VIDYA BHARATI MAHAVIDYALAYA, AMRAVATI

C. K. Naidu Road, Camp, Amravati – 444602. (M.S.) India

Re-accredited "A" Grade by NAAC with CGPA 3.26

College with Potential for Excellence (CPE) Status by UGC

Star College Status by Department of Biotechnology, New Delhi

Affiliated to Sant Gadge Baba Amravati University, Amravati

GREEN & ENVIRONMENT AUDIT REPORT 2015-2016

Prepared by

Mountain Watercare Technologies, Pune

MOUNTAIN WATERCARE TECHNOLOGIES

Assuring Quality Water

Registration No. Pimpri/II/53363

Date, 23/04/2016

To,

Principal,

Vidya Bharati Mahavidyalaya,

Camp, Amravati

It is to certify that we Mountain Watercare Technologies Consultancy, Pune conducted "Green & Environment Audit" of the campus of Vidya Bharati Mahavidyalaya, Amravati for the Academic Year 2015-2016.

Mountain Watercare Technologies PUNE

(Kishan M. Jagtap)

Index

I. Introduction

Vidya Bharati Mahavidyalaya one of the foremost educational institutions of Vidarbha, was established in 1972 first as a Science College at the graduate and Junior College levels. Later it blossomed into a multi-faculty institution with Arts, Commerce, Management and Cosmetic Technology. The College offers courses from the Junior College level, through Graduation and Post-graduation to Research for PhD in all the faculties.

The institution has well-equipped laboratories, ample computer and internet facilities, an excellent library, an immense playground with a Sports Complex, a well-equipped Gymnasium, a state-of-the-ad AV Theatre, an Astronomy Club and two Girls' Hostel in the campus itself. These facilities along with exemplary teaching staff have taken the results of the college to greater heights of glory with each passing year. Student achievers in the fields of Academics and Sports and Cultural activities are felicitated every year by the College with prizes, certificates, mementoes and track suits.

On 5' January 2013, the College was re-accredited by NAAC, Bangalore with Grade 'A' and a CGPA of 3.26, the highest till date among all the colleges in the four Universities of Vidarbha. The College was also awarded the Star College status by the Department of Biotechnology, New Delhi. It was also accorded College with Potential for Excellence (CPE) status by the UGC, New Delhi for the second time. The College has significant representation of teachers in the University, with 02 members as Deans of the Faculties of Science and Commerce and 12 members on the different Boards of Studies. Researches being a major activity, the faculty members have 05 Major and 30 Minor UGC-approved Projects to their credit.

Educational Institutes are playing a important role in continues development of human resources worldwide through teaching and research. Educational institutes conduct various activities with aim to percolate the knowledge among the different levels of society. Likewise educational institutes also try to give issues related environmental conservation and pollution control. Various types of environmental management and evolutionary methods are used to identify the environment concerning problem. It includes Environmental Impact Assessment (EIA), Social Impact Assessment (SIA), Carbon Footprint Mapping, Green audit etc. Green 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). This includes all emissions to air; land and water; legal constraints; the effects on the neighbouring community; landscape and ecology; the public's perception of the operating company in the local area. Green audit shows the path to continuously run healthy practices, new innovative system for optimum utilization of resource and minimization of waste generation. It helps for protection and conservation of environment, natural resources and lead institution sustainable campus in social, economical and environmental views.

II. Mission and Vision of College

Mission

Committed to the creation of a self-reliant centre of excellence that imparts knowledge and develops the right values, attitudes and skill stressing quality consciousness, to produce ideal citizens who can contribute their mite to nation-building.

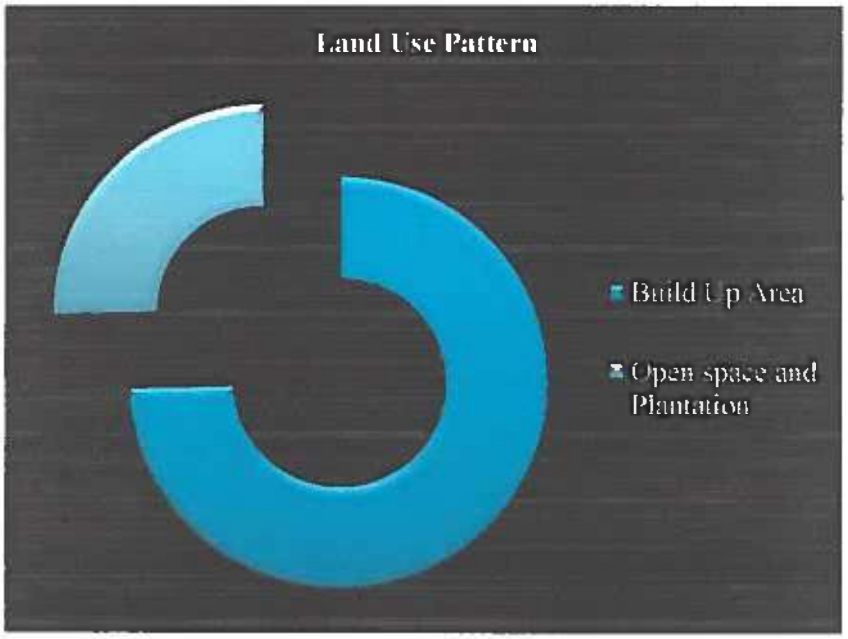
Vision

Holistic development of the students into a responsible, morally upright citizen capable of thinking, learning and striving for national development.

III. Total College Campus and Build-up Area

Vidya Bharati Mahavidyalaya is within the geo-position between latitude $20^0 56'$ N and longitude $77^0 46'$ E in Amravati, Maharashtra, India. It encompasses an area of about 28881.16 sqmeter. The college has following land use pattern:

Categories of Land Use	Area in sqm
Build Up Area	21542.09
Open space and Plantation	7339.07
Total Area	28881.16



College Infrastructure

Facilities

Class rooms

Laboratories- including language and psychology lab

Botanical Garden

Seminar Halls

Meeting Halls

Reception Room

Auditorium

Information display and notification

Computer with internet facility

Canteen

Cricket Ground

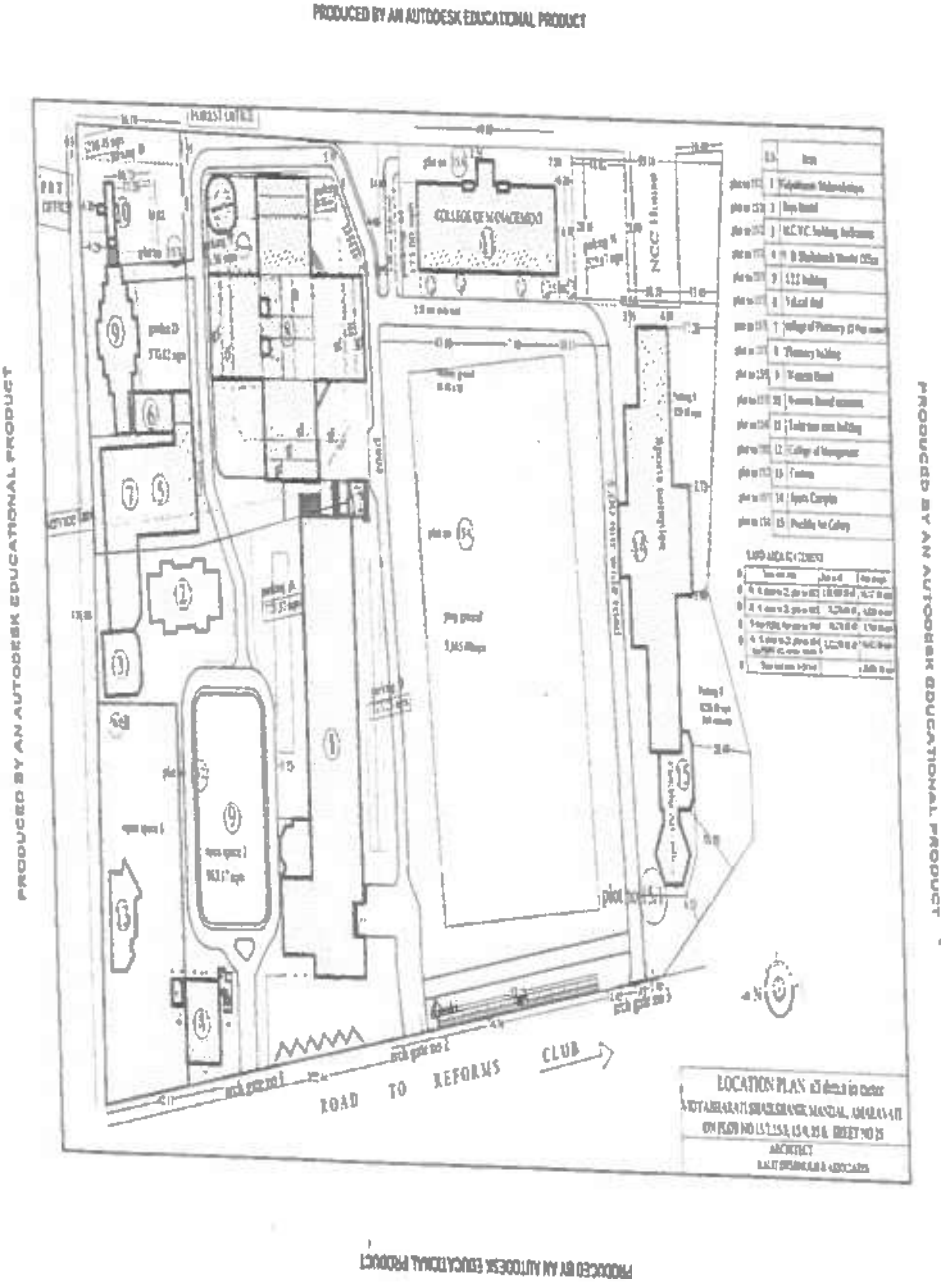
Gymnasium

Badminton & Tennis Court

Library

Hostel for Students etc.

Collage Layout Plan



IV. Goals of Green Auditing

Green audit of college provide a opportunity to judge strength and weakness of organization towards conservation of environment. Green audit is one of such concepts or principles introduced to make the educational institute environmentally sustainable. "Green audit is a tool to assess general practices implemented by organization in term of its impact on environment". Green audit also throws a light on adverse practices which are responsible for degradation of environment. To collect base line dada and ground reality about green practices conducted by college. Check out the facility of different types of waste management system. Collection of data regarding environmental problems such as promotion of the energy savings, energy conservation, water reduction, water harvesting , water environment, Solid waste management, minimizing use of Plastic, etc. Increase environmental awareness throughout campus with training. To identify areas in need of improvement, and prioritize the implementation of future projects for betterment of environment. To provide opportunities of higher education to the students of the hilly, backward rural area, coming from modest family background and to make them competent enough to face the challenges of the environment.

V. Methodology

Pre-Audit Stage

On the basis of requirement audit divide into two parts first environment audit and second green audit. Environment audit involve the auditing of water and green audit involve the auditing of energy, solid waste and greenery of college campus. Pre-Audit stage is primary stage of green audit and various preparatory works. The first action of pre-audit is to conduct the pre-audit meeting with different representative of stakeholder of college. A pre-audit meeting provided an opportunity to face to face discussion on green audit. The pre-audit meeting was held at Vidya Bharati Mahavidyalaya Camp, Amravati on 10 Jully, 2015. The pre-audit activity includes the identified and establishing the scope and objective of green audit. Dividing the college campus according to green audit performing point of view. The audit plan was designed based on available resources, time duration for achieving the sustainability. The target areas of green auditing, audit team and assignment of responsibility were established. Collection and review of all necessary documents, relevant standards were collected and preparation of questionnaire for audit.

On-Site Audit Activity

Green auditing was done by Mountain Watercare Technologies Consultancy, Pune with help of IQAC members of college. The green audit began with the teams walking through all the different department and campus at the college. The audit stage include survey by questionnaire, review of documents and records, review of policies, interviewing of key persons (stakeholders), physical inspection of college campus, monitoring of water, biodiversity, energy consumption, solid waste generation and disposal, carbon footprint in campus. College records and documents were verified several times to clarify the data received through survey and discussions. The whole process was completed within academic session months period, i.e. January to December, 2015.

Post Audit Stage

The post audit stage includes the data analysis and preparation of green audit report and fallow up plan. All data collected trough survey by questionnaire, review of documents and records, review of policies, interviewing of key persons (stakeholders), physical inspection of college campus, monitoring and energy, water solid waste and vegetation, were crossed checked during the personal visit. All data were tabulated in excels spreadsheets and future analysed by using different software to find out the result in percentile format.

VI. Environment Audit

Water Audit

The study observed that the Well Water, Corporation Tap Water and Tube Well water are major sources of water in College and for the girls hostels. Water is used for Drinking Purpose, Canteen, Toilet Laboratory, Gardening etc and in Girls Hostel for daily routine activity. On an average the total use of water in the Vidya Bharati College campus is 38500 liters of water per day which include 9000 L/Day for Girls Hostel, 2500 L/Day for Garden purposes, 3500 L/Day in Main Building etc. 420 liters of water per day is lost through the leaking of pipes and taps of different location. Drip irrigation should be practiced in gardens. If water treatment system is installed at canteen and chemical laboratories the amount of water lost through pollution can be prevented. A major preference to the recycling of water may be adopted in the college for an efficient water management. Awareness programmes for the management of sustainable water use will be highly efficient in this college.

Air Audit

Air quality in the academic college is very important for producing good educational atmosphere as well as for the health of the students, faculty, staff and other stake holder of the college. For monitoring air quality of Vidya Bharati Mahavidyalaya total three locations are selected for ambient air quality monitoring in all over the campus selection of stations is based on the Meteorological Conditions of the area. The analysed air parameters included Sulphur Dioxide (SO_2), Nitrogen Dioxide (NO_2), Carbon Monoxide (CO) and Repairable Suspended Particulate Matter (RSPM) etc. High Volume Sampler is an instrument used for monitoring of air quality parameters in the college campus by following the guidelines, rules and formats prepared by Ministry of Environment and Forest, New Delhi, Central Pollution Control Board. Overall air monitoring and analysis is perform by consulting agency and there expert team.

Air Quality Measurement (12 hours)

Sr. No.	Parameters	Average Reading	Unit	CPCB Standards	Remarks
1	RSPM	52	µg/ m^3	100.0 µg/ m^3	All within limits
2	SO_2	65.2	µg/ m^3	80.0 µg/ m^3	
3	NO_2	57.6	µg/ m^3	80.0 µg/ m^3	
4	CO (8 hours)	0.6	mg/m^3	2.0 mg/m^3	

All above mentions air parameter are below the standard limits given by CPCB.

Noise Audit

Noise pollution is one of the biggest problems of society. Unwanted sound or sound at wrong place at wrong time is considered as a noise pollution. The major source of noise identified in the college campus has been predominantly the vehicular movement, and the transportation activities. The noise levels / Sound pressure level (SPL) measurements were carried out using precision sound level meter or dB meter. The noise level measurement was periodically carried out at five locations, at outside as well inside the college campus.

The Vidya Bharati Mahavidyalaya is located in residential and commercial area. Other than staff and student vehicles no more source of noise are identified in college campus. The major source of noise not identified in the college campus.

Average Noise Monitoring Results:

Sr. No.	Location	Average Reading dB (A) Leq (Day Time)
1	Near Main gate	69 ± 5.2
2	Boys Parking	60 ± 8
3	Near Main Building	52 ± 5.2
4	Near B. Tech Building	51 ± 7.9
5	Canteen area	59 ± 7.6

From the monitoring survey of noise levels it was observed that the day time noise levels were observed in the range of 51 to 69 dB(A).

VII. Green Audit

Energy Audit

The total energy utilization of the college for different purposes is approximately 111845 kwh per month. Major energy consumption equipments are the high wattage electrical appliances such as electrical motors for pumping the water, air conditioners, water coolers, freezers, ovens, incubators, centrifugal machine, magnetic starrer etc were noted during the survey and on site visit. Energy saving through the replacement of incandescent bulbs to LED light may be a good energy management system for the college. Awareness programmes for the stakeholders to save energy may also increase sustainability in the utilization of various energy sources. Although staff are encouraged to switch off their own lights, monitors and other equipment, the House maintenance team carry out a lock down of the building at the end of every day and switch off any lights or equipment that have been left on. College replace the incandescent bulbs have to be replaced by low energy bulbs. The College should improve its monitoring and reporting of energy usage and provide information to campus users. Classrooms are made with sufficient cross ventilation and light so that the use of electricity can be minimized. This shows the institutions commitment towards energy conservation.

Solid Waste Audit

The average total solid waste collected in the campus is 17.5 Kg/day including all categories. Waste generation from tree droppings and garden management and paper waste is a major solid waste generated in the campus. Most of the departments including office, library are major contributing in the paper waste generation. Single sided used papers reused for writing and printing in all departments and office work. Followed by paper plastic is secondary contributing solid waste generated in large quantity in the campus. The college has adopted Vermiculture Composting in open space on 300 sqft lands and Pit Compositing for tree leave and garden waste in campus. The main purpose of this is to reduce disposable waste in the college campus. After complete process of vermicomposting, it is used as manure in the garden and lawns. Hazardous waste generated from the college can be collected properly and handed over to the local self-governments treatment yards. Bottles, plastics, cans, broken glass wares, tins etc., recycled or sold out.

E-Waste

Generation of E-waste is apparent at every college. In every college there are several equipments and instruments used for educational activities like performing practical work. Computers, Printers, Scanners, Xerox machines are mostly used for administrative work. In teaching, learning and evaluation processes college students and staffs handle electric material, electric equipments/ instruments, measuring instruments, different electric circuits, wires, ICs etc specially in physics and computer science and electronic department. After some time period some material comes out as a e-waste.

E-waste generated in the campus is very less in quantity. Administration conducts the awareness programmes regarding E-waste Management with the help of various departments. The E- waste and defective item from computer, electronic physics, administration office etc is being stored properly handover to recycle and reuse facility.

Vegetation in College

A total of 79 species of flowering plants are documented in which 38 were Herbs, 22 Shrubs, and 16 Angiospermic trees distributed in 22, 13, and 12 families respectively.

List of Herbs:

Sr. No.	Botanical Name	Family
1	*Vernonia cineria* (L.)Less.	Asteraceae
2	*Calendula officinalis L.*	Asteraceae
3	*Zinnia peruviana* (L)	Asteraceae
4	*Zinnia angustifolia* kunth.	Asteraceae
5	*Blainvillea acmella* L.	Amaranthaceae
6	*Aerva Lanata* (L.) Juss.	Amaranthaceae
7	*Achyranthus aspera* L.	Amaranthaceae
8	*Amaranthus poligonides L.*	Amaranthaceae
9	*Andrographis paniculata* (Burm.f.)Wall ex Ness	Acanthaceae
10	*Diplocyclous palmatus L.*	Cucurbitaceae
11	*Cocculus hirsutus* (L.) Deils	Menisparnaceae
12	*Oxalis corniculata L.*	Oxalideaceae
13	*Colocasia esculanta* (L.) Schott	Araceae
14	*Ocimum sanctum L.*	Lamiaceae
15	*Catharanthus roseus* (L.)	Apocynaceae
16	*Datura metal L.*	Solanaceae
17	*Withania somnifera* (L) Dunal.	Solanaceae
18	*Acalypha indica L.*	Euphorbiaceae
19	*Curcuma longa* L.	Zingiberaceae
20	*Zingiber officinale* Rosc.	Zingiberaceae
21	*Iponoea cairica* (L.) Sweet.	Convolvulaceae
22	*Passioflora edulis* Sims.	Passifloraceae
23	*Aloe vera* L.	Liliaceae
24	*Asparagus racemosus* (L.) Willd.	Liliaceae
25	*Cissus qudrangularis* L.	Vitaceae

26	*Agave americana* (L.)A.L.Juss. ex Schutt	Agavaceae
27	*Hymenocallis littoralis* (Jacq.)	Amaryllidaceae
28	*Jasminum auriculatum* Roxb.	Oleaceae
29	*Dianthus chinensis* L.	Caryophyllaceae
30	*Trigonella foenumgraecum* L.	Fabaceae
31	*Cynodon dactylon* (L.)Pers	Poaceae
32	*Dicanthium annulatum* (Hook.f.) Blatt. & Mc C.	Poaceae
33	*Lophopogon tridentatus* Hack.	Poaceae
34	*Andropogon pumilus* Roxb.	Poaceae
35	*Aristida hystrix* L.F.	Poaceae
36	*Chloris virgata* Swartz.	Poaceae
37	*Dactylotenium aegyptium* (L) P.Beauv.	Poaceae
38	*Eleusine indica*(L.)Gaertn.	Poaceae

List of Shrubs:

Sr. No	Botanical name	Family
1	*Hibiscus rosa-sinensis* L.	Malvaceae
2	*Abelmoschus moschatus L.*	Malvaceae
3	*Lawsonia inermis* L.	Lithraceae
4	*Murraya koenigii* (L.) Spr.	Rutaceae
5	*Citrus aurantiifolia* (Christm.) Sw.	Rutaceae
6	*Hamelia patens* Jacq.	Rubiaceae
7	*Ixora coccinea* L.	Rubiaceae
8	*Coffee arabica* Ritter Ron.	Rubiaceae
9	*Nyctanthes arbortristis* L.	Oleaceae
10	*Nerium oleander L.*	Apocynaceae
11	*Tabernaemontana divaricata* (L.) R. Br.	Apocynaceae
12	*Calotropis procera* (Ait) R. Br.	Asclepiadaceae
13	*Solanum nigrum* L.	Solanaceae
14	*Barleria cristata* L. var. *cristata*	Acanthaceae

15	*Adhatoda beddomei* Hong Gao	Acanthaceae
16	*Vitex trifolia L.*	Verbenaceae
17	*Lantana camara* L. var. *aculeatea*(L.) Mold	Verbenaceae
18	*Jatropha curcas L.*	Euphorbiaceae
19	*Ricinus communis* L.	Euphorbiaceae
20	*Acalypha wilkesiana* Muell. Arg.	Euphorbiaceae
21	*Euphorbia tithymaloides* L.	Euphorbiaceae
22	*Cajanus cajan*(L.)Millsp DC.nom. cons.	Fabaceae

List of Angiospermic Trees:

Sr. No	Botanical name	Family
1	*Azardirecta indica* A. Juss.	Meliaceae
2	*Ficus benghalensis L.*	Moraceae
3	*Ficus religiosa* L.	Moraceae
4	*Ficus glomerata* Roxb.	Moraceae
5	*Aegle marmelos* (L.) Corr.	Rutaceae
6	*Feronia limonia L.*	Rutaceae
7	*Mangifera indica* L.	Anacardiaceae
8	*Emblica officinalis* Gaertn.	Euphorbiaceae
9	*Psidium guajava* L.	Myrtaceae
10	*Santalum album L.*	Santalaceae
11	*Tectona grandis* L. f.	Verbenaceae
12	*Cocos nucifera* Linn.	Arecaceae
13	*Ziziphus mauritiana* L.	Rhamnaceae
14	*Butea monosperma* (Lam.) Taub.	Fabaceae
15	*Gliricidia sepium* (Jacq.)Walp.	Fabaceae
16	*Pongamia pinnata* (L.) pierre	Fabaceae

In total, based on our data collected by consulting agency there are 149 plants in the college campus including trees, shrubs and herbs. There are 82 plants present in the college Botanical Garden.

Terminalia arjuna

Azadirachta indica

Alstonia scholaris

Terminalia catappa

VIII. Recommendations

1. Adopt the proposed Environmentally Responsible Purchasing Policy, and work towards creating and implementing a strategy to reduce the environmental impact of its purchasing decisions.
2. Increase recycling education on campus.
3. Increase Awareness of Environmentally Sustainable Development- Use every opportunity to raise public, government, industry, foundation, and university awareness by openly addressing the urgent need to move toward an environmentally sustainable future.
4. Educate for Environmentally Responsible Citizenship- Establish programs to produce expertise in environmental management, sustainable economic development, population, and related fields to ensure that all university graduates are environmentally literate and have the awareness and understanding to be ecologically responsible citizens.
5. Practice Institutional Ecology- Set an example of environmental responsibility by establishing institutional ecology policies and practices of resource conservation, recycling, waste reduction, and environmentally sound operations.
6. Involve All Stakeholders- Encourage involvement of government, foundations, and industry in supporting interdisciplinary research, education, policy formation, and information exchange in environmentally sustainable development. Expand work with community and nongovernmental organizations to assist in finding solutions to environmental problems.
7. Collaborate for Interdisciplinary Approaches- Convene university faculty and administrators with environmental practitioners to develop interdisciplinary approaches to curricula, research initiatives, operations, and outreach activities that support an environmentally sustainable future.
8. There should be proper sign boards displayed to tell students where to go for the disposal of other recyclables, plastics and hazardous wastes.
9. Solar panels should be installed to generate electricity.
10. Declare the campus plastic free and arrange awareness programmes to make the campus plastic free.
11. Establish a purchase policy for environmental friendly materials.
12. Chemistry department may change their experiments to green chemistry.

13. Consider carrying out meter readings on a regular basis in order to monitor water usage.
14. Installed waste water treatment plant for girls hotel water.

IX. Conclusion

Green and Environment Audit is the most efficient & ecological way to solve such an environmental problem. The experiments on the nature by avoiding natural rules, this can be a one major reason behind Green audit process. Green Audit is one kind of professional care which is the responsibility of each individual who are the part of economical, financial, social, environmental factor. Green and environment audits can "add value" to the management approaches being taken by the college and is a way of identifying, evaluating and managing environmental risks (known and unknown). The green audit reports assist in the process of attaining an eco friendly approach to the development of the college. There is scope for further improvement, particularly in relation to waste minimization and energy monitoring. The findings of this report show that the college performs fairly well on sustainability issues. The college does consider the environmental impacts of most of its actions and makes a concerted effort to act in an environmentally responsible manner. In conversations with faculty, staff, and administration at the college, a major theme has been the improvements made over the last several decades in how the college performs environmentally. Even though the college does perform fairly well, the recommendations in this report highlight many ways in which the college can work to improve its actions and become a more sustainable institution.