, waste, biodiversity campus.

The Audit covered the following major areas:

1. Water Efficiency and Water Management
2. Energy Efficiency and Energy Management
3. Air Quality &Carbon foot print and Management
4. Waste and Waste Management
5. Biodiversity &Green Zone and management

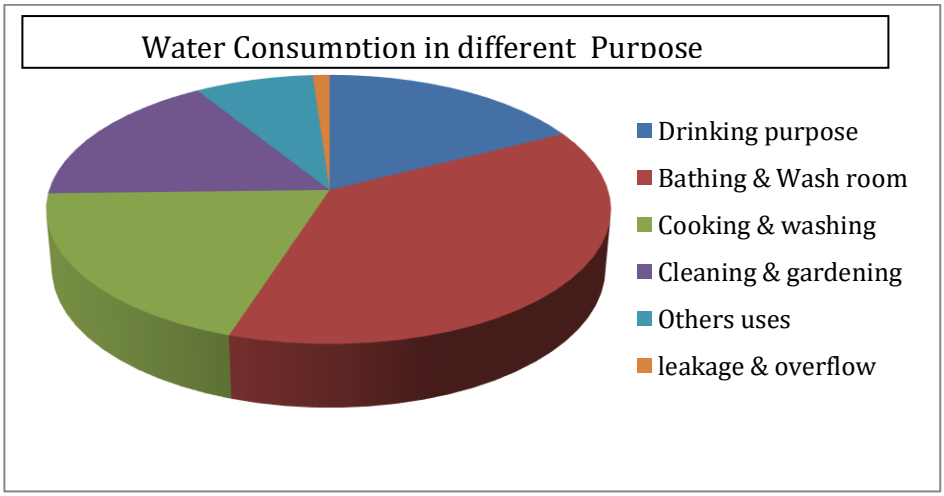
3.2 Water Efficiency and Water Management

Water is a Flow and natural resource; all living matters depend on water. While freely available in many natural environments, in human settlements potable (drinkable) water is less readily available. We need to use water wisely to ensure that drinkable water is available for all, now and in the future. By the Enquiry, Aquifer (Underground) is the main source of water. That water is use for Drinking, Washing, Cleaning, Cooking, Bathing and gardening purpose. About 40,000 gl. Liter water per day require for that purpose. The maximum water is use for Bathing and washing in Hostels& Staff Quarter. About 37.5% water has been supply for that sector. The leakage and misuse of water is about 1.1% in whole campus by small drip from a leaky tap and over flow can waste of water to a day. Minimum leaking faucets were seen in washrooms. Water conservation faucets in washrooms were not seen. Installation of such faucets can save water and will help in minimising the water footprint of the institute. Sanitary wastewater generated from washrooms is connected to sewerage system. Chemical wastewater generated in chemical labs in the institute is also connected to sewerage system.

Water Tank

Waste water recycle is not practiced in the institute as grey water/ sewage treatment /recycle facility is not provided. Aquifer depletion and water contamination are taking place at unprecedented rates. It is therefore essential that any environmentally responsible academic institution should examine its water use practices. By the enquiry, water auditing is finding out that the reuse of water and use of surface water is very poor implemented condition. Water auditing is conducted for the evaluation of facilities of raw water intake and determining the facilities for water treatment and reuse.

Vidyasagar University is located in Lateritic drought prone region of Paschim Medinipur of W.B, which is a water scarce area. Therefore, the concerned auditor investigates the relevant method that can be adopted and implemented to balance the demand and supply of water and also proper water management practices along with rooftop rain water harvesting system must be installed in whole campus for recharging ground water and meeting part of the water requirements. It is therefore essential that any environmentally responsible institution examine its water use and Re-use practices.



Water Consumption in 2017-18		
Sl no.	Purpose	Use of %
1	Drinking Purpose	17.5
2	Wash Room& Bathing(Hostel)	37.5
3	Cooking & Washing	19.2
4	Cleaning & Gardening	16.5
5	Others use	7.8
6	Overflow & leakage	1.1

By the investigation with the help of Water P^H meter and TDS meter, we have assessed that the water quality of drinking water is highly healthy for human health. As result, Quality of Water

weightage is high (H). Other hand, we have observed that only one Rechargeable unit is active at Science Building and only one water harvesting plant found here which is located at north eastern side of the campus. So, the medium category of Water Harvesting and water recharge methods are applied in the campus. By the observation, Reuse of water and use of surface water in the campus is not properly managed. So, weightage of taken water management policy level is Low (L) .

Taken Water management policy

Sl.No	Factors	Weightage
1	Quality of Water	H
2	Re-use of water	L
3	Water Harvesting & Recharge	M
4	Use of Surface Water	L

* H denote- Taken management policy level above 60%
** M denote- Taken management policy level 40%-60%
*** L denote-Taken management policy level below 40%

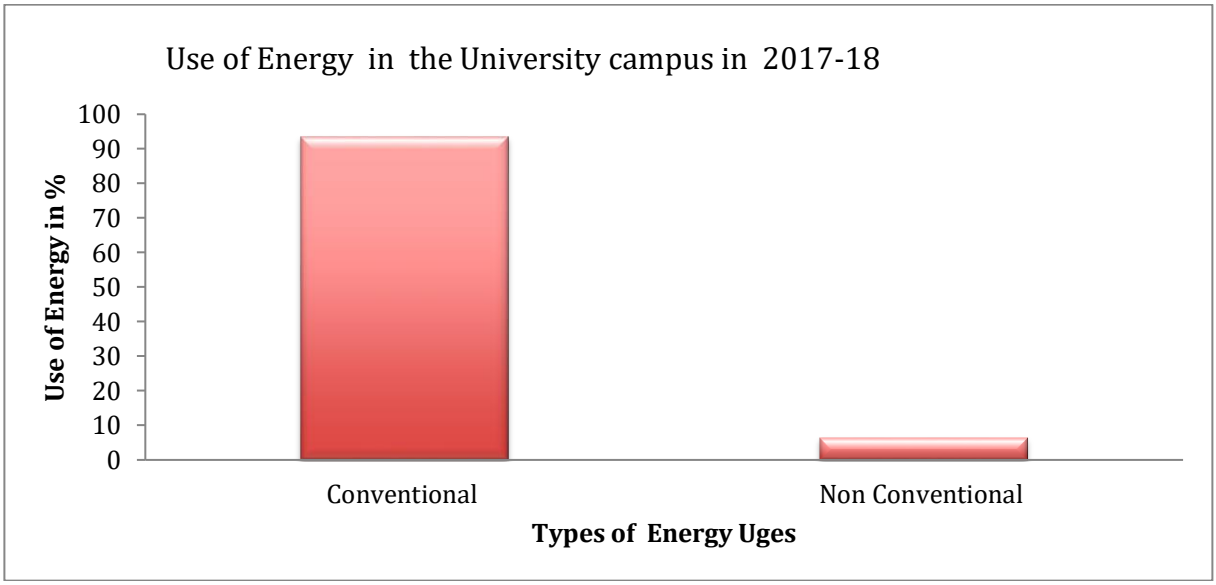
3.3 Energy Efficiency and Energy Management:

This indicator addresses energy consumption, energy sources, energy monitoring, lighting, appliances, and vehicles. Energy use is clearly an important aspect of campus sustainability and thus requires no explanation for its inclusion in the assessment. An old incandescent Tube uses approximately 40W while an energy efficient light emitting diode (LED) uses only less than 10 W. By the enquiry, we have observed that the uses of energy have come from Conventional and Non-Conventional energy source. The uses energy is 1639117 unit which Rs. Amount is Rs.16001910/. Only 6% uses Energy is Non-conventional energy which is Solar Power. About 1000sq ft (100kw) area is cover by the solar plate. The Maximum energy is consumption to Light & Fan purpose which amount about 42.5 % from total consumption. Other hand Departmental and Computer laboratory has been more expended about 34%. Energy auditing deals with the conservation and methods to reduce its consumption related to environmental degradation. It is therefore essential that any environmentally responsible institution examine its energy use practices.

Canteen Observation

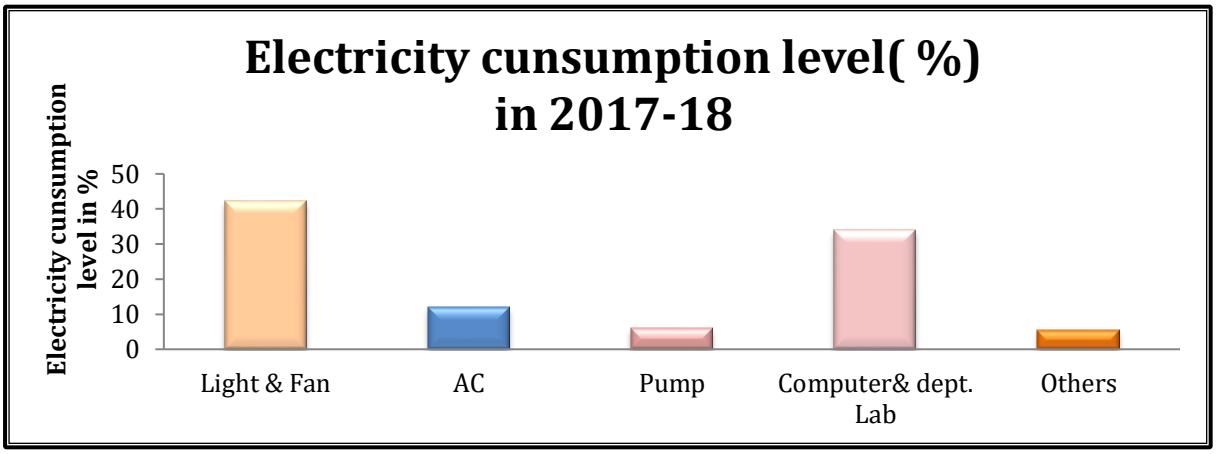
Energy cannot be seen, but we know it is there because we can see its effects in the forms of heat, light and power.

Other hand, it has been observed that LPG gas cylinders are used in Chemistry laboratories (4pc/year) and in the hostels(90PC/Month) and canteen (50pc/month) for cooking. Other than this, LPG gas is not used anywhere. There is no dedicated gas storage area. Gas cylinders are refilled as and when required. There are Green generators used in the premises.



Good Daylight Design and Ventilation:

a) All the corridors receive good daylight due to the large windows.
b) Corridors are wide with good ceiling height.
c) Classrooms also have high ceiling with wide doors and large windows. Windows are kept open to receive sunlight.
d) Curtains are provided on some of the windows to avoid glare. Due to the location some classrooms do not receive ample natural light and fresh air. Hence these rooms are provided with tube lights even during day time.
It was observed that reflectors are not provided for tube lights which can reduce electricity consumption. Computers are always kept on standby mode with power saving screensavers.
There are no signage encouraging users to switch off light and fans to save electricity. Providing signage through screensavers & posters near electrical switches will help in making students responsible for conservation of electricity.



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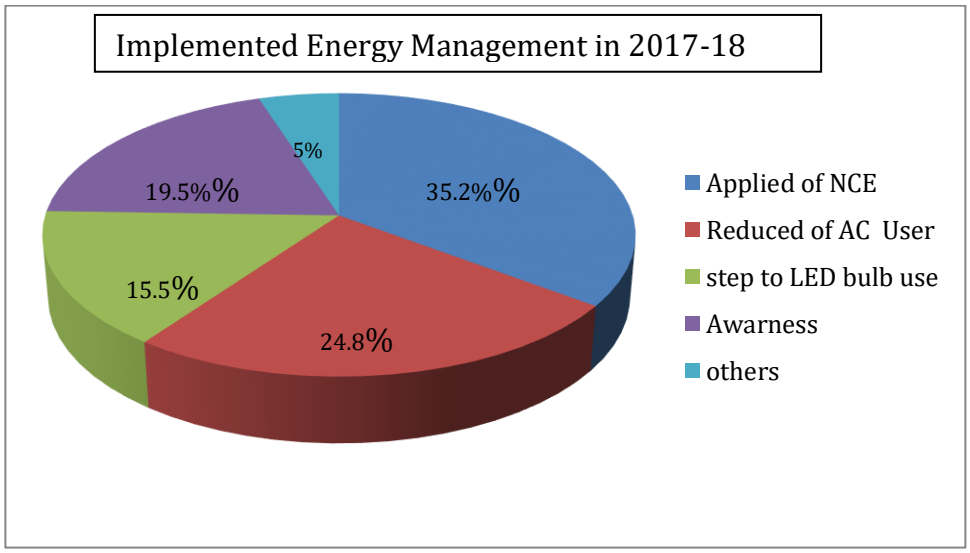
a) Every classroom and lab with central switch board should have a diagram linking place of tube light, fan etc. with corresponding switch. This will ensure that correct fitting is switched on/ off and can save time & unnecessary operation.

b) Installation of automatic lights with sensors can be considered.

c) Standard Operation Procedures (SOPs) should be prepared and followed for green purchasing wherein equipment's with star rating; those using eco-friendly materials; those with safe disposal policy or return to supplier after defunctioning, can be considered.



d) For purchasing new electronic appliances, star rating provided by Bureau of Energy Efficiency (BEE) should be considered. The equipment which has maximum star ratings could be purchased, which will consume less energy, ensure environmental sustainability and also operate at low cost.

e) Usage of light reflectors is recommended as the reflectors can spread light to relatively large areas.

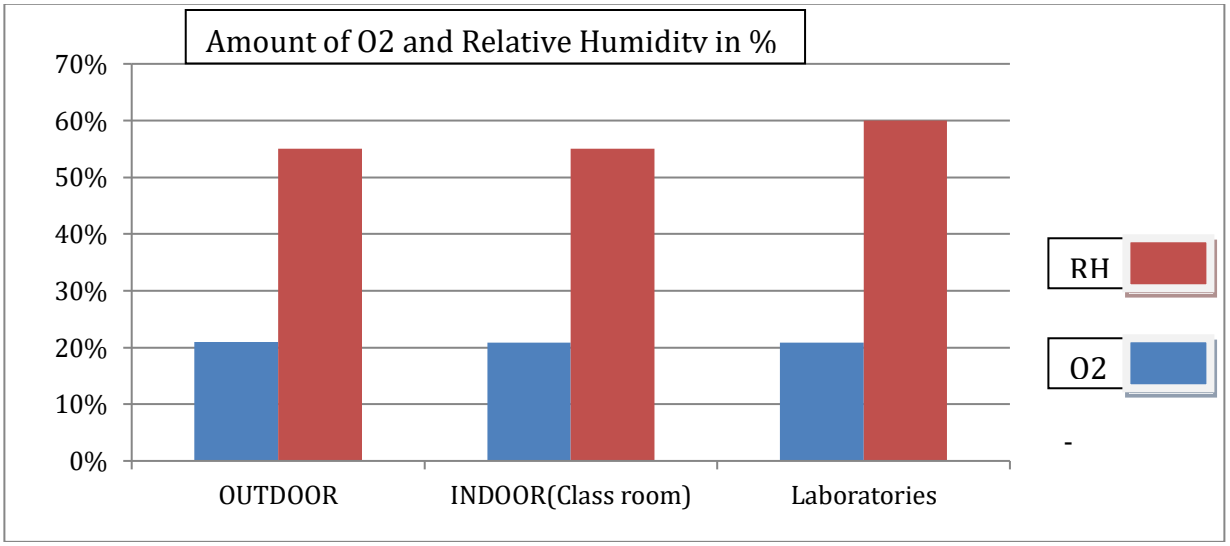
f) Notices/ signage can be put up/ displayed near switches and on notice boards, informing students and staff to switch off all Departments & Sectors when not in use.

g) Use of large number of percentage renewable energy should be considered.

3.4 Air Quality and Carbon Footprint:

Commutation of stakeholders has an impact on the environment through theemission of greenhouse gases into the atmosphere consequent to burning offossil fuels (such as petrol, Diesel, LPG Gas). The most common greenhouse gases are carbon dioxide, CFC, water vapour, methane, nitrous oxide and ozone. Of all the greenhouse gases, carbon dioxide is the most leading greenhouse gas, comprising 407.4 ppm of the Earth's atmosphere. 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. It undertakes the measure of bulk of carbon dioxide equivalents exhaled by the organization through which the carbon accounting is done. It is necessary to know how much the organization is contributing towards sustainable development. It is therefore essential that any environmentally responsible institution examine its carbon footprint.

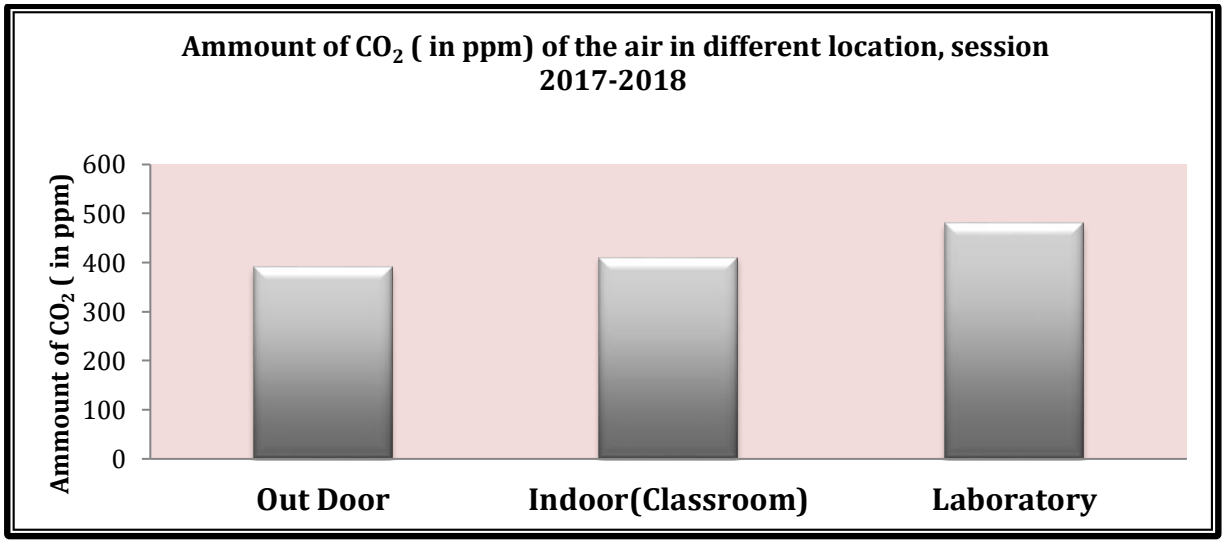
It is was observed that the Outdoor air quality is Fresh and comfortable for breathing to human life .



By the enquiry, it was observed that more than 21% Oxygen available in the air. While, Indoor air quality especially Computer and Departmental Laboratories is usually uncomfortable, there are level of Oxygen is less than 20.80%. Other hand the amount of CO2 is very high in the departmental and Computer laboratories which amount is more than 440ppm and also amount of CO is 5 to 6 ppm.

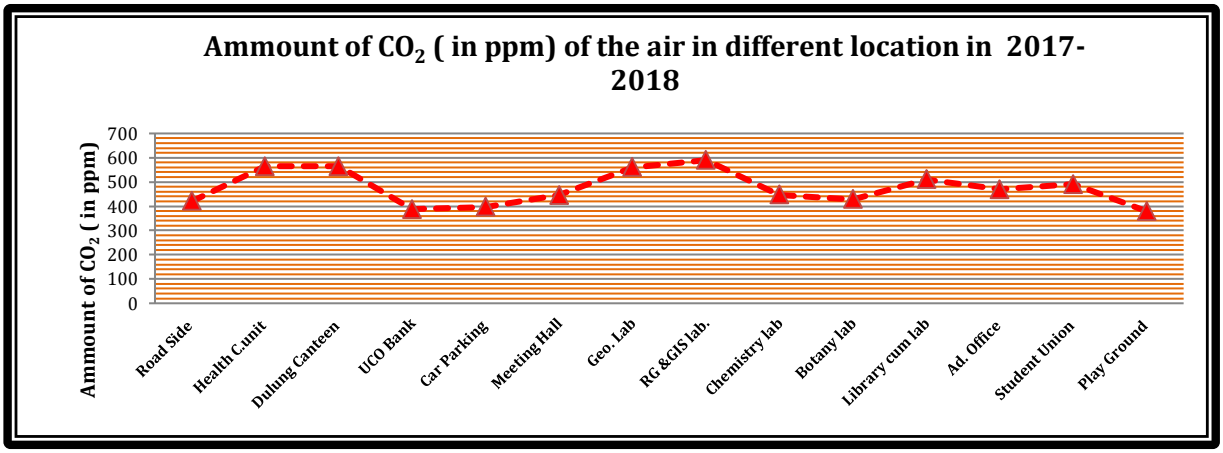
Amount of CO_2 (in ppm) of the air in different location, session 2017-2018

Location	Density of CO_2 (ppm) in
Out Door	390
Indoor(Classroom)	410
Laboratory	480



Amount of CO_2 in ppm in Different stations in 2017-2018

Different stations	Density of CO_2 (ppm) in
Road Side	420
Health C.unit	565
Dulung Canteen	565
UCO Bank	387
Car Parking	397
Meeting Hall	446
Geo. Lab	560
RG &GIS lab.	590
Chemistry lab	447
Botany lab	429
Library cum lab	510
Ad. Office	470
Student Union	490
Play Ground	379



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

• Molds and other allergens – This may arise from water seeping into the building envelope or skin, plumbing leaks, condensation due to improper ventilation, or from ground moisture penetrating a building part.

• Carbon monoxide – Sources of carbon monoxide are incomplete combustion of fossil fuels.

• Volatile organic compounds – 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.

• Carbon dioxide – Due to human respiration

Amount of O_2 (in %) of the air in different location in 2017-2018

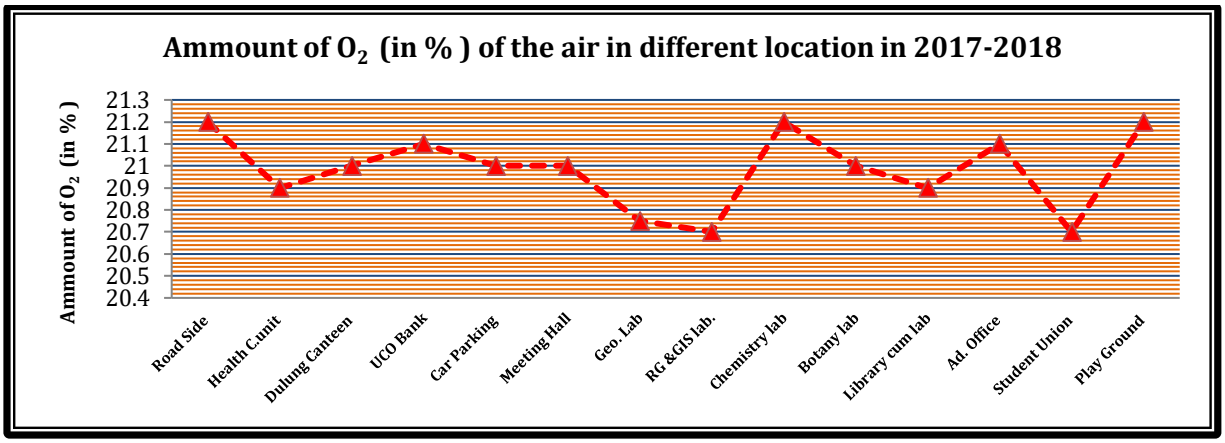
Air quality record in Different station	O_2 in %	O_2 in %
Road Side		21.4
Health C.unit		20.9
Dulung Canteen		21
UCO Bank		21.1
Car Parking		21
Meeting Hall		21
Geo. Lab		20.75
RG &GIS lab.		20.7
Chemistry lab		21.2
Botany lab		21
Library cum lab		20.9
Ad. Office		21.1
Student Union		20.7
Play Ground		21.2

• Particulate matter – Due to construction and maintenance activities

Major observations under indoor air quality are as below:

a) Ventilation is achieved by fans in the institute and air conditioners in Official and Lab. places.

b) Heating Ventilation and Air Conditioning (HVAC) system is not installed.



d) Exhaust fans are only provided in washrooms and chemistry lab.

e) No indoor plants were observed in the entire institute. Indoor plants can be plotted not only for the aesthetic appearance but also for health benefits.

3.5 Generation of Waste and Waste Management

Waste (or wastes) is useless or unusable materials or components which are discarded after principal use. Sometimes, it is a defective article and of no use. In modern outlook waste may be a valuable substance subject to an appropriate operation or action on the waste. With the context of waste management RRR (reduce, reuse and recycle) model may be followed in appropriate fashion.

Solid Waste

Pollution from waste is aesthetically unpleasing and results in large amounts of litter in our communities which can cause health problems. Plastic bags and discarded ropes and strings can be very dangerous to birds and other animals. This indicator addresses waste production and disposal, plastic waste, paper waste, food waste, and recycling. Solid waste can be divided into two categories: general waste and hazardous waste. General wastes include what is usually thrown away in homes and schools such as garbage, paper, tins and glass bottles. Hazardous waste is waste that is likely to be a threat to health or the environment like cleaning chemicals and petrol. Unscientific landfills may contain harmful

contaminants that leach into soil and water supplies, and produce greenhouse gases contributing to global climate change. Furthermore, solid waste often includes wasted material resources that could otherwise be channeled into better service through recycling, repair, and reuse. Thus the minimization of solid waste is essential to a sustainable university. The auditor diagnoses the prevailing waste disposal policies and suggests the best way to combat the problems. It is therefore essential that any environmentally responsible institution examine its waste processing practices. Keeping the objective of the audit the following study will be limited to the waste generated in an academic campus and surroundings.

Types of waste :

The following categories of wastes are generated in the University campus:

a) Solid waste - Nearby the Science department old instruments, Plastic containers, Bottles and furniture cause dump. Waste generated through paper, plastic packaging causes nuisance. Some wastes are generated after various experiments, primarily, chemistry laboratory; broken test tube, glassware are the example.

Source place of Bio-Waste (Canteen)

b) Liquid waste - There are bio-chemical wastes generated through various chemical reactions and biological processes. Generally, these are being drained to nearby Surface water bodies contaminating water and soil. Appropriate means is suggested to adopt scientific liquid waste management practices. These are neutralization, bacterial control, and natural control through plantation.

Waste Management

a) Solid waste

It was observed that:

a) Wet waste and dry waste segregation is not practised in the premises. No separate bins are provided for wet biodegradable and dry recyclable waste.

b) Combined waste is directly handed over to the Municipality

c) Hostel is the main area where biodegradable and non-biodegradable waste is generated.

In the back of the girls hostel the sanitary napkins are mostly observed scattered here and there.

e) In other areas like classrooms, it is mostly paper waste and plastic wrappers

Old Instruments: The suggestion is that old instruments may be preserved in a central museum (may be developed if does not exist). The same may be used for demonstration to the new and passionate students and to school children for their project purpose.

Old Furnitures: Old furniture may be reassembled to make stools, desks, chairs, tables, racks and book shelves with appropriate renovation. Moreover, since cutting of threes is not suggested, whatever timber we have from the ancestors must be preserved and utilize properly.

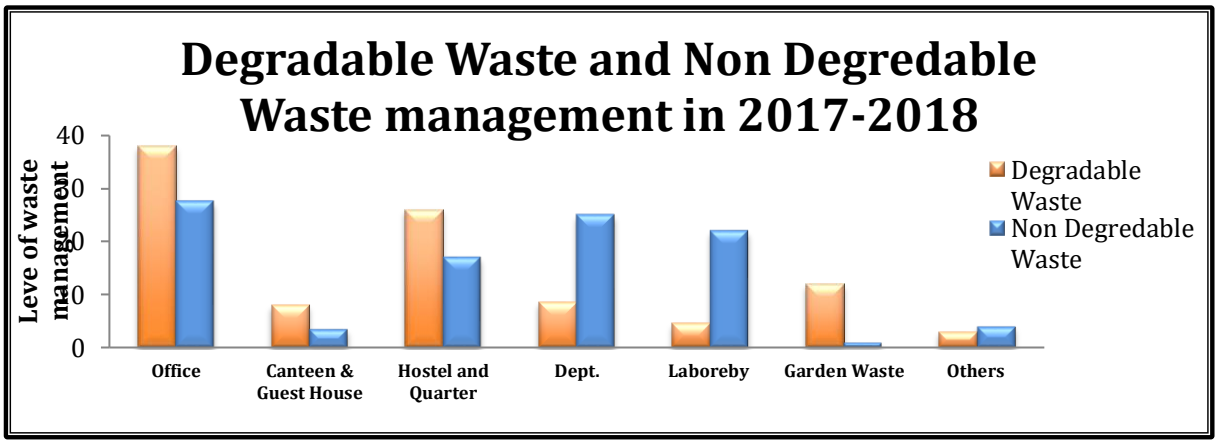
Plastic Waste: For plastic three dimensional package-of-practices is suggested. First of all, awareness on plastics material (and its life cycle), its uses and disposal will be there regularly among students. In the second stage, practice of keeping plastics wrapping, packaging, and other plastic-made things in the appropriate bin should be there. For this purpose sufficient numbers of bins will be placed in appropriate locations like students' common room, canteen etc. A mechanism will be there for regular collection by dedicated manpower. At the end, the plastics will recycled by grinding/ chopping instrument and final material is to be dispatched to market. The institution has accepted the suggestion of use of such innovative recycling machine and suggested to design the machine.

Type of E-Waste

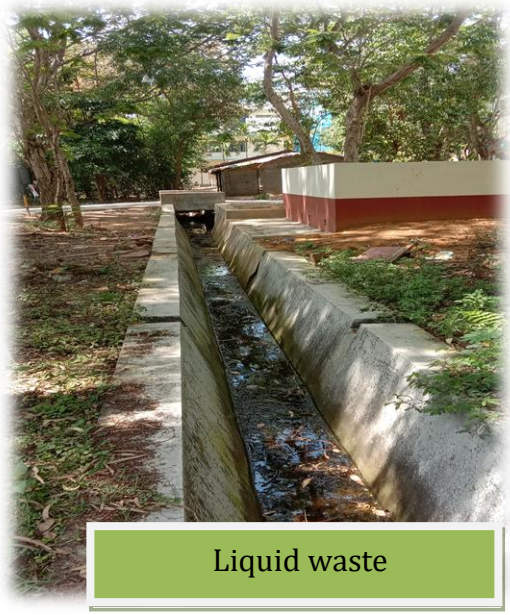
Paper Waste Management: Being academic institution, waste paper is the main solid waste generated in the premises. The institution has taken steps to minimize and avoid paper usage. Faculty and administration staff uses old papers and envelops for internal usages as rough work, file markers, page separators etc. Paper notices are displayed on the notice boards .The dissertation reports, journals, and answer papers are stored as per the University rules after that the waste paper is supplied to nearest paper mill .About 80% wastes are Bio- Degradable. Farther, 60% degradable waste is Papers mainly examine papers. Which amount is 10 to12 ton. After couple of years, old submissions and answer papers will be archived and stored in a record room at Examination control room.. Old publications are still stored in the library. As per the memo, for the disposal of old newspaper scrap dealer is called by central purchase department.

E-Waste Management: Most of the storage of E- Wastes is in computer laboratory, library, Geography, Remote Sensing & GIS, MBA Departments. The data on E-waste generation and its disposal is not available. There is no documented policy for collection, segregation of e-waste.

Hazardous waste: Wastes generated from chemical experiments are to be disposed safely maintaining chemical hazard disposal protocol.



b) Liquid waste: Liquid waste generated from canteen, hostels & quarters, Toilets and also from chemical experiments, washing of used glassware etc. Appropriate means is suggested to adopt scientific liquid waste management practices. These are neutralization, bacterial control, and natural control through plantation.



Liquid waste

Bio-Degradable waste

Waste prevention

Since waste demands a cost for recycling, it is better to design such product which takes less recycling cost. So, at the design phase the proper need assessment is to be undertaken to reduce the target cost for disposal.

Major audit issues in management of waste :

The following are being emphasized during audit of waste management:

a) Name of the waste

b) Category of waste

c) Quantity of waste

d) Hazardous effect of the waste

e) Institutional action and mechanism for waste management

Compliance audit of waste issues:

At the present stage the institute is capable in managing their waste. They are complying with the essential requirements of waste management although suggestions are given for future improvements.

Performance audit of waste issues:

No critical audit issue is there with respect to the waste management.

Implemented wastes management		
Sl.no	Factors/Indicators	Weightage
1	Plastic and Polythene free	H
2	Re-use of papers	H
3	Hazardous effect waste management	L
4	Removal of E-Wastes	M
5	Organic & food waste	M
6	Others solid wastes	M

* H denote- Taken management policy level above 60%
** M denote- Taken management policy level 40%-60%
*** L denote-Taken management policy level below 40%

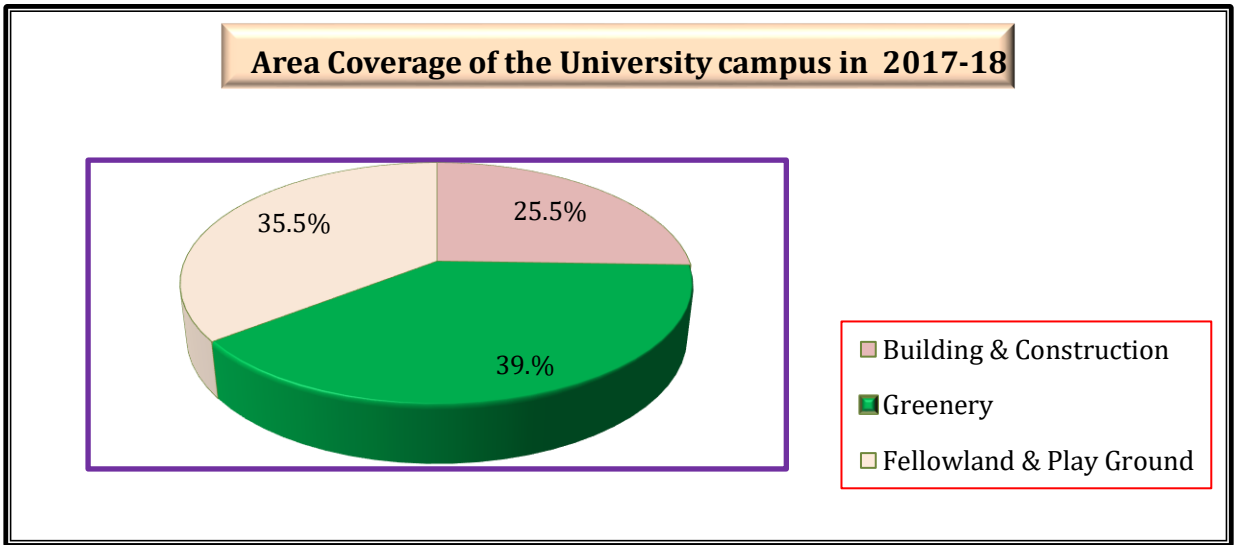
3.6 Auditing for Biodiversity & Green Campus Management

Unfortunately, biodiversity is facing serious threats from habitat loss, pollution, over consumption and invasive species. Species are disappearing at an alarming rate and each loss affects nature's delicate balance and our quality of life. Without this variability in the living world, ecological systems and functions would break down, with detrimental consequences for all forms of life, including human beings. Newly planted and existing trees decrease the amount of carbon dioxide in the atmosphere. Trees play an important ecological role within the urban environment, as well as support improved public health and provide aesthetic benefits to cities. In one year, a single mature tree will absorb up to 48 pounds of carbon dioxide from the atmosphere, and release it as oxygen. The amount of oxygen that a single tree produces is enough to provide one day's supply of oxygen for people. So while you are busy studying and working on earning those good grades, all the trees on campus are also working hard to make the air cleaner for us. Trees on our campus impact our mental health as well; studies have shown that trees greatly reduce stress, which a huge deal is considering many students are under some amount of stress.

Indigenous Herbs & Shrubs

Total area of the university campus is 138.78 acres, where, Main campus is 103.74 acres, Residential campus –is 35.04 acres. Farther, 39% area is under greenery and biodiversity zone. The university campus is highly biodiversity rich area. So, it is a local biodiversity hotspot in Midnapur urban centre. Biodiversity includes the genetic variability and diversity of life forms such as plants, animals, microbes etc. living in a wide range of ecosystems. Flora and fauna of Vidyasagar University is rich. It is located under the Tropical Humid climatic zone as well as dry deciduous forest zone . More than 200hundred different plants species have there. Abromaaugusta, Acalyphaindica, Acaciaauriculiformis, Anthocephaluscadambe, Alstoniascholaris, Ageratum conyzodes, Albizzialebbeck ,Anacardiumoccidentale, Albiziasaman, Buteamonosperma, Dalbergiasissoo, DigitariasaguinallsFiligiosa, Mimosa pidica, Peltophorampterocarpum , Setariaviridis, Swieteniamahaganiand, Zizyphusmauritianaetc species are common Tree, Shrubs and Herbs in the University campus.

Plantation trees



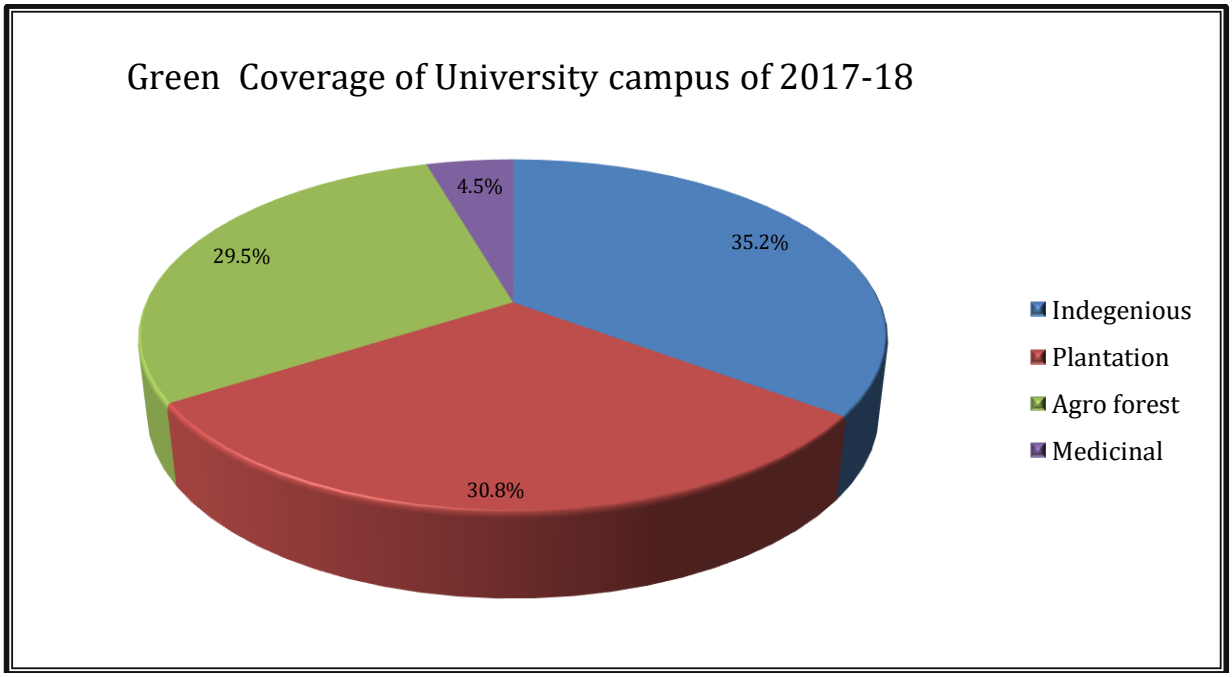
About 30.2 % plants are Indigenous and Native trees, 30.8% is Plantation trees, 29.5% trees are Agro forest and 4.5 % are medicinal plants common. Mammals, amphibian, Insects, Birds, Myriapods are common animals groups are found here and also different organism are common type of biodiversity.

a). Plantation is needed in the compound in the periphery of the campus, Specially in area of Teachers quarters and Girls hostels. This plantation will also help keep down severe heat and cold. The trees should be planted in such a way that it should not completely obstruct the view of the building from outside and sunlight to room.

b). Indoor plants can be potted along the corridors of Department and class rooms also Laboratories due to maintain of air quality and entrance of the building. For enhancing the scenic beauty it is suggested to plant flowering trees, which bloom in different seasons, in front of the large trees along the periphery.

d).Vertical Gardening can be done on the compound wall of the institute.

Bio-Diversity Zone with Insect



Implemented Biodiversity & Green Management		
Sl. No	Factors/ Indicators	Weightage
1	Plants Diversity	H
2	Birds and Insects	H
3	Mammals	M
4	Amphibian	M
5	Mushrooms & Organisms	M

* H denote- Taken management policy level above 60%

** M denote- Taken management policy level 40%-60%

*** L denote-Taken management policy level below 40%

3.7 Review of Documents and Records

Documents such as admission registers, registers of Engineering and water charge remittance, furniture register, laboratory equipment registers, purchase register, audited statements, and office registers were examined and data were collected. University calendars, university magazines, annual report of the university and NAAC self-assessment reports, UGC report etc. were also verified as part of data collection.

3.8 Review of Policies

Discussions were made with the University management regarding their policies on environmental management. Future plans of the University were also discussed. The management would formulate a revised environment /green policy for the university in the light of green auditing. The purpose of the green audit was to ensure that the practices followed in the campus are to be in accordance with the Green Policy adopted by the institution.

3.9 Interviews

In order to university information for green auditing different audit groups with Interviewed IQAC Cell, Deputy Registrar, Dean of Student Welfare, and Director DDE, Dept. HOD, Teaching and non-teaching staff, students, Students Union, parents and other stakeholders of the University. Discussions were also made with the PTA office bearers to clarify doubts regarding certain points.

Interview with other Stakeholder

Meet with teaching faculty in Geography Dept.

CHAPTER : 4.0 POST AUDIT STAGE

4.1 Data analysis and Assessment

The base of any green audit is that its findings are supported by documents and verifiable information. The audit process seeks, on a sampled basis, to track past actions, activities, events, and procedures to ensure that they are carried out according to systems requirements and in the correct manner. Green audits form a part of a process. Although they are individual events, the real value of green audits is the fact that they are carried out, at definedintervals, and their results can illustrate improvement or change over time.

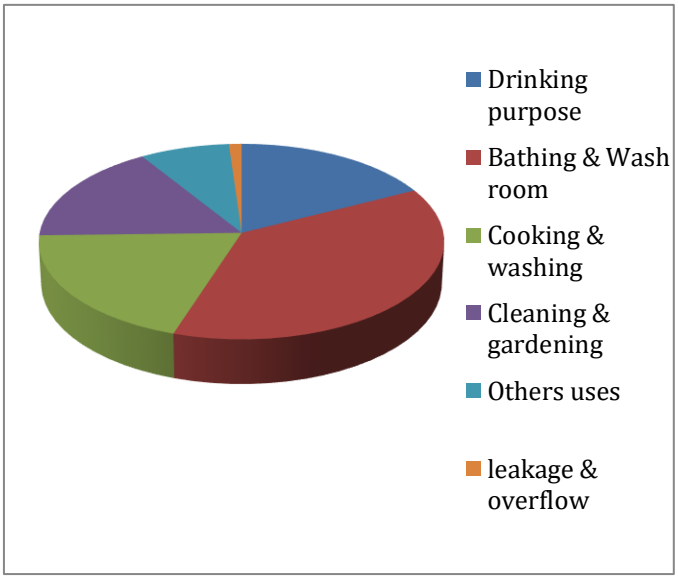
Although green audits are carried out using policies, procedures, documented systems and objectives as a test, there is always an element of subjectivity in an audit. The essence of any green audit is to find out how well the environmental organisation, environmental management and environmental equipment are performing. Each of the three components are crucial in ensuring that the organisation's environmental performance meets the goals set in its green policy. The individual functioning and the success of integration will all play a role in the degree of success or failure of the organization's environmental performance.

4.2 Results and Findings

a) Water –

Main water uses in the campus

- Garden
- Lab
- Cleaning
- Canteen
- Drinking
- Toilets
- Bathrooms
- Hostel
- Washing
- Construction works
- Office use



Consumption of water per day		
1	Drinking purpose	26560 Liters
2	Wash room & Bathing purpose	56700 Liters
3	Cooking & Washing	29230.4 Liters
4	Gardening, Ground & Cleaning	24948 Liters
5	Others Purpose	11998.6 Liters
6	Overflow and leakage	1763 Liters

4.2.b. Energy:

❖Electricity Consumption -1639117 Unit, Rs.-16001910/- per Year

a) Conventional energy-1532574
b) Nonconventional energy-106543

- ❖ Fossil fuel consumption per Year:
  a. Number of Gas cylinders used for cooking purpose(Hostels& Canteen) – 1080PC
  b. Number of Gas cylinders used in Chemistry Laboratory - 4PC
  c. Diesel used for green Generater-1500 liter
- ➢ Number of Gas cylinders used per month – 130 PC
- ➢ Cost of Gas cylinders used Rs. 84500/month
- ➢ Number of Green Generators - 4
- ➢ Cost of generator fuel – Rs. 8125/month
- ➢ Total cost of energy – Rs. 1426117.5/month

Energy consumption in different purpose : 2017-18		
1	Lights & Fans	696624.72 unit
2	Air Condition	198333.15 unit
3	Lifting of water(HP pump)	98347.02 unit
4	Computer & Dept. Lab	557299.78 unit
5	Others(CCTV,TV, water cooler & others)	88512.31unit

4.2.c. Waste

- ➢ Total Students & others Stakeholders inside the campus – 4395
- ➢ Departments – 27
- ➢ Student Hostels & Staff Quarters - 8
- ➢ Office Building – 5
- ➢ Guest house -2

- Canteen- 2
- Type of Wastes & Management:
- E-wastes- computers, electrical and electronic parts – Disposal by selling
- Plastic waste- disposal by selling
- Solid wastes – Damaged furniture, Iron & Metal scraps- Disposal by Selling
- Papers wastes – Disposal by Selling
- Food wastes – Waste Rice, Vegetable, Paper plates- Disposal to municipal waste Collection centers.
- Chemical wastes – Laboratory waste – No treatment
- Waste water – washing, urinals, and bathrooms in soak pits
- Glass waste – Broken glass wares from the labs to municipal waste
- Collection centers.
- Napkin & Clothes incinerators- Disposal to municipal waste Collection centers.

Quantity of waste generated:-

- Biodegradable – 15 kg/day (office), (except Exam. Evaluation sheet)
- Non biodegradable – 2.5 kg/day (office)
- Biodegradable – 3kg/day (labs)
- Non-biodegradable – 3 kg/day (including glass bottles)
- Hazardous waste –250gm/day

Canteen, Hostels & Staff Quarters waste

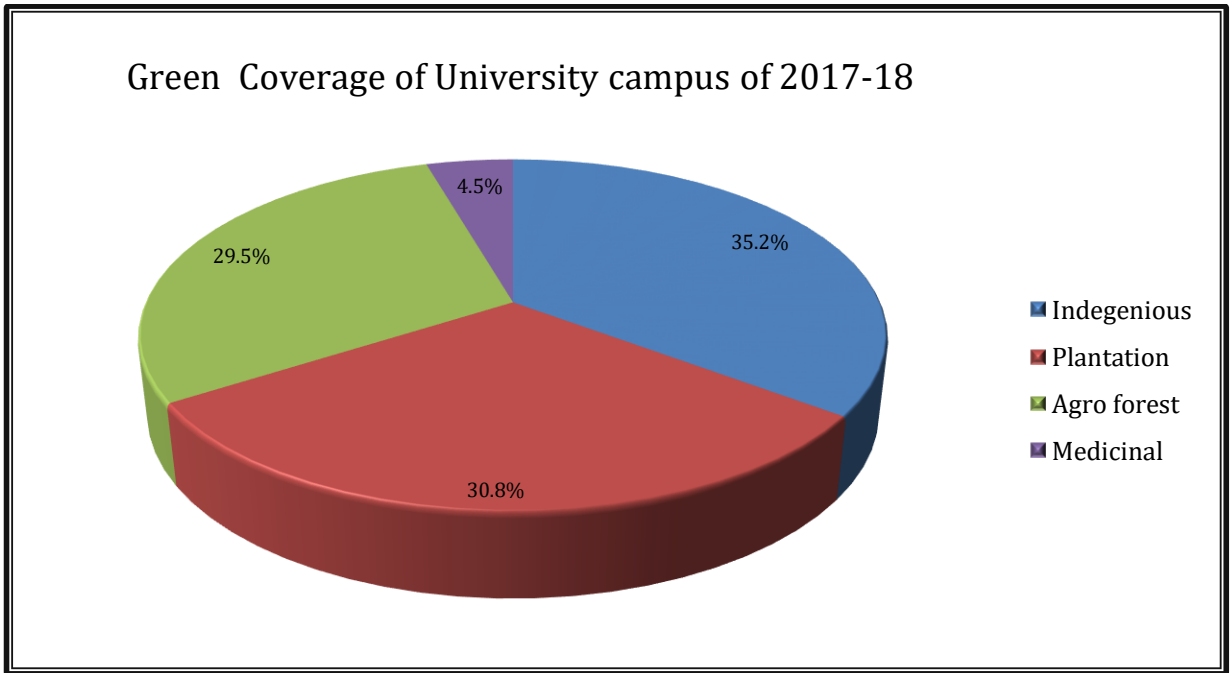
- Biodegradable University canteen – 60kg/day
- Non biodegradable – 4 kg/day

d) Green Campus

- Total number of plant species identified – more than 200 species.
- Tree cover of the campus – 54 acre area
- Free space including Play ground- 49 acre area

Crops cultivated in the campus:

Banana, Tapioca, Chilly, Cabbage, Tomato, Spinach, Brinjal, Cauliflower, Ladies finger, Pea and different seasons flowers are produced during different seasons in Hostels and Quarters Kitchen garden and University premises area.



Campus farming

Organic vegetable cultivation as interim crop is another
plan to be materialized soon. The university has also cultivated of Cashew in the backyard of the campus.

The department of Botany has been consistently undertaking Honey, vegetable cultivation of monsoon, winter and summer crops and conducting the sale of the products among the community.

Routine Green Practices

World Water Day- 21st March, World Earth Day- April 22,World Biodiversity Day- May 22,World Environment Day – June 5,

Ozone Day – September 16

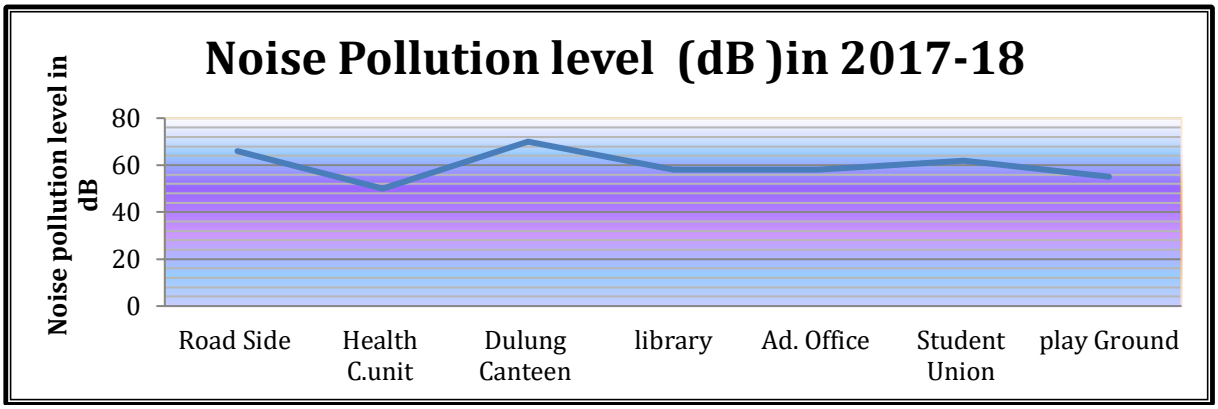
Awareness seminars are organized on various environmental problems.

Distribution of fruit trees, poster exhibition etc. are some activities on that day. Conducted poster competition, Invited lectures etc and also University has been declared as 'Save water Save earth'

The Green campus drive is an initiative of the University to protect the Environment. The University has been declared as 'No Plastic' & No Smoking' zone. The campus protects age old trees in addition to several new trees and plants planted. The campus is lush green with gardens, lawns, flowers and plants wherever there is open space. Rain water is harvested and collected in the well in front of the university. There is a pond at the far end of the university ground to harvest water. Bio-degradable waste iscollected and made intocompost.Non-degradable and electronic waste and toxic materials are regularly disposed of. Important days like World Environment Day, Ozone Day, Hiroshima Day etc are observed and several programmes including processions with placards, competitions and street plays are conducted by various departments to create awareness in environment protection and conservation. The department of Zoology and Geography regularly conduct weekly quiz on nature and fauna.

e) Carbon Footprint

- ✓ Number of Students & Staff using cycles – 360
- ✓ Number of persons using cars – 12
- ✓ Number of persons uses two wheelers – 112
- ✓ Number of students uses Buses - 85
- ✓ Number of persons using other transportations – 2725
- ✓ Number of visitors per day – 160
- ✓ Number of Students staying in the hostel – 632
- ✓ Number of Faculty and staff staying in the quarters – 88
- ✓ Average distance travelled by stake holders – 6x2 kms /day
- ✓ Expenditure for transportation per person per day – Rs.40/-



4.3 Consolidation of Audit Findings

We hope that students and Stakeholder will have developed a greater appreciation and understanding of the impact of their actions on the environment. They have successfully been able to determine the impacts on the environment through the various auditing exercises. Participating in this green auditing procedure they have gained knowledge about the need of sustainability of the university campus. It will create awareness on the use of the Earth's resources in their home, University, local community and beyond.

4.4 Summary of Green Auditing and Environmental Auditing

- ➢ The environmental awareness initiatives are not substantial.
- ➢ The University campus is noticed that plastic free and maintained the outdoor air quality.
- ➢ The installation of solar panels, Fire extinguishers training, organic vegetable cultivation and Vermi composting practices are inadequate.
- ➢ There is no Green Club/ Nature club of the University towards its environmental performance for Community development.
- ➢ Gardens inside the University premises are found well maintained.
- ➢ Departmental gardens are noticed in Botany Dept and Geography dept.

- .Medicinal plate garden is covered with minimum percentage of land and also minimum species are having there.
- Indoor air quality of the laboratories is very uncomfortable and inhospitable.
- Use of notice boards and signs are inadequate to reduce over exploitation of natural resources.
- Programs on green initiatives have to be increased. Campus is declared
- Fully carbon foot print and wastes free zone actions should be taken to maintain this.
- Rain water harvesting systems, solar power generation, Bio Gas, Re-use of water environmental education programs have not properly apply.
- Fire protection method is not properly display.

Water Audit

- There is no water consumption monitoring system in the Hostels of university campus.
- The University does not have waste water treatment for waste water Generated from laboratories, canteen, hostel kitchen, toilets, bathrooms and office rooms.
- The waste water from hostels, canteen and kitchens are not suitably controlled and are not re-used for gardening.
- The university has to take actions to strengthen rain water harvesting. Rain water harvesting for separate buildings are lacking.
- Measurement of quantity of water obtained from the rain water harvesting should be done.
- Automatic switching system is not installed for pump sets used for overhead tank filling.
- Per day use of water is very high and there is no control over wastage ofwater.
- Display boards against the misuse of water use are lacking.

Energy Audit

- The communication process for awareness in relation to energy conservation is found inadequate.
- Assessment of electrical load calculation is yet to be done by the university.
- Monthly use of electricity in the university is very high.
- Objectives for reducing energy, water and fuel consumption are meager.
- There are fans and Tube light of older generation and non energy efficient which can be phase out by replacing with new energy efficient fans and tubes.
- Regular monitoring of equipments and immediate rectification of any problems.

Waste Audit

- Solid waste management systems established are insufficient.
- The university has proper communication with the local body for regular collection of solid waste from the campus.
- Implementation of sustainable projects to attain set environmental goals is not in place.
- Waste bins in the class rooms, veranda, canteen and campus are open and inadequate.
- Bio gas plant is not found.
- Proper composting systems are lacking.
- Green chemistry labs are not introduced.

(ix) Green Campus Audit

- ✓ Tree cover of the university with respect to the stakeholder strength is enough.
- ✓ Regular planting of trees in the campus are inadequate.
- ✓ Vegetables cultivation is not done regularly.

- ✓ Display boards to all plants identified are lacking.
- ✓ Water uses for gardens are high.
- ✓ No arboretum is set up in the university campus.
- ✓ There is only very few fruit trees in the university to attract birds.
- ✓ Uses of herbs cultivated in the medicinal garden are not displayed.

(x) Carbon Foot Print Audit

- ➢ University has not yet taken any initiative for carbon accounting.
- ➢ Too much adequate common transportation facilities should be provided by the University
- ➢ Encourage students to use cycles.
- ➢ Fossil fuel is burned every day for the functioning of the University. This is too high carbon emission.
- ➢ Minimum % of the energy is used from Non-conventional power.
- ➢ Uses of 130 gas cylinders per month is very high.

Implemented Air Quality management		
Sl No	**Indicator**	**Weightage**
1	Carbon & Smoke free	H
2	Exhaust fans &Ventilation	M
3	Emission of GHGs	M
4	Indoor Plants	L

* H denote- Taken management policy level above 60%

** M denote- Taken management policy level 40%-60%

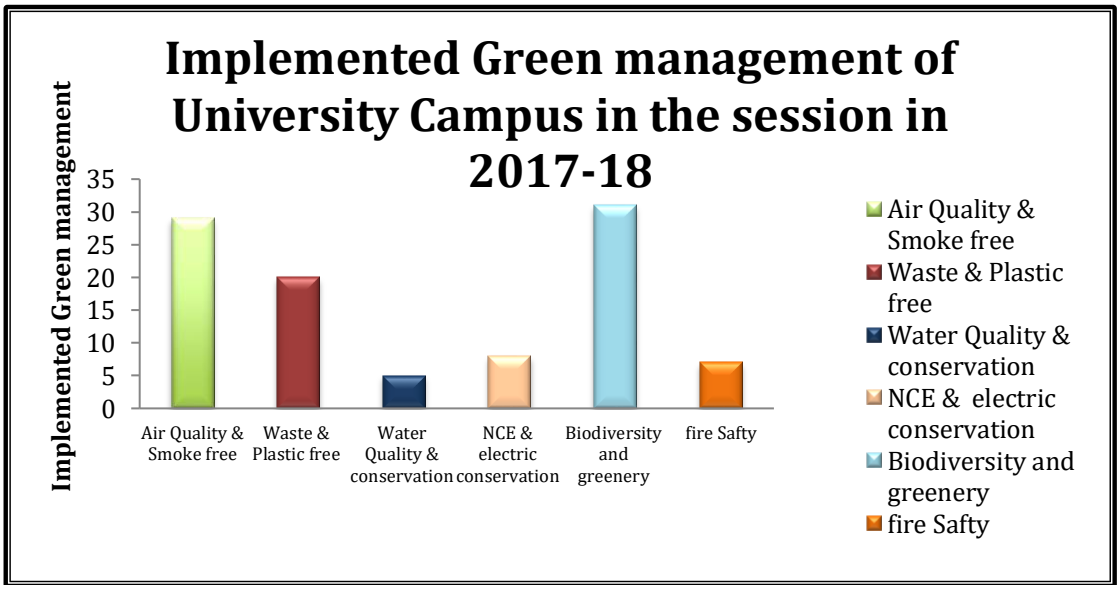
*** L denote-Taken management policy level below 40%

Major Audit Observations		
Sl. No	**Sectors/Indicators**	weightage
1	Water efficiency Audit	L
2	Energy efficiency Audit	M
3	Air Quality & Carbon foot print Audit	H
4	Wastes Audit	M
5	Green & Biodiversity Audit	H

* H denote- Taken management policy level above 25%

** M denote- Taken management policy level 15%-25%

*** L denote-Taken management policy level below 15%



4.5 Preparation of Action Plan

Policies referring to university's management and approaches towards the use of resources need to be considered. The university should have a green policy/environmental policy for its sustainable development. The environmental policy formulated by the management of the university should be implemented meticulously. The university should have a policy on awareness rising or training programs (for ground staff or kitchen staff for example) and university also should have a procurement policy (the university's policy for purchasing materials).

4.6 Follow Up Action and Plans

Green and Environmental Audits are exercises which generate considerable quantities of valuable management information. The time and effort and cost involved in this exercise is often considerable and in order to be able to justify this expenditure, it is important to ensure that the findings and recommendations of the audit are considered at the correct level within the organisation and that

action plans and implementation programs result from the findings. Audit follow up is part of the wider process of continuous improvement. Without follow-up, the audit becomes an isolated event which soon becomes forgotten in the pressures of organizational priorities and the passing of time.

4.7 Environmental Education

The following environmental education program may be implemented in the University before the next green auditing:-

- ❖ Training programs in solid waste management, liquid waste management, setting up of medicinal plant nursery, water management, vegetable cultivation, paddy cultivation, tree planting, energy management, landscape management, pollution monitoring methods, and rain water harvesting and ware re-use methods.
- ❖ Increase the number of display boards on environmental awareness such as – save water, save electricity, no wastage of food/water, no smoking, switch off light and fan after use, plastic free campus etc.
- ❖ Activate the nature or green clubs
- ❖ Set up model rainwater harvesting system, rainwater pits, Organic vegetable garden, medicinal plant garden, Honey farm, Mushrooms, Indigenous fish farm etc. for providing proper training to the students.
- ❖ Conduct exhibition of recyclable waste products
- ❖ Implement chemical treatment system for waste water from the Laboratories.

Awareness on Carbon Consumption

- ✓ Students and Staff members may be made totally aware of pollution caused by use of vehicles.
- ✓ The carbon consumption awareness programs on carbon emission at Individual as well as social level will help to avoid air and noise pollution in the campus due to vehicles.

5.0 Conclusion of Recommendations

The green and environmental audit assists in the process of testing performance in the environmental arena and is fast becoming an indispensable aid to decision making in a university. The green audit reports assist in the process of attaining an eco friendly approach to the sustainable development of the university. Hope that the results presented in the green auditing report will serve as a guide for educating the university community on the existing environment related practices and resource usage at the university as well as spawn new activities and innovative practices. A few recommendations are added to curb the menace of waste management using eco-friendly and scientific techniques. This may lead to the prosperous future in context of Green Campus and thus sustainable environment and community development. It has been shown frequently that the practical suggestions, alternatives, and observations that have resulted from audits have added positive value to the audited organisation. An outside view, perspective and opinion often helps staff who have been too close to problems or methods to see the value of alternative approaches. A green audit report is a very powerful and valuable communications tool to use when working with various stakeholders who need to be convinced that things are running smoothly and systems and procedures are coping with natural changes and modifications that occur.

Common Recommendations

- ✓ Adopt an environmental policy for the university
- ✓ Establish a purchase policy for environmental friendly materials
- ✓ Introduce UGC Environmental Science course to all students
- ✓ Conduct more seminars and group discussions on environmental education
- ✓ Students and staff can be permitted to solve local environmental problems
- ✓ Renovation of cooking system in the canteen to save gas
- ✓ Establish water, waste and energy management systems

Criteria Wise Recommendations

Water

- ➢ Remove damaged taps and install sensitive taps is possible.
- ➢ Drip irrigation for gardens and vegetable cultivation can be initiated.
- ➢ Establish the re-use water management methods.
- ➢ Establish rain water harvesting systems for each building.
- ➢ Establish water treatment systems.
- ➢ Awareness programs on water conservation to be conducted.
- ➢ Install display boards to control over exploitation of water.

Energy

- ✓ Employment of more solar panels and other renewable energy sources.
- ✓ Conduct more save energy awareness programs for students and staff.
- ✓ Replace computers and TVs with LED monitors.
- ✓ More energy efficient fans , tubes and bulb should be replaced.
- ✓ Observe a power saving day every year.
- ✓ Automatic power switch off systems may be introduced.

Air Quality & Carbon footprint

- ❖ Establish a system of car pooling among the staff and visitors to reduce the number of four wheelers coming to the university.
- ❖ More providing university bus services to the students and staff.
- ❖ Encourage students and staff to use cycles.
- ❖ Establish a more efficient cooking system to save gas.
- ❖ Discourage the students using two wheelers for their commutation.
- ❖ More use of generators every day should be discouraged.

Waste

- ❖ Establish a functional bio gas plant.
- ❖ A model solid waste treatment system to be established.
- ❖ Practice of waste segregation to be initiated.
- ❖ A model Vermi composting plant to be set up in the Hostels, canteen and Quarters of university campus.
- ❖ Establish a plastic free campus.
- ❖ Avoid paper plates and cups for all functions in the university.

Green Campus

- ✓ All trees in the campus should be named scientifically.
- ✓ Create more space for planting.
- ✓ Grow potted plants at corridors, class rooms and Laboratories.
- ✓ Create automatic drip irrigation system during summer holidays.
- ✓ Not just celebrating environment day but making it a daily habit.
- ✓ Beautify the university building with indoor plants
- ✓ Providing funds to nature club for making campus more green
- ✓ Encouraging students not just through words, but through action formaking the campus green
- ✓ Conducting competitions among departments for making students moreinterested in making the campus green.

Chapter 5

CLOSING MEETING AND REPORT SUBMIT :

The exit meeting was conducted by the lead auditors Dr.Pranab Sahoo and Mrs. Sanchita Bhattachariya. It was a mechanism to provide the IQAC management and staff a broad feedback on the preliminary findings of the audit team before completing the audited report. The exit meeting was held in the IQAC Office in the University on 20th Feb., 2018. Clarification on certain information gathered was sought by the audit team from the management and staff of the UNIVERSITY.

Pre-Submission of final Audit report

Draft audit Report

The information gathered by the audit team was consolidated as a draft audit report. This draft report was then circulated to the audit team and those directly concerned with the audit to check the report for accuracy. The draft green and environmental audit report was also discussed in the exit meeting.

Final Audit Report :

The final audit report is the corrected final document which contains the findings and recommendations of the audit. It will also form one of the bases of future audits because the information it contains informs some of the tests and analyses that need to be performed in the future. Final Audit Report was submitted on 14th June, 2018 to the Director, IQAC of the university.

Air Quality & Carbon footprint

Green and Environmental audits form a part of an on-going process. Innovative green initiatives have to be designed and implemented every year to make the University environmentally sustainable.

Follow up programs of green auditing recommendations should be done meticulously before the next audit.

Next Audit :

In order to promote continuous improvement it is recommended to conduct the next green and Environmental auditing during the year 2019.

Transparency of Green Audit Report :

Green and Environmental audit report is one of the useful means of demonstrating an organisation's commitment to openness and transparency. If an organisation believes it has nothing to hide from its stakeholders, then it should feel confident enough to make its green audit reports freely available to those who request them. As a basic rule, green audit reports should be made available to all stakeholders.

Executive summary: 2017-18

Green and Environmental Audit is a process of systematic, documented, periodic and objective evaluation of components of environmental diversity with the aim of safeguarding the environment and natural resources in its operations. The process starts with systematic identification, quantification, recording, reporting and analysis of components of environmental diversity of the university. Green and Environmental auditing is a means of assessing environmental performance (Welford, 2002). It is a systematic, documented, periodic, and objective review by regulated entities of facility operations and practices related to meeting environmental requirements (EPA, 2003).
It aims to analyze environments within and outside of the concerned area, which will have an impact on the eco-friendly atmosphere. Green and Environmental 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 and also management ways of waste and GHGs emission. It can create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of Green impact on their area of work. It can also be used to determine the type and volume of waste, which can be used for a recycling project or to improve waste minimization plan. Green and Environmental auditing and the implementation of mitigation measures is a win-win situation for all the university, the learners and the planet. It can also create health consciousness and promote to Holistic approaches to environmental management, awareness, values and ethics. It provides staff and students better understanding of Green impact on campus. Green and Environmental auditing promote financial savings through reduction of resource use. It gives an opportunity for the development of ownership, personal and social responsibility for the students and teachers. If self enquiry is a natural and necessary outgrowth of a quality education, it could also be

stated that institutional self enquiry 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.

In Vidyasagar University, Midnapur, WB the audit process involved initial interviews with management to clarify policies, activities, records and the cooperation of staff and students in the implementation of mitigation measures. This was followed by Administrative Officers, staff and student interviews, collection of data through the questionnaire, review of records, observation and enquiry of practices and observable outcomes. In addition, the approach ensured that the management and staff are active participants in the Green and Environmental auditing process in the Vidyasagar. The baseline data prepared for the Vidyasagar University, Midnapur will be a useful tool for campus greening, resource management, planning of future projects, and a document for implementation of sustainable development of the university. Existing data will allow the university to compare its programmes and operations with those of peer institutions, identify areas in need of improvement, and prioritize the implementation of future projects. The area of the University premises is 138.78 acre out of which about 54.12 acre area is covered by trees, plants etc. The tree census is carried out by NSS volunteers, students of Geography and Students of Botany. In the present audit report most of the aspects are covered such as tree plantation, introduce the Herbal and medicinal plants garden, awareness about environment programme of the programme evaluated by experts clean university green campus and Plastic free premises are the motto of our university and the university has already taken some steps to protect the environment with help of university Administrative Officers, staff and students under the guidance of Honorable Vice Chancellor Prof.(Dr) Ranjan Chakraborty, university giving the green audit report. We expect that the management will be committed to implement the green and environmental audit recommendations. We are happy to submit this green and environmental audit report to the Vidyasagar University, Midnapur, W.B.

Dr. Binoy Chanda	Dr. Pranab Sahoo	Mrs. Sanchita Bhattachariya	Dr. Koushik Chatterjee
President, TIEE R	Secretary, TIEER	Chief Executive Officer, CMS	Expert & Member, TIEER

Acknowledgements:-

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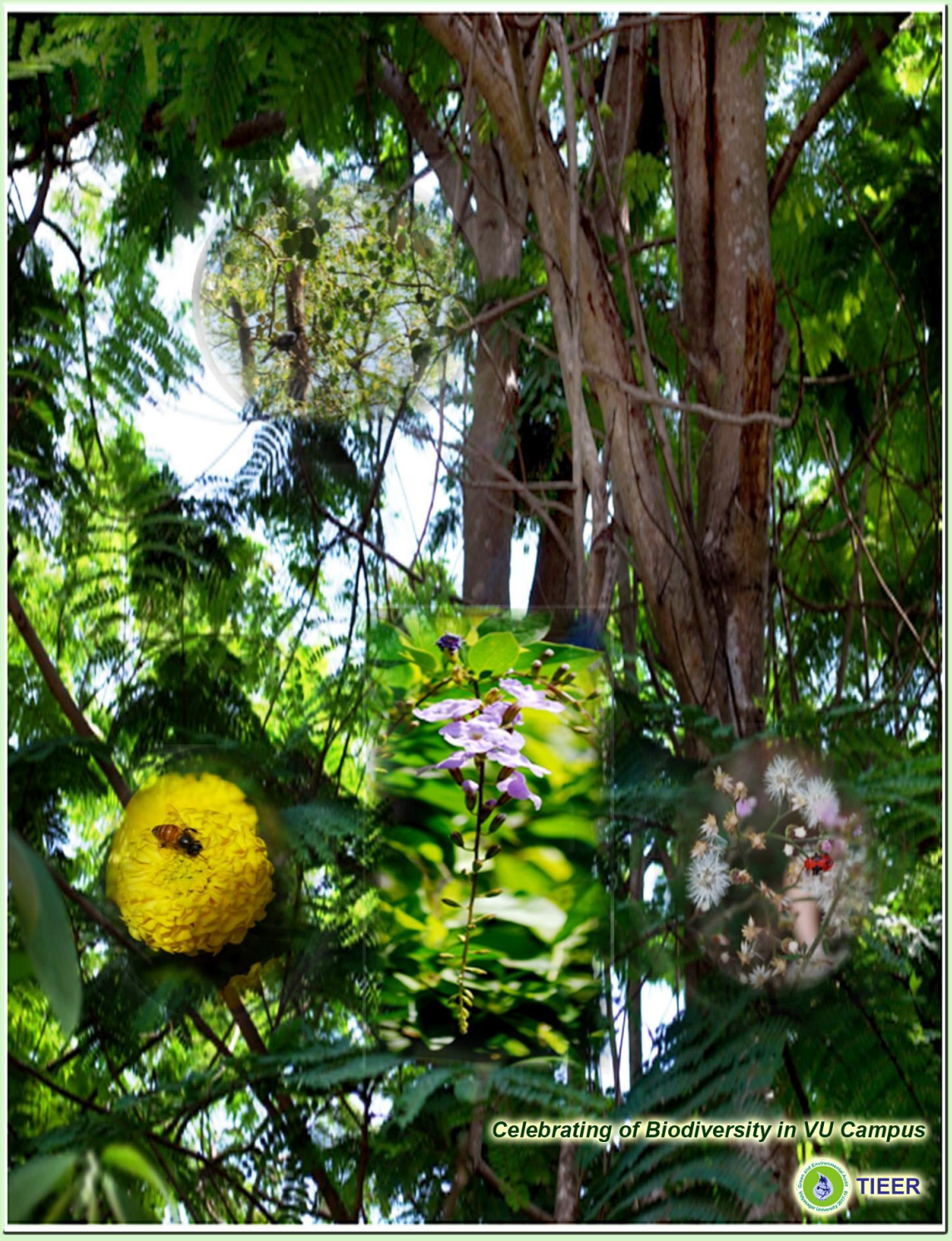
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