

COLLEGE OF HOME SCIENCE, NIRMALA NIKETAN, MUMBAI

GREEN AUDIT REPORT 2019



Technical Expert

Mr. Avick Sil (Regional Director)
Environment Policy and Research India (EPRI)

Green Audit Conducted By
Archdiocesan Office for Environment (AOE), Mumbai

Report by
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ACKNOWLEDGMENT

The overall objectives of a Green Audit (GA) of a campus are an assessment of the environmental sustainability of its current policies and practices, identification of opportunities to improve and make the campus environment-friendly as possible, as well as raising awareness on environmental issues and sustainable practices among the campus community. Keeping the above objectives in mind a tool was developed and several Green Audits have been undertaken by Archdiocesan Office for Environment (AOE) since 2014. Our Journey of Green Audits began with College of Home Science, Nirmala Niketan and Polytechnic, Churchgate, Mumbai in 2014 and St Andrew's College of Arts, Science & Commerce, Bandra, Mumbai in the year 2015. In 2016, Green Audit of Poona Diocesan Corporation Bishop's House Campus (comprising of 12 institutions on the Campus) was conducted with an aim to assist in "Greening the Campus".

College of Home Science, Nirmala Niketan, Mumbai, Green Audit 2019 was conducted during August- September 2019. This GA process meant the involvement and collaboration of many organizations and individuals to whom we are grateful. Ms. Deepika Singh, the Secretary, AOE is mainly responsible for planning & executing the "Green Audit" projects. She has coordinated the entire process and was mainly responsible for this project from the start to the finalization of the report. We also thank Mr. Avick Sil (Regional Director) Environment Policy and Research India (EPRI) who is the technical expert for this Green Audit. We thank Ms Sanjivani Shinde and Ms. Vashnavi Manohar Rane of the EPRI for their assistance in data collection and compilation.

Ms. Noella Dias the Manager of the College was mainly responsible to initiate the GA process. A special thanks to the Heads and staff representatives of all the departments, Dr. Ela Dedhia (IQAC Coordinator & HOD, TFT), Mrs. Anuradha Mitra (HOD, FND), Dr. Anuradha Bakshi (HOD, HD), and Mrs. Sunita Jaiswal (HOD, CRM), Dr. Pratima Goyal, Mrs Vibha Hasija, Mrs. Roopa Rao and Dr. Anjali Srivastava, Ms Cheryl (Accountant), Ms Thelma (IT Coordinator), this green audit exercise could not have been completed without their support and cooperation in providing data as well as their valuable inputs and feedback. We are thankful to Ms. Rhonda Divecha who played a crucial role, coordinating the entire audit process on behalf of the college, and the staff, especially HOD's. Our final thanks to the Principal Dr. Geeta Ibrahim and the management of the College of Home Science, Nirmala Niketan, Mumbai, for entrusting AOE with conducting this Green Audit of the College.

Bishop Allwyn D'Silva

Bishop in Charge: Archdiocesan Office for Environment (AOE)

Chairperson: CCBI Commission for Ecology

EX: Exec Secretary: FABC (Federation of Asian Bishops Conferences)-CCD (Climate Change Desk) & OHD (Office for Human Development)

September, 2019

CHAPTER 1

Green Audit: The Concept

The Preamble:

The challenge of the 21st century is to devise developmental pathways that would have zero or minimum impact on the environment. This is no longer an option, but a necessity in view of the natural disasters impacting humanity that are a direct consequence of human action. From this perspective, it is imperative to understand the implications of our lifestyle choices, as well as resource and energy use patterns for the environment. This understanding will also lead us to find ways and means of reducing the adverse impact on the environment. Environmental audit is a useful tool from this perspective, similar to financial audit; environmental audit also depends on systematic and objective documentation and periodic evaluation.

The decision to focus on educational institutes for conducting green audit was mainly because an educational institute bears “a profound moral responsibility to increase in the youth the awareness, knowledge, skills and values needed to create a just and sustainable future” (Essex Report, 1995: 5). This exercise is also an opportunity to have an overview of the policies and practices of an institute. The tool not only helps audit the environmental impact (including energy, water and materials use) of any institute, educational campus or residential locality but also guides the management regarding what data needs to be maintained in order to improve the auditing process itself. It is expected that iterations of the audit process will bring out a clearer and more accurate picture of the environmental impact, and will therefore help in identifying specific action strategies for maximum positive outcomes.

Background:

AOE has been working on awareness-building and education on environmental issues and climate change since inception. In the process of engaging with communities and educational institutes basically with the college youth creating environmental consciousness, we have designed and experimented with various training modules and projects. We have networked with various partners who are working engaged with various eco-systems based vulnerable communities building their capacities through studying, analyzing, discussing the local issues and engaging through community work or advocacy work. AOE has also been successful in many innovative collaboration such as greening initiatives undertaken at Our Lady of Nazareth parish and school at Bhayander under “Green Parish” which included several activities like “terrace gardening”, environmental syllabus for all classes, green saving, healthy and nutritious food in the school canteen, etc.

Green initiatives were also launched at St. John the Baptist Church in Thane. These initiatives included training workshops for Christian community leaders and formation of an Eco-Club in the parish. Initiated a student-driven environmental activity named “Green Audit” with an aim to educate and provide an opportunity to college youth to understand and evaluate environmental practices and policies of various institutions. It helps them learn about environmental degradation, the impact of lifestyles on the environment and sustainability issues.

Rather than just acquiring procedural knowledge of an audit, it was more about understanding how various human practices impact the environment, how concepts of ecological sustainability play out in the “real” world by seeing just how much energy, water, paper and other materials and resources a home, institute or office building consumes daily and how much garbage and global warming it produces. It was an exercise basically oriented to educating students, which helped them see for

themselves in concrete terms what have mostly been abstract concepts about global warming, pollution, garbage, energy efficiency, etc. and the connections to politics and economics as a bottom line.

Thus the concept of Green Audit has basically emerged from our engagement with the communities from various eco systems, faith communities, educational institutes and the youth. With a collaborative partnership with expert organizations a final tool for conducting Green Audit was developed in 2014. Thereafter we have undertaken about 15 Green Audits which includes: College of Home Science, Nirmala Niketan and Polytechnic, Churchgate, Mumbai (2014), St Andrews College of Arts, Science & Commerce, Bandra, Mumbai (2015) Poona Diocesan Corporation Bishop's House Campus, comprising of 11 institutions (2016) with an aim to assist in "Greening the Campus" and Green Audit of Symbiosis College of Arts and Commerce, Pune, (2017).

Engaging the institute's key personnel's in the entire green audit exercise is one of the main features making the audit a participatory exercise from the start. The De-briefing /concluding session for sharing of the draft report is a friendly discourse which highlights good practices and offers recommendations to reduce the ecological footprint of the campus. The aim is to help the institute/campus to become a "Model Green Campus", guiding and enabling students, communities and institutions to adopt environmentally transformative behaviors. The main Auditor Ms Deepika Singh is also the project coordinator of Climate Change Desk (CCD) /Office of Human Development (OHD) of The Federation of Asian Bishops Conference (FABC), a platform which connects with the whole of Asia with specific reference to Climate Change - impacts as well mitigation, adaption actions, and initiatives in the region.

Future Plans

AOE engages with educational institutions, diverse faith communities and youth on climate change and issues around environmental concerns with a major focus on reducing ecological footprint. AOE is the nodal agency for carrying out the "Greening of the Archdiocese" which was announced in September 2018. We also plan to continue offering internships to students of higher education and capacity enhancing services to educational institutes, faith based communities and interested individuals for the assessment of their own environmental practices and policies, and to facilitate and minimize their ecological footprints. Further, we also aim to build a network which can offer services to members in attaining higher levels of "greening" their homes, campuses and localities.

CHAPTER - 2

Green Audit: The Process

Pre-Audit Process

Overall objectives of a Green Audit (GA) of a campus are an assessment of the environmental sustainability of its current policies and practices, identification of opportunities to improve and make the campus environment-friendly as possible, as well as raising awareness on environmental issues and sustainable practices among the campus community. Towards this end a Tool was developed in 2014 thereafter AOE has so far undertaken 15 Green Audits of educational and other campuses.

In month of March 2019 an informal invite was received from Ms. Noella Dias the Manger of the College of Home Science, Nirmala Niketan, Churchgate, Mumbai (*henceforth referred as the College*) accordingly a decision was taken by AOE to initiate the process of this Green Audit.

In 2014 a green audit of this College was undertaken by AOE in collaboration with its networking partners therefore in the current green audit 2019 it was important also to review if the recommendations of the previous green audit were helpful for the College.

To initiate the audit process a brief meeting was held between the Audit Team to finalize the process and the audit exercise.

The Audit Team consists of:

Technical Expert: Mr. Avick Sil (Regional Director) Environment Policy and Research India (EPRI): was mainly responsible to provide technical assistance for this audit which consisted of updating the tool, data analysis, exploring possible actions to promote carbon neutral campus and inputs on the final report.

Coordinator of the Green Audit Exercise Ms Deepika Singh: Secretary Archdiocese Office For Environment (AOE): was responsible for coordinating the entire green audit exercise, includes updating the tool, communication between the audit team, College administration, HOD's and AOE, designing the entire audit exercise such conducting the introductory meeting, discussion with the HOD's, data collection schedules, data compilation, analysis', preparing the draft report, organizing the missing data collection and preparing the final report.

Data Collection Ms. Sanjivani Gokul Shinde & Ms. Vashnavi Manoha Rane staff of Environment Policy and Research India (EPRI): were mainly responsible for data collection, data compilation, analysis and preparing the draft report. The Green Audit Process details as follows:

Step 1: Initiating Meeting



Photo1: Green Audit Orientation session with HOD's College of Home Science, Nirmala Niketan

As indicated in the Photo:1, On 2nd April 2019, The HOD's along with the Principal Dr. Geeta Ibrahim participated in the Orientation Session for the Green Audit 2019 held from 2-3.30 pm. In 2014 a Green

Audit of the College was conducted by the AOE and its collaborating partners hence in the introductory meeting a short review of the recommendations of the Green Audit 2014 was done following which the Tool for Green Audit 2019 was studied in detail. The suggestions for modification were incorporated in the draft tool. Below given are the areas under consideration for the audit exercise, were also discussed in the meeting:

- Energy Management
- Water Management
- Materials Management – consumables
- Waste Management
- Travel and Transport Management
- Ecology Management
- Knowledge Management
- Pollution Management
- Disaster Preparedness

The HOD's suggested to initiate the data collection process in month of June 2019 with the new academic session for the year. Ms. Rhonda Divecha was to coordinate the process between the College and the Green Team.

Step 2: Data collection

15th June-28th August 2019: An updated tool for data collection was shared with College for initiating data collection. On 24th June 2019 department wise data collection was initiated by the faculty in charge Ms Rhonda Divecha.



Photo2: Focused Group Discussions with the Principal, HOD's, Staff Representatives for the Green Audit 2019

On 24th July 2019, partial data was received from the College. Second round of data collection was undertaken on 9th August 2019 through a Focused Group Discussion (FCD) with the heads of the

departments to obtain missing data. Photos: 2, 3, 4 & 5 indicate the FGD with the HOD's; A short questionnaire was shared with HODs for sharing relevant "missing data" from the departments, the discussion was focused to review the implementation of the recommendations of Green Audit 2014, the views of the HOD's on various areas under observation for the current green audit.



Photo3: Focused Group Discussions with the HOD's for the Green Audit 2019

On 11th August 2019, data verification visit to the College was undertaken by the data collection team. By 19th August 2019 department wise data of the College was received by AOE.



Photo 4&5: Focused Group Discussions with the HOD's for the Green Audit 2019

Step 3: Assessment of data and Draft report preparation by Audit Team

19th August – September 2019: By 29th August partial data compilation was initiated, by September 15, 2019 gathered data was collated; missing data identified, and data analysis was completed. The draft report was prepared by mid September 2019.

Step 4: Sharing draft report and recommendations with Principal and the College faculty

18th September 2019: Draft Report was shared with purpose to identify if there are still any missing data, clarify data and findings if any.

Step 5: Finalization of report and recommendations based on feedback received from head of institution: The report of the Green Audit 2019 was finalized and shared with the College by first week of October 2019 thereafter a printed copy of the same was also submitted to the College.

Step 6: Final Meeting

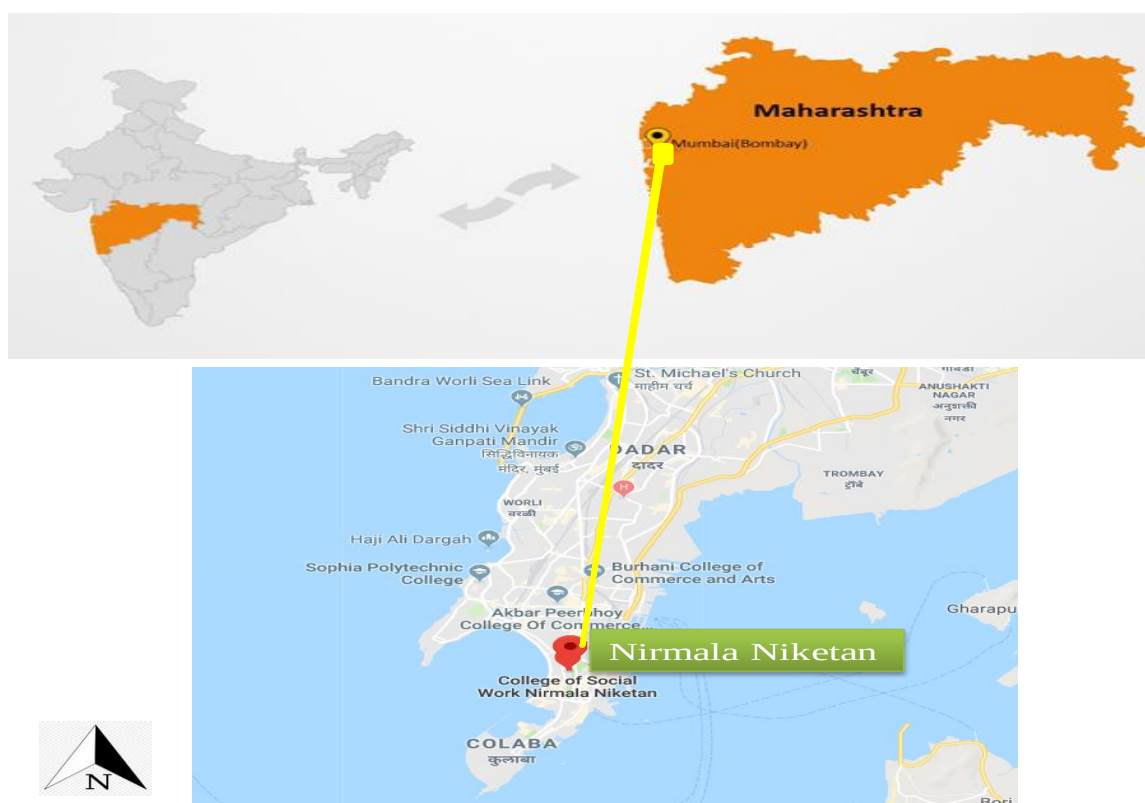
September 2019: (suggestion) by mutual agreement step 5 and 6 were merged to save on time. A final meeting to present and finalize the report took place at end of September 2019. And the final report was submitted to the college in September 2019.

CHAPTER 3

Green Audit: Data Analysis

College of Home Science, Nirmala Niketan, is a Christian Minority institution managed by Nirmala Niketan Institute, a society, registered under the Societies Registration Act, 1860 and Public Trust Act 1950. The College is located in the heart of the Mumbai city and is easily accessible since it is within walking distances both from the Western and Central railway terminus.

Location Map



Location map of the College of Home Science, Nirmala Niketan, Mumbai

Basic information

College of Home Science, Nirmala Niketan is affiliated to the University of Mumbai.

Address: 49, New Marine Lines, Mumbai, Maharashtra 400020 Tel. +91.22.2207 6503 website: <https://www.nirmalaniketan.com/>



Photo 6: College of Home Science, Nirmala Niketan, Churchgate

The College of Home Science, Nirmala Niketan is a Degree College offering Undergraduate, Postgraduate, and Doctoral degrees in Home Science and add-on courses (affiliated to the University of Mumbai).

B. Sc. Home Science (Affiliated to the University of Mumbai) offers the following courses with specializations given under:

- Food, Nutrition and Dietetics (FND)
- Human Development (HD)
- Textile and Fashion Technology (TFT)
- Community Resource Management (CRM)

M.Sc. Home Science (Affiliated to the University of Mumbai) offers specialization in:

- Food, Nutrition and Dietetics (FND)
- Human Development (HD)
- Textiles and Fashion Technology (TFT)
- Sports Nutrition (SN)

Ph.D. in one of the above subjects

P.G Diploma in Dietetics and Applied Nutrition, (1 yr Affiliated to the University of Mumbai)

Add-on Diploma Courses

- Add-on Diploma Course in CAD CAM and Computer Technologies in the Apparel Industry

Following add-on courses (affiliated to the University of Mumbai) are also offered.

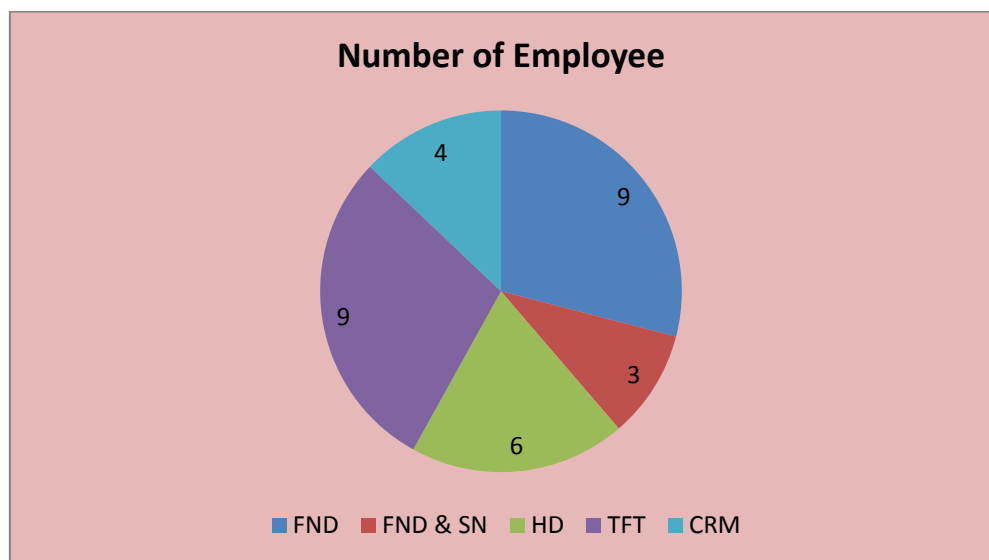
- Certificate Course in Nutrition & Exercise for fitness
- Certificate Course in Entrepreneurship in Textile Crafts

- Certificate Course in Visual Merchandising
- Work Station Design & Applied Ergonomics
- Research Methods and Statistics Course for Doctoral Students in Home Science

Value Added Courses

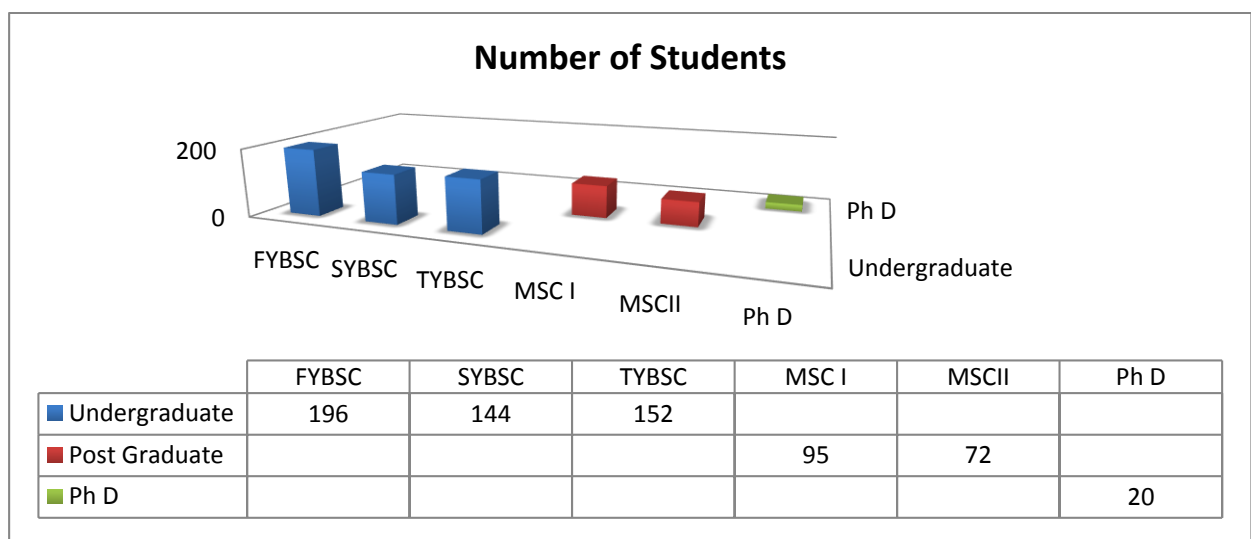
- Indian Sign Language (ISL)
- Diploma in Arts Based Therapy
- Personal Styling, Fitness and Grooming
- Cultural and Heritage Management

Graph 1, indicates the department wise distribution of the total 31 staff of the College of Home Science, Nirmala Niketan Churchgate, Mumbai



Graph 1: Number of Employees (2019-20)

Graph 2, shows the number of students taking education from College of Home Science, Nirmala Niketan.



Graph 2: Number of Students 2019-20

Graph 1 & 2 indicates that the College of Home Science, Nirmala Niketan has total 710 people comprising of 679 students which includes 492 undergraduate and 187 Post graduate students and 31 Teaching Staff.

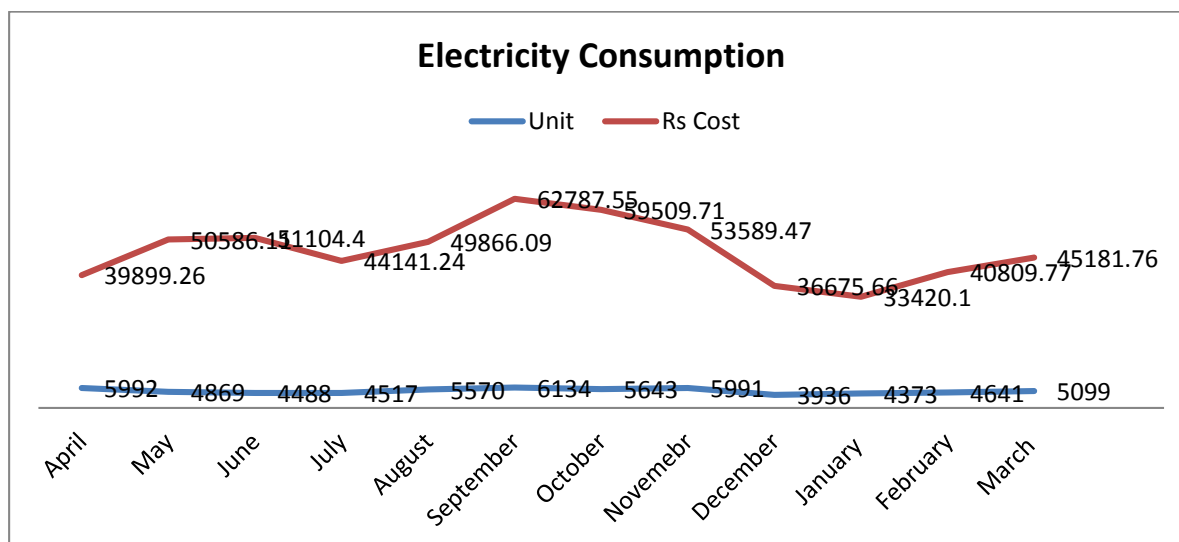
CHAPTER 4

Areas Reviewed for Green Audit

A. Energy Management

The college primarily uses energy in the form of electricity provided by Brihanmumbai Electric Supply and Transport (BEST). For a proper analysis of energy consumption, we need to understand the electricity consumption over at least one academic year, and ideally three previous years. However, in this case we were able to obtain one year energy bills which were of three electrical connections of BEST used in the name of the College and they are with Consumer ID's 332-153-001*2, 102-027-155*7 and 102-028-069*8.

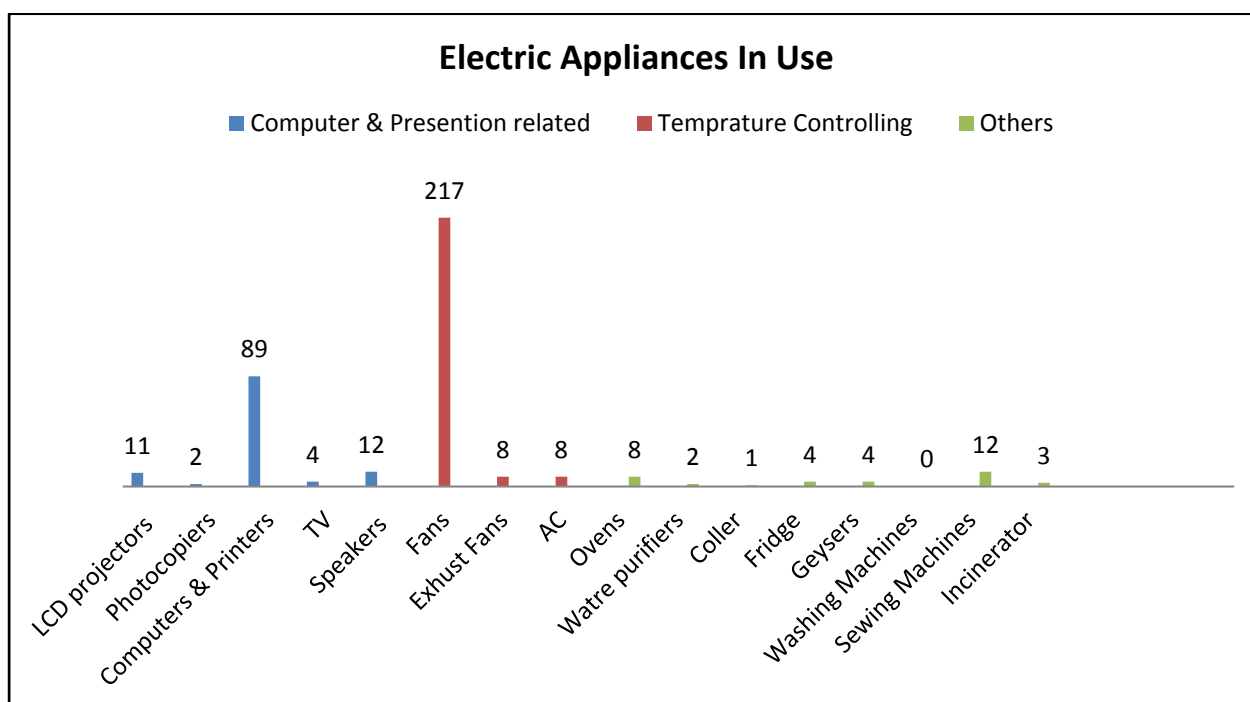
From these bills a summary of the electricity consumption data from April 2018 to March 2019 are presented below in Graphs 3.



Graph 3: Electricity Consumption from April 2018-March 2019.

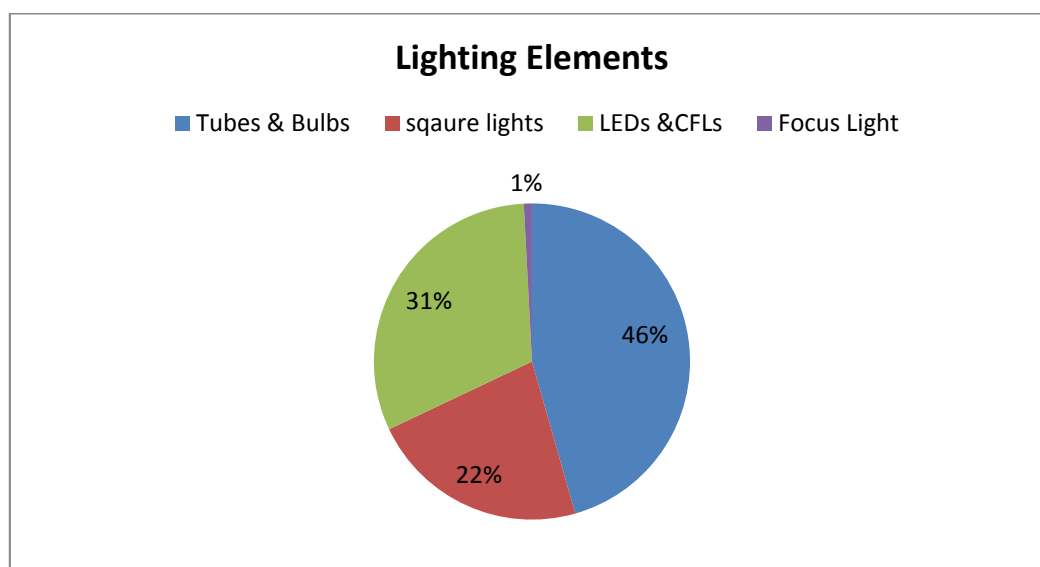
The trend generally seen is as expected for any academic institute. The electricity consumption drops to minimal during vacation period, is low during winter months, and is highest during summer months.

Summary of the electric appliance in use in the College are given in Graph 4.



Graph 4: Electricity Appliances in Use

Graph 5 indicates the lighting elements in use in the College.



Graph 5: Lighting Elements in use in the College.

Major use of the energy is at office and laboratories for lighting, cooking and laboratory work. The main electric appliances in the college are lighting elements, fans, computers and LCD projectors, and computers and accessories.

Major energy consumption equipments are the high wattage electrical appliances such as Air conditioners, water coolers, freezers, ovens, incubators, centrifugal machine, magnetic stirrer, incinerators etc.

Good practices in the College

In all sections of campus lecture rooms, office rooms, laboratories etc are spacious voluminous and airy, having proper natural light and ventilation. Hence actual requirement energy consumption in lightening is minimal. The air conditioners in the management chamber or in Principal Chamber are rarely used and avoiding unnecessary use of the same is a part of the green practice in the College.

LPG is used for cooking, the pipe gas line as proposed in the Green Audit Recommendations of 2014 was not possible as the Mahanagar Gas does not have their connections in this locality. However for safety purpose the LPG cylinders are kept outside the building and the supply to cooking and chemistry lab is provided by a piped connection.

Some of the “**Green Practices**” on the Campus includes; the display of the instruction boards/notices displayed on each classrooms/ lab for switching of the fans and lights when not required. Switching to star rating electric appliances in phase wise manner, new fans are installed in phases, step by step process of replacing CFL with LED light, Star rated sewing machines, relatively less energy consuming Juki machine for clothing lab. The College building has two lifts, the front lift is operational for the entire day and the rear back lift is operational till 1.00 pm. Lifts are used only for going up and it is only operational from ground floor to 5th floor in a 7 floor building. The notice for the same has been placed at the side of the lift. The management has sought star rated sewing machines as part of their commitment for energy saving practices.

As proposed in the Green Audit 2014, there is no provision for motion sensor lightings however instruction boards are displayed on each classrooms/ lab for switching of the fans and lights when not required.

As a follow up on the Green Audit 2015 recommendations and exploring possibilities of switching to solar energy. The College is in the process of obtaining Rashtriya Uchchar Shiksha Abhiyan (RUSA) Grant for solar power facility which is expected to be utilized by December 2019.

Auditor is Comments:

We commend the College Management for greater efforts to follow up on the recommendations of the Green Audit 2014 in Energy Management as well as for efforts for green practices in College. The College is in the process of obtaining Rashtriya Uchchar Shiksha Abhiyan (RUSA) Grant for solar power facility. The Grants to be obtained and utilized by December 2019. This again is greater efforts towards “Greener Campus”.

The good practices on the Campus are commendable **However the auditors have following recommendations for sustained efforts towards efficient energy management:**

Policy Document related to energy conservation and efficiency: While we highly commend the efforts of the college for follow up on the recommendations of the Green Audit 2014 and working towards having possibility of roof top PV installation for electricity generation by 2019, we recommend that College consider **renewable energy options/efficient energy management** as a policy matter. A system could be evolved to ensure efficient documentation & monitoring on the same. **Switching off electric appliances when not in use should be inculcated as work culture for both the staff and students.** It is also commendable to note that as an ongoing process one way to

encourage the behavior change is that the college has put up signs about switching off appliances on some places. However the Auditors recommend such sign post are put up at all exit doors of all rooms. Student volunteers could be assigned as 'energy monitor' on each floor, for monitoring the entire college campus.

Investing in energy efficiency of appliances: The step by step switching to energy saving appliance is much appreciated however we recommend that college shift completely to LED light fixtures and use of T5 fluorescent tube with electronic chocks through the entire college building. We recommend that the same approach may be pursued for other electric appliances, particularly fans, ACs, and LCD projectors.

Maintain an inventory: In view to documenting energy efficient and energy saving practices we recommend that an inventory of all the electric appliances with its specifications such as star rating, wattage and type of the existing as well as new purchases of all energy based equipments I maintained by the office. Regular and periodic servicing and cleaning will help these appliances operate at the maximum efficiency.

It is also important to replace the appliances when they reach the end of their recommended lifespan. While replacing appliances, the most efficient option available in the market at the time should be invested in, rather than going for the least expensive one.

While we commend on the efforts of the College administration for working towards Solar Energy Options, we suggest that area lighted by solar lighting could include corridors, lobby area, street and landscape lighting area with automatic timers. The solar water heating, Could explore feasibility of alternative for LPG.

We also suggest exploring feasibility of replacing the existing lifts to VFD control lifts which are with high efficiency motors.

We suggest the College to explore possibilities of conducting an energy Audit.

B. Water Management

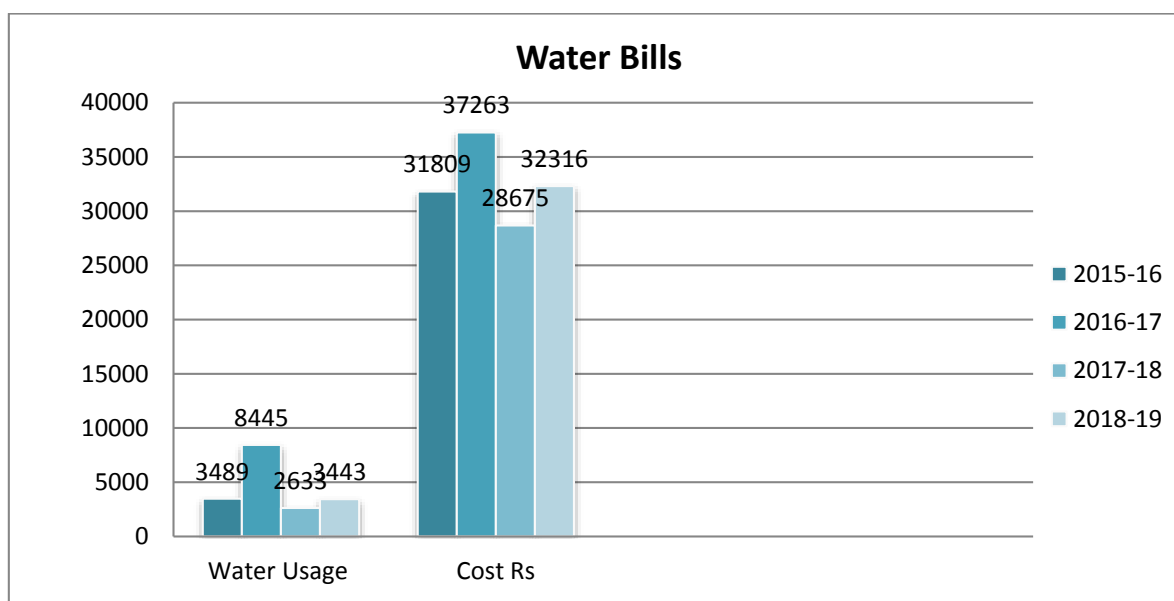
This auditing indicator addresses water consumption, water sources, irrigation, appliances and fixtures. In survey water used at bathrooms, toilets, laboratory, garden, shower and as well as leakages and over flow of water from overhead tanks is also been evaluated. The data collected from all the sections is examined and verified.

The water supply in the Campus is provided by the Brihanmumbai Municipal Corporation and the Municipal water is being used for all water requirements at the campus, such as for drinking, cleaning, in the labs, gardening and flushing the toilets. The quality of water is good. Water quality testing is done twice and results observed are good. (Reports attached as *Annexure*).

To analyze the water consumption and cost paid, we have obtained water bills of 4 years. The bills are paid under Consumer ID- 1040000156 and Consumer ID- 8800781 by the College.

A summary of the 4 years water bills is given in Graph 7. The Graph indicates that in the year 2016-17 water utilization was 8445 liters and the cost paid was Rs 37,263 which was highest among the 4 years. If we assume that total number of persons could be about around 710 staff and students

(actual no for the year 2018-19) hence per capita water use from the College could be about *11.8 lit* and cost was *about Rs. 52.48* for the given year.



Graph 7: Water Bills from the year 2015-19

In the following year 2017-18 immediately the water consumption was lowered to 2633 lit and cost paid was Rs 28675 which is also lowest among the given 4 years. The water consumption per capita was 3.7 lit the cost paid was Rs 40.30 for the given year.

The water consumption trends which appear to be bear minimum indicate the water conservation practices on the campus.

It was informed that the institute is monitoring maintenance of leakages well. Regular Servicing and plumbing is carried out and water flow in general is regulated from top. Few flushes are old one; some are changed to new water efficient flushes. College is also considering monitoring and installing the “flow meters” to reduce the flow of water in the taps especially in the lavatories and food labs and Installation of water saving flushes in toilets.

The Green Audit 2014 recommendations to consider the possibilities of Harvesting Rain Water on the Campus have been explored but it was not found feasible due to insufficient space and underground municipal sewage networks. However the management is considering the possibilities to Recycle Waste Water and use it within the building for toilet and gardening purposes.

Presently College is utilizing fresh water for all its water requirements, the management is considering the possibilities of plant based waste water treatment (STP) as part of RUSA plans and will be accomplished when the funds will be available. Probably by 2019-20 a feasibility study and implementation of STP will be possible.

Possibilities for the storage of rain water is also under consideration by the College which can be utilized as fire extinguisher, primary treatment is required for the same and Scope of student’s internship or research project on rain water harvesting in collaboration with relevant organizations. The College Management is exploring to achieve the above stated suggestion by involving NSS.

Auditors' Comments:

The team of Auditors commends the College administration for the good practices in conserving water such as regular plumbing services, regulating the water flow from top and some of the flushes are switched to water efficient flushes.

There is willingness to explore the option of Waste Water Treatment (STP), by 2019-20, thus the (plant based) recycled water can be utilized for the toilet flushing and gardening if it is implemented successfully and the option for collecting the rainwater possibly in syntax tanks as a precaution for the disaster preparedness.

As it is not possible to estimate the exact quantity of water used by different departments, however the highest consumption of water is most likely happening in toilets and the food lab and in view of the escalation of water scarcity in Mumbai, we recommend that the following basic steps be carried out to optimize the water utilization at the college level, which will also contribute to reducing the related expense:

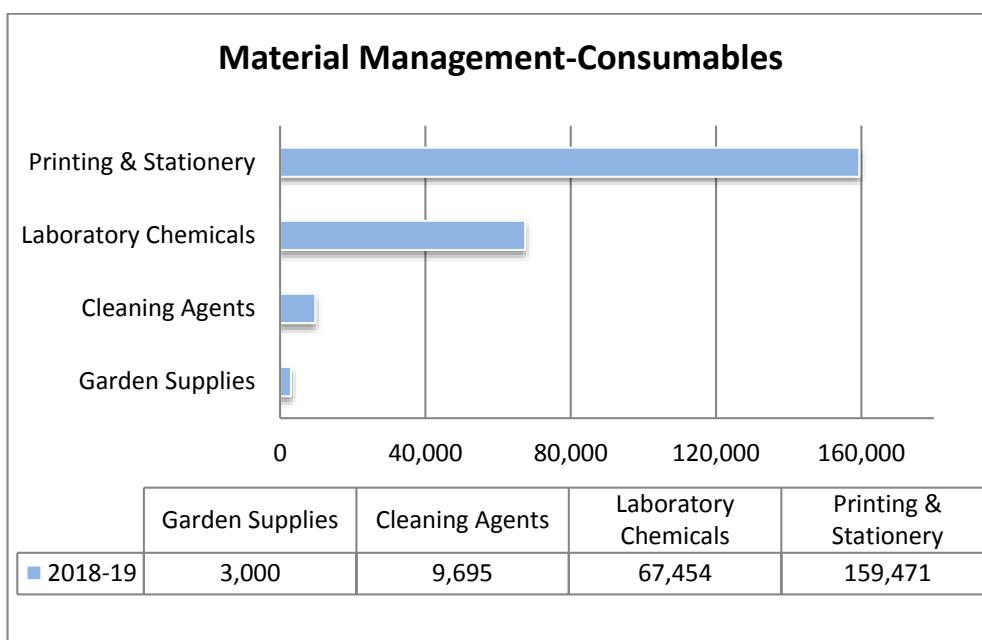
- a. Putting up notices in all washrooms and near all water coolers about the need for saving water, and simple tips like ensuring all the taps are properly closed, leakages are immediately brought to the notice of the management, respective floor cleaning staff could be given the responsibility to keep a check on every floor if any taps are open or leaking. Training to the cleaners in economical use of water for cleaning purposes and a system in place for immediate response when issues of water leakage are observed so that water losses are prevented.
- b. An in-house or easily available plumber in case of any urgent repair will be of great needs. It may perhaps be more useful if the plumber is assigned the task of periodic maintenance checks.
- c. It was observed that the drinking water coolers are generally placed near washrooms; if possible drinking water coolers could be shifted to other places for aesthetic and hygiene point of view.
- d. Regular monitoring of tank (which will be provided for firefighting) to avoid any last moment inconvenience during any fire hazards.

We suggest that College explore the feasibility of installing water flow meters, self - closing taps or sensor based taps on all the floors and treatment of waste water (STP). The (STP) treated water can be used for flushing and gardening, which will result in about 33% of reduction in Fresh water consumption, could check the possibility for use of excess treated water by neighboring buildings or gardens, to achieve Zero Liquid Discharge for green building approach (or no discharge in municipal sewer lines).

C. Materials Management – Consumables

In order to obtain data the audit team sought Information on utilization of office stationery, lab chemicals, food items, and other consumables along with the practice of reduce, reuse, or recycle from all the departments. This data has been obtained from the office as well as the Heads of the departments. The consumables-material management data is maintained by the college administrative office.

Graph 8, indicates variety of consumable materials in use in the college. The total expense on consumable items at the college was Rs 2, 39, 620 for the year 2018-19.



Graph 8: Consumable –Material Management

Stationery and printing also includes electronic consumables (pen drives and CDs as well as components of equipment like computers, printers, projection systems, etc.), other consumables in use are like cleaning chemicals and garden supplies.

Each department is practicing concept of reduce, reuse and recycle in their own way. Some of the good practices are as given under:

Good Practices

The administrative staff and the faculty continually reuse old files and make optimal use of one-sided paper. The college is taking several steps for reducing the use of paper and other consumables, trying to go 100% paper less through increasing use of electronic data management. Some of the practices by departments are:

Food, Nutrition and Dietetics (FND): hazardous laboratory chemicals are stored separately however use of hazardous chemicals is minimal in labs. Policy level decision, not affecting course curriculum, Foods lab utilizes all vegetarian product which required less attention in storage, cooks only vegetarian recipes because it is microbiologically safer, economically viable, Ingredients are used economically, demonstration of recipe where expensive ingredient are required, use of audio visual aids wherever possible and encourage research work on utilization of food waste. The department focuses on wastage reduction. In chemical lab reagents are prepared in bulk. Vegetable peels/ food waste is converted to value added products (fish waste – protein powder). They have done these kinds of projects in collaboration with BARC.

Human Development (HD): Various activities are conducted based on Best out of waste concept, educational material and teaching aids are developed using waste materials, ensures and suggest that separate bin for disposing of paper waste is strictly followed.

Textiles and Fashion Technology (TFT): Towards focus to UN 17 goals, innovation, development, (zero water wastage). Textiles chemistry utilizes eco-friendly chemicals (For fabrication or designing of clothes generally uses the Food and vegetable peels for product development- like for fabric dying). As per the Policy decision of the department – 80% fabrics comes from pre-consumer waste (waste clothes from mills or Chindhi market) free fabrics collected from industry.

Garment produced in examination are utilized for product development during extension activities conducted at NGOs. Participated in HGH International Textile Exhibition and put up a stall in which all the products were developed using old denim fabrics. The department head encourage projects and research work on waste management. Textile and Fashion Technology won Gold **medal** at Inter Zonal Level within University of Mumbai of Avishkar Research Convention.

Community Resource Management (CRM): won **Gold medal** at the Inter University Maharashtra State level 2018-19, same contestant also got **Silver medal** at the Inter University State Level 2017-18 under Occupational Health and Disposal of Bio hazard materials. The department also promotes Puppets made from waste, worked on plastic ban in campus and outside also, community oriented projects, CRM market utilize paper plates, fabric table cloth etc. There is a foundation course also having topics on reuse, reduce and recycle.

Auditors Comments:

We congratulate the College staff and students for their enthusiasm and innovative spirit indicated in good practices which are recognized and awarded by the respective authorities time to time.

It is highly commendable that each department is doing their best in practicing the 3R right from the use of materials to practices carried out for the extension activities (example: puppets with waste of textile, newspaper bags, awareness program, reduction in poster color, No usage of plastic, acrylic from senior to junior, purchase less, waste reduction).

D. Waste Management

Various types of waste generated on the campus can be categories as: solid waste, liquid waste, construction waste and e-waste. The Solid waste comprises of dry & wet , dry waste includes plastic, glass, paper, clothes, metal, garden waste and others. The wet waste comprises of food waste (mostly from the lunch boxes, food labs and others). The liquid waste comprises of the chemical waste and the e waste comprises chips, bulbs, circuit boards, motherboards, computers, batteries, switches and others. It was not possible to get an exact amount of each categories of waste that is generated daily on the Campus.

The waste collection and management system:

Separate bins for disposal of wet and dry waste are kept on each floor with awareness posters to deposit the dry and wet waste in the respective bins as indicted in the Photo 7. The respective cleaning staff from each floor collects the waste, segregates into dry and wet, dry waste is sold to the scrap dealer and wet waste is disposed off into the municipal bin. As per the solid waste handling rule 2018 the solid waste is managed by the municipal corporation accordingly there are waste collection locations from which the waste is collected by the waste collection vehicles daily.

NSS unit of the College has conducted several awareness sessions in the college and outside of the College on awareness building on the segregation and efficient management of the solid waste.

Photo 7 is depicting various actions related to waste management in the College.



Photo 7: Various actions related to waste management in the College

In view to liquid waste, banned chemicals are not used in any labs; the College has modified the syllabus based on that. Textile department is using natural dyes and eco friendly chemicals. Bio medical waste is being dealt with by a collaborating NGO. Microbiological items are autoclaved and disposed off.

For sanitary napkins incinerators on four floors (ground floor, second floor, fifth floor and seventh floor) have been installed.

In view to managing E-waste, new product in exchange of older electronic products while buying new products is encouraged, and students have been educated not to throw away e waste into garbage. An E waste Drive has been planned.

Various efforts are made to regulate waste generation. Especially in labs and other departments recycling most by reusing whatever is possible is ensured so that fewer natural resources are used.

Efforts towards a paperless office – Though not completely paperless, the office staff have been provided with adequate computers and commendable part of the official records are maintained through soft copies. Electronic gadgets are favored to transfer and store the official data and information. The college has developed the bulk message system for students, teaching and non-teaching staff, by Email and WhatsApp groups. Right from study material to official notices, are easily communicated through emails and the phone-based messaging services, without paper use. The college is equipped with various software for admission and fee payment. Furthermore, the college uses the OSM examination software through the University of Mumbai, for corrections, thereby minimizing the use of paper. The College has introduced the E- Magazine since 2016, to reduce paper use.

The Intercollegiate fashion competitions on theme “Cent Percent” was organized by Department of Textile and Fashion Technology on 15th March 2019 where in the participants were expected to produce garments using at least 50% of used fabrics.

While single use plastic has been already banned on the Campus there is also a plan to ban completely the use of plastic, install an E-waste collecting machine and efforts are being made by the College to explore the possibilities to go for a campaign to go for a “ZERO” Municipal Waste Campus. A team consisting of HOD’s, staff and students are to work on a detail plan to implement these plans which might need to create a list of the types of plastics which will be banned on the campus, frame a policy document. Certain fines could be employed on failing to abide by the policy of the College which could be introduced during the admission of the student. The policy document also could have the provision of the delegation/appointment of the team.

Auditors’ Comments:

We commend the College for their various good practices and efforts to regulate waste generation, encouraging recycling most by reusing whatever is possible in the labs and the classrooms, policy decision not to use the banned chemicals in any labs; accordingly syllabus modification, the use of eco friendly chemicals and natural dyes in the textile department, handling of Bio medical waste and the disposing of Microbiological items. The wet and dry waste awareness posters placed in the corridors, the awareness sessions on segregation of waste by the NSS unit are some of the positive steps towards green practices on Campus.

We commend the College for installing the sanitary napkins incinerators on four floors (ground floor, second floor, fifth floor and seventh floor) as a follow up on the recommendation of the 2014 Green Audit Report.

Recommendations:

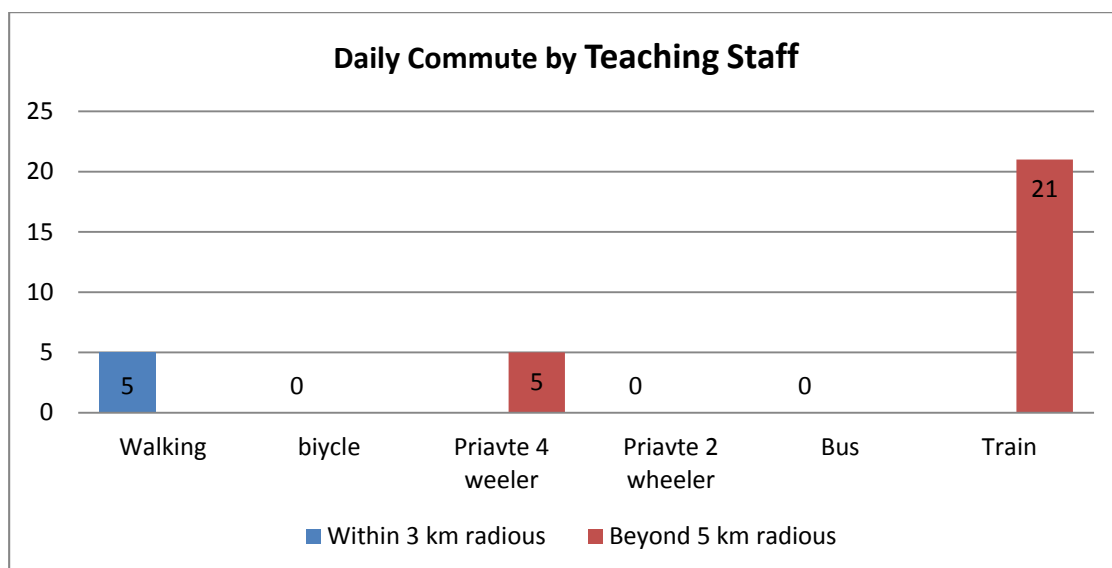
The students are encouraged to participate in campaigns and programs promoting awareness on segregation of waste, clean and safe environment. However we recommend the following for an efficient waste management on the Campus:

- a) Presently floor wise the solid waste is being collected segregated into dry and wet, dry is being sold to the scrap dealer and wet is being disposed of into the municipal bin by the respective cleaning staff from the floors. We recommend that the College explores possibilities of efficiently handling the wet waste on the Campus, may be by out sourcing to an appropriate agency or NGO. Proper budget could be allocated for the same.
 - b) NSS volunteers have conducted several awareness building sessions; the NSS unit could be involved in educating the students and staff to ensure an efficient management of the solid waste on the Campus.
 - c) Depositing wet and dry waste in appropriate bins in the class rooms by the students could be monitored strictly. Teams like “Clean up Marshals” from among the students could be formed to monitor classroom wise waste practices in the College.
- E.** It is highly commendable that sanitary napkin incinerators installed on 4 floors and a cleaning staff is delegated with responsibility to manage it. However it was randomly discussed with a random group of students in the Campus and was found that that particular group of about 30-

40 students were unaware of the installation of the sanitary napkin incinerators in the college, they were also unaware of their functions and importance. Therefore we recommend periodical awareness sessions with demonstrations on their importance and functions are regularly conducted in the College.

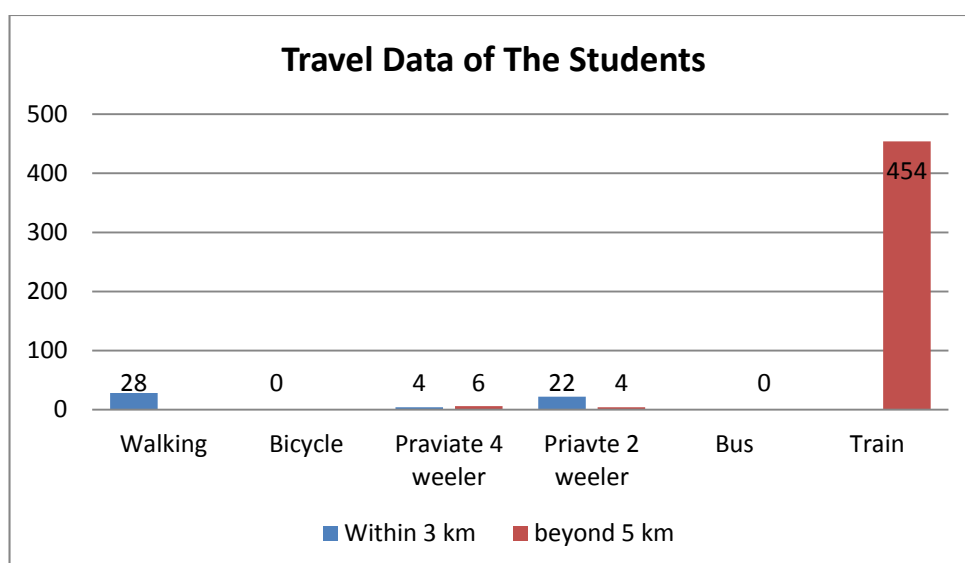
F. Travel and Transport Management

548 persons comprising of 517 students and 31 staff responded to the travel survey given by the green audit team. Graph 9 & 10 shows the travel data of the staff and students of the College of Home Science, Nirmala Niketan.



Graph 9: Travel Data of the Teaching Staff

Travel data of the students is given in the Graph 10.



Graph 10: Travel Data of the Students

Auditors' Comments:

We congratulate and thank the College team who collected the travel data for the green audit. Collecting comprehensive data on modes of commuting used by staff and students of the College is the most challenging part of the green audit data collection process. This is also one of the most significant data points because of the contribution of vehicles to local pollution and traffic problems as well as to global climate change.

The college data shows that most of the teaching staff are using the public transportation while few (5) using private vehicle for a distance beyond 5 km and 5 of them even walk down the distance within 3 km. is commendable. Almost all students (554) traveling from beyond 5 km take a public transport that is train while very few (6) students 4 wheelers for commuting to the College. From among the students traveling within 3 km there are maximum number of students (28) walking out the distance as well as using a mix of commuting mode while almost equal number of students (22) are travelling by two wheelers where in there are small number (4) who are travelling by 4 wheeler to the college from within 3 km.

It is a positive sign that few teaching staff as well as students travelling within 3 km are walking down the distance to the college daily. Maximum number of teaching staff as well as students using the public transport, however there are few teaching staff and students using 4 wheelers to travel within the 3 km distance. The staff and the students travelling by 4 wheelers from within 3km and 5 km could explore possibilities of carpooling. The staff and students could discover on a daily basis who else is traveling the same route at the same timings as themselves, and explore vehicle pooling opportunities.

Use of bicycle as a transport could be encouraged for a manageable distance, the travel data indicates that while many students and teaching staff walked down the distance to college but no one has opted for bicycle.

Recommendation:

College could allow parking on college premises only for those vehicles that have a valid PUC certificate. Organizing servicing camps for vehicles belonging to the staff and students, and trainings for safe and fuel-efficient driving. Use of bicycles from within shorter distance could be promoted.

G. Ecology Management

Total area of the College Campus is 14,400 Sq Ft. of which building occupies nearly 38% of the area, sports and recreation area covers 15%, while 28% of the total area is landscaped or planned garden, tree cover occupies about 18 % and 1% of the total area is occupied by natural flora. Within the campus, the garden is landscaped with almost 100% flora native to the local ecosystem. Glimpses of the ecology on the Campus are shown in photo 8.

The College has not explored the possibility of green building certification. The building is a cement-concrete modern structure and has not used any natural materials or traditional local architectural concepts however the class rooms require only about 50 % artificial lighting and corridors which are quite specious as good as little less than half of a classroom are also used thought out and they get 100% sunlight throughout the working period. Fans are required depending on seasonal variations.



Photo 8: Tree Cover at College of Home Science, Nirmala Niketan, Churchgate

Vanmahotsva (tree plantation festival) is celebrated with cultural expressions like street plays, poster making and tree plantation drives where in staff and students have planted several types of tree saplings in their localities and public places and tree saplings were also planted in the College garden area. (For details on tree plantation drive please see the Knowledge Management section).

As per the list provided by the, the tree cover has been documented, labeled by their names, botanic names & use as given under:

List of trees on the Campus

COMMON NAME	BOTANICAL NAME	TYPE/USE
Peepal	Ficus religiosa	Evergreen shade providing
False Ashoka	Polyalthia longifolia	Wind breaker
Gulmohar	Delonix regia	Ornamental
Papaya	Carica papaya	Fruit yielding, Medicinal
Mango	Mangifera indica	Fruit yielding, Medicinal, shade
Banana	Musa acuminata	Fruit yielding, Medicinal
Tagar(Chandni)	Tabernaemontana	Ornamental
Aboli	Crossandra	Ornamental
Chilli	Capsicum	Vegetable, Medicinal
Asparagus	Asparagus officinalis	Ornamental, Medicinal
Adulsa	Justicia adhatoda	Medicinal
Coleus	Coleus sp	Ornamental
Coconut	Cocos nucifera	Fruit yielding, Medicinal, Ever green
Jamun	Eugenia Jambolana	Fruit yielding, Medicinal, Ever green
Jackfruit	Artocarpus heterophyllus	Fruit yielding, Medicinal, Ever green

Sontaka	Hedychium	Ornamental
Paanphuti	Bryophyllumpinnatum	Medicinal
Tulsi	Ocimum sanctum	Medicinal
Aralia	Aralia species	Ornamental
Crotons	Codiaeumvariegatum	Ornamental
Spider Plant	Chlorophytumcomosum	Ornamental
Curry Leaves	Murrayakoenigii	Medicinal
Philodendron	Philodendron sp	Ornamental
Ferns	Nephrolepis Vas	Ornamental
Jasmine	Jasminum	Medicinal, Essential Oil
Khorphad	Aloe vera	Medicinal
Raat Rani	Cestrum nocturnum	Ornamental, Essential Oil
Jasvand	Hibiscus rosa-sinensis	Medicinal
Money Plant	Pothossp	Ornamental
Pentase	Pentaseesp	Ornamental
Lemon	Citrus limon	Medicinal
Syngonium	Syngoniumsp	Fruit yielding, Medicinal, Ever green
Song of India	Dracaena reflexa	Ornamental
Table Palm	Livistonarotundifolia.	Ornamental
Dieffenbechia	Dieffenbachia seguine	Ornamental
Euphorbia	Euphorbia milii	Bio Fuel
Insulin Palnt	Chamaecostuscuspidatus	Medicinal
Caladium	Caladium spp	Ornamental
Begonias	Begonias sp	Ornamental
Guava	Psidiumguajava	Fruit yielding, Medicinal, Ever green
Gokarna	Clitoria	Ornamental
Madhumalti	Quisqualisindica	Ornamental
Srilankan Beetle Palm		Ornamental

Table 1: Data of tree cover, types and use of the trees

Auditors' Comment:

Going by general standards and norms for educational institutions, the College should have more designated sports and recreation area. However, being located in a commercial/business area with a high premium on land, the space constraint is a big factor. It is therefore all the more praiseworthy that in spite of the space constraints, the college is doing well on space utilization and ecology management.

The team of auditors commends the College administration for the efforts in documenting the trees by its botanic name, type and usage. This exercise should continue to update as and when a new plant is added. A team could be assigned to monitor the tree health, nutrition and care; students could be given an opportunity to take care of the trees/ plants in the Campus.

The efforts by the NSS staff and students particularly of planting variety of saplings during Vanmhotsva and spreading the message for taking care of the trees are praiseworthy. These actions will go a long way in spreading awareness and motivating people to take care of the trees as in the last few years much of the tree covers have been sacrificed in the name of urbanization all over the country.

In view to be the most “Green Campus” College could consider exploring possibilities of the “green building certification”. If the building structure is suitable, possibilities for terrace garden could be also explored.

H. Knowledge Management

Detailed data of the activities and programs conducted by the College explains the contribution of various departments in creating eco friendly attitudinal change and the mindset of the students and faculty. We acknowledge the cooperation and support rendered by Heads of the Departments in obtaining these data from the College.

The College aims to have a paperless office and towards meeting this end there are several efforts going on in the College. Department’s wise specific data on eco friendly programs and activities are given here below:

Department of Textile and Fashion Technology: Colour event, 2015 –A seminar on “Green Coloration In action” in collaboration with Society of Dyers and Colourist’s (SDC) was organised by College of Home Science Nirmala Niketan on 30th January 2015 at the College which was addressed by Eminent speakers and well respected dignitaries.



Photo 9&10: Seminar on “Green Coloration In action”.

“Green Fashion – A Way of Life”, with a mission to increase ecological awareness in textile and fashion industry by establishing a premier forum that continuously facilitates research and promotes Green Fashion, to make “Green Fashion – A Way of Life”. The International event of Consortium of Green Fashion on 8th and 9th February 2015 included events and programs such as Intercollegiate Competitions- Consortium of Green Fashion and an International Conference of Consortium of Green Fashion. The third edition of Green Fashion International Conference was organised by the Textile & Fashion Technology Department in collaboration with School of Fashion Technology, Pune, the Conference had Sub-themes like Relationships and Linkages, Reduce, Recycle and Reuse, Craft and Design, Technology and Design, Retail and Design. This mega-event involved several workshops, competitions and sessions inviting well-known resource persons and experts from the field.

“furious pace with which humans consume resources and generate waste, the explosion of chemical production, and its impact on human health and environment”, on “Inclusive Sustainability” by Mr. Nitin Shah, Hon. Secretary of The Society for the Vocational Rehabilitation of the Retarded, Tardeo, spoke on “teaching skills to the differently-abled”.



Photo15, 16 & 17: Seminar on ‘Recent Developments in Sustainable Textiles, Clothing and Coloration’ and market of sustainable products

Ms. Amisha Parekh Founder, SEVA NGO, shared her ongoing journey of working on the development and social up-gradation of the tribal people from Sanjay Gandhi National Park, Borivali. “Nature-Sustainable Palette” was dealt with Ms. Bhavini Parikh Founder ‘Bunko Junko’, an expert who has created an entire brand of women's clothing and accessories made from “pre-consumer waste fabrics”. Mr. Sarfaraz Khatri, CEO Pracheen explained his journey of keeping alive the tradition of block printing with natural dyes. Ms. Monal Zaveri, Marketing Manager, Brand Developer and Product Coordinator Milaaya Embroideries spoke on “Sustainable marketing”, stressed on the marketing strategies adapted by various international brands. Mr. Viral Dedhia, Director Easytech Innovations a young budding entrepreneur, spoke about Smart Textiles, smart technology, innovations such as ‘The Smart Shirt’, Dr. Vijay Habbu, Senior Vice President PETCHEM, Reliance Industries, the Guest of Honour at the Valedictory function explained in detail, the sustainable polymeric science and synthetic fibres.

“Jamboree Sustainable Haat: In continuation with the theme “Trend Sustain”, “Jamboree Sustainable Haat”, was a space where in the NGOs, and artisans proudly exhibited their products which were patronised by many. **Fashion Shows:** a) **“Cent Percent”- Intercollegiate fashion competition** was organised by the Department of Textile and Fashion Technology in March 2019 where in the participants produced garments using at least 50% of used fabrics. Participants from Sophia Polytechnic, SASMIRA, NIIFD, Nirmala Niketan Polytechnic, College of Home Science, Nirmala Niketan showcased their collection through a fashion show and best collection was awarded.



Photo18 & 19: Intercollegiate fashion competitions on theme “Cent Percent”

Fashion Show “Jamboree 2019”: under the theme “Trend Sustain” – There were twelve collections, the themes for each collection revolved around sustainability and a tribute to Indian textile heritage. The show was an amalgamation of trends with sustainability showcased from kids-wear to designer wedding collections. Fashion shows “Jamboree 2019” on theme “Trend Sustain” was organized by Department of Textile and Fashion Technology on 16th March 2019.



Photo 20,21,22,23 &24: Jamboree 2019 Fashion Show on theme ‘Trend Sustain’

The students of the department had an opportunity to model their self-designed and self-constructed garments in the presence of renowned panel of jury comprising national and international designers, Fashion Stylist, Fashion Consultant and other dignitaries. The grand finale was the ‘Jewels of India’, a fashion show presented by the department students acknowledging the contribution of artisans of traditional handcrafted woven, embroidered, dyed and printed textiles and costumes across the length and breadth of India in traditional and contemporary versions.

Some of the programs conducted by the Department of Community Resource Management are shared here below:

The “Research on “Consumer Awareness on E-Ticketing and Recycling Of Train Tickets” won the 2nd prize out of 16 participating teams at AARYA (Awareness and Action Research for Youth Awakening) An Intercollegiate Research Convention 2018-19. Mrs. Sunita Jaiswal, the HOD, Associate Professor for the Community Resource Management was the supervisor of the research team of 8 students who undertook the research with objectives to analyze why e-ticketing is not every traveler’s first preference, what is the solution to reduce wastage of paper generated through tickets, to promote awareness about the UTS app, to find out how much paper is generated in the ticketing section and what is the solution for the already generated tickets. With 100 respondents this study will also come up with a solution on how with the help of simple techniques, one can reuse and recycle the paper to make paper products.



Photo 25: Research team at AARYA an Intercollegiate Research Convention.

National conference on 'Sustainable Practices in Solid Waste Management in India': Staff members attended the above seminar organized by National solid waste Association of India ,supported by Maharashtra State Pollution control Board and Indian centre for Plastic in environment in association with Dept. of Resource Management SNDT Women's University



Photo 26: 'National Seminar on Sustainable Practices in Solid Waste Management in India'

“Extension Activity”: As a “policy matter”, it is mandatory for the students of the College to spend (3 hrs a week) under “Extension Activity” which is basically an outreach program where in village camps and other activities and programs are conducted by the students for the village men, women and children.

National Social Service (NSS) unit of the College conducted programs, activities and campaigns in collaboration with NGO's and Govt offices: Swacch Bharat Abhiyan (SBA): The programs on the SBA are initiated with an Oath Taking Ceremony with an aim generate awareness and commitment to keep their surroundings clean. The students undertaking several activities like street play, poster making, flash mobs, cleanliness drives, scrap collection drives, rallies, conduct seminars and workshops to motivate public towards SBA. Some examples are: **2018:** SB Poster and Slogan making, included exhibition of the posters in the corridors and latter used for the SB rally. Flash mob on SBA, 16 volunteers and Non-NSS participated. **2017:** NSS volunteers performed street play on SBA and undertook cleanliness drives which included Cleanliness drive for waste segregation (29th July, 2017 near Churchgate subway in collaboration with BMC/MCGM). SB poster making competition (12th August 2017; 6 participated, 10 volunteers). Scrap and Debris Collection drive: old paper debris and scrap were collected to be handed over to M.E.S.C.O. The trust who sells the scrap utilizes the money for educating a student, help to treat patients, provide ration to a family.



Photo 27&28: Students conducted workshops on paper bags making AS PART activity to promote ban of plastic bags both in urban slums and rural areas.

2016: Station Beautification activity held on 6th, 7th and 22nd October, 2016, Grant Road Railway Station was cleaned and painted by volunteers. 14 sections of fence were painted. Students conducted a cleanliness drive in college and awareness in Churchgate area namely Khao Galli, Fashion Street, Football Stadium for a 15 days in 2016. Poster competition was conducted in the college to create awareness on 'Swachh Bharat' mission and & Road safety.

The College promoted the Vanmahotsav (National Festival of Tree Plantation): The College undertakes several activities from July-August in collaboration with Go & NGO have to celebrate the tree plantation day.



Photo 29 & 30: Tree Plantation drive during Vanmahotsav

The celebrations include street plays and tree plantation drives at public places like Churchgate train station and in front of the college with an aim to generate awareness on the Importance of taking care of the trees, planting trees and conserving green tree covers in the surrounding. **Some of the examples are:** in 2016, college collaborated with Forest Department and Collector office of Mumbai city Zone, the department also sponsored the T-Shirts for the students and the banner to create awareness. A tree plantation drive was undertaken by 15 NSS volunteers from 24 July to 1st August in 2018 where in the students planted 75 saplings in Shell colony Chembur, S.K. Patil garden at charni Road, Kalyan, Dombivli, Dahisar, Mazgoan, Borivali, Kolhapur, Bhaynder, Goregaon, Uran.

The NSS unit of the College motivates the students to participate in Beach Clean Ups, the Ganesh Festival after the immersion the Mumbai beaches become the waste debris. The NSS volunteers took up beach cleanup in Girgaon Choupatty in September 2016 and Versova Beach clean up on International Coast cleaning day (16 September 2017) **The Cleanliness Drive** have been undertaken with an objective of promoting cleanliness on the streets. For examples: in 2018 Cleanliness drives were conducted at Andheri Sports Complex and at Kalina Mumbai University Campus,. The activities on **Hygiene and Sanitation Practice** were undertaken with an aim to ensure that children maintaining appropriate hygiene and sanitation practice. A Poster Display activity was held in month of January and February 2017.

In regards to NSS volunteers' engagement with issues of Solid Waste Management, the students participated in the 'Phenk Mat Mumbai' campaign of the 'CII- Confederation of Indian Industries', a project of Brihanmumbai Municipal Corporation in partnership with state government. The students were trained to train others and took part in the campaign as brand ambassadors. The campaign was launched in 2017 to maintain cleanliness in the city. The NSS volunteers with the support of the non teaching staff conducted about 7-8 sessions on **importance of waste management**.

Plastic Pollution: Towards an eco-friendly campus; Signboards/Posters are displayed in the college for encouraging ideas of a plastic free environment, everyone is engorged to adopt the 3 R's Reduce/Reuse/Recycle. To promote eco friendly celebrations Students visited many Ganesh Pandal and distributed paper bags and cloth bags to the devotee to carry the pooja items for the worship.

In 2019: the NSS unit visited **15 Ganesh Pandals** and distributed **500 Newspaper Bags** to the devotees educating them to reduce the usage plastic bags. The volunteer's stitched bags from the cloth material received from the donations and distributed to societies, taxi drivers and railway employs at Churchgate station they also organized a Flash Mob On Anti Plastic Campaign at Churchgate station, Poster and Slogan making by NSS volunteers, Rally and Street play on Anti-Plastic Campaign from college to Khugalli (near SNTD college) and Churchgate station – Churchgate station bus stop – College.

Environment oriented course content in the syllabi implemented on the campus: The College offers 18 courses on Human Values and Professional Ethics and has Environment oriented course content in the syllabi implemented on the campus one among them is: "Environmental Issues and challenges" in the 3rd year Final of the Department of Community Resource Management. The activities include selection of topics, case studies, class discussion and interactive sessions on the topics.

Year and Semester	Course	Topic
FY BSc - Sem I	Foundation Course	Values for Human Excellence: Part I - Community values, focusing on environment
FY BSc - Sem II	Foundation Course	Value System of great personalities: Life stories of achievers (Indian and global) in various fields - environmental concerns
SY BSc - Sem III	Foundation Course	Dealing With Environmental Health & Education Concerns
SY BSc - Sem IV	Foundation Course	Environmental Ethics
TY BSc TFT - Sem V	Project work II - Sustainable Community Work	Products made from Textiles appropriate for community work Visit to relevant GO 's and NGO's. (Products are developed from fabric material which has been used for examination)
MSc I TFT - Sem I	Value Addition through finishes- Textile and Garment	Use of environmental friendly chemicals and reagents
MSc I TFT - Sem II	Value Addition Through Dyeing and Printing	Use of Eco Friendly Materials and Methods
MSc II TFT - Sem III	Management & Administration in the Textiles & Apparel Business	Environmental considerations of the entrepreneurial venture
MSc II TFT - Sem IV	Sustainable & Ethical Design Development for Textiles & Apparel	sustainable product – Apparel, Home Furnishing and Accessories

Table 2: Environment oriented course content in the syllabi implemented on the campus

Environment related topics researched at Doctoral, Post graduation levels in the College:

POST GRADUATION			
Name of the student	Year	Research Topic Guide	Department
Anjali Kirve	2015-16	Natural Dyeing of Banana Fabric with	Textile and Fashion

		Marigold Extract, Guided by DrVishaka Karnad	Technology
KakkaHiral Bharat	2017-18	To dye cotton with natural herbs using cows urine, Guided by Dr Ela Dedhia	Textile and Fashion Technology
ZatakiaDishaNitin	2017-18	Application of aroma and anti - microbial finish obtained from natural source on cotton fabric,Guided by Dr. Anjali Srivastava	Textile and Fashion Technology
Fatima Shaikh	2018-19	A study on anti-microbial property of Wrigthiatinctora (Indrajau) seeds - Extraction and application on cotton Fabric, Guided by Dr. Anjali Srivastava	Textile and Fashion Technology
Kunjan Bajaj	2018-19	To develop antimicrobial warmer for rural preterm neonates as first line of deform to prevent infection and hypothermia, Guided by Ms.Vrinda Udiaver	Textile and Fashion Technology
Sneha Savla	2018-19	Comparative study of dyeing cotton fabric with Chenopodium album leaves extract using pre, simultaneous and post mordanting techniques, Guide by Dr.Pratima Goyal	Textile and Fashion Technology
RESERCH TOPICS AT DOCTORAL LEVEL			
Name of the student	Year	Research Topic Guide	Department
Ms SumanMundkur	2015-16	Sourcing and Reuse of Post-Consumer Clothing Waste for Technical Textiles, Guided by Dr Ela Dedhia	Textile and Fashion Technology
JinalSangani	2018-19	Khadi- A fabric for Sustainability, Guided by Dr Ela Dedhia	Textile and Fashion Technology
RESEARCH PROJECTS RELATED TO ENVIRONMENT			
Name of the student	Year	Research Topic Guide	Department
Qureshi Hafsha, Neemuchwala Arwa, Nagda Niki, Patanwala Mariya, Palitanawala Sakina, Najam Sakina, Padghan Pranjal	2018-19	Up-cycling of Textile Waste for Capacity Building in Lower Socio-Economic Women, Dr. Ela Dedhia and Ms. Neha Mulchandani	Textile and Fashion Technology
Nambiar Darshana, Savla Hasti, Shah Muskan, Nalwala Arwa, Pawaskar Arfiya, Mullah Ashfa, Ranka Riya, Patodia Tanvi	2018-19	Plastic Bags to Cloth Bags: The Game-Changer for Tribal Empowerment, Guided by Dr. Ela Dedhia and Ms. Vrinda Udiaver	Textile and Fashion Technology
Gaikwad Tajashree, Shajapurwala Sakina	2018-19	Creating Eco-consciousness about Natural Fabrics and Remodeled Garments amongst Youth, Guided by Dr. Vishaka Karnad and Ms. Vibhuti Khedekar	Textile and Fashion Technology
Bajaj Kunjan, Shaikh Fatima	2018-19	Sustainable Menstruation- Economics, Environment, Health and Hygiene, Guided by	Textile and Fashion Technology

		Dr. Ela Dedhia and Ms. Vrinda Udiaver	
Karia Hemanshi, ThanawalaNafisa	2018-19	The Perception Of The Current Generation On Sarees, Guided by Dr. Pratima Goyal	Textile and Fashion Technology
Swamini Binsale	2018-19	Biodegradable agrotextile, Guided by Dr Ela Dedhia	Textile and Fashion Technology
Hemanshi Karia	2018-19	Upcycled Sari using waterless Dyeing method, Guided by Dr Ela Dedhia	Textile and Fashion Technology
Sneha Savla	2018-19	Sustainable jewelry made from plastic, Guided by Dr Ela Dedhia	Textile and Fashion Technology
Fatima Shaikh	2018-19	Solar bag for energy availability and mobility, infrastructure improvement, Guided by Dr Ela Dedhia	Textile and Fashion Technology
Nafisha Thanavala	2018-19	Responsible Consumption and Production – Flex banner Can-can skirt, Guided by Dr Ela Dedhia	Textile and Fashion Technology
Dolly Gala	2018-19	The sustainable smart shoe for healthy lifestyle of common man, Guided by Dr Ela Dedhia	Textile and Fashion Technology
Shajapurwala Sakina	2018-19	Trouser for a paraplegic person, Guided by Dr Ela Dedhia	Textile and Fashion Technology
Merchant Sakina	2018-19	Affordable and Clean Energy, Guided by Dr Ela Dedhia	Textile and Fashion Technology

Table 3: Environment oriented Research undertaken in the College

Individual Eco Friendly practices by staff: Most of the staff on the Campus uses steels, copper and glass bottles and lunch boxes, carry their own plates, ceramic cups for tea/coffee to avoid disposable cups in college, use of melamine plates instead of disposable plates for birthday parties organized at home, they donate old clothes or reusing, up-cycling and re-cycling of clothes and home furnishing whenever possible, donate books of their children to others for reuse also take from other parents for their children if it is in good condition, use unused sheets of old notebooks.

The College faculties have received recognition, awards for their contribution towards building eco-friendly vision and practices, which includes. Some examples are: Dr. V. Karnad awarded the Certificate of Merit for the Oral Paper presentation of Research paper (co-authored with Dr. V. Karnad) "Fabric Based Jewelry Designing and Making" presented by Ms. N. Dawra on 8th February, 2015 at the Consortium of Green Fashion International Conference. Mrs Suman Mundkur received Second Prize for Poster Preparation on 'Flexible Cellulosic Nonwoven Packing Material from Fibres Reclaimed from Clothing Waste at the Research Conclave- World Packaging Congress 2015 on Packaging strategies for Global Competitiveness on 9th & 10th October 2015. Dr Ela Dedhia Invited as Jury for Paper presentations for Inter Disciplinary National conference 2016 on "Green technology & sustainable development: indigenous practices" organized by Amity University of Mumbai. She was also invited as speaker during plenary session and chairperson for technical session during the

National Workshop on Natural Dyes in Batik and Shibori organized by the Institute of Jute and Fiber Technology in Kolkata on 16th and 17th September, 2016.

List of Publications by the department faculty: 2016-2019

- 1) Ms. Juhi Agarwal and Dr. Ela Dedhia (2016) "Grading of Mesta Fibres' Full paper in the proceedings of Inter Disciplinary National Conference-"Green technology & sustainable development: indigenous practices", Amity University of Mumbai, 26th and 27th February.
- 2) Ms. Khushboo and Dr. Ela Dedhia (2016) 'Organic Finishes' Full paper in proceedings of Inter Disciplinary National conference 2016 on "Green technology & sustainable development: indigenous practices" Amity University of Mumbai 26th and 27th February 2016 Publication
- 3) Dr. Pratima Goyal, Ms. Deepa Lakshmi. A. (2016) "A Step to Obtain Sustainable Textiles Using Plasma Technology" Full paper in proceedings of an Inter Disciplinary National conference on "Green technology & sustainable development: indigenous practices" Amity University of Mumbai, 26th and 27th February 2016
- 4) Dr. Pratima Goyal, Ms. Mohaddesa Dehghani (2016) "Sustainable Fashion" " Full paper in proceedings of Inter Disciplinary National conference on "Green technology & sustainable development: indigenous practices" Amity University of Mumbai 26th and 27th February 2016
- 5) Dedhia E and Shah M. (2016) A Study of One Bath Eco-friendly Denim Washing Process, the Journal of Asian Regional Association for Home Economics, Vol. 23 (2), 206, ISSN 1027-880x eISSN 2234-4454, pg. 35-51
- 6) Dedhia, E. (2016) "Journey of Natural Dyes" in Book of Papers of a Workshop on Natural Dyes in Batik & Shibori organized by Institute of Jute & Fibre Technology Kolkatta.
- 7) Srivastava A. & Dedhia E. (2016) 'Dyeing of Cotton Fabric with Acacia Arabica Bark' the Journal of Farm Sciences (Formerly Karnataka Journal of Agricultural Sciences, Vol . 29 (5) Special Issue 31st Biennial National Conference of Home Science Association of India on Science and Technology for Reaching the Unreached, Printed, Pp. 762-765, ISSN 0972-1061.
- 8) Mundkur Suman Deepak & Ela Manoj Dedhia (2017) 'Sustainable Consumer Practices in Reusing Clothing 'International Research Journal of Commerce Business and Social Sciences (IRJCBS), Vol. VI, Issue 9 (I), ISSN 2277-9310, 110.
- 9) Madhan R. & D'Souza E. (2017) Upscaling Fabric Scrap to Develop Fabric Jewelry Full Paper in proceedings of Paradigm Shifts in Fashion & Textiles- Style Q' 17, Amity University. Pages 45 – 51

Auditors' Comments:

Varied range of interesting, enthusiastic and creative activities being conducted by various departments of the College over the years is highly commendable, the Syllabi based course content on environment, specifically some of the research topics, efforts towards **going for paperless office**, display of signboards/posters in the college on environmental consciousness such segregation of dry & wet waste, switching of electric appliance, management of lifts, encouraging ideas of a plastic free environment, promotion of 3 R's Reduce/Reuse/Recycle, eco friendly practices by the staff and students.

We congratulate the College staff and students for Textile and Fashion Technology department for winning the **Gold medal** at Inter Zonal Level within University of Mumbai of Avishkar Research Convention, for the Community Resources Management department for winning **Gold medal** at the Inter University Maharashtra State level 2018-19, same contestant also got **Silver medal** at the Inter University State Level 2017-18 under Occupational Health and Disposal of Bio hazard materials.

We commend the enthusiastic and innovative projects by various departments of the College such as the **colour event**, the International event of Consortium of **Green Fashion** and related projects,

the intercollegiate competitions, **Up cycling old denims'** - , the exhibition of Recycled products, the **Jamboree Haat, Cent Percent** themed fashion shows, several programs and campaigns undertaken by the NSS unit of the College such as Swacch Bharat Abhiyan (SBA), Vanmahotsav (National Festival of Tree Plantation), Beach Clean Ups, training on Solid Waste Management and Anti Plastic Pollution through several creative methods like street plays, poster making, flash mobs, rallies, and workshops to create awareness on these issues.

Recommendation:

In 2015, all the nations including India have ratified the Paris Agreement, which now puts the onus of mitigating climate change on all countries, rather than just the developed countries. At the same time, India is also one of the most vulnerable countries for the impacts of climate change that has already happened.

Thus, both climate change mitigation and adaptation to climate change are going to be important governing factors in the development choices of the country in the near future, and will impact the youth the most. This will in turn also open many career opportunities, not just for trained climate and environment scientists, but also for experts in various fields, hence themes like climate crisis impacts, climate solutions specifically in context to food and clothing, environmental Studies that can churn out professionals with the right expertise to tackle climate issues could be explored.

I. Pollution Management

Information related to checking air quality, noise pollution, water quality, initiatives taken by the institute discussed and relevant information provided. Table 4 indicates the readings for noise and daylight analysis at College Building.

Noise and daylight analysis at College Building

Floor	Noise (dB)	Daylight (lux)
Ground Floor	87	30 (A)
First Floor	83	31 (A)
Second Floor	75	45 (A)
Third Floor	50	08 (A)
Fourth Floor	50	125 (A)
Fifth Floor	68	250 (B)
Sixth Floor	68	332 (B)
Seventh Floor	60	749 (B)

Table 4: Noise and day light analysis of the college building

The noise levels measurements were carried out using precision noise level meter. The Photo 31 Shows the noise barriers and noise sampling equipment.



Photo 31: The noise barriers and noise sampling equipment

Water testing was undertaken by the College recently and drinking water quality was found to be good. As part of the environmental monitoring of campus, it was observed that Illumination and Ventilation is adequate considering natural light and air velocity present in the classrooms. Average noise level in the campus was found to be within the limit i.e. below 67 dB at day time. The noise level survey as given in the table 4 was carried in classroom, in study area it is averagely 67 dB. No mikes are used in the classrooms. The Vitthaladas Thackeray Marg is adjacent to college building. During discussion and site visit it was observed that building construction is such that it acts as noise barriers.

NSS unit of the College regularly conducts various activities related to environment and pollution (Please view Knowledge Management for details) Some of the research projects of TFT department are promoting use of natural dyes and natural fibres which do not cause pollution.

Auditors Comments:

We commend the efforts of the College towards reducing the environment pollution through ban of “single use plastic”, process of banning other use of plastic on the Campus. The staff specifically does not use the “use and throw” cutlery, plates, cups, glasses or any materials as part of their vision to create a pollution free campus and world. The NSS unit has undertaken anti plastic campaign, water testing and noise pollution has been traced on the Campus.

Air pollution detectors are now available in the market. The college may install a detector, to track real time data on air pollution faced by the campus, the air pollution data could be used for raising awareness on daily pollution levels, the dangers of exposure to air pollution and possible preventive measures (e.g., use of a proper mask while driving, etc.).

In order to ensure the betterment of indoor air, the paints used for building could be free of Volatile organic compounds (VOCs).

Number of individuals coming to the college in private vehicles with single occupancy could be discouraged to focus on reducing the contribution of its own community to the air, noise pollution

and traffic congestions. Environment related project/ research on Campus could be promoted with allocation of nominated awards.

J. Disaster Preparedness

Mock Drills are conducted at the college, Fire Awareness program by Civil Defense at stock exchange building and Disaster Management Workshop conducted by Hinduja College and Lala Lajpat Rai College of Commerce and Economics were attended by volunteers from the College. Fire Safety Equipments: Fire extinguishers are installed on every floor in the College

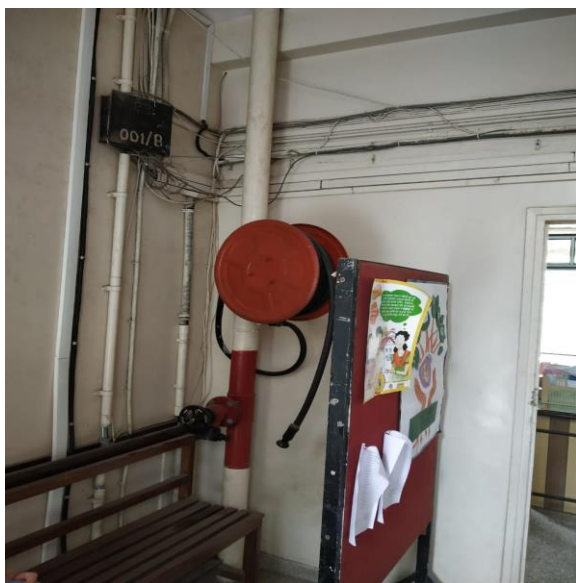


Photo 31: Fire extinguisher & Hose reels, placed in the College.

Emergency equipments like fire extinguishers, hose reels etc. for fire hazard were in place in the college building as shown in Photo 31. The college administration informed that students have been exposed during disaster management. For example, in the past, during monsoon disaster, the college has catered to approx. 500 people victim of floods by giving shelter and food which was cooked in college itself. The College Administration is considering a plan to collect rain water to use as a safety measure for disaster preparedness.

Auditors Comments:

We recommend that the college administration carry out an internal review of potential natural disaster risks, and explore other strategies, such as storm drain system, routine drills for quick evacuation program, etc. A team of staff and Students could be assigned with responsible tasks with periodic reporting to the management on the same.

CHAPTER 5

Conclusion and Way Forward

Main highlights of the Good Environmental Practices on campus:

1. Some good practices in energy management are in place on the college campus.
 - a) Step by step switching to star rating electric appliance, as well as CFL to LED bulbs and fans, star rated sewing machines, relatively less energy consuming Juki machine for clothing lab, instructions and efforts in energy conservation practices are some of the best efforts on the Campus.
 - b) The efforts for exploring possibilities to use solar power facility by December 2019 with grant from Rashtriya Uchchatar Shiksha Abhiyan (RUSA) are praise worthy.
2. A reasonably good system of waste segregation is in place in the College. With Separate bins for dry and wet waste placed at different and main places in the college. The NSS unit of the College has conducted several programs on creating awareness on segregation of waste.
 - a) The commitment of all the departments for following the principal of best out of waste, waste reduction, and reuse of the materials making optimum use of everything, utilization of eco-friendly chemicals, research projects on 'Sustainable Menstrual Cup' focused on reducing usage of sanitary napkin which won the Gold medal in Avishkar Research Convention are some of the praise worthy efforts.
 - b) College has installed Sanitary Napkin (Napi Vending Machines) and the incinerators placed on the 4 floors in view to managing one the most emerging crisis of the house hold waste.
 - c) The college administration is making conscious efforts to make its operations as paperless as possible to reduce waste generation, and improve efficiency of operations. The administrative processes are going electronic and some of the examinations are being conducted online.
3. The commitment of the College in terms of having specific Policy is highly commendable.
 - a) By Policy each student is required to spend 3 days a week for an extension activity with the centers in the village of city reaching out to the poor and the marginalized.
 - b) Utilization of 80% fabrics from pre-consumer waste (waste clothes from mills or Chindhi market) free fabrics collected from industry.
 - c) The varied range of activities that the students have engaged in over the years is highly praiseworthy.
 - d) We commend the college authorities and the staff for initiating concept like green consumerism, green fashion, fashion shows, research, various seminars and programs addressing the environmental aspects.
 - a) We congratulate the College staff and students of the TFT department for winning Gold medal at inter zonal level within University of Mumbai of Avishkar Research and the community Resources Management for winning Gold medal at the Inter University Maharashtra State level 2018-19 and the same contestant also got Silver medal at the Inter University State Level 2017-18 under Occupational Health and Disposal of Bio hazard materials.

Summary of main Recommendations from Auditors:

A number of recommendations have been made in each section in the previous chapters for motivating behavior change among the campus community to inculcate habits of conservation of resources like energy and water. In addition, a few recommendations require investment or other inputs from the college management. The main recommendations of 'action points' for the management are summarized below.

1. Roof Top Solar PV for in house electricity generation by December 2019
2. Explore feasibility for sewage water treatment and reuse of the treated water for flushing the toilets and gardening and similar purposes.
3. Continue the effort towards paperless administration, but with proper electronic waste management systems in place.
4. The Solid Waste Management on the Campus could be out sourced to an agency or NGO for managing it efficiently. Appropriate budget could be allocated for the same.
5. A team of students could be delegated with responsibility of taking care of the tree cover helped by an eco sensitive landscaper occasionally to ensure proper care of all the plants and special care of the flora which are from native ecosystem. Updating the documentation of the tree cover should continue.
6. The environment-focused activities with the students, though already too many in variety and very much based on experiential learning on local environmental issues, should also focus on educating students about climate change mitigation and adaptation issues, challenges and career opportunities etc. in these emerging areas.
7. It is recommended to explore the possibility of installing monitoring devices on campus to track air pollution arising from the busy road adjacent to the college campus.
8. The college management should carry out an internal review of potential natural disaster risks, and explore possible mitigation strategies.

Suggested Next Steps:

The College is already performing considerably well on most environmental issues, however there is still scope for improvement. Some of the steps require continuous efforts for inculcating behavioral change and changes in work culture. As new students are continually entering the campus, some of the activities may need to be carried out annually/continually. In addition, several interventions involving one time action and some capital investment will also go a long way in further improving the environmental performance of the College. While we have made several recommendations, it is for the college management to prioritize the issues and develop a time bound action plan.

The Tools used for the green audit may be used internally for green assessments every 2 or 3 years, to track progress. Similar external audits may also be carried out periodically for validating the progress.

We encourage the College to continue nurturing and expanding the various student-centric activities on environmental awareness. We congratulate the college authorities for initiating and completing the second green audit of the campus, for successfully implementing most of the recommendations of the last green audit (2014). If the College continues with same commitment soon it will be one of the "greenest education campuses" in Mumbai.

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Profile of the Audit Team



Ms Deepika Singh:

Coordinator: OHD: Office of Human development Climate Change Desk (CCD)- FABC (Federation of Asian Bishops Conference)

Secretary: Archdiocese office for Environment (AOE), Visiting Faculty for SOP/SRP: St. Andrews College, Bandra,

Past: South Asia Consultant: Swiss league of Catholic Women, Switzerland, Member: Advisory Board of Archdiocesan Office for Environment (AOE), Coordinator: Institute for Community Organization Research-until Oct 2016,

Ms Deepika Singh is a development professional/ consultant. Has Masters in Social Sciences, more than 25 years of experience working with rural and urban communities in India and South Asia on Monitoring and evaluations for impact, assessment and designing grassroots approach to development more than 300 projects undertaken, including an evaluation of Trauma Counseling project in Sri Lanka post civil war in 2012. Since last 4 years working with Office of Human Development (OHD) and Climate change Desk (CCD) of the Federation of Asian Bishops Conference (FABC) a network active in 25 countries of Asia. During last 15 years, designing and conducting seminars, conferences, workshops to engage leaders, communities, college youth, educational Institutions and different communities on themes of environment and Climate Change. Designing and conducting Social Out Reach/ Social Responsibility Program for approx 500 students of St Andrews College, Bandra since 2008. Basic idea of “Green Audit” was born during experimenting and designing education modules to engage students on environment and climate change in 2012.



Avick Sil: M. Phil (2009) – Biotechnology

Regional Director: Environment Policy and Research India (EPRI) since Amy 2014, **Guest Editor** Sustainable SWM: Perspective of urban areas in Developing Nations; Bentham Science Publisher; since June 2014, **Reviewer:** Toxicology, Elsevier since 2011.

Past: **Senior Manager:** EPRI from January 2011- April 2014, **Assistant Editor:** Earth Quest, from August 2010-February 2011,

Supervisor and Microbiologist: Eureka Forbes Ltd., Mumbai from November 2009-Aug 2010.

Assistant (Level II): National Environmental Engineering Research Institute (NEERI) form 2007 to 2009, **Editorial Correspondent:** SNM Events magazine from 2012 – 2014.

Research Projects: undertaken : Fish Toxicity as per USEPA, MoEF and OECD Guidelines – 3, Guideline on control of particulate matter from construction activities (Funded by MMRDA), Aluminum toxicity of Bhandup Water Treatment Plant (Funded by MCGM), Driving characteristics of waste carrying vehicles in Mumbai (Funded by Texas University), Emission from vehicles due to traffic congestion (Funded by Maharashtra Transport Forum. **Peer Review** Journals-total 11, **Magazine Publications (Total: 22. Conducted various Environmental Audits** for MSW processing plants, Water Audit of Solvay Chemicals, Motibag and Itawari Railway station and its colony , DPR of Mahad CETP as per MoEF notifications, ESR Preparation for Bhiwandi Nizampur City Municipality.

Areas of Expertise: Traffic air modeling, Energy modeling, Shadow analysis, Heat island, DMP and wind analysis, Corporate social responsibility, Scientific and statistical evaluation data, Physico-chemical and microbiological analysis of drinking water, wastewater, soil, solid waste, and many more, Green building formulation, EIA – SWM and Construction projects Sewage treatment plant and solid waste management formulation. **Has member ship to several NGO's and networks such as** SOCLEEN, Waste to Energy Technology and Research Council, India (WTERT – India), Action Plan



Sanjivani Gokul Shinde:

Bachelor of Engineering in Biotechnology.

Present: Technical Assistant since 2017, at Enviro Policy Research India Pvt. Ltd. Thane. **Past:** Project Assistant, State Level Expert Appraisal Committee- I (SEAC-I), May 2015- 31stOctober, 2017 Environment Department Mantralaya, Mumbai.

Projects Handled: Environmental Clearance (EC) and Environmental Impact Assessment (EIA), Carbon Footprint Assessment of Hagwood Commercial Developers Pvt. Ltd.: **Roles and Responsibility:** Estimation of Carbon emission (in terms of CO₂) from Solid waste, Water usage, Electricity consumption, Transport, Material Usage during construction and operation phase, Submission of report and PPT at MoEF level. Assessment of Particulate Matter at Wadia International Centre (Wadia Group): **Roles and Responsibility:** To carry out Indoor Air Quality Assessment (IAQ), to evaluate the ventilation rate and submission of report with results and recommendations with execution part. Consultancy Services for Solid Waste Management for Grune Designs (Bangalore, Vasind & Trivendrum): Estimating solid waste generated from the project as per population data, Management of Biodegradable waste and providing technological option along with its Costing, Non biodegradable waste storage and its disposal methods.



Vashnavi Manohar Rane

M. Sc in Environmental Science

Experience: High Rise Clearance and Environment Clearance consultancy, *Role and Responsibility:* Site visit, Report making using different software for shadow analysis, wind analysis, daylight, Indoor Air Quality assessment, Traffic impact assessment.

Projects Handled: PSN Builders and Developers, Yash Builders and Developers, Sunrise Developers, Divekar Construction, Imperial classic, Shree Ganesh Corporation, Green Wood residency, vasai one Realty, M/s Ruhi maruti construction, Acetron Real Estate, Unity Estate Developers, Shantee Homes, M/s JSB Dreams. **Role and Responsibility:** Making Proposal, calculation for residential as well as commercial areas, installation of in vessel composting unit (IVC) at site location, training and Explanation about the unit and technology. Making certificate of the IVC installation at site for OC requirement. **6 Monthly Compliance Monitoring: Role and Responsibility:** Site Visit for monitoring of air, water, soil and noise, sampling of water air and soil, site photographs. Survey based project (Noise Monitoring of Mumbai): **Role and responsibility:** Collecting noise reading at 1200 location in Mumbai, site photos and observations.



Archdiocesan Office For Environment (AOE)

“Environment is a special area of concern for the Church in Asia and in India. The year 2010 was a successful year for Care for Creation programme in the Archdiocese of Bombay. This important and urgent service of the Church to society, to India and to Asia must be carried on and intensified: The Pastoral letter of the Archdiocesan Consultation 2013- page 1.

First A'dhoc committee meeting held on December 14, 2013, the vision and scope, areas to consider for its reach out was shot listed.

The need to make the Church of Mumbai aware of the seriousness of Climate Change causes and impacts. The model of development has to be questioned which is mainly the cause of Climate Change. A decentralized Environment Cell is important to be more effective.

The focus areas listed out were:

Reach out to faith communities, education institutes, youth, children and public at large.

To start from visible factors that touches the hearts of the people.

Promote environment sustainability; undertake research, trainings, awareness sessions, exposure trips, eco spiritual exposures, reflections, eco retreats, green events, green audits and promoting green campus

Green Audits can be conducted in Religious institutions and Homes.

The hierarchy needs to be congratulated for the interest in Environment and Climate Change.

Bishop Allwyn D'Silva: Bishop In charge of AOE, Fr Joseph Gonsalves is the Head & Ms Deepika Singh is the Secretary

Archdiocesan Office for Environment (AOE), St Pius College, Aarey Road, Goregaon E, Mumbai 63

