**Dnyanganga Shikshan Prasarak Mandal Malwadi, Sanchalit**

**SHRIPATRAO CHOUGULE ARTS AND SCIENCE COLLEGE**
**MALWADI – KOTOLI**
Tal – Panhala, Dist – Kolhapur (Maharashtra)
Accredited at the "B" Level by NAAC Bangalore.
email-shripatraochougulecmk@yahoo.in,
website- www.shripatraocollege.com
**(Affiliated to Shivaji University, Kolhapur)**

# GREEN AUDIT REPORT

# Year-2017.

**Prepared by :-**

**Author**

**Vilas S. Patil**

Green Audit Expert

Assistant Professor, Department of Physics,
Yashwantrao Chavan Warana Mahavidyalaya, Warananagar.

**Co-author**

**Bharati S. Shinde.**

Assistant Professor, Department of Geography
Shripatrao Chougule Arts and Science College Malwadi – Kotoli.

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**Principal, Professor P.A. Attar**
Shripatrao Chougule Arts and Science College, Malwadi – Kotoli.
Tal – Panhala, Dist – Kolhapur (Maharashtra)
Phone (O)- 02328- 252227
Mob:09422412024
Fax:
email-shripatraochougulecmk@yahoo.in ,
email-pattar2@gmail.com
website-http://www.shripatraocollege.com

**Author**
**Vilas S. Patil**
Green Audit Expert
Assistant Professor, Department of Physics,
Yashwantrao Chavan Warana Mahavidyalaya, Warananagar.
Phone (O)-02328-224041.
Mob.: 9423282718.
email- vilaspatilkodoli@yahoo.in, vilaspatilkodoli2201@gmail.com.

**Co-author**
**Bharati S. Shinde**
Assistant Professor, Department of Geography
Shripatrao Chougule Arts and Science College
Malwadi – Kotoli.
Phone (O)- 02328- 252227
Mob.:9960198006.
Email-bharatishinde79@gmail.com

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**Dnyanganga Shikshan Prasarak Mandal Malwadi,**
Sanchalit
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# GREEN AUDIT REPORT

# Year-2017.

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  Under the Guidance
- **Bharati S. Shinde -Coordinator**

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"Only when the last tree has been cut down,

Only when the last river has been poisoned,

Only when the last fish has been caught,

Only then will you find that money cannot be eaten."

**-Lester Brown**

"In Mexico City, Tehran, Kolkata, Bangkok, Shanghai, and hundreds of other cities, the air is no longer safe to breathe. In some cities, the air is so polluted that breathing is equivalent to smoking two packs of cigarettes per day."- **Mahatma Gandhi**

***Hon. Dr. K.S. Chougule (Anna)***

***President, Dnyanganga Shikshan Prasarak Mandal Malwadi.***

# Green Message…..

Today, the human society is facing severe environmental problems like climate change, greenhouse effect, energy crisis, depletion of natural resources, biodiversity loss, pollution of air, water and soil, etc. The ever increasing population and changing life styles are increasing the severity of the environmental problems. The time has come to protect the natural environment through precise efforts. Sustainable development through higher education provides a pivotal role in nations building. Sustainable development remains barely a significant social, economic or environmental challenge for our country. Though teaching and learning must begin to reflect environmental issues, there is an emerging consensus that institutions must also model sustainable practices. Such education contributes strongly to sustainable development by training and expanding young minds in researching solutions to the environmental challenges. After graduation the students become leaders of tomorrow and get dispersed from the world of higher education into their specific career. In doing so, they take with them the green practices and approaches they were involved with at their institution.

The '**Green audit Year-2017'** of our college was carried out to find out areas of strengths and weaknesses in environmental management within campus. Findings of the '**Green Audit Report- 2017'**showed that the institution could conserve paper, electricity and water easily, if better environmental awareness was created. Canopy of trees, number of gardens and greenery in campus beautify the campus and automatically neutralize carbon footprint. College has already taken some steps like plantation of local and endemic plant species, arranges special programmes by inviting the eminent personalities for environmental consciousness of staff as well as student, cleaning and beautification of our campus by various activities through NSS units. The report made a number of recommendations, including the design of an Environmental Management Plan (EMP) for institutions which must be enforced after designing the Green Policy by college. Now College recognizes the need to function all year round in a manner which minimizes its harmful environmental impact by designing a Green policy. I know that sharing of this reports widely generate greater awareness with in campus community, hence I am very glad to make public this report.

I am very happy to forward this **'Green Audit Report Year-2017'** of Shripatrao Chougule Arts and Science College ,Malwadi – Kotoli campus. I must congratulate Assis. Prof. Vilas S.Patil, Green Audit Expert and Assistant professor in physics of YCWM Warananagar, who give his precious expertise and guidance in this field and our college team of Green Audit Committee for taking efforts for the completion of such brief report. I hope the report will be helpful to all concerned in the Shripatrao Chougule Arts and Science College , Malwadi – Kotoli campus to provide Greening aspect to our college.

(*Dr. K.S. Chougule.)*

***President,***

*Dnyanganga Shikshan Prasarak Mandal Malwadi.*

***Hon. Mr. G.T. Patil (Sir)***

***Vice-President, Dnyanganga Shikshan Prasarak Mandal Malwadi.***

# Message…….

*Preserve Nature,*
*And Nature will preserve Us,*
*Simplify Life,*
*And make the Nature thrive,*
*Plant Trees,*
*And make our planet Green.*

Above six lines give the green message to preserve the nature as well as human life. The purpose of the audit was to ensure that the practices followed in the campus are in accordance with the Green Policy adopted by the institution. It includes different steps preparation and filling up of questionnaire, physical inspection of the campus, observation ,collection of data and its analysis, measurements, reporting ,recommendations and suggestion of green policy for greening campus. It also including Water Conservation, Tree Plantation, Waste Management, Paperless Work, use of non-conventional energy etc.

Our College has one N.S.S. units sanctioned by the university, which are doing tremendous job through organizing different activities like blood donations, tree plantations,

health check-up, environment awareness campaign, Sanitation, Tree Plantation, De-addiction, save baby girls, free plastic mission, literacy personality development etc. in college and in nearby villages. Our college has big contribution in striving nature protection mission in Panhala and Karveer taluka in Kolhapur district.

Main objective of the green audit is to promote the Environment Management and Conservation in the College Campus and to identify, quantify, describe and prioritize framework of Environment Sustainability in compliance with the applicable regulations, policies and standards. Green Audit expert Assis. Prof. Vilas Patil and his green audit team in our college aware students, teaching and non-teaching staff to real concerns of environment and its Sustainability. Team gives the knowledge to secure the environment and cut down the threats posed to human health by analysing the pattern and extent of resource use of the campus. This audit process also establish a baseline data to assess future sustainability to bring out a status report on environmental compliance in the form of "**Green Audit Report**".

On behalf of our institute, I am congratulating to Assis. Prof. Vilas Patil , green audit expert and audit Committee of our college, teaching , non teaching staff and students who give their contributive support and valuable help for the noble work of completion of 'Green Auditing of institute' and supplying **' Green' Report-2017'** in our hand. Thanks a lot again.


*(Mr. G.T.Patil..)*

***Vice-President,***

*Dnyanganga Shikshan Prasarak Mandal*

*Malwadi*

***Hon. Mr. Shivaji S. Patil ( Mamasaheb)***

***Secretary. Dnyanganga Shikshan Prasarak Mandal Malwadi.***

# Green Audit at Glance…

The rapid urbanization and economic development at local, regional and global level has led to several environmental and ecological crises. On this background, it becomes essential to adopt the process of the Green Campus for our college which will lead for sustainable development. Shripatrao Chougule Arts and Science College , Malwadi – Kotoli, campus, is deeply concerned and unconditionally believes that there is an urgent need to address these fundamental problems and reverse the trends. Being a premier institution of higher learning, the college has initiated 'The Green Campus' programme that actively promote the various projects for the environment protection and sustainability. The purpose of the audit was to ensure that the practices followed in the campus are in accordance with the Green Policy adopted by the institution. The methodology include, preparation and filling up of questionnaire, physical inspection of the campus, observation and review of the documentation, interviewing key persons and data analysis, measurements and recommendations. It works on the several facets of 'Green Campus' including Water Conservation, Tree Plantation, Waste Management, Paperless Work, Alternative Energy and

Mapping of Biodiversity. With this in mind, the specific objectives of the audit are to evaluate the adequacy of the management control framework of environment sustainability as well as the degree to which the Departments are in compliance with the applicable regulations, policies and standards. It can make a good impact on student health and teaching, learning environment in college campus. The criteria, methods and recommendations used in the audit are based on the identified risks.

Green Audit was initiated with the motive of inspecting the work conducted within the organizations whose exercises can cause risk to the health of inhabitants and the environment. Through Green Audit, one gets a direction as how to improve the condition of environment and there are various factors that have determined the growth of carrying out Green Audit. Green audit is assigned to the criteria 7 of NAAC, which declares the institutions as Grades according to the scores assigned during the accreditation.

On behalf of our institute, I am thankful to Assis. Prof. Vilas Patil, green audit expert and concerned Green Audit Committee members of our college, our teaching , non teaching staff and students for their support, dedication, team work and untiring efforts in completion of **'Green Audit Report-2017'**.

*(Mr. Shivaji S. Patil..)*

***Secretary,***

*Dnyanganga Shikshan Prasarak Mandal*

*Malwadi.*

"Thank God men cannot fly, and lay waste the sky as well as the earth." **Henry Ford**

***Hon. Principal. Professor. P.A.Attar.***

***Shripatrao Chougule Arts and Science College, Malwadi – Kotoli.***

# Foreword

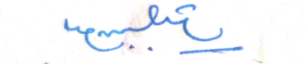
As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more prevalent. Hence sustainability is the need of the hour for our country to provide our future generation a cleaner, safer environment. To achieve it there are many paths, one should be able to identify the best path related to their educational organization to achieve sustainability. Various models and tools are already developed by experts, which helps to identify the focus areas where the optimization is possible to improve the environmental performance in academic colleges. Sustainable development is widely used in these days by the policy makers, academia, and governments.

Education is one of the key solutions for this situation. Ecology is being associated with the growth of any industry, organization. A nation's growth starts from its educational institutions, where the ecology is thought as a prime factor of development associated with environment. Educational institutions nowadays are becoming more sensitive to environmental factors and more concepts are being introduced to make them eco-friendly. To preserve the environment within the campus, various viewpoints are applied by our educational institutes to solve environmental problems such as promotion of the energy savings, recycle of waste, water reduction, water harvesting etc. our college must play an active role in creating and modeling solution for such environmental problems. 'Green audit

of an academic college ' is one such concept introduced to make the educational institute environmentally sustainable. Our college has implemented eco-friendly practices to manage the available resources and has taken steps in environmental conservation and protection. As a part of such practice, internal environmental audit (Green Audit) is conducted to evaluate the actual scenario on the campus. The Green Audit expert and **'Green Audit Committee Year -2017'** made a keen survey Shripatrao Chougule Arts And Science College ,Malwadi – Kotoli campus in which these experts identify and determine whether institutional practices are eco-friendly and sustainable.

During the Green auditing for survey, data collection, monitoring, verification of records concern the Hon. Chairman Dr. K.S. Chougule, Hon. Vice Chairman Ex.Principal G. T. Patil sir, Hon. Secretary, Shivaji S. Patil, Dr. Ajay Chougule encouraged us with their full moral and economical support, hence I thankful to them from my bottom of heart.

I am also thankful to Assis. Prof. Vilas .S. Patil, Expert Green Audit (Assistant Professor, Department of Physics, Y.C.W.M. Warananagar) under his valuable guidance the team of our college leaded by Bharati S. Shinde take the sincere efforts and hard work for the data collection of different indicators. Also Assis. Prof. Vilas S. Patil take efforts for the writing and completion of such case study report. I hope the report will be helpful to society, staff, students and all concerned in the of Shripatrao Chougule Arts and Science College ,Malwadi – Kotoli ,campus and will motivate for Greening aspect through green practices.



*(Professor. P.A.Attar.)*

***Principal,***

*Shripatrao Chougule Arts and Science College,*

*Malwadi – Kotoli.*

***Dr. Ajay K. Chougule.***

***Director, Dnyanganga Shikshan Prasarak Mandal Malwadi.***

# Greening a institute Campus…..

The college has also adopted the '**Green Campus**' system for environmental conservation and sustainability. There are main three pillars i.e. zero environmental foot print, positive impact on occupant health and performance and 100% graduates demonstrating environmental literacy. The goal is to reduce CO2 emission, energy and water use, while creating an atmosphere where students can learn and be healthy. In our college The 'Green Campus' process has been active since last year committee for that actively promote the various things. The college administration going works on the several facets of 'Green Campus' including Water Conservation, Tree Plantation, Waste Management, Paperless Work, Alternative Energy etc.

This report describes the status of environmental management at Shripatrao Chougule Arts and Science College , Malwadi - Kotoli, campus. The report provides an overall idea about existing conditions, efforts taken to make the area green compliant, increasing awareness amongst stakeholders etc. It helps in understanding the activities carried out by the

college team as a responsible educational citizen and provides guidance on further scope for improvement. This report is prepared based on the evidences produced during the course of audit.

The main findings of the audit show that, in general, all the departments and students are aware about the need for environmental protection at a general level. It was also observed that a number of best practices such as maintaining potted plants, introducing plastic free zone , dust bin in class rooms etc. are followed in the campus.

However, on detailed review, the college is going to implementing Green Policy for the first time, many of the practices followed in the institution are not in compliance with the Green Policy, which becomes helpful in order to improve the efficiency, fairness and consistency of Green Practices.

My special thanks to Assis. Prof. Vilas Patil, green audit expert and concerned Green Audit Committee members of our college, our teaching, non teaching staff and students for their support, dedication, team work ,untiring efforts in collection of data throughout year, writing a reportand completion of **'Green Audit Report-2017'**.

*(Dr. Ajay K. Chougule)*

***Director***,

*Dnyanganga Shikshan Prasarak Mandal Malwadi*

Mobilizing to Save Civilization

"Only when the last tree has been cut down,

Only when the last river has been poisoned,

Only when the last fish has been caught,

Only then will you find that money cannot be eaten."

**-Lester Brown**

***Vilas S. Patil.***

***Author and Green Audit Expert,***

***Assistant Professor, Department of Physics,***

***Y.C.W.M. Warananagar..***

# About Green Audit….

The term “Green” means eco-friendly or not damaging the environment. This can acronymic ally is called as “Global Readiness in Ensuring Ecological Neutrality” (GREEN). “Green Accounting” can be defined as “systematic identification quantification, recording, reporting & analysis of components of ecological diversity & expressing the same in financial or social terms. **“Green Auditing”**, an umbrella term, is known by another name “Environmental Auditing. To implement the green audit other important aspects such as objective of green audit is important. Drivers of green audit, future scope, benefits, and advantages are necessary to understand. The green audit practically involves energy conservation, use of renewable sources, rain water harvesting, efforts of carbon neutrality, plantation, hazardous waste management, air quality, noise quality & E-waste management. Finally, Green audit is a requirement of NACC accreditation process of academic college. Industries are using Green Audit as a management tool to evaluate the environmental standards. Industries can perform better for the sustainable development of the organization.

In scenario people are not caring of nature, they are directly or indirectly damaging the environment and it causes problems like; global warming, difficulties in maintaining

ozone layers, air pollution, water pollution etc. Green Audit is the most efficient & ecological way to solve such a environmental problems. For protecting the nature as a human being we have to show our sense of humor towards the mother earth. In corporate sector the practice of saving environment through the various programmes like CSR (Corporate Social Responsibility), GO Green, Save Water, Save Trees, Plantation of trees are to be taken. It will definitely work for the future. That is the only way out to safeguard the planet. The Green Audit is one of the requirements of NACC Committee to the colleges. It is necessary to conduct a green audit in college campus because student aware of the green audit, its advantages to save the planet & they become good citizen of our country. Green audit and sustainable development process help to reduce the wastage and associated cost as well as increases the product quality. Obviously, there is relationship between Green Audit and Sustainable Development of the any business organization. The primarily needs for achieving the sustainable development of the business are to determine the Green Audit policy, Green Audit Framework, Accurate implementation, and Result analysis of it. Strong Green Audit process can help to achieve the sustainability. Green Audit framework helps to achieve the goal set by an organization. Green Audit is linked to Sustainable development process.

Green Audit is the most efficient & ecological way to solve environmental problems. The experiments on the nature by avoiding natural rules, can be a major reason behind Green Audit process. Green Audit is one kind of professional care and a responsibility of each individual who are the part of economical, financial, social, environmental factor.

As per the Energy Conservation Act, 2001, Energy Audit is defined as "the verification, monitoring and analysis of use of energy including submission of technical report containing recommendations for improving energy efficiency with cost benefit analysis and an action plan to reduce energy consumption".

In Maharashtra itself there are more than 6000 educational institutions now operating to cater to the needs of students from various areas of study for more than 2.5 million

students. It is well known that educational institutions consume resources like water, electricity; Forest products and generates wastes like many industries. Establishment and operating of educational institute are not covered by any of the environmental laws in India. As a result, the importance of making the educational institute operate with self consciousness in the utility of resources inside the campus is least understood. Eco campus is a concept implemented in many educational institutes across the globe to make them sustainable because of their mass consumption of resources and creation of waste. Waste minimization plans inside the educational institute for solid and wastewater is now mandatory to maintain the cleanliness inside the campus. To find out the environmental performance of the educational institutions and to analyse the possible solutions for converting the educational campus as eco-campus the conduction of Green Auditing of institution is essential.

The Green Auditing of Shripatrao Chougule Arts and Science College ,Malwadi – Kotoli,campus is totally based on proposed strategy on the Greening concept approved by the IIT Council on Greening Educational Institutions and the deliberations of a consultative meeting held on 2 nd March 2013 at Indian Institute of Science, where representatives from six IITs along with IISC participated. This process of green audit enables us to assess our life style, action and assess its impact on the environment.

For green auditing of Shripatrao Chougule Arts and Science College ,Malwadi – Kotoli, campus I worked as Green Audit Expert and the responsibility of Green Auditing of college campus is given to me. This is the first attempt to conduct green auditing of this college campus.There was no baseline data. Hence I formed the Green Audit committee under my guidance and conducted four contact seminars for awareness of concept and scope of this purpose. For auditing we followed rules, acts and formats set by Govt. of India, Ministry of Environment and Forest, New Delhi ,Central Pollution Control Board, New Delhi and proposed strategy on the Greening concept approved by the IIT Council. Focus was

given on greening indicators like consumption of energy, electricity, natural gas, water as well as disposal of liquid waste, solid waste, hazardous waste and e-waste and air quality also. We prepare the questionnaires to collect the campus data and start the actual conduction of auditing. The questionnaire contains month, year, total number of students and employees, visitors of the department, average working days and office timings. The information related to consumption of resources like water, electricity and handling of solid and hazardous waste was collected in the formats from seven sections of campus. Even though, the data collected is for one month and during the period of year is giving a total idea about the various environmental parameters. Collected data was grouped, tabulated in Excel sheets and analyzed. I prepare final report pertaining environmental management plan with strength, weakness and suggestion on the environmental issue of campus. I proposed a structure of "Green Policy' for campus as management plan.

During the Green auditing for survey, data collection, monitoring, verification and for preparation of the-**'Green Audit Report-2017'** the Hon. President Dr. K.S. Chougule (Anna), Hon. Vice Chairman G. T. Patil, Hon. Principal Professor P.A.Attar , Hon. Ex.Principal Dr. J. K. Pawar, Hon. Secretary, Shivaji S. Patil (Mama), Hon. Dr. Ajay chougule encouraged us with their full support. All Heads of the departments, Professors, Non-Teaching staff, officers in-charges of the common facility centers and others units of the college also gave full co-operation. I am also thankful to Bharati S. Shinde coordinator, committee members and students for supporting me during Green auditing and to take one step ahead for greening purpose.

Further I hope, this will boost the new generation to take care of Environment and propagate these views for many generations to come.

Thanks a lot.

*(Vilas S Patil.)*

***Green Audit Expert***

*Assistant Proffessor,Department of Physics,*

*Y.C.W.M. Warananagar.*

The proper use of science is not to conquer nature but to live in it.

- Barry Commoner

Plans to protect air and water, wilderness and wildlife are in fact plans to protect man.

- Stewart Udall

***Mrs.Bharati S. Shinde***

***Co-Authorand Coordinator***

***Assistant Professor, Department of Geography,***

**Shripatrao Chougule Arts and Science College ,Malwadi – Kotoli**

# Coordinator Message….

India with the second largest population in the world is now one of the fastest growing economies with a rapid growth in GDP. In the past few decades the need for trained people is rapidly increasing in the industrial and other fields to support our countries technological growth. This has lead to the establishment of more and more technological and educational institutions in India. India has a large number of Universities, colleges, and other institutions and the number is growing rapidly in the past few decades. In our state number of educational institutions are operating for education of students and educational institutions consume resources like water, electricity, fuel for educational purpose and create solid, biodegradable , chemical and hazardous wastes. Thus the rapid developments at local, regional and global level has led to several environmental issues. On this background it is become essential to adopt Green Auditing for sustainable development and optimum utilization of natural resources.

The purpose of the green audit is to ensure that the practices followed in the Shripatrao Chougule Arts and Science College ,Malwadi – Kotoli are in accordance with the existing environmental laws. To educate and inculcate the campus wide environmental literacy for green auditing the key roll play by the green audit expert Assis. Prof. Vilas S. Patil, assistant professor of Y.C.W.M. who conduct the different contact seminar of staff and attend number of meetings, visits for inspecting our collage campus. I thankful to Prof. Vilas Patil for spending much time for data collection and scientifically writing this report for us, which is necessary for facing third cycle of NAAC.

I also thankful to Hon. Chairman Dr. K.S. Chougule, Hon. Vice Chairman Mr. G. T. Patil, Hon. Principal Professor P.A.Attar , Hon. Ex.Principal Dr. J.K.Pawar, Hon. Secretary, Shivaji S. Patil, Hon. Dr. Ajay chougule for giving me the opportunity to do work as the coordinator of green audit committee. During the process of audit all Heads of the departments, Professors, Non-Teaching staff, officers in-charges of the common facility centers and others units of the college also gave full co-operation to committee. I am very glad for submitting this compressed Green Audit report Y ear -2017.

We both the authors are grateful to the Management and college authority to award this prestigious project and allowed us to enter the new era of Green Audit Green audit in the College Campus. Thanks a lot.

*(Bharati S. Shinde)*

***Co-Author and Coordinator***

*Assistant Professor, Department of Geography,*

*Shripatrao Chougule Arts and Science College ,Malwadi – Kotoli*

***Vilas S. Patil.***
***Author and Green Audit Expert,***
***Assistant Professor, Department of Physics,***
***Y.C.W.M. Warananagar.***

# ...Expert Opinion...

Environmental changes are caused by inequitable and unsustainable production and consumption patterns that aggravate poverty in many regions of the world, We believe that urgent actions are needed to address these fundamental problems and reverse the trends. Stabilization of human population, adoption of environmentally sound industrial and agricultural technologies, reforestation and ecological restoration are crucial elements in creating an equitable and sustainable future for all humankind in harmony with nature.

The activities pursued by colleges can create a variety of adverse environmental impacts. Colleges and Universities have broad impact on the world around them, both negative and positive. But colleges are also in the unique position as educational institutions to be leaders in pursuing environmentally sustainable solutions.

Green Audit can be defined as systematic identification, quantification, recording, reporting & analysis of components of environmental diversity. The term "Green" means eco-friendly or not damaging the environment. The green audit practically involves energy

conservation, use of renewable sources, rain water harvesting, efforts of carbon neutrality, plantation, hazardous waste management & E-waste management.

This document presents a proposal for both the process and the content of an environmental assessment of ***Dnyanganga Shikshan Prasarak Mandal Malwadi- Kotoli sanchalit Shripatrao Chougule Arts and Science College ,Malwadi – Kotoli.*** The process involves the formation and deliberation of assessment teams, each consisting of a group of knowledgeable stakeholders within the campus community. This report serves to highlight many accomplishments and to make recommendations for improving the college campus's environmental sustainability.

The Environmental or Green audit report is prepared by me and the faculties associates at ***Shripatrao Chougule Arts and Science College ,Malwadi – Kotoli*** with support from Principal Professor P.A.Attar& various stakeholders of ***Dnyanganga Shikshan Prasarak Mandal Malwadi- Kotoli.*** I would like to extend my special appreciation for the amazing work done by institution on the ***Green Audit*** project. Seeing their diligence, self motivation and focus has been a source of motivation for the rest of the team, as we see a positive approach in the college. Besides that, this assignment provides opportunities for student learning and growth, about an obligation to exercise leadership in promoting environmental sustainability, environmental awareness and commitment that leads to action, that leads to transformation and change. Team formed for this work have studied all related things and presented a compressed report. This is not only for the institution itself, but just as importantly to be a role model institution for others to emulate and bring the environmental concerns and related mitigating measures to centre stage of ***Green Campus life*** which extend locally, regionally and beyond.

The overall goals of this project are four-fold:

1.To introduce students to the tools of investigation and the process of quantification of resource use and sustainability using ***the Dnyanganga Shikshan Prasarak Mandal Malwadi- Kotoli Campus*** as a study site.

2. To analyze various resource use patterns and levels of resource use on the Campus.

3. To establish a baseline to assess future sustainability work.

4.To identify and catalog existing efforts to make the College a more environmentally sustainable institution of higher learning.

To accomplish these four objectives, concern team have to analyze resource use and the campus environmental impact through a series of environmental or sustainability lenses. ***Shripatrao Chougule Arts and Science College ,Malwadi – Kotoli,*** College needed to conduct an audit, in order to judge how they are using their resources and if they can use them more efficiently.

***Shripatrao Chougule Arts and Science College ,Malwadi – Kotoli*** is the multi faculty college *(Arts & Science),* and expresses its commitment to sustainability in many ways. It has taken a number of positive steps to reduce its environmental impact. But many areas remain in which substantial improvements can be made. The environmental aspect has studied the practices of the college regarding solid waste management, water and wastewater management, energy usage and pollution and Green campus maintenance. It may also examine the eco-friendly initiatives of the college.

***It is observed that :***

- Establishing an environmental policy statement indicating the commitment of the Institute towards improving its environmental performance.
- Evaluation of compliance with respect to applicable legal requirement.
- Increase visible communication on environmental issues.
- Effective use of notice boards and signs.
- Plantation inside the college premises is found well maintained.

- The college undertakes various activities through N.S.S, students clubs, environmental clubs, etc like beautification, water and power management.
- Baseline data generation for Air, water, energy (in all forms electricity, fuel) and waste.
- Data management and analysis of trends with respect to energy consumption, water consumption, waste water generation, solid waste generation (stream wise).
- Program on rain water harvesting has been taken up, the project is under progress at coplition level ( Wagjai site- 60,00,000 Liters water). Establishing improvement objectives for reducing energy consumption, water consumption, and fuel consumption.

***Recommendations:***

- ✓ A mechanism needs to be developed to identify the various environmental aspects & the impact arising from the activities of the institute. This will enable the college to map its various resources usage and waste streams, in accordance with the same control measures could be developed and implemented.
- ✓ College needs to develop a monitoring & measurement program for resources (water, electricity, LPG & fuel) Consumption efficiency by (a) evaluating current consumptions, (b) setting time based reduction targets (c) action plan to achieve the same with defined responsibilities (d) periodic review of effectiveness of actions implemented.
- ✓ Suitable communication by means of banner, posters, one point lesson can be displayed at vantage location to create awareness among all stakeholders.
- ✓ Student's community may be involved in small groups for different environmental improvement projects within the college as well outside the college boundary.
- ✓ The cleanliness of the common room for students and some of the classrooms found inadequate.

- ✓ Participation and involvement of the students can be improved by college event on pertinent days such as world environment day, earth day, World Water day etc.
- ✓ Waste Water reuse and recycle opportunities have not been explored. The college may take initiative for community plantation programme by involving students to offset the GHG(Greenhouse gas) emission.
- ✓ College needs to develop an emergency preparedness plan; Signage indication emergency evacuation layouts, routes and assembly area are not implemented.
- ✓ Stakeholder awareness on emergency preparedness needs to be improved.
- ✓ Infrastructure for firefighting needs to be reviewed.
- ✓ First aid room is not maintained in proper condition.

***Waste Generation and Management:***

- ➢ E-waste and glass waste generated from office, IT and science labs. is handled through authorized service provider.
- ➢ The Chemistry, Botany and Zoology laboratories are using a number of hazardous chemicals (e.g.- mercuric chloride, formaldehyde, butyl alcohol etc). The department needs to identify all the hazardous chemicals and necessary communication Do's and Don'tsto minimize environmental and health impact by the user from the MSDS (Material Safety Data Sheet).
- ➢ Presently solid waste disposal process is done in unorganized basis. The collection of and the waste is done from the campus on as and when required basis and the solid waste disposed through only by recognized technologies like verrnicornposting, decomposition, etc.
- ➢ The college has not yet taken any initiative for carbon accounting.
- ➢ Plantation program has been initiated inside the campus.

- Adequate awareness program amongst the students and other stakeholders (faculty,other staffs, service providers etc,) needs to be organized for proper solid waste disposal.
- The college may start proper communication with the local body for regular collection of solid waste from the campus. Various wastages like used tube lights, plastic bottles were observed on ground behind the building, common room.
- College needs to prepare & implement a waste handling & disposal procedure with clear identification for different type of wastes. Disposal area for different types of waste needs to be earmarked.
- The college does not have a waste collection system with proper segregation. The college may introduce waste collection bins with different colour code for Wet , Dry waste, biodegradable and non-biodegradable waste for source segregation with adequate signage.

***Water Conservation:***

- ✓ The college has not yet introduced any water consumption monitoring within the college campus. The authority may install flow meter at the intake point and generate water consumption pattern.
- ✓ The detailed layout of water dispensing taps is not available presently.
- ✓ The college may compare the water consumption from the measured data with WHO guideline, to chalk out water conservation measures for continual improvement.
- ✓ College needs to evaluate its water consumption efficiency by suitable monitoring of (a) Quantity of water supplemented by rain input from IRRIGATION DEPARTMENT (b) water harvesting which is under implementation (c) operational control to reduce wastage in toilets & canteens, (d) identification & stoppage of leakages in pipelines.

- ✓ Float valve Operated auto shut off switch may be installed for pump sets used for overhead tank filling,
- ✓ Washing waste; water from kitchens and hostel needs to be suitably controlled to prevent residual food waste contaminating the storm water drains.
- ✓ The college doesn't have waste water treatment unit for the waste water generation from different chemical laboratories for the proper treatment, Effluent Treatment Plant (ETP) may be installed.
- ✓ The college has taken initiative for rain water harvesting. Presently rainwater from college roof is being collected in college bore well and used for gardening. Study on measurement of water quantity from the rain water harvesting should be required.

Energy Conservation& Efforts on Carbon Neutrality:

- ✓ Assessment of electrical load calculation is not yet done by the college.
- ✓ The college may assess the equipment rating to have the baseline data for assessing energy consumption pattern.
- ✓ Maximum numbers of electrical fans are found of older generation & non energy efficient, The college may develop a phase out plan of the same by replacing with new energy efficient fans.
- ✓ High energy consuming Incandescent lights and fluorescent lights are not found in use. The college planned for long term phase out plan with less energy consuming LED or CFL lights.
- ✓ The communication process for awareness in relation to energy conservation found inadequate.
- ✓ The college is having considerable area in the roof top, a cost benefit analysis may be done for installation of solar panel to reduce carbon footprint. College needs to explore the usage of renewable energy sources like solar panels for lighting & water heating, Electricity generation from Wind mills etc.

- ✓ The college may account the carbon foot print from per capita energy consumption and other moans of GHG emission, Based on the baseline data the college may set target and program to reduce carbon foot print.

***Important Note*:-Prepare Green Policy for Environment consciousness and strictly deploy Environment Management Plan.**

Hope that the results presented in this report will serve as aguide for educating the college community on the existing environment related practices and resource usage at the college as well as spawn new initiatives and innovative practices. However improvement, particularly in relation to , there is scope for further waste minimisation and energy monitoring . By implementing a basic environmental management system, current good practice could be formalized and a framework could be set up for monitoring. implementation of action plans and continual improvement.

Thanks and Regards,

Yours Sincerely,

*(Vilas S. Patil.)*
***Author and Green Audit Expert,***
*Assistant Professor, Department of Physics,*
*Y.C.W.M. Warananagar.*

# CONTENTS

# List of Tables

# List of Graphs

## EXECUTIVE SUMMARY AND STUDY OF GREEN INDICATORS:

The rapid urbanization and economic development at local, regional and global level has led to several environmental and ecological crises. On this background it becomes essential to adopt the system of the Green Campus for the institute which will lead for sustainable development. The purpose of the audit was to ensure that the practices followed in the campus are in accordance with the Green Policy adopted by the institution. The methodology include: preparation and filling up of questionnaire, physical inspection of the campus, observation and review of the documentation, interviewing key persons and data analysis, measurements and recommendations. It works on the several facets of 'Green Campus' including Water Conservation, Tree Plantation, Waste Management, Paperless Work, Alternative Energy and Mapping of Biodiversity. Keeping this in mind, the specific objectives of the audit are to evaluate the adequacy of the management control framework of environment sustainability as well as the degree to which the departments are in compliance with the applicable regulations, policies and standards. It can make a tremendous impact on student's health and learning college operational costs and the environment.

Simply Green audit is defined as an official examination of the effects a college has on the environment. As a part of such practice, internal environmental audit (Green Audit) is conducted to evaluate the actual scenario at the campus. It can also create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of Green impact on campus. Green auditing promote financial savings through reduction of resource use. It gives an opportunity for the development of ownership, personal and social responsibility for the students and teachers. If self enquiry is a natural and necessary outgrowth of a quality education, it could also be stated that institutional self enquiry is a natural and necessary outgrowth of a quality educational institution.

Dnyanganga Shikshan Prasarak Mandal Malwadi Sanchalit, Shripatrao Chougule Arts and Science College Malwadi – Kotoli college is situated in rural and hilly area in region of west Panhala taluka in Kolhapur district is the first rural college in Maharashtra state has conducted a **"Green Audit"** in the calendar year - 2017. 'Green audit' is one of such potential tools which can be used effectively by any educational institution for resource usage identification and optimization. 'Green auditing is the process of identifying and determining whether institutions practices are eco-friendly and sustainable'. The main objective to carry out green audit is to check green practices followed by the college and to conduct a well formulated audit report to understand where we stand on a scale of environmental soundness. (This is the first attempt to conduct green audit of college campus, there was no baseline data). For Green Auditing questionnaires supplied by expert for solid waste, energy, water, hazardous waste and e-waste. For the analysis of data the study area i.e. campus is divided into five sections and detailed description of areas included shown in following table:

| Sr. No. | Sections | Included campus sites |
|---|---|---|
| 1. | Administrative Office | Office, Principle Cabin, Chairman Cabin, university examination office. |
| 2. | Science | Jr. Science wing, Sr. science wing include: Physics Chemistry Mathematics. Botany, Zoology, Microbiology, Computer Science. Electronics departments |
| 3. | Arts | Jr. Arts, Sr. Arts wing includes: Marathi, Hindi, English, History, Politics Economics, Sociology Geography Psychology departments |
| 4. | IT/Computer | I.T./Computer Lab |
| 5. | Gymkhana | Gymkhana, Ground, Exterior area of college infrastructure. |

| | | |
|---|---|---|
| 6. | Common Facility Centers | NSS unit, Canteen, Library, Hostel ,Multi- purpose Hall etc. |
| 7. | Other Units | Includes : Jr. Wing, High School, DE.d. College, ITI college, Semi English school, English medium etc. wings |

The environmental audit of campus was carried for solid waste, electricity and energy, water, hazardous waste, noise and air quality. The 'Green Audit' report and 'Environmental Management Plan' are proposed for 'Green Policy' to enhance the green practices in campus.

**1. Solid Waste and management:**Pollution from waste is aesthetically unpleasing and results in large amounts in our communities which can cause health problems. Plastic bags and discarded ropes and strings can be very dangerous to birds and other animals. Solid waste can be general waste : include what is usually thrown away in homes and schools such as garbage, paper, tins and glass bottles and biodegradable waste etc.

This indicator of auditing is deals with, waste production and its disposal: paper waste, food waste, plastic waste, biodegradable waste, construction waste, glass waste, dust etc and recycling. Solid waste generation and management is a burning issue. Unscientific handling of solid waste can create threats. The solid waste audit focused on volume, type of solid waste generated in college campus. The solid waste collected was paper waste, plastic waste, biodegradable waste, construction waste, glass waste and other waste. The total solid waste collected in the campus is 12051.16Kg/Year. Paper waste is a major, also single sided used papers reused for writing and printing in office and in other departments. Important and confidential reports/ papers are stored in office store, can't send for recycling after completion of their preservation period. Very less plastic waste is generated in college campus but it is neither categorized at point source nor sent for recycling. Metal waste and wooden waste is

neither segregated not given to authorized Scrap agents. Few glass bottles are reused in the laboratories and small glass waste is thrown on site. Small paper piece waste, classroom waste, biodegradable waste is used for vermi-composting but some biodegradable, office and classroom waste burn on site near office administrative building. Food waste, dinning waste etc. of common canteen is thrown on site.

**2. Electricity and energy audit:**

Energy cannot be seen, but we can see its effects in the forms of heat, light and power. This indicator addresses energy consumption, energy sources, energy monitoring, and electricity consumption on lighting appliances / instruments, and natural gas. Energy sources utilized by all wings and common facility centers include electricity and LPG. Major use of energy is in Science building, office, canteen and laboratories for lighting, cooking and laboratory work. An old incandescent bulb uses approximately 60W to 100W while an energy efficient light emitting diode (LED) uses only less than 10 W. Energy auditing deals with the conservation and methods to reduce its consumption related to environmental degradation. It is therefore essential that any environmentally responsible institution examine its energy use practices. Energy consumption by major energy consuming Equipments is 4060.375 KWh/Year and average energy consumed by Major energy consuming equipments per month is 337.85KWh / Month, Energy consumption by less energy consuming Equipments is 8639.19KWh/Year and average energy consumed by less energy consuming equipments per month is 719.92KWh / Month . Also Energy consumption by Lightning Equipments is 1150.906 KWh/Year while average energy consumed by lightning equipments per month is 135.895KWh / Month . Thus total Electric energy consumption in college campus is 13850.471 KWh / year. In campus everywhere LED lamps are used which decreases energy consumption of electricity while use of incandescent lamp is not observed. The use of two solar lamp for lighting the campus at night and use of solar water heater for hostel is one the green practices deployed by college. The renewable solar energy used in

campus for lightning exterior is about 117KWh/year. The adequate ventilation and natural light survey of whole infrastructure is essential to less the more consumption of electricity on air and light appliances. In science laboratory at some places exhausts fans are not used at proper locations. It is essential to be monitoring the use of windows in science Laboratory. Also high consumption of electricity is observed at office in duration of admission and examination. While inspecting campus sites the water coolers (nearer to office and Management office ) are seen overflowing frequently, it wastes electricity as well as water. For this monitoring responsibility was given to peon in nearby. Major electricity is required for water fetching, irrigating purpose to minimize use sprinkler, drip irrigation for watering the gardens, lawns, Plants, trees and new plantations in campus. Minimum in a science building and administrative building shut down electricity after occupancy time.

Auditing shows that teaching as well as non-teaching staff has been living out off the campus and most of students are coming from nearby villages of Kotoli . Our college is situated in rural area and many students are using state transportation vehicles. No other student's make use of private transportation. Staff members who live out of campus are sharing the vehicles for daily transportation. Private transportation vehicles are restricted in college. Study tours, collection tours, visits, treks, save fort and clean forts etc abhiyan are followed by college which gives the message of importance of walking. Separate locked gas room is in used which is a green practice deployed in college. Consumption of LPG for educational practical purpose as well as the LPG consumption at canteen is observed to be less (1740 Kg). The LPG connection is taken by the college and LPG is handled by the departments of Physics, Chemistry and Microbiology etc for heating purpose at the time of practical, no leakages and off mode regulators are seen at time of verification.

**3. Water and waste water audit:**

As Green Audit can be a useful tool for a college to determine how and where they are using the most energy or water or resources; the college can then consider how to

implement changes and make savings. It can also be used to determine the type and volume of waste, which can be used for a recycling project or to improve waste minimization plan. Green auditing and the implementation of mitigation measures is a win-win situation for all the college, the learners and the planet. This auditing indicator addresses water consumption, water sources, irrigation, appliances and fixtures. In survey water consumption at bathrooms, toilets, laboratory, canteen, garden, shower and as well as leakages and over flow of water from overhead tanks have been evaluated.

The data collected from all the sections is examined and verified. For monitoring of water use, number of times of filling of tanks per day, time for overflowing, rate of flow, water wasted in liters per day due to overflowing is periodically supervised. Data submitted by the sections and examined according to leakages, rate of flow of leakages, use for washing and use of water for cleaning etc by expert and committee.

On an average total use of water in the college is 19,88,843 Liters/Year. About 3,73,636 Liter/Year water is loosed/ drained out through overflow of tanks and it is observed that about 97,632Liters /Year water loss due to leakages in different sites of water use. The major use of water is in office administrative building, science building and at exteriors. Roof top rain water harvesting is also been practiced in some extent. For water harvesting tacks and gutters are made due to that campus rain water and roof top water refills the two campus bore and excess flows toward river. Department of Chemistry stores the rain water in small water tank and using it as distilled water and distributing to other department for practical purpose. Drained water and rain water from roofs of building, rain water from paved area in the campus collected and send to the bore well in college campus.

Although our campus has canopy of trees (grand total -2076) these trees are in College Campus, Garden campus. in botanical garden, garden, Hostel campus and *Wagjai* (*Bilwar Tekadi*) Tree Plants .college campus require major irrigating water and it is

sufficiently filled by the two bores in campus but new design of water harvesting system and watering the garden by drip/sprinkler irrigation system to save water. Less numbers of leakages are observed while conduction of verification and site inspection of infrastructure still plumbing survey of water supply line is necessary to stop water supply after occupancy time and to use pressure valves / sensor valves to make control on overflow. Need of monitoring, controlling overflow is essential and periodically supervision drills should be arranged by authority. No water recycling plant in campus, small scale / medium scale reuse and recycle of water system is necessary.

**4. Hazardous waste audit:**

**A. Chemical waste:**

Hazardous waste is waste that is likely to be a threat to health or the environment like cleaning chemicals and petrol. Unscientific landfills may contain harmful contaminants that leach into soil and water supplies, and produce greenhouse gases contributing to global climate change.

This is hazardous waste of laboratories, medical waste from health center, colors, dies and chemicals used in campus maintenance. Hazardous materials represent significant risks to human health and ecological integrity. Only in the department of Chemistry, Micro-biology the laboratories generate the chemical waste. Survey and data collection shows that chemical waste generated on the campus through Science laboratories is very less and majorly generated by the department of Chemistry and micro-biology. At time of site inspection it is observed that in the department of Chemistry hazardous chemicals are handled for practical purpose and these hazardous chemical wastes are drain out with basin water directly to the campus and garden which producing negative impact on environment. In some extent it produces an air, soil, water pollution. Hence drainage of chemical laboratory should be collected in air tight cement chamber and frequently the chemical waste from

chamber is sent for recycle or for scientifically destroy process. In chemistry, Micro- biology different chemical bottles are labeled properly, tight with unbroken caps .The study data reveals that solid hazardous waste 10kg and liquid hazardous waste 33 liter are generated, it drained with making 100 times dilution. Usually there is a practice in the laboratories to store these hazardous chemicals in the containers and cans for safe disposal. The stoppers of all the bottles are regularly checked. The exhaust fans are not provided in some laboratory to expel gaseous waste. No separate dust bins for wet solid waste or for chemical precipitation are seen in laboratory.

**B. E-waste:**

E-waste can be described as electronic equipment that is near or at the end of its useful life. E-waste is much more hazardous than other waste because electronic components contain cadmium, lead, mercury, and Polychlorinated biphenyls (PCBs) that can damage human health and the environment. E-waste generated in college campus is of schedule III and is generated is very less but not disposed in scientific way. Now institute has some e-waste like chips, bulbs, circuit boards, mother boards, computers, batteries, and switches.

The college is not using paperless office work administration due to which in campus there is carbon emission due to printers, filing of cartridge inside the office and in several section Xeroxing and printing facility is observed. The non-working computer spare and other non-working electrical equipments like bulbs, tubes, PCB components, pieces of wires, computer hardware's, old instrument's are dumped in different sections at several places. Buy back policy is not available. The cartridges of printers are not refilled outside or in closed room in college campus. College does not conduct the awareness programmes regarding -E-waste Management with the help of Department of Physics for how to handle the and dispose the E-Waste. E-waste generated within college in last year is observed to be 77 Kg which not store separately and not disposed off through authorized vendors.

**5. Air quality audit:**

Air quality in the academic college is very important for producing good educational atmosphere as well as for the health of the students, faculty, staff and other stake holder of the institute. There no air pollution sources other than natural dust is observed in the college campus. The college campus is situated in rural and hilly area of Kolhapur district and it is far from major transporting roads. College has green campus of seven acres, efforts have been made on to bring part of land under cultivation of trees, plants through NSS students ,Seniors students , teaching and non-teaching staff in college. In campus total 2076 trees of 78 varieties are present in which 1922 are trees, 08are herbs and 146 are shrubs and climbers. College campus has a lot of open area and all buildings are discrete hence airy, clean atmosphere is seen. College created a green zone in college campus. The college has planted different types of large number of trees in the campus, this greenery in campus helps to neutralize the carbon products generated.

**6.0 Noise Environment**

The noise levels measurements were carried out using precision noise level meter. The noise level survey was carried in classroom, in study area it is averagely 62 dB. No major source of noise are identified, the study area is quite no major vehicular movement and the transportation activities are seen.

**7.Environmental Management Plan:**

Environmental Management Plan gives the strength, weaknesses and suggestions on the environmental issues of Shripatrao Chougule Arts And Science College Malwadi – Kotoli campus. It also suggests about which area is to be given priority. The green audit of Shri Shripatrao Chougule Arts and Science College Malwadi – Kotoli campus reveals that the

administration should take care of glass waste, waste water, chemical waste and e-waste management on high priority as the ignorance to these will deteriorate the environment on the campus. The entire exercise of green audit concluded that the college administration is keen on all the environmental issues and starts steps for environmental sustainability. Students, staff, faculty and administration working together will produce the best results in raising awareness and help for environmental friendly campus.

## Author:


- **Vilas S. Patil**

Green Audit Expert,

Assistant Professor, Department of Physics,

Yashwantrao Chavan Warana Mahavidyalaya,

Warananagar.


## Co-author:


- **Bharati S. Shinde.**

Assistant Professor, Department of Geography,

Shripatrao Chougule Arts and Science College Malwadi – Kotoli.

# Chapter- I

# Introduction

**1.1 Introduction:**

'Light of knowledge is light of life' Bearing this is in mind Shri K. S. Chougule established Dnyanganga Shikshan Prasarak Mandal, Kotoli in 1995. In the beginning, the Institution had to find its way through hardship and struggle. Of which there is a little awareness in the minds of people of higher education. This is how Dnyanganga Shikshan Prasarak Mandal, Malwadi started `Shripatrao Chougule Mahavidyalaya' in July 1998 at Malwadi- Kotoli, Tal: Panhala, Dist: Kolhapur. The college is situated in rural and hilly area, which is 27 km away from the city of Kolhapur. The place where the college is situated is not fully developed. The people of the area are mostly dependent on farming and other

occupation related to farming. Major crops in the area are sugarcane, rice, groundnut, sunflower, maize, etc. The village Kotoli and nearby villages are now in the developing stage. As water problem is solved up to some extent a lot of land is irrigated. So it has giving them economical stability and standard of living of the people has increased. The total population of Malwadi-Kotoli is about  in that day.The Institution is dedicated to the following Mission and Goals.

**1.2 Vision :**

We aspire to be an institution of higher education catering to the diverse needs of rural students providing them stimulating teaching learning environment to develop them into socially responsible person.

**Mission**: To enable students to develop intellectually to make them responsible citizens to face the global challenges confidently.

**1.3 Objectives :**

1.To promote, provide and run Montessori, Pre-Primary, Secondary, Higher Secondary Schools and College etc.

2. Priority should be given to the agriculture, commerce, technology, science, industry, arts and education in the courses started by the Institution.

3. To make the infrastructure available for the educational purposes.

4. To make the guidance available for the students regarding the competitive examination conducted by the Government, University and other approved Institutions.

5. To motivate the students to understand the importance of education and encourage them.

6. To provide the facilities of hostel, library and playground etc.

7. To create and nurture values such as love for Nation, National integration, honesty, discipline, love for each other among the students.

8. To take efforts in order to have overall personality development of the students.

9. To inspire the students for education and make the education available to the poor, socially and economically disadvantaged students in rural and hilly area.

10. To make the college a center of educational activities as well as intellectual and cultural upbringing of the society.

11. To create the ability amongst the students of self-evaluation and sow the seeds of scientific and rational attitude in their minds to make them aware of the value and the dignity of labour.

**1.4 Historical Background of Malwadi-Kotoli**

Malwadil-Kotoli in Kolhapur District has some historical background. It is situated at the foot of the Panhala Fort. The fort of Panhala has wide historical background. It is one of the important forts, which the great Maratha Emperor Shivaji Maharaja had. He fought against Siddhi Johar. One of the great fighters Baji Prabhu Deshpande scarified his life for his master Chhatrapati Shivaji Maharaja. The Kotoli has another historical background that is 'Masai Pathar' (Masai palteau), to which it is supposed that the great persons in Hindu mythology - Pandvas visited. The people visit it for the research purposes also. There are number of caves. One more religious sacred place near the college is `Jotiba' (Wadi-Ratnagiri). A number of pilgrims from nearby States visit it religious purpose.

Historical background of the college

The Chairman of the Institution Dr. K. S. Chougule belongs to rural area. Being a son of a farmer he faced many difficulties at the time of taking higher education. He has to go to Kolhapur to achieve his Master Degree. As higher education facility was not available in the vicinity, and then he became aware of the problems of rural area students regarding higher education. As he minutely studied the percentage of the students taking higher education, he was shocked to see that very few students were taking higher education. There were many reasons behind this:

**i)** lack of awareness for higher education,

**ii)**Poor economic conditions of the people,

**iii)**lack of availability of Senior College in the vicinity.

Due to these reasons many students were deprived of the opportunity of higher education. Therefore he determined to make higher education available to these needy students of rural area as early as possible. Under these circumstances it was a great challenge in front of him. He had his own land but it was not sufficient. So he purchased more land and in the year 1995 he established 'Dnyanganga Shikshan Prasarak Mandal' at Malwadi, and in the year 1998 the this college was started. As his father motivated him for the higher education, the college is named after the name of his father. The motto accepted by the Institution is 'Na Hi Dnyanen Sadrushyam Pavitra Mahi Vidyate' (Nothing is Holier than Knowledge, Vidya and Sanskar) .The aim behind establishing the College is to provide higher education to students especially girls who are economically and socially backward. It was highly impossible for the girls to get the higher education, as it was available only at Kolhapur. So it was the need of the society to have a Senior College in this rural and hilly area. During the about last 20 years the college has succeeded in achieving the motto to some extent. It has been possible only because the Chairman of the Institution is the epitome of knowledge and inspiration. He has been active member in political and social movement since his college life.

During the period of emergency he joined the movement started by late Jai Prakash Narayan. The company of great people inspired him to contribute in the social development. He was aware that unless the poor and rural people join the cooperation movement they will not be able to survive therefore he established 32 Dudha Sanstha (a unit which collects the milk from the villages and dispatched it to District milk process unit), 3 Seva Sanstha and further in order to make the finance available to the farmers and other people he established 5 Patsanstha (a small unit of Bank). He has firm conviction that this cooperation movement will help in the progress of Nation. In the course of time the Chairman has developed his political career and has achieved some important position such as `Sabhapati' of Construction

and Health Department of Jilla Parishad, Kolhapur and he is the President of B. J. P. (Rural area of Kolhapur District). He is always ready to guide and help in all possible ways.

The college was opened with strength of 152 students in 1998 only with the faculty .of Arts. Later in the year 2000 the college established Computer Laboratory to provide various computer courses to the students. Further in 2001-02 the Junior college wing of Arts was added to the Senior College. At present the Government of Maharashtra has sanctioned an amount of 25% and 50% of grant, out of which some amount against a slab of 25% of grant is received. Now the College is grantable. With these limited sources the college is developing.

**1.5 THE MISSION AND GOALS OF THE COLLEGE.**

The college has faith in quantity as well as quality, so it follows the following mission and goals.

**Mission: -**

1. To take efforts in order to have overall personality development of the students.

2. To inspire the students for education and make the education available to the poor, socially and economically disadvantaged students in rural and hilly area.

3. To make the college a center of educational activities as well as intellectual and cultural upbringing of the society.

4. To create the ability amongst the students of self-evaluation and sow the seeds of scientific and rational attitude in their minds to make them aware of the value and the dignity of labour.

5. To create the awareness amongst the students about the current social, economic and material condition of the society and to enable the students to face the future challenges confidently.

**Goals: -**

1.To plan the teaching-learning process and evaluate it.

2.To make the process more effective with the help of different methods and techniques.

3. To enable the faculty to update the mechanism for self-evaluation and evaluation of their performance.

4. To make use of scrutiny method during the time of admission to create ideal citizens.

5. To use continuous evaluation method to ensure the quality of education.

6. To sow seeds of values such as National Integration, Equality, Humanity, Scientific Approach, Democracy and Socialism among the students.

7.To create awareness regarding Population, Illiteracy, Empowerment of women and AID's among the people in the vicinity of the college.

8. To start a center for personality development with the help of present students and the Alumni in the nearby villages.

9. To arrange the lectures, discussion sessions of renowned persons in different fields.

10. To promote among the students values such as discipline, punctuality, respect for teacher, cooperation and social awareness.

11. To prevent the malpractices in the examinations conducted by the University and the College.

12. To give a special coaching to average students as well as a special guidance to meritorious students. 13. To encourage and help the students to participate in extra -curricular activities such as agriculture programmes, quiz, debating, and other competitions.

14. To guide and help the students for the preparation of competitive examinations.

**1.6 Logo :**

Dyanganga Shikshan Prasark Mandal, Malwadi' was established in 1995 at Malwadi. The main objective behind establishing this Institution is to provide higher education in the rural, hilly area. The values like sacrifice, hard work, and perseverance, patriotism were common among the people during pre-independence period. To prepare well-educated citizens is the intention of the Institution. This can be achieved only through the means of schools and colleges. The aim of the institution is to serve the community by providing the people educational facilities. Without any strong support of economically well-settled organization; the institution is trying its level best to provide educational facilities to the students from hilly and economically backward areas. The institution has accepted the following motto - Na Hi Dnyanen Sadrushyam Pavitra Mahi Vidhatye' (Nothing is holier in the world and on the earth than knowledge vidhya and sanskara,) During more than 20 years the Institution has been trying to achieve the aim.

The College has completed its 5years and since 1998, two batches have been graduated from the college even though the college is in the process of getting 75 % of State Government's grant. The amount of 25% and 50% is sanctioned. But at present the college has received some amount out of 25 % of grant. With the limited resources the College is trying to achieve its goals.

Bearing this in mind Hon’ble Dr. K. S. Chougule established Dnyanganga Shikshan Prasarak Mandal, Malwadi in 1995. In the beginning, the institution had to find its way through hardship and struggle. Dnyanganga Shikshan Prasarak Mandal, Malwadi started Shripatrao Chougule Arts and Science College, Malwadi Kotoli. (Arts in-1996, Science in 2016-17. In the year 2016 -17. Tamil University, USA gave him Doctor of Letters (D.lit) for his social work. This is the greatest achievement of him. In the course of time the Chairmen developed his political career and achieved some important position such as “Senate Member” of the Shivaji University, Kolhapur and President of BJP (Rural area of Kolhapur District) , now he is the Member of BJP Maharastra Pradesh karyakarini (state) and Hon’ble

Secretary Shivajirao Patil , he is the member of BJP Kolhapur district (rural). Chairman of the institute is always ready to guide and help the people. The college officers B.A and B.Sc. programme.

**1.7 Some Notable Features at Glance** :

The main objective of establishment of this college was to provided higher education to poor, needy, hilly area students. The college has now been known as a good education centre , where higher education was highly impossible for majority of students especially girl student Majority of the parents were not ready to send their girls to urban area for education . In the Re-accreditation period, college has adopted increasingly student centered and need based approach to bring out the unexplored talent of the youth. The college maintains complete transpiring is the admission process. Admissions are given according to the rules of Shivaji University and Govt. of Maharashtra. Reservation policy is followed. Academic calendar and the teaching plan in prepared at the beginning of the academic year. In addition to the regular lecture method, teaching-learning process is enriched through interactive sessions, ICT enabled lectures, projects, group discussions, seminars etc. Even faculty members make use of some CD's related to their syllabus. The student's progress is monitored through class tests. Weak students are identified and remedial teaching is provided to them. Even bright students are also guided through meritorious committee. Regular feedback about teaching-learning is taken from students. In the academic year 2013-14 our college students stood third and sixth rank in the Shivaji University Merit List. In the academic year 2014-15 our college student stood first rank in the Shivaji university Merit List. In the academic year 2015-16, the college got first rank among all the rural college for having students with maximum merit scholarships at the rural college for having students with maximum merit scholarships at university level. The college has taken extra efforts to make progress in all the activities such as sports NSS and cultural activities. The Gymkhana has more remarkable progress. Our students have participated in zonal, International and Inter

university level competitions. Some students have brought laurels to the college. Our institute organized Shivaji University Inter-zonal Judo (Men-Women) competition in the academic year 2015- 16 and organized University 16 and organized University Level Table Level Table-Tennis (Men Tennis (Men-Women) Tournament in the academic year 2016-17 . Our alumni *Shri. Vishal Shankar Mane* has been awarded with *Shri. Chatrpati Krida Purskar* for his performance in wrestling competition at National and International level (2013-14) The N.S.S unit of the college is very active. N.S.S unit of the college organized many extension activities. The contribution of N.S.S to community service is remarkable. N.S.S unit has organized residential camps in rural area. The participation of the volunteers in the rural camps and several others social activities have created positive awareness among the students about society. Different programmes organized through N.S.S are cleanliness of the village ,building of roads, tree plantation , AIDs awareness rallies, Voting awareness programme save the baby girl and disaster management (during the flood situation ) etc. Institute is trying its level best to organize different activities for Intellectual, Physical, Cultural and Emotional development of the student through various co-curricular and extra –curricular activities . Our all students belongs to rural area, they have an ability to take hard efforts for success. Our students are interested in competitive examinations so college started competition examination their center has prepared their separate time table centre and our faculty members gave their contribution in teaching. Faculty members encouraged many students for various competitions. One girl student achieved success in competitive examinations. Our student *Shubhangi Magnum (PSI)* achieved best cadet award , *Silver Batten Award and Savitribasi Phule* award topper in girls in all batches in her training of PSI. She received these awards by *Hon. Chief Minister Devendra Fadanwis*. This is very creditable thing to college because one rural area girl student achieved this success. Our students have also participated in *Youth Festivals and Avishkar Research* Competition organized by Shivaji

University .Kolhapur . Along with the regular class room teaching the faculty members organized various visits to the industries and organized study tours of the concerned subjects.

To provide skill oriented education to students. Institute has started to COC courses.

1. Certificate course in English Communication Skill

2. Certificate course in Computer Application and two short courses

1. Functional English

2. Translation Course in Hindi

Institute has organized Health Awareness Camp for society. Rural people appreciated this activity. 12 Doctors and Health 17 Volunteers participated in this camp. More than 500 people took benefited of it. By considering our social responsibility. Institute has helped cancer student by giving Rs. 51000/-. To create awareness among the society about gender sensitization .Institute took an innovative decision by changing the names of the girl' *'Nakushi'* and filled more than 500 forms of save the baby girl by visiting *'Nakushi'* and filled more than 500 forms of save the baby girl by visiting different villages . Institute has also helped drought affected people who migrated in this area by giving grains and useful things. For women empowerment Institute has organized *'Mahila Melawa'* more than 500 women participated in it.

Even Institute has organized workshops:-

1) Environment Preservation

2) Prevention of Sexual Harassment of Women at Workplace.

3) Cashless Economy.

Institute has also organized two workshops under lead college activity. Science wing has organized poster presentation of the students. The college has also made Gender Audit of the college.The college has been making conscious efforts to create environment awareness in

and outside the college. Computer lab of the college is the efficient lab. All faculty and students make maximum use of computer lab. The faculty members regularly update their knowledge and skills by attending seminars, conferences, orientation course, refresher course etc *Ten* faculty members have completed their *M.Phil* and *06* faculty member have completed *Ph.D* degree. *05* have registered for *Ph.D.* A number of research papers have been presented in the conferences, seminars and workshops and even published in different magazines, One faculty member completed minor resource project.*12* faculty members prepared their minor research projects. Financial assistance is provided to the poor students as far as fee is Financial assistance is provided to the poor students as far as fee is concerned. Installment facility is also provided to the students. The college has firmed special committee for girls- *Saheli Vyaktimattva Vikas* Munch and BC cell to solve the difficulties of the students. To encourage and motivate the students the management and faculty members gave cash prizes to the students. College also motivate the student by organizing annual prize distribution ceremony. The teaching and non-teaching staff is felicitated for their achievements. The college has so many strengths e.g. specialization in nine subjects at degree level and efficient computer lab. Many girl students completed their education because of this college. There are certain weaknesses e.g. transport facilities are not adequate, books in the library etc. The college has still opportunities e.g.to enhance the library facilities to motivate the students to participate in cultural actives, sports and competitive examinations. The institution aspires to be a centre catering to the diverse needs of society. This college is the only aided college, providing higher education in this vicinity. Many girls are educated and achieved their degrees only because of this college. The management is very keen on maintaining the excellence in academic as well as administrative matters.

Shri K. S. Chougule established Dnyanganga Shikshan Prasarak Mandal, Kotoli in 1995 and our college started here in Gat no.173of 0.29.5R and a super built-up area of 26925.29 sq. feet. has requisite infrastructure for hostel in nearby gat no.249 of 0.2.17 R having super built area of

355 sq. meter and for sport activity ground having gat no.228 of 0.60 R for carrying out all functions and activities ,which furnish all the requirements of the pupils enrolled in college. In arts wing we have nine departments(Marathi, English, Hindi, Economics, Psychology History, Politics, Sociology and Geography), and in our non grantable science wing has four departments(Physics, Chemistry, Mathematics, Electronics, Botany, Zoology Microbiology and computer science).In addition to this college other educational institutes run by our organization are given below:

**Table 1.1 Table shows details of educational units run by institute, establishment and strength:**

| **Sr.No.** | **Name of Units** | **Year of Establishment** | **Number of Students in this year** | | |
|---|---|---|---|---|---|
| | | | **Male** | **Female** | **Total** |
| 1. | Shripatrao Chougule Art's and Science college(Sr. Wing) | 1998-1999 | 194 | 215 | 409 |
| 2. | Shripatrao Chougule Art's and Science college(Jr. Wing) | 2001-2002 | 137 | 128 | 265 |
| 3. | High School | 2003-2004 | 105 | 75 | 180 |
| 4. | Shripatrao Chougule DE.d.College | 2008-2009 | 12 | 42 | 54 |
| 5. | Shri.K.S.Chougule ITI | 2010-2011 | 86 | 01 | 87 |
| 6. | Shri.K.S.Chougule Semi-English | 2013-2014 | 138 | 68 | 206 |
| 7. | Shri.K.S.Chougule English Mediem | 2014-2015 | 71 | 44 | 115 |
| 8. | Shripatrao Chougule Art's and Science college(Jr. Wing) | 2014-2015 | 195 | 102 | 297 |
| 9. | Shripatrao Chougule Art's and Science college(Sr. Wing) | 2016-2017 | 186 | 107 | 293 |
| | **Total** | | **1124** | **782** | **1906** |

Following table shows the number of administrative, teaching and non-teaching staff working in institutes

**Table 1.2. Number of administrative, teaching and non-teaching staff working in institutes:**

| **Sr.No.** | **Name of Units** | **No. of administrative, teaching and non-teaching staff working** | | **Total** |
|---|---|---|---|---|
| | | Male | Female | |
| 1. | Sr. Arts Wing | 25 | 06 | 31 |
| 2. | Jr. ArtsWing | 05 | 02 | 07 |
| 3. | High School | 08 | 02 | 10 |
| 4. | Shripatrao Chougule DE.d.College | 05 | 04 | 09 |
| 5. | Shri.K.S.Chougule ITI | 07 | 00 | 07 |
| 6. | Shri.K.S.Chougule Semi-English | 06 | 03 | 09 |
| 7. | Shri.K.S.Chougule English Mediem | 06 | 09 | 15 |
| 8. | Jr. Science Wing | 09 | 03 | 12 |
| 9. | Sr. Science Wing | 09 | 11 | 20 |
| **Total** | | **80** | **40** | **120** |

### 1.8 Green audit outline:

Shripatrao Chougule Arts And Science College Malwadi – Kotoli, college is producing awareness about the environment consciousness, for which institute take number of steps by organizing different events of green practices. This institute's campus runs various activities with the aim to percolate the knowledge along with practical dimension among the society as well as the stakeholders. College also try to give solution for different burning issues related to environment, its awareness as well as its protection..

As nowadays academic colleges are becoming more sensitive to environmental factors more concepts are being introduced to make them eco friendly. To preserve the environment within the campus, various viewpoints are applied by the our institute to solve their environmental problems such as promotion of the energy savings, energy conservation, water reduction, water harvesting , water environment, Solid waste management, air quality,

noise pollution, minimizing use of Plastic, etc. **'Green audit'** is one of such concepts or principles introduced to make the educational institute environmentally sustainable."Green audit is a tool to assess general practices implemented by organization in term of its impact on environment". Green audit also throws a light on adverse practices which are responsible for degradation of environment. It shows strength and weakness of organization towards conservation of environment. It is helpful to recognize the need to function around the year in a manner to minimize its harmful environmental impact. It means Green Audit is the base line survey to decide the Green policy.

**1.9 Need of Green audit:**

Green auditing is the process of identifying and determining whether institution practices are eco-friendly and sustainable. Traditionally we are good and efficient users of natural resources. But over the period of time excess use of resources like energy, water, chemicals have become habitual for everyone especially in common areas. Now, it is necessary to check whether our processes are consuming more than required resource, Whether we are handling waste carefully? Green audit regulates all such practices and gives an efficient way of natural resources utilization Green audit provides an approach for it and increases overall consciousness among the people working in institution towards environment.

**1.10 Goals of Green audit:**

Shripatrao Chougule Arts And Science College Malwadi – Kotoli conducted a green auditing in the year 2017 with specific goals as follows:

1. To conduct a baseline survey to know the reality status of green practices.

2. To identify strength and weakness in green practices conducted in college campus.

3. To analyze and suggest solution for problems identified from Audit Report.

4. To increase environmental consciousness throughout the campus among all the stakeholders.

5. To identify and assess if some environmental risks inside the college campus.

6. To motivate staff as well as students for optimized sustainable use of available natural resources.

7. To give the direction to work on some local environmental issues.

**1.11 Objectives of Green audit:**

1.To make the baseline survey to know the reality of green practices in the college campus.

2. To identify and analyze significant environmental issues in campus.

3. To examine the current practices which can have impact on the environment such as of resource utilization, waste management , energy conservations, etc.

4. To prepare Green Audit Report and listing the green practices followed by college.

# Chapter-II

# Methodology

## 2.0 METHODOLOGY

The Green Audit taken up by the Shripatrao Chougule Arts and Science College Malwadi -Kotoli had been divided into three parts.

### 2.1 Pre - Audit Stage:

In the pre-audit stage, meetings provide an opportunity to support the capacity and objectives of the audit and enable discussions on the feasibility associated with the audit. The meeting provides the first opportunity to meet the audit and deal with several practical knowledge and concerns. The meeting provided the chance to gather information that the audit team can study before arriving on the site. The audit procedure and audit plan was handed over at this meeting and discussed in advance of the audit itself. In Shripatrao Chougule Arts and Science College Malwadi – Kotoli, the planning of audit processes was discussed in the pre-audit meeting. Audit team was also selected in this meeting with the help of staff and the college management. The audit protocol and audit plan were handed over at this meeting and discussed in advance of the audit itself.

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

**2.2 The Audit Stage:**

The Audit Stage encompasses of the team selection and the field works performed. Looking after the unique structure, location and ambiance of the college, the Green Audit Team focused on Material Issues pertaining to college which have the highest influence on the Green Attributes of the College. The Audit stage also focused on the Methodology adopted. Checklist approach is adopted for transparent evaluation of the topics and increase readability for independent reader.

**2.3 The Post Audit Stage:**

The post-audit stage ensures formulation of Draft findings and sent to management response. Since the audit is done internally, it was important to ensure management approval for the draft. After getting draft approval, the audit team went for final report formulation and design a green policy for campus.

Green Auditing of college campus is the baseline survey which is totally based on proposed strategy on the Greening concept approved by the IIT Council on Greening academic colleges, in the meeting held on 2 nd March 2013 at Indian Institute of Science, where experts IITs and IISc are participated. The present study is based on onsite visits, personal observations and questionnaires and survey tools. Initially Vilas S. Patil, Green Audit expert raise the awareness of the staff member by arranging two contact seminars for staffs. For well survey whole campus is divided in to seven sections, based on data requirement, sets of questionnaires about Electricity consumption, Water consumption, fuel waste, solid waste collection, chemical waste, E-waste etc were prepared. Prof. Vilas.S.Patil

Green Audit expert, with Hon. Principal Professor P.A, Attar, Co-ordinator Mrs. Bharati Shinde Madamand other Green Audit Committee Members committee visited to different sections and expert keenly observed all the things related to green auditing of the college campus and expert give the training for filling the questionnaires. Such filled questionnaires are collected from each section for each month in the Year 2017( From Jan.-2017 to Dec. -2017). The generated data is subsequently gathered together, tabularized and used for the further analysis. From the outcome of the overall study, a final report is prepared. The following methodology was adopted for present work.

**2.4 Survey by Questionnaire:** Data for green audit report preparation was collected by questionnaire survey method. Questionnaires prepared for actual green auditing in the college campus is based on the guidelines, rules, acts and formats prepared by Ministry of Environment and Forest, New Delhi, Central Pollution Control Board and other statutory organizations and guidelines from proposed strategy on the Greening concept approved by the IIT. Most of the guidelines and formats based on broad aspects and some of the issues or formats were not applicable for college campus. Therefore, using these guidelines and formats, combinations, modifications and restructuring was done and sets of questionnaires were prepared as solid waste, energy, fuel, water, hazardous waste, and e-waste, etc. With the help of questionnaires some data related to Green Audit is collected from students, employers by interaction with them.

All the questionnaires comprises general information of the concerned section, which broadly includes name of the section, month and year, total number of students and employees, visitors of the department, average working days and office timings etc. The next module is related to the present consumption of resources like water, energy, fuel or the handling of solid waste and hazardous waste. Maintaining records of the handling of solid and hazardous waste is much important in green audit. There are possibilities of loss of resources like water, energy due to improper maintains and the assessment of this kind of

probability is necessary in green audit. At some locations in some departments loss of water and major energy consumption was observed due to lack of observation and improper handling of technical equipments. For the better convenience the green audit expert ,coordinator, committee members arranged number of meetings with the HODs, professors and laboratory assistants , officers in charge in CFC. In these meetings idea of the environment audit, green audit, indicators of green audit, greening practices, environmental issues in campus are discussed for concept clearance. Some statistics like, basic energy consumption characteristics for electrical equipment, Wattages of different common equipments in colleges etc. was provided with the questionnaires itself. Committee member starts filling the questionnaire in month of Jan. 2017 and filled questionnaires from each sections are collected at the end of each month in span of Jan. 2017 to Dec. 2017.

**2.5 Site inspection and monitoring :**

College campus is in gat no.173of 0.29.5R and a super built-up area of 26925.29 sq. feet. has requisite infrastructure for hostel in nearby gat no.249 of 0.2.17 R having super built area of 355 sq. meter and for sport activity ground having gat no.228 of 0.60R. campus has vast built up area comprising of various sections, Administrative Office, Science section, Arts section, IT/Computer section, Gymkhana, Common Facility Centers and Other Units like (Jr. Wing, High School, D.Ed. College, ITI college, Semi English school, English medium etc) administrative building, science building, management building, Gardens, Library, sports ground, hostel ,canteen etc. All these amenities have different kinds of infrastructure as per their requirement.

All these buildings and parts of campus were visited by the Green Audit expert and committee members to check the present condition. They are checked with the help of the filled questionnaires of departments and verified on site. Personal observations were made during the onsite visit. The census pertaining plants and trees in campus was carried out by *Miss. Tejaswini Suryawanshi*, and students of B.Sc.-II and III of Botany and Zoology

department after their regular college timing in span of *15th November 2017 to 18th November 2017*. Tree Counting Survey of trees, plants etc. in college campus is shown in Table No.4.40 to 4.49.The college campus divided into seven sections for convenience of study of green Audit.

**2.6 Site Monitoring** :-

After collection of information from various seven department, committee members visited periodically and verified the data. The data related to energy survey, lighting survey, vehicle survey, solid waste generation, E- solid waste generation, water waste etc is verified personally by committee. Committee is periodically monitoring water storage, water requirements, water losses and water leakages in campus. Prof. Vilas .S. Patil and his team periodically monitored and recorded the information regarding the air quality, noise pollution at Onsite the campus for two times in year.

**2.7. Analysis and reporting:**

A proper analysis and presentation of data produced from work is a vital element. In case of green audit, the filled questionnaires of the survey from each group, were tabulated as per their modules, in excels spreadsheets. The tabulated data is then used for further analysis. For better understanding of the results and to avoid complications, averages and percentages of the Tables were calculated. Graphical representation of these results was made to give a quick idea of the status. Interpretation of the overall outcomes was made which incorporates all the primary and secondary data, references and interrelations within. Final report preparation was done using this interpretation.

# Chapter-III

# Green Audit Analysis

**3. 0 Green Audit Analysis**

**3.1 Electricity and energy audit:**

Main energy source in our campus is electricity of MSEB. Five electrical connection of MSEB are in name of college, it include two electrical connections are for two water bores and three respectively for old building, Administrative office and science building. In

administrative office, new building and science building there is provision of uninterrupted power supply from DC battery storage for computer use. When rarely interrupted we get electricity from diesel generator( ≈1.5 KV) which is common facility of all section of our college . Energy sources utilized by all the sections of college include electricity, liquid petroleum and LPG. Major use of the energy is at office, ,laboratories for lighting, laboratory work and minor use of LPG for cooking purpose in canteen. There is no provision of generating electricity, non- conventional electric energy from any source on site of campus.

To analyze the total energy consumption, various sections of college are categorized into five different groups for the sake of simplicity viz. Administrative Building ,Science Building, New Building, Old Building Exterior. Different sites of campus are divided in to five sections that distribution shown in following table.

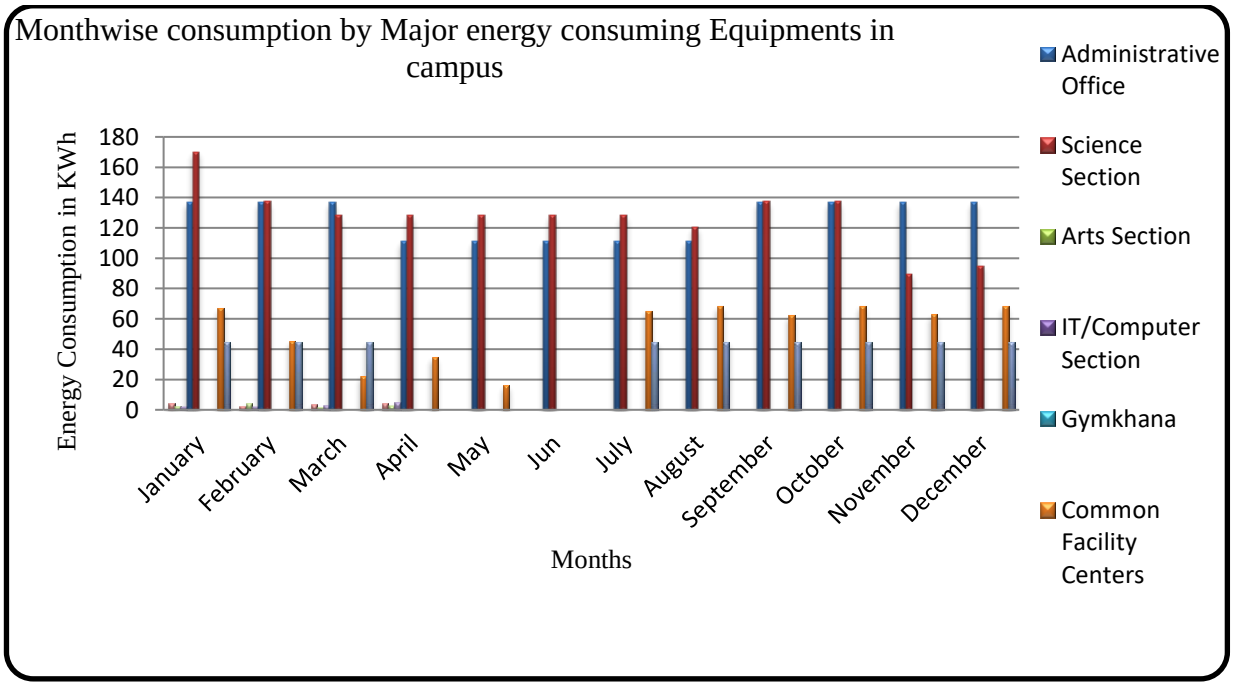
**Table no. 3.1 Different sites of campus are divided in to seven sections:**

| Sr. No. | Sections | Included campus sites |
|---|---|---|
| 1. | Administrative Office | Office, Principle Cabin, Chairman Cabin, university examination office. |
| 2. | Science | Jr. Science wing, Sr. science wing include: Physics Chemistry Mathematics. Botany, Zoology, Microbiology, Computer Science. Electronics departments |
| 3. | Arts | Jr. Arts, Sr. Arts wing includes: Marathi, Hindi, English, History, Politics Economics, Sociology Geography Psychology departments |
| 4. | IT/Computer | I.T./Computer Lab |
| 5. | Gymkhana | Gymkhana, Ground, Exterior area of college infrastructure. |
| 6. | Common Facility Centers | NSS unit, Canteen, Library, Hostel ,Multi- purpose Hall etc. |
| 7. | Other Units | Includes : Jr. Wing, High School, DE.d. College, ITI college, Semi English school, English medium wings etc. |

Further at each section, electric energy consumption is calculated on energy usage like office equipments (Computers, Printers, Laptop, LCD projector), Lights, and fan consumption. For sort of analysis electric energy consuming equipments are categories in to three groups Major energy consuming Equipments, less energy consuming Equipments , Lightning equipments, the category wise list of equipments and their wattages are provided to all the staff and training of filling usage form / questionnaire is given already, difficulties are solved by the green Audit expert personally. Monthly Submitted data by the respective HOD/ coordinator is verified onsite by the green audit committee member and again is verified by expert to get real data. Then data collected at the end of each month in duration 01January 2017 to 31 December 2017 for one year, collected data analyzed together for total energy consumption. The analyzed data is tabularized and graphically shown below to get a information of energy consumption of electricity in different sections.

**3.1.1 Energy consumption at campus:**

**Graph No. 3.1 Month wise Energy consumption by Major energy consuming Equipments in campus:**



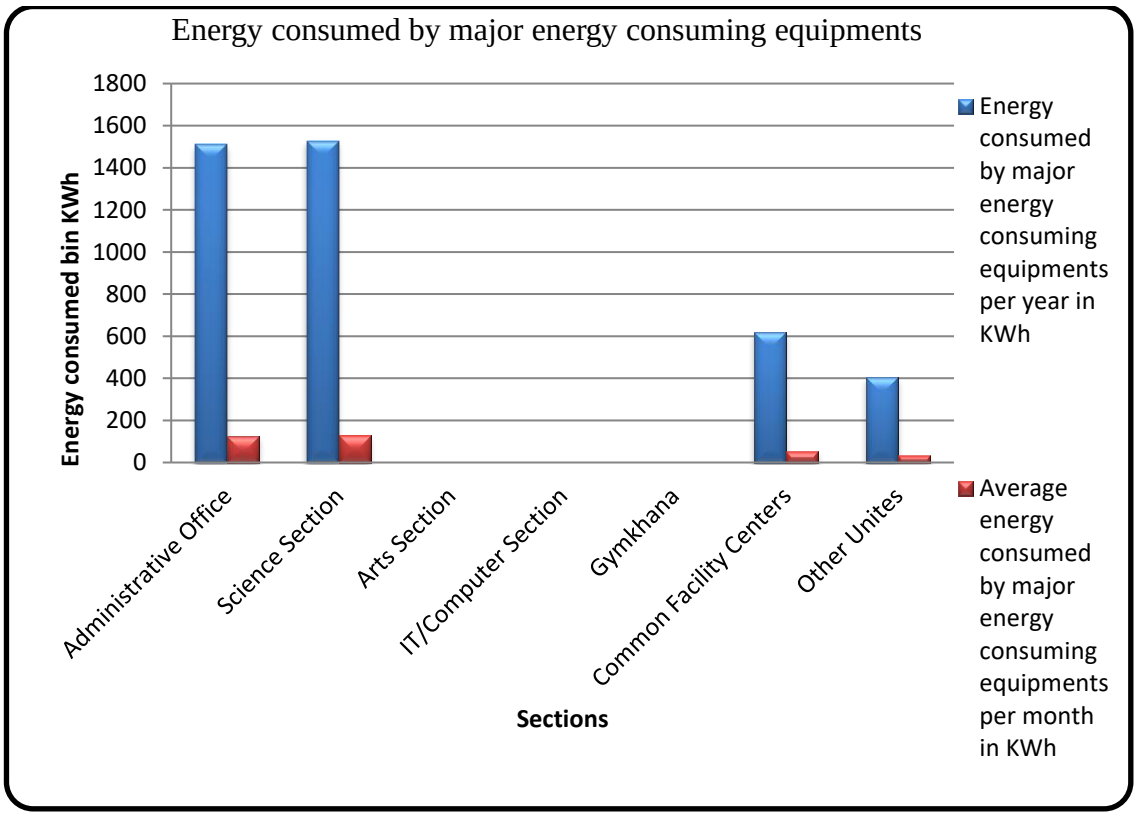

Major energy consumption equipments are the high wattage electrical appliances such as electrical motors for pumping the water, Air conditioners, water coolers, freezers, ovens,

incubators , centrifugal machine, magnetic starrer etc. But air cooler and air conditioners are only used in Principal Chamber. Above graphical representation show the Month wise consumption of electrical energy by Major energy consuming Equipments in different sections of college campus. It reveals that major energy consuming equipments are higher at science sections, it consumes averagely 127.3 KWh energy per month on the other hand minimum consumption of electrical energy by major consuming equipments is observed at Arts, IT/Computer and Gymkhana sections of college campus. In science wing for the practical purpose many high wattage equipment are required and regularly used. These equipments are essential for academic and practical purpose hence we can't minimize their use.

**Table No.3.2 Energy consumed by major energy consuming equipments per year in KWh and Average energy consumed by major energy consuming equipments per month in KWh:**

| Sr. No. | Sections | Energy consumed by major energy consuming equipments per year in KWh | Average energy consumed by major energy consuming equipments per month in KWh | Description |
|---|---|---|---|---|
| 1. | Administrative Office | 1512.34 | 126.03 | High |
| 2. | Science Section | 1527.62 | 127.30 | High |
| 3. | Arts Section | 00 | 00 | Less |
| 4. | IT/Computer Section | 00 | 00 | Less |
| 5. | Gymkhana | 00 | 00 | Less |
| 6. | Common Facility Centers | 618.34 | 51.02 | -- |
| 7. | Other Units | 402.075 | 33.50 | -- |
| **Total** | | **4060.375** | **337.85** | |

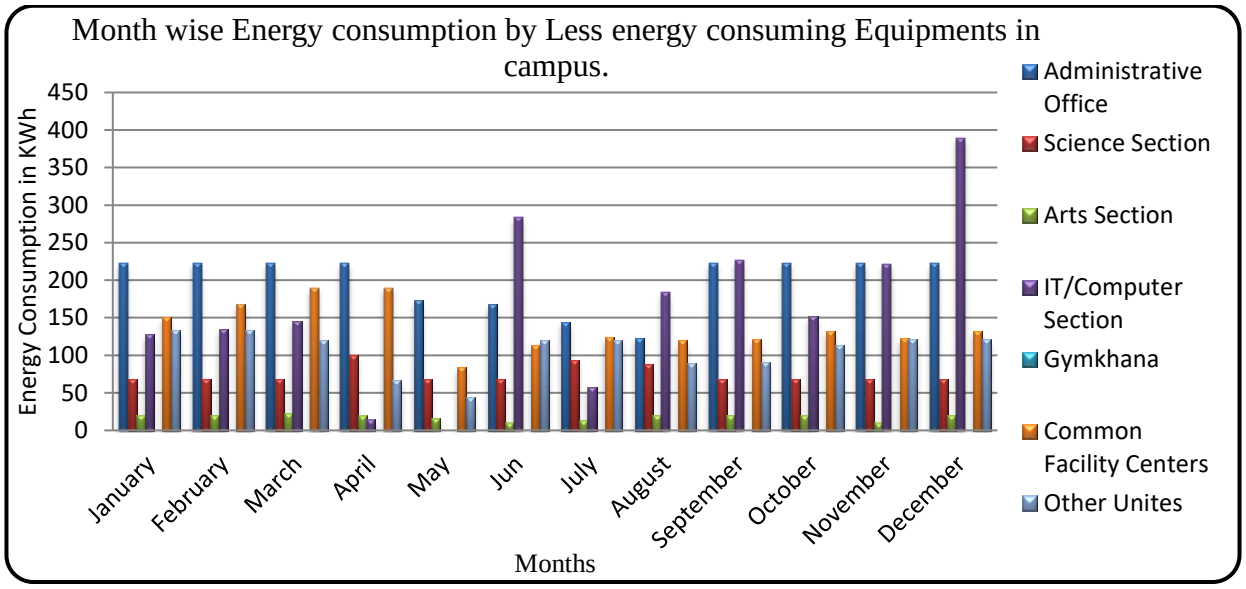
**Graph No.3.2Energy consumed by major energy consuming equipments per year in KWh and Average energy consumed by major energy consuming equipments per month in KWh:**




Above Table and graph elf describes the energy consumed by major energy consuming equipments per year in KWh and Average energy consumed by major energy consuming equipments per month in KWh, from it is observed at science section (=1512.34KWh/year) and at Administrative Office section (=1527.62KWh/year) high electrical energy consumption is recorded on the other hand very less energy consumption by major energy consuming equipments at Arts, IT/Computer and Gymkhana sections of college campus is recorded. Also second column of table shows that average energy consumed by major energy consuming equipments per month in KWh it reveals major energy consuming equipments are higher at science sections and at administrative office section, it consumes averagely 127.3 KWh and 126.03KWh energy per month respectively, on the other

hand zero consumption of electrical energy by major consuming equipments is observed at Arts, IT/Computer and Gymkhana sections of college campus.

**Graph No. 3.3 Month wise Energy consumption by less energy consuming Equipments in campus:**

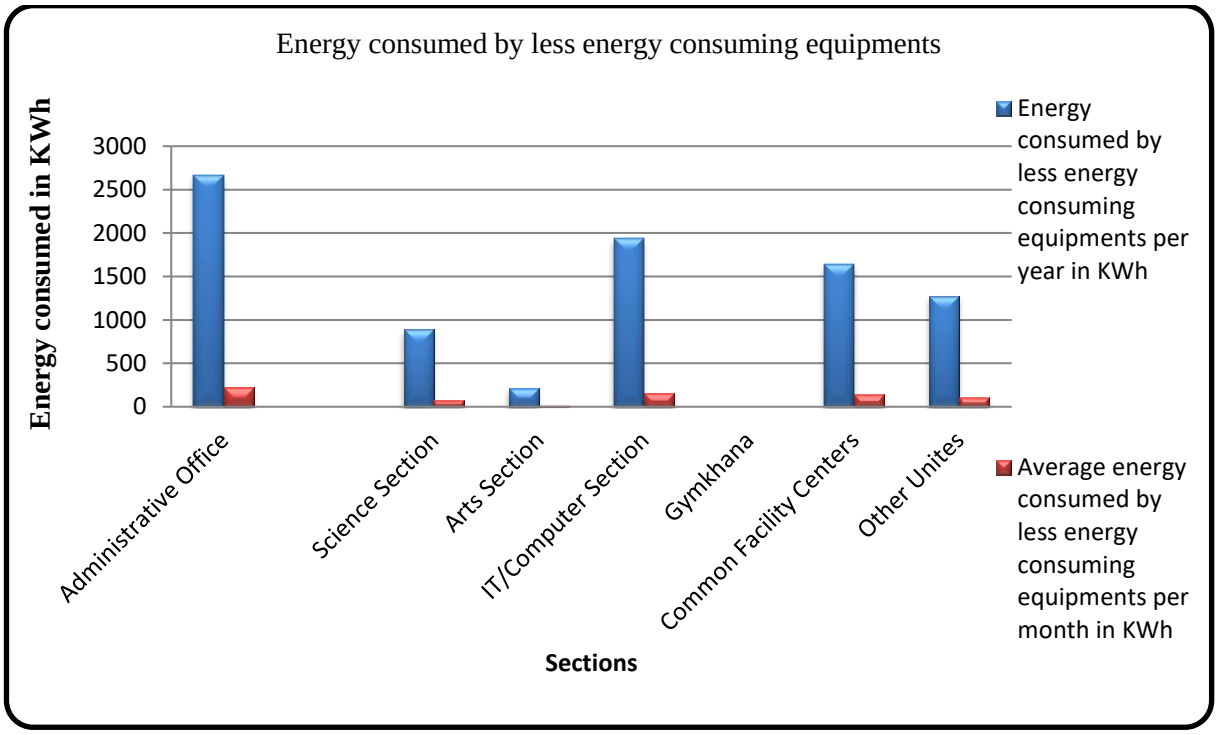



From above representation the energy consumption of less energy consuming equipment is moderate throughout year and higher in four month June, September, November and December, during the rainy season, when the peak practical work is going on and in duration of winter semester examination. It also shows that in year administrative office, new building consume averagely about 225 KWh energy in each month for official use computers in the occupation time and in IT/ computer section in computer laboratory about 31 computers is operating to perform day to day practical work. At ground floor of this building - CAP Room, Principal Room, Administrative office, equipped science laboratory are performing their roll in regular academic activities. At gymkhana section there is no energy consumption of less energy consuming equipment.

**Table No.3.3Energy consumed by less energy consuming equipments per year in KWh and Average energy consumed by less energy consuming equipments per month in KWh:**

| Sr. No. | Sections | Energy consumed by less energy consuming equipments per year in KWh | Average energy consumed by less energy consuming equipments per month in KWh | Description |
|---|---|---|---|---|
| 1. | Administrative Office | 2670.6 | 222.55 | High |
| 2. | Science Section | 891.9 | 74.33 | |
| 3. | Arts Section | 215.8 | 17.98 | |
| 4. | IT/Computer Section | 1938.9 | 161.57 | Medium |
| 5. | Gymkhana | 00 | 00 | Less |
| 6. | Common Facility Centers | 1647.53 | 137.29 | |
| 7. | Other Units | 1274.46 | 106.20 | |
| **Total** | | **8639.19** | **719.92** | |

**Graph No.3.4Energy consumed by less energy consuming equipments per year in KWh and Average energy consumed by less energy consuming equipments per month in KWh:**



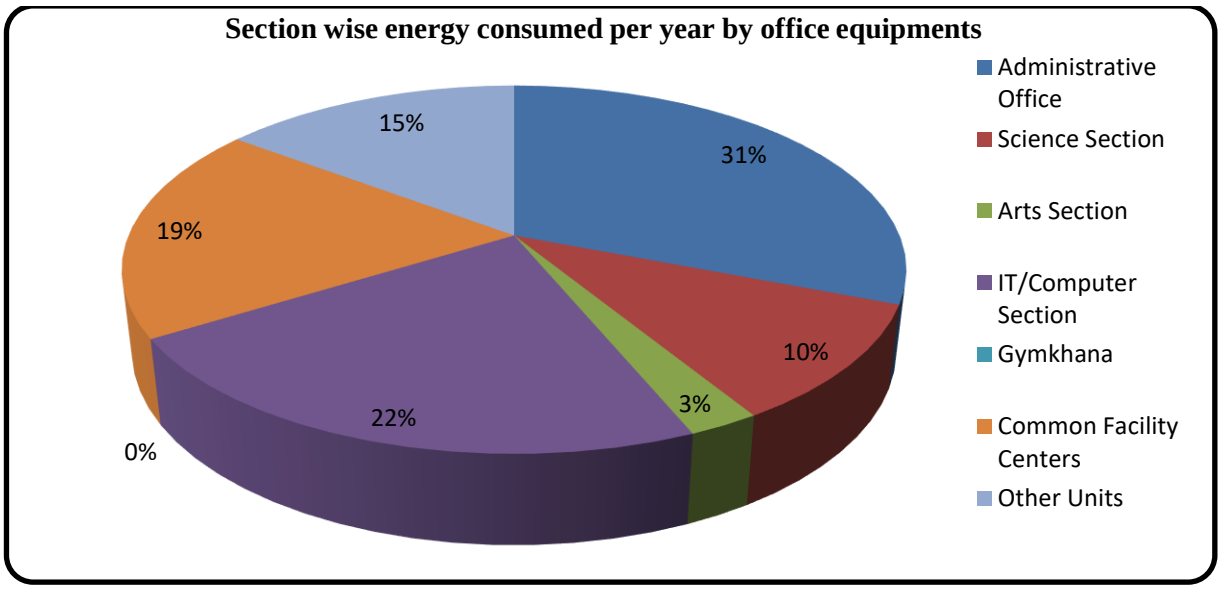

Above Table and graph describes the energy consumed by less energy consuming equipments per year in KWh and Average energy consumed by less energy consuming equipments per month in KWh, it is observed high electrical energy consumption is recorded at administrative Office section (=2670.6KWh/year) and (=1938.9KWh/year) on the other hand medium energy consumption by less energy consuming equipments at common facility centers, other units and sciences section is recorded while zero energy consumption at gymkhana section. Also second column of table shows that average energy consumed by less energy consuming equipments per month in KWh it reveals less energy consumption at administrative office section is 222.55KWh/month, at IT/Computer section 161.57 KWh/Months and at common facility centers section 137.29KWh/Month and zero consumption of electrical energy by less consuming equipments is observed at Gymkhana sections of college campus.

**Table No.3.4 Section wise No. of office equipments and energy consumed per year:**

| Sr. No.. | Sections | No.of office Equipment | | | | | | Total Equipment | Energy consumed KWh Per year |
|---|---|---|---|---|---|---|---|---|---|
| | | Computer | Printer | Laptop | LCDS | Projector | Ceiling /Table /wall Fan | | |
| 1 | Administrative Office | 07 | 02 | 01 | 00 | 00 | 05 | 15 | 2670.6 |
| 2 | Science Section | 07 | 00 | 00 | 01 | 01 | 02 | 11 | 891.9 |
| 3 | Arts Section | 02 | 00 | 05 | 00 | 00 | 02 | 09 | 215.8 |
| 4 | IT/Computer Section | 20 | 00 | 00 | 01 | 00 | 01 | 22 | 1938.9 |
| 5 | Gymkhana | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 6 | Common Facility Centers | 02 | 00 | 00 | 00 | 00 | 16 | 18 | 1647.53 |
| 7 | Other Unites | 04 | 02 | 00 | 00 | 00 | 07 | 13 | 1274.461 |
| Total | | 42 | 04 | 06 | 02 | 01 | 33 | 88 | 8639.191 |

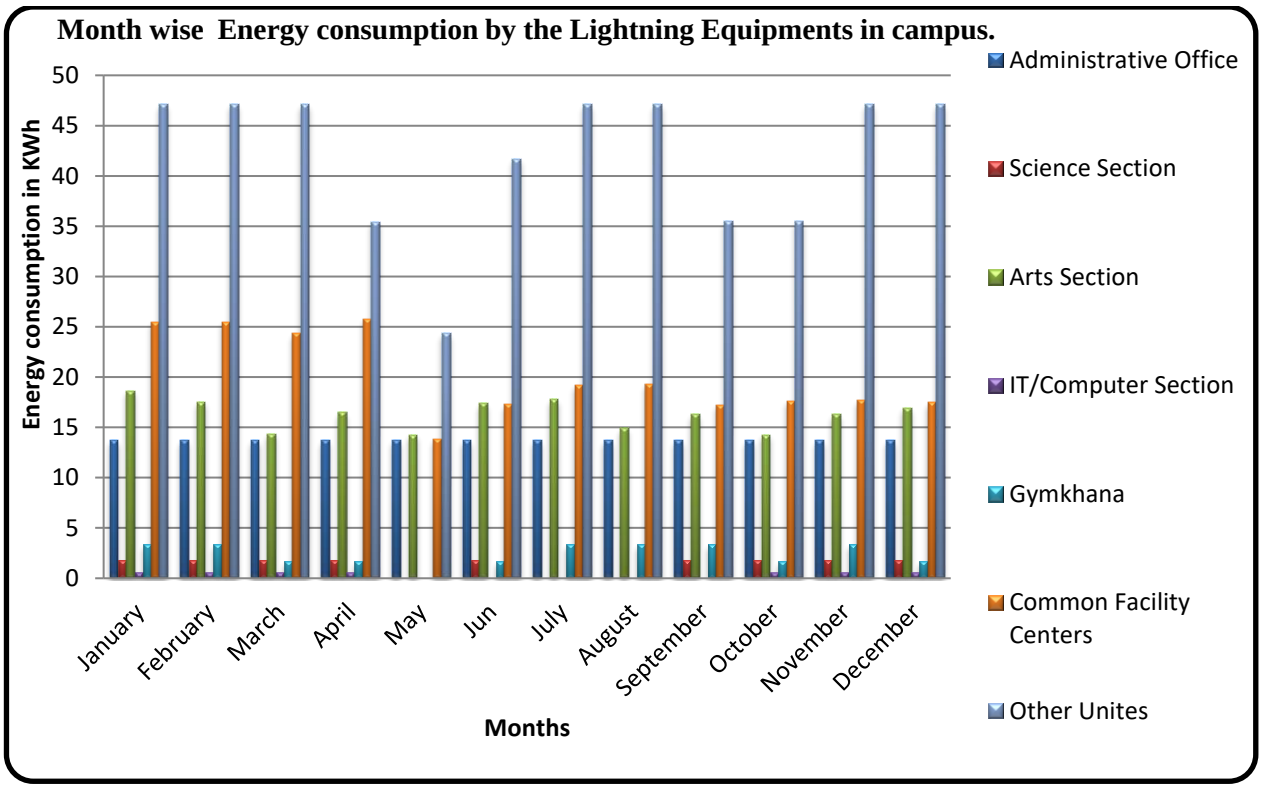
Above table shows section wise no. of office equipments and energy consumed per year it reveals that office equipments like computers, printers, laptops, LCDs, projectors, fans etc. are large in no. at IT/computer sections and zero in no. at Gymkhana section. Total no. of equipments in campus are 88 and electric energy consumed by these office equipments is 8639.19 KWh per year. High energy is required at administrative section, less energy is required at 215.8 KWh and zero energy at Gymkhana section.

**Graph No.3.5 Section wise energy consumed per year by office equipments:**



Graph shows the section wise electric energy consumed per year by office equipments**.** About 31% energy used at administrative office,22% used at IT/Computer section, 19% at common facility centers,15% by other units and 0 % at Gymkhana.

**Graph No. 3.6 Month wise Energy consumption by the Lightning Equipments in campus:**



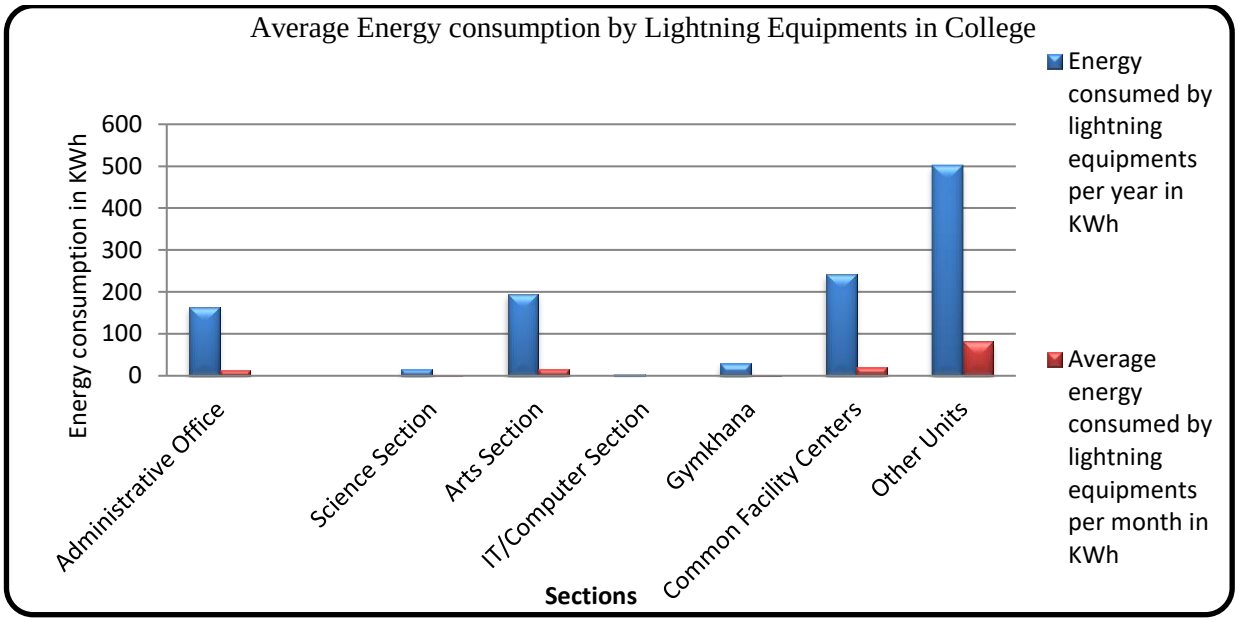

This graph shows energy consumption by the lightening equipments in different sections of the college campus , Averagely about 40KWh to 47KWh energy in other units section and in common facility center section 12KWh to 26KWh energy consumed per month. In arts and administrative office section about 15KWh to 18 KWh energy is consumed per month. In Science Section, IT/Computer Section, Gymkhana energy consumption by lightning equipment is very less. 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 for lightening purpose is very small .

**Table No. 3.5 Energy consumption by Lightning Equipments in College:**

| Sr. No. | Sections | Energy consumed by lightning equipments per year in KWh | Average energy consumed by lightning equipments per month in KWh | Description |
|---|---|---|---|---|
| 1. | Administrative Office | **164.16** | 13.68 | Moderate |
| 2. | Science Section | **16.2** | 1.35 | Less |
| 3. | Arts Section | **195.03** | 16.25 | Moderate |
| 4. | IT/Computer Section | **4.2** | 0.35 | Less |
| 5. | Gymkhana | **28.416** | 2.35 | Less |
| 6. | Common Facility Centers | **240.78** | 20.065 | Moderate |
| 7. | Other Units | **502.12** | 81.85 | high |
| | **Total** | **1150.906** | 135.895 | |

This chart shows total energy consumption by lightening equipments at college campus is 1150.906 KWh/ year and 135.895KWh/month. The maximum consumption at other units (=502.12KWh/year), moderate consumption at common facility centers (=240.78KWh/year) and minimum about 4.2 KWh/year energy is consumed by lightening equipments in college sections. The fourth column of above table shows energy consumption for lightening purpose at different sections college campus per months.

**Graph No. 3.7 Average energy consumption by lightning equipments in college per year in KWh and average energy consumption by lightning equipments per month in KWh:**



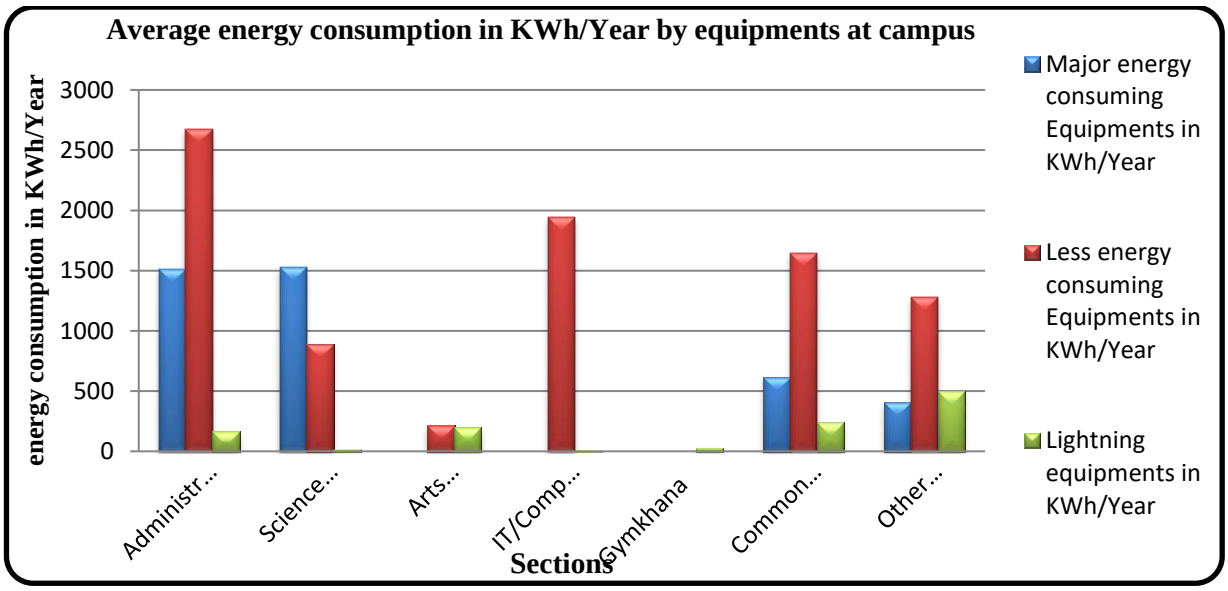

This graph shows Average energy consumption by lightning equipments in college per year in KWh and average energy consumption by lightning equipments per month in KWh Averagely about 1150.906 KWh/ year and 135.895KWh/month is consumed in different sections of college campus.

**Table No. 3.6 Average energy consumption in KWh/Year at campus:**

| Sr. No. | Sections | Total energy consumption by | | | Total | Description |
|---|---|---|---|---|---|---|
| | | Major energy consuming Equipments in KWh/Year | Less energy consuming Equipments in KWh/Year | Lightning equipments in KWh/Year | | |
| 1. | Administrative Office | 1512.34 | 2670.6 | 164.16 | 4347.1 | High |
| 2. | Science Section | 1527.62 | 891.9 | 16.2 | 2435.72 | Moderate |
| 3 | Arts Section | 00 | 215.8 | 195.03 | 410.83 | High |
| 4. | IT/Computer Section | 00 | 1938.9 | 4.2 | 1943.1 | Moderate |
| 5. | Gymkhana | 00 | 00 | 28.416 | 28.416 | Less |
| 6. | Common Facility Centers | 618.34 | 1647.53 | 240.78 | 2506.65 | Moderate |
| 7. | Other Units | 402.075 | 1274.46 | 502.12 | 2178.655 | Moderate |
| Total | | 4060.375 | 8639.19 | 1150.906 | 13850.471 | |

This table shows average month wise well comparison of electrical energy usage in these five sections of campus for major, less and lightening equipments. Normally electrical consumption for above usage equipments is higher at science building section (= 741.86 KW/Month) and medium use of energy is enjoyed at administrative office building as well as new building(≈ 435 to 455 KW/month)and average less energy usage is at exterior section of campus.

**Graph No. 3.8 Average energy consumption in KWh/Year at campus:**



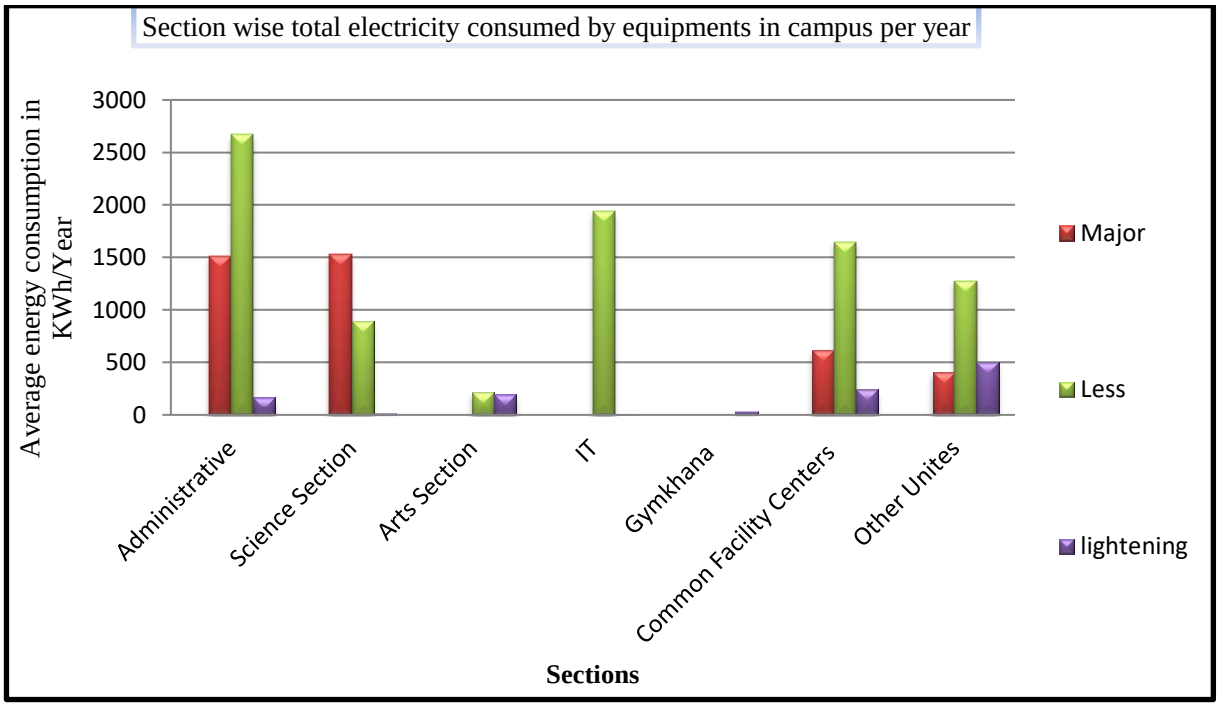

Above graph at glance clearly shows that electric energy consumption for less consumption equipments is larger than that of energy consumption for major consuming equipments and lightening equipments in all sections. Graph clears that energy consumption in gymkhana and arts section is minimum. Energy required for administrative office (=4347.1KWh/Year) is high nearly twice of energy consumed by other unit sections of college. Energy required for science section (2435.72KWh/Year), energy for the common facility centers(2506 KWh/Year) and energy consumption at gymkhana is very less (28.41 KWh/Year).

**Table No. 3.7 Section wise total electricity consumed by equipments in campus per year in KWh:**

| Sr. no. | Total electricity consumed Per year | Sections | | | | | | | Total energy | Description |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Admini-Strative Office | Science Section | Arts Section | IT /Computer Section | Gymkh-ana | Common Facility Centers | Other Unites | | |
| 1. | Major | 1512.34 | 1527.62 | 00 | 00 | 00 | 618.34 | 402.075 | 4060.375 | Moderate |
| 2. | Less | 2670.6 | 891.9 | 215.8 | 1938.9 | 00 | 1647.53 | 1274.461 | 8639.191 | High |
| 3. | lightening | 164.16 | 16.2 | 195.03 | 4.2 | 28.416 | 240.78 | 502.12 | 1150.906 | Less |
| | **Total** | 4347.1 | 2435.72 | 410.83 | 1943.1 | 28.416 | 2506.65 | 2178.655 | 13850.471 | |

Above tabular represent section wise total electricity consumed by equipments in campus per year in KWh, campus consume 13850.471 KWh/ electric energy per year out of it 4060.375KWh consumed by less consuming electrical equipments, 8639.191KWh consumed by spent on major consuming Equipments and only 1150.906 KW is consumed on lightening Equipments. Also in campus administrative office consume (4347.1KWh) highest electrical energy, and science ,common facility centers, other units consume nearly same about (2178.655 KWh to 2506.65KWh) per year.

**Graph No. 3.9 Section wise total electricity consumed by equipments in campus per year:**



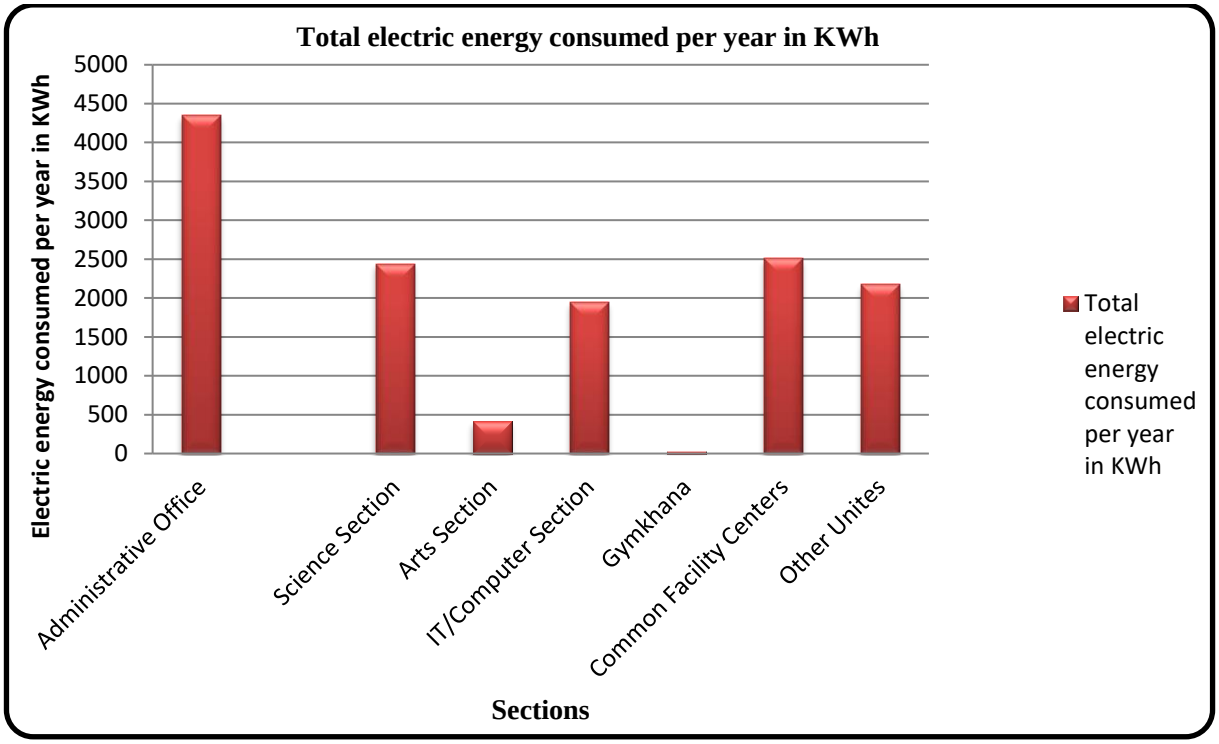

This graph shows section wise use of the electrical energy for major , less consuming energy equipments and lightning equipments in college campus in calendar year -2017.

**Table No. 3.8 Section wise total energy consumed in KWhper year :**

| Sr. No. | Sections | Total electric energy consumed per year in KWh |
|---|---|---|
| 1. | Administrative Office | 4347.1 |
| 2. | Science Section | 2435.72 |
| 3. | Arts Section | 410.83 |
| 4. | IT/Computer Section | 1943.1 |
| 5. | Gymkhana | 28.416 |
| 6. | Common Facility Centers | 2506.65 |
| 7. | Other Unites | 2178.655 |
| | **Total** | **13850.471** |

Above tabular form clears that the total use of electrical energy consumed in colander year -2017 is 13850.471KWh, out of it 4347.1KWh is used in administrative office, 2506.65KWh is used in common facility centers, 2435.72 KWh is used by science section,1943.1KWh is used by IT/Computer section and only 28.416 KWh is consumed at gymkhana section of college.

**Graph No. 3.10 Section wise total energy consumed per year in KW :**




Above graph represent total electric energy consumed by different sections in campus in KWh per year in which total campus consume 13850.471KWh per year out of it major amount of energy (4347.1KWh) is used in administrative office, 2506.65KWh is used in common facility centers, 2435.72 KWh is used by science section,and only 28.416 KWh is consumed at gymkhana section is very less in comparison with other section.

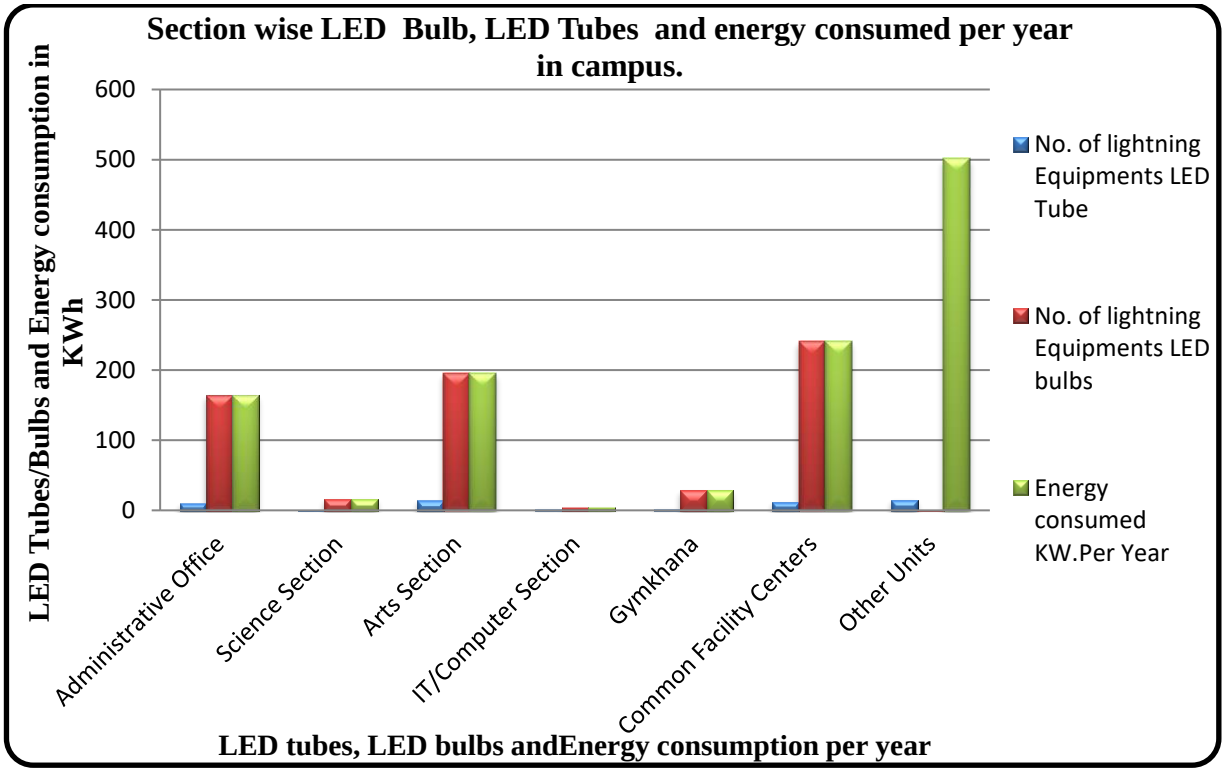
### 3.1.2 Energy consumed in campus for lightning:

**Table No. 3.9 Section wise LED Bulb, LED Tubes and energy consumed per year in campus:**

| Sr No. | Sections | No. of lightning Equipments | | Total Equipments | Energy consumed KWh PerYear |
|---|---|---|---|---|---|
| | | LED Tube | LED Bulbs | | |
| 1. | Administrative Office | 10 | 02 | 12 | 164.16 |
| 2. | Science Section | 01 | 03 | 04 | 16.2 |
| 3. | Arts Section | 14 | 07 | 21 | 195.03 |
| 4. | IT/Computer Section | 02 | 00 | 02 | 4.2 |
| 5. | Gymkhana | 02 | 00 | 02 | 28.416 |
| 6. | Common Facility Centers | 12 | 14 | 26 | 240.78 |
| 7. | Other Units | 15 | 01 | 16 | 502.12 |
| Total | | **56** | **27** | **83** | **1150.906** |

Use of smart electrical appliance is necessary to save electrical energy, for this LED bulbs/tubes are used in college campus, is an green practice of our college. As LED bulbs/tubes are less wattage, bright, intense , highly fluorescent, electricity saving lighting equipment total 100% of old filament bulbs, tubes and other lightening appliance are re-placed by LED bulbs/tubes. Steps are taken in last year to replace all the old electrical lightning appliances by LED bulbs/tubes. In whole college campus about 27 LED bulbs and 56 LED tubes are used for saving electricity. Above table gives details of use of LED bulbs/tubes in different sections and electricity consumption for year in these sections of college campus.

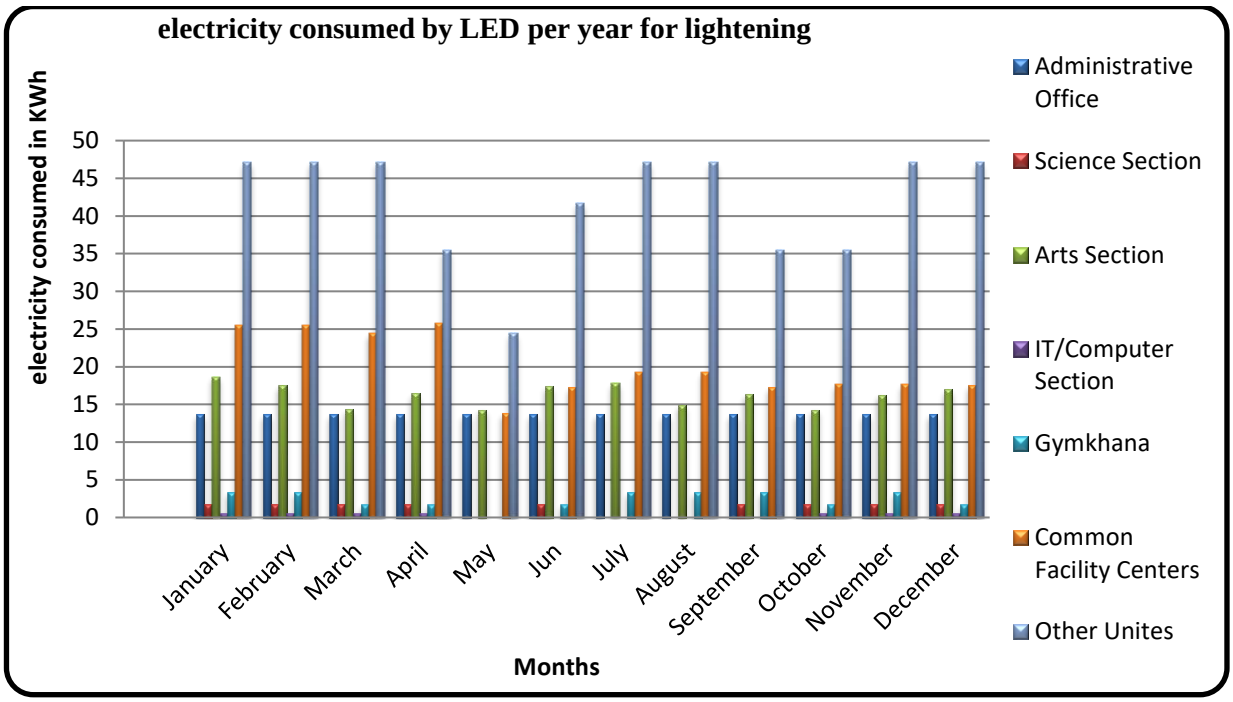
**Graph No.3.11 Section wise LED Bulb, LED Tubes and energy consumed per year in campus:**




Above bar graph shows that in campus for lightning only LED tubes/bulbs are used all where. The number of LED tubes are greater than that of LED bulbs. Less electric energy is used for lightning purpose by LED tubes /bulbs at IT/Computer section and large is

required at other units while large no. of tubes are used at common facility centers and less no. of tubes are used at IT/computer sections.

**Graph no 3.12 Month wise electricity consumed by LED per year for lightening in college:**



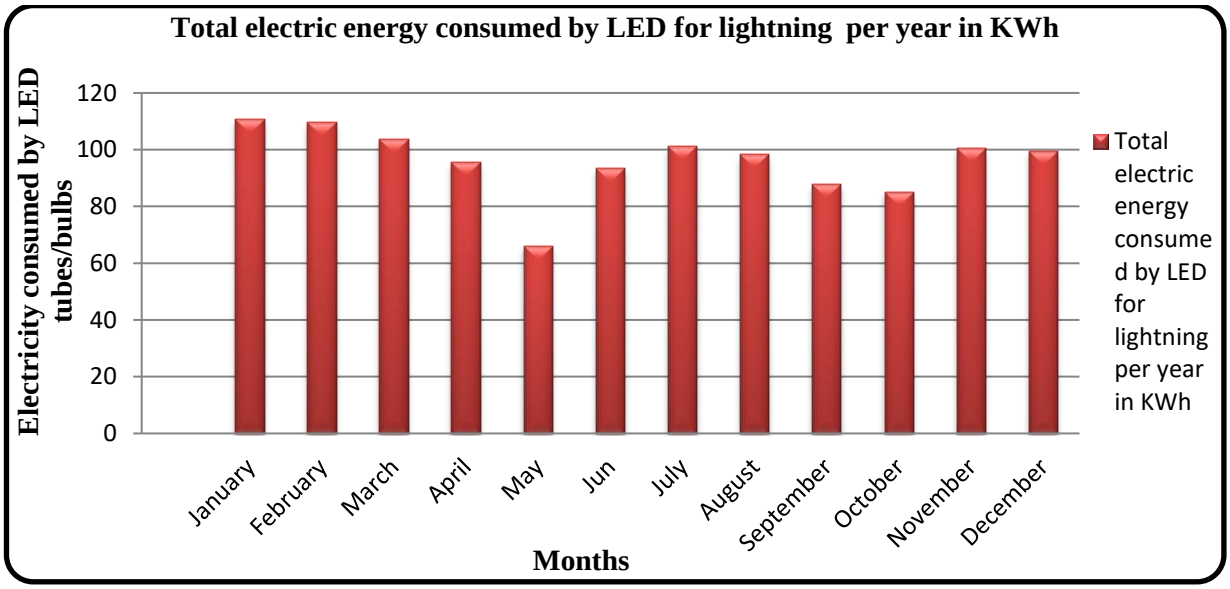

Above graph reveals that energy consumption by LED tubes/bulbs in throughout year in each month. It shows maximum use of LED tubes/ bulbs are in other units, common facility centers, arts and administrative sections in college.

**Table no 3.10 Total electricity consumed by LED Per year for lightening:**

| Sr. No. | Sections | Total electric energy consumed by LED for lightning per year in KWh |
|---|---|---|
| 1. | Administrative Office | **164.16** |
| 2. | Science Section | **16.2** |
| 3. | Arts Section | **195.03** |
| 4. | IT/Computer Section | **4.2** |
| 5. | Gymkhana | **28.416** |
| 6. | Common Facility Centers | **240.78** |
| 7. | Other Units | **502.12** |
| | **Total** | **1150.906** |

Above table it reveals that energy consumption by LED tubes/bulbs in throughout year in for lightning purpose. From above different tables and graph we see that total electric energy consumed by different sections in campus in KWh per year is 13850.471KWh per year, out of it for lightning purpose 1150.906KWh/year is consumed and in above table total electricity consumed by LED per year for lightening is1150.906KWh/year. It means in college campus in all sections their use of only LED lamps and LED tubes, no incandescent lamps/ bulbs are used in campus is the one of best green practices.

**Graph no 3.13 Total electricity consumed by LED Per year for lightening:**




Above graph reveals that in January February and March about 110KWh energy is consumed, from June to December average 90 to 100KWh energy consumption is seen.

**Table No. 3.11 Month wise total electricity consumed recorded by auditing:**

| Sr.No. | Months | Total energy consumed by major energy consuming equipments per month in KWh | Total energy consumed by less energy consuming equipments per month in KWh | Energy consumed by lightning equipments per month in KWh | Total electricity consumed in campus by auditing per month in KWh |
|---|---|---|---|---|---|
| 1. | January | 418.255 | 724.07 | 110.626 | 1252.951 |
| 2. | February | 363.945 | 748.24 | 109.516 | 1221.701 |
| 3. | March | 331.905 | 768.41 | 103.56 | 1203.875 |
| 4. | April | 273.89 | 613.83 | 95.43 | 983.15 |
| 5. | May | 255.29 | 384.13 | 66.14 | 705.56 |

| | | | | | |
|---|---|---|---|---|---|
| 6. | Jun | 277.29 | 762.24 | 93.46 | 1132.99 |
| 7. | July | 349.095 | 554 | 101.116 | 1004.211 |
| 8. | August | 344.185 | 625.4 | 98.366 | 1067.951 |
| 9. | September | 380.945 | 749.2 | 87.836 | 1217.981 |
| 10. | October | 387.145 | 707.95 | 85.12 | 1180.215 |
| 11. | November | 333.705 | 765.51 | 100.466 | 1199.681 |
| 12. | December | 344.725 | 953.65 | 99.27 | 1397.645 |
| | | **4060.375** | **8639.19** | **1150.906** | 13850.471 |

We collect the of record electric energy consumed at our campus with help of questionnaires given in annexure –A, which describe electric energy used by major energy consuming equipments, less energy consuming equipments and for lightening purpose. Above table 3.11 shows the Month wise total electricity consumed at campus was recorded at the time of actual auditing process. Above table 3.11 reveals that electricity consumed by less energy consuming equipments8639.19KWh per Year ,major energy consuming equipments consume 4060.375 KWh pear year and total electricity consumed in campus13850 KWh per year. Maximum electricity consumption is observed in month of December, January, February and March is nearly about (1397 KWh per month to 1203KWh per month) and minimum at the month of May (705KWh per month)

**Table No. 3.12 Month wise total electricity consumed according to actual readings from electricity bills supplied by MSEB:**

| Sr.No. | Month | Readings of the meter in name of Dnyanganga Shikshan Prasarak Mandal in KWh | Readings of the meter in name of Principal .K S Chougule ITI in KWh | Total electricity consumed according to meter readings in KWh |
|---|---|---|---|---|
| 1 | January | 97 | 587 | 684 |
| 2 | February | 438 | 657 | 1095 |
| 3 | March | 286 | 740 | 1026 |
| 4 | April | 470 | 1187 | 1657 |
| 5 | May | 276 | 1049 | 1325 |
| 6 | June | 127 | 934 | 1061 |
| 7 | July | 198 | 1114 | 1312 |
| 8 | August | 473 | 942 | 1415 |
| 9 | September | 378 | 908 | 1286 |
| 10 | October | 428 | 469 | 897 |
| 11 | November | 252 | 566 | 818 |
| 12 | December | 222 | 703 | 925 |
| **Total** | | **3645** | **9856** | **13501** |

In our institutional campus for electricity depend on MSEB, which supplied with help of two connections out of that one is in name of Dnyanganga Shikshan Prasarak Mandal (**Customer** No.263070006686) and other is in name of Principal .K S Chougule ITI. Whose electricity consumption is charged monthly with help of electricity bills. With taking in account the electricity consumed in each month given on electricity bills above table showsmonth wise total electricity consumed according to actual readings from electricity bills supplied by MSEB.It clearly reveals that electricity consumption of meter in name of Principal K S Chougule ITI in KWh is 9856 KWh per year is higher than that of consumption of electricity by meter of Dnyanganga Shikshan Prasarak Mandal which is 3645 KWh per year. Total electricity consumed according to meter readings is **13501** KWh per year.

If we compare above mentioned (Table No.3.11 and 3.12) two tables the difference in measurement is shown to be 349.471KWh is negligible and due to major time spent MSEB between measurement issue the bills. Also at the time of electricity auditing consumption data is taken by all sections and by different employers, due to their understanding, literacy and unliterary of auditing seriousness and punctuality this difference will be accountable. Also above both the tables itself proves that the auditing process conducted in campus is proper and to be correct.

### 3.1.3.LPG Consumption in campus :

In different section of college for common facility centers like hostel, mess, canteen, tea club, in ITI work shop and in science wing for practical purpose, like heating, boiling LPG gas is used, its consumption is shown in following tabular form.

**Table No.3.13 LPG consumption in college:**

In this total yearly LPG consumption from all the sections of college campus is recorded as fallows,

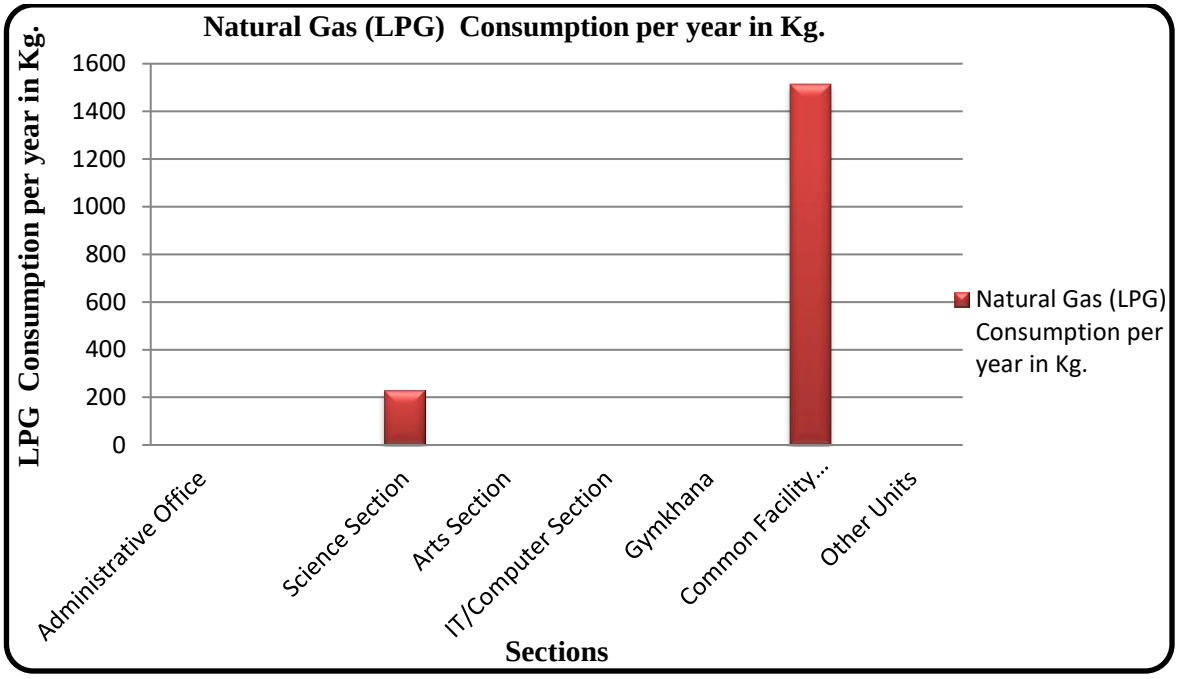
| Sr. No. | Sections | Natural Gas (LPG) Consumption per year in Kg. |
|---|---|---|
| 1. | Administrative Office | 00 |
| 2. | Science Section | 228 |
| 3. | Arts Section | 00 |
| 4. | IT/Computer Section | 00 |
| 5. | Gymkhana | 00 |
| 6. | Common Facility Centers | 1512 |
| 7. | Other Units | 00 |
| | **Total** | **1740** |

The consumption of LPG gas in different sections of college is given in above table. College has one LPG gas connection; this LPG gas is used/ consumed for practical purpose at science section in Chemistry, Physics, Botany and microbiology department. Also in front of college canteen facility is owned by the private vendor for staff members, students and visitors in campus. In common facility center like canteen and hostel, mess LPG is consumed for preparation of food and data recorded details are summarized in above table.

In science section LPG gas consumption is about 228 Kg/Year and in common facility centers section like canteen, hostel, mess etc. consumes 1512Kg/year LPG gas. Total LPG gas consumption in college campus site is 1740 Kg/Year.

**Renewable Energy used at campus:** In campus two solar lamps are used for lightning the exterior of building at night. Also solar water heater is used at hostel campus to providing hot water to students for bathing purpose. It is an estimate throughout year is 117 KWh/year. This much energy used in campus from renewable energy resources.

**Graph No3.14 Natural Gas (LPG) Consumption per year in Kg:**




The graph shows consumption of LPG gas in various sections of college. In science section LPG gas consumption is about 228 Kg/Year and in common facility centers section like canteen, hostel, mess etc. consumes 1512Kg/year LPG gas. Total LPG gas consumption in college campus site is 1740 Kg/Year. While in administrative office, Arts, IT/computer, Gymkhana and in other units section there is no use of LPG gas is seen.

### 3.1.4 Students data at glance : Type of transportation used

We collected an information from students for the completion of Energy Audit **(Annexure Form –A to G)**In this form also survey of students vehicle, type of transportation used by the students is done. We prepared a questionnaire to get information in detail. As the strength of students in our college is 1007 circulation of an questionnaires to students, taking information, gathering together, handling it for analysis is very difficult, hence our Green Audit team collected all relating information from the students in the classroom at the time of lectures by raising their hands. With this method it minimized not only physical and mental exertion but also it saved an expense on much of stationary and minimizes relating solid waste. We got the information of students who were present in the classroom on the day of data collection is only the demerit of this method. The collected data, its statistical analysis ,

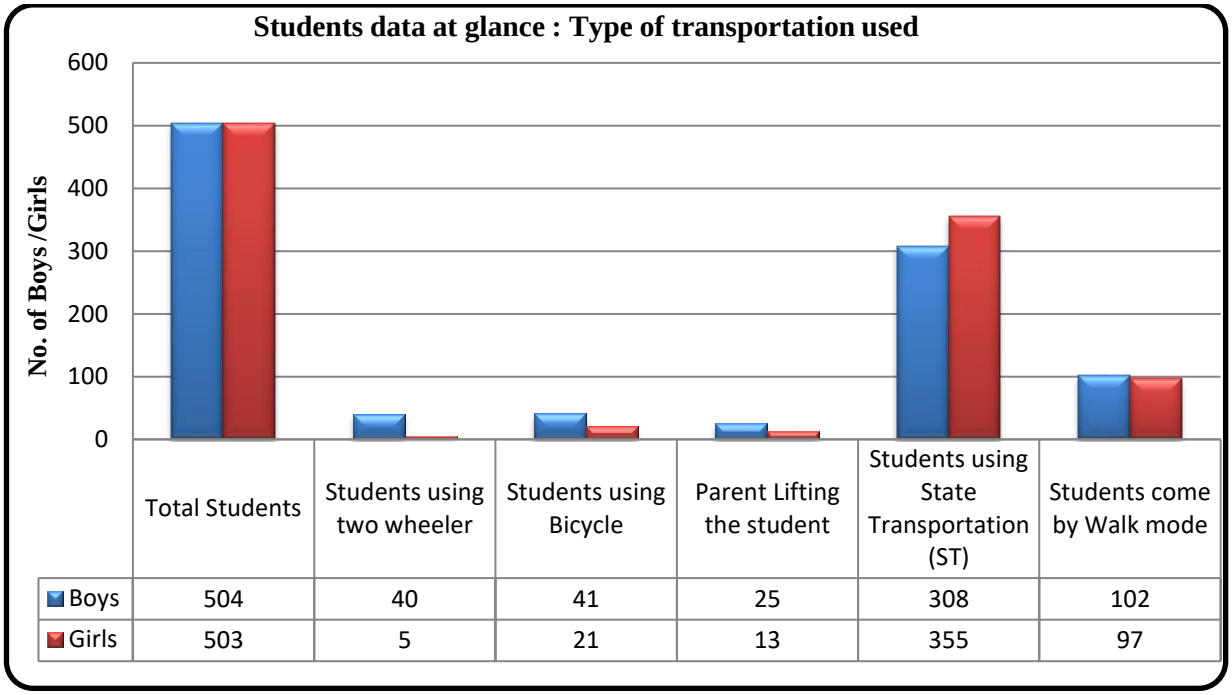
distribution and percentage with total is shown in below Table No.3.14 . It shows the percentage of female students is (49.95%) is nearly equal to male students (50.04%). About 65.84% students are using State Transportation (ST), about only 06.16% students are using bicycle and about 19.76% students use the walking mode while only 04.47% students use their own two wheeler vehicle. Parents of 3.77% students drop them to the college. In our college about 41 boys and 21 girls total 62 student use bicycle for transportation, about 102 boys and 97 girls students use walking mode to regular college activity ,355 girls 308 boys students use state transportation vehicles for college.

**Table No.3.14 Students data at glance : Type of transportation used:**

| Sr.no | | Total Students | | | Students use two wheeler | | | Students use Bicycle | | | Parent Lifting the student | | | Students use State Transportation (ST) | | | Students comes Walk | | | Not answ-ered |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Boys | Girls | Total | Boys | Girls | Total | Boys | Girls | Total | Boys | Girls | Total | Boys | Girls | Total | Boys | Girls | Total | |
| 1. | Total | 504 | 503 | 1007 | 40 | 05 | 45 | 41 | 21 | 62 | 25 | 13 | 38 | 308 | 355 | 663 | 102 | 97 | 199 | 00 |
| 2. | % | 50.04 | 49.95 | 100 | 88.88 | 12.2 | 100 | 66.12 | 33.87 | 100 | 65.79 | 34.21 | 100 | 46.46 | 50.53 | 100 | 51.26 | 48.74 | 100 | 00 |
| % with total | | 100% | | | 04.47% | | | 06.16% | | | 03.77% | | | 65.84% | | | 19.76% | | | % |

This table shows the comparative percentages of male and female students adopting the mode of transportation for college. It reveals that percentage of girl students adopting State Transportation ( ST), is greater than that of the percentage of boy students and Greater number of boys about 40 are using two wheeler at the same time only 5 girl student are using their two wheeler. That our girl students are more conscious about environment than boys student, so they use environment friendly modes of transportation like ST (Vehicle with sharing), Bicycle, walking etc.

**Graph No.3.15 Students data at glance : Type of transportation used:**




Above graph shows the comparative statistics of male and female students adopting the mode of transportation for college. From above graph it reveals that girl students adopting State Transportation ( ST), is greater than that of the boy students and Greater number of boys about 40 are using two wheeler at the same time only 5 girl student are using their two wheeler. Less number of girl and boy students using two wheeler and bicycle.

**3.1. 5 Staff data at glance : Type of transportation used**

**Table No.3.15 staff data at glance : Type of transportation used:**

| Use of mode of transportation | Using 4 Wheeler | Using 2 wheeler | Sharing 4 Wheeler | walking | Using ST | total |
|---|---|---|---|---|---|---|
| No. of Vehicle | 03 | 49 | 03 | 13 | 38 | 106 |
| % | 2.85% | 46.67% | 2.85% | 12.38% | 35.24% | 100% |

Like the students we collected an information from staff for the completion of Energy Audit. In this survey from Staff (Faculty of all Sr. Jr. wing, office staff, non-teaching staff, r etc) we collected data about vehicle, type of transportation used by them to come to college. So we prepared questionnaire to get information in detail, distributed them, helped them for filling, completed in all respect and collected. Its statistical analysis is shown in above Table.

Above Table no.3.15 and graph no.3.16 below shows the use of vehicle by staff of our college. About 2.85% of staff is using four wheeler, 46.67% staff is using two wheeler vehicles while about 2.85% staff is using four wheeler with sharing, 12.38 % are come by walking, about 35.24% staff use ST and no staff using Bicycle for transportation.

**Graph No.3.16 staff data at glance : Type of transportation used:**

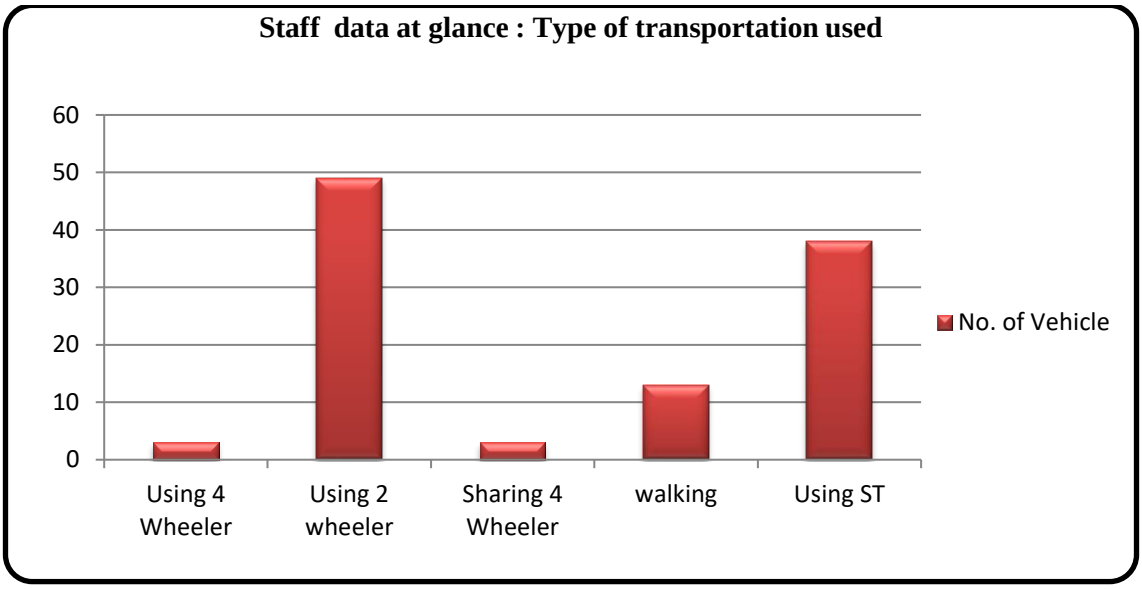
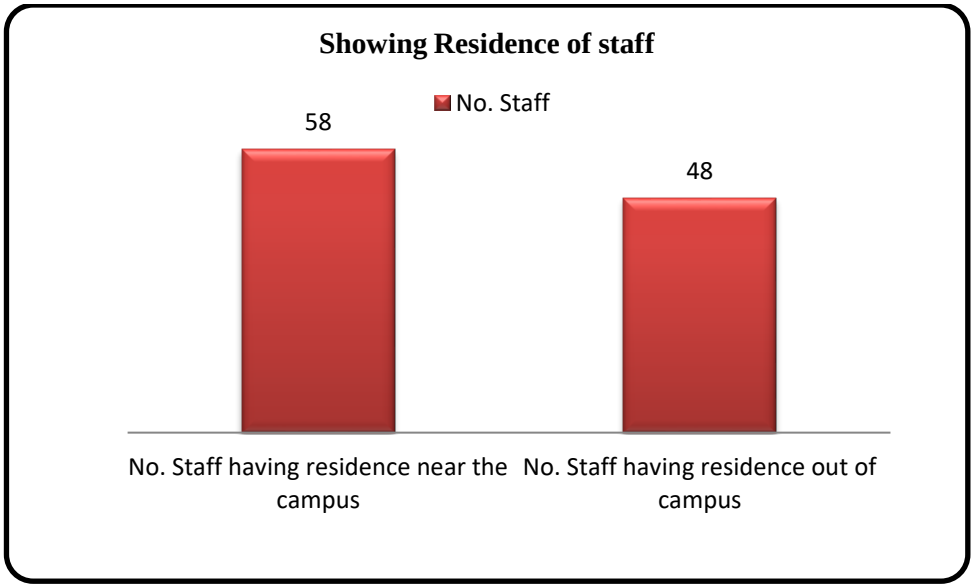



**Table No. 3.16 Showing Residence of staff :**

| Staff residence | No. Staff having residence near the campus | No. Staff having residence out of campus |
|---|---|---|
| No. Staff | 58 | 48 |
| % | 54.72% | 45.28% |

**Graph No. 3.17 Showing Residence of staff :**



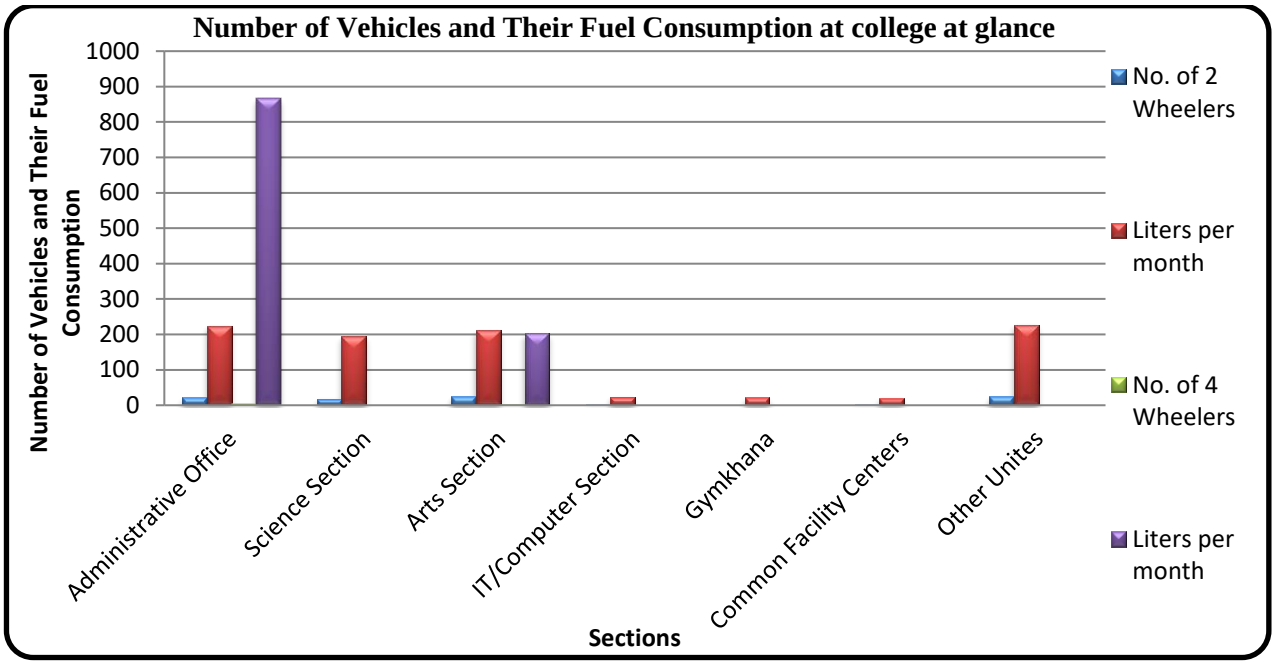
While collecting information from staff, we make the interactions, discussions with the staff; through it we collected the information about their residence. We collected information from staff by questionnaire about the residence of the staff from college campus. From above Table No 3.16 and Graph No. 3.17 it clears that about 54.72% of our staff resides near the college campus and 45.28% of staff resides just far from campus (≈ 25 to 30 KM distance) which minimize fuel consumption in liter per month.

**Table No. 3.17 Number of Vehicles and Their Fuel Consumption at college at glance:**

| Sr. No | Department | Vehicles | | | | Description |
|---|---|---|---|---|---|---|
| | | 2 Wheelers | Liters/month | 4 Wheelers | Liters/month | |
| 1. | Administrative Office | 22 | 224 | 06 | 866 | High |
| 2. | Science Section | 18 | 195 | 00 | 00 | |
| 3. | Arts Section | 25 | 212 | 03 | 202 | |
| 4. | IT/Computer Section | 02 | 23 | 00 | 00 | |
| 5. | Gymkhana | 01 | 22 | 00 | 00 | |
| 6. | Common Facility Centers | 02 | 20 | 00 | 00 | Low |
| 7. | Other Unites | 25 | 226 | 00 | 00 | |
| Total | | 95 | 922 | 9 | 1068 | |

Above table shows number of vehicles and their fuel consumption at college which produces carbon footprints and pollution to environment. In above it clearly shows that average number of 2 wheeler and 4 wheeler used at different sections of college and their fuel consumption. In college campus about 95 two wheeler and 9 four wheeler came at an average and1990 liter/month fuel consumption is observed. High fuel consumption is recorded at administrative office section and low fuel consumption is recorded at common facility center sections.

**Graph No. 3.18 Number of Vehicles and Their Fuel Consumption at college at glance:**




Above graph shows number of vehicles and their fuel consumption at college campus at glance. In above it clearly shows that average number of 2 wheeler and 4 wheeler used at different sections of college. It reveals high fuel consumption is recorded at administrative office section and low fuel consumption is recorded at common facility center sections.

**3.2 Solid waste :**

In this 21st century we have become technosavy, person is using different things which are having shorter life due to that 'Use and throw' culture is highly growing and spreading, which is going to raise the waste behind us. In world about 90 crore ton plastic waste is available at the bottom of sea, about 568 Million ton solid waste is present and out of that 1.5 Million ton solid waste is decomposing on site and going to create threat to the life of human being . When useful things become useless they are thrown out as a waste, it makes serious affect to environmental.

Waste management is one of the burning problems not only in India but also in the world. Hence it is necessary to use the things properly and mange them cautiously. The main purpose behind this audit is to analyze the quantity and volume of solid, liquid waste and their proper management. Similarly, to make aware about their hazardous effects and to create awareness amongst the students, teachers about minimum use, reuse and recycle of the

waste. Solid waste generation and its management is a burning issue in current days. The rate of generation of solid waste is very high and yet we do not have adequate technology to manage the generated waste. Unscientific handling of solid waste can create threats to public health and environmental safety issues. Thus, it is necessary to manage the solid waste properly to reduce the load on waste management system. The purpose of this audit is to find out the quantity, volume, type and current management practice of solid waste generation in the Shripatrao Chougule arts and Science college Malwadi- Kotoli, Tal: Panhala, Dist: Kolhapur established by Dnyanganga Shikshan Prasarak Mandal, Malwadi .This report will help for further solid waste management and to go for green campus development.

As mentioned above we make the seven sections of campus to study the solid waste generation and management and analyzed information is given below.

**3.2.1 Status of solid waste generation in college:**

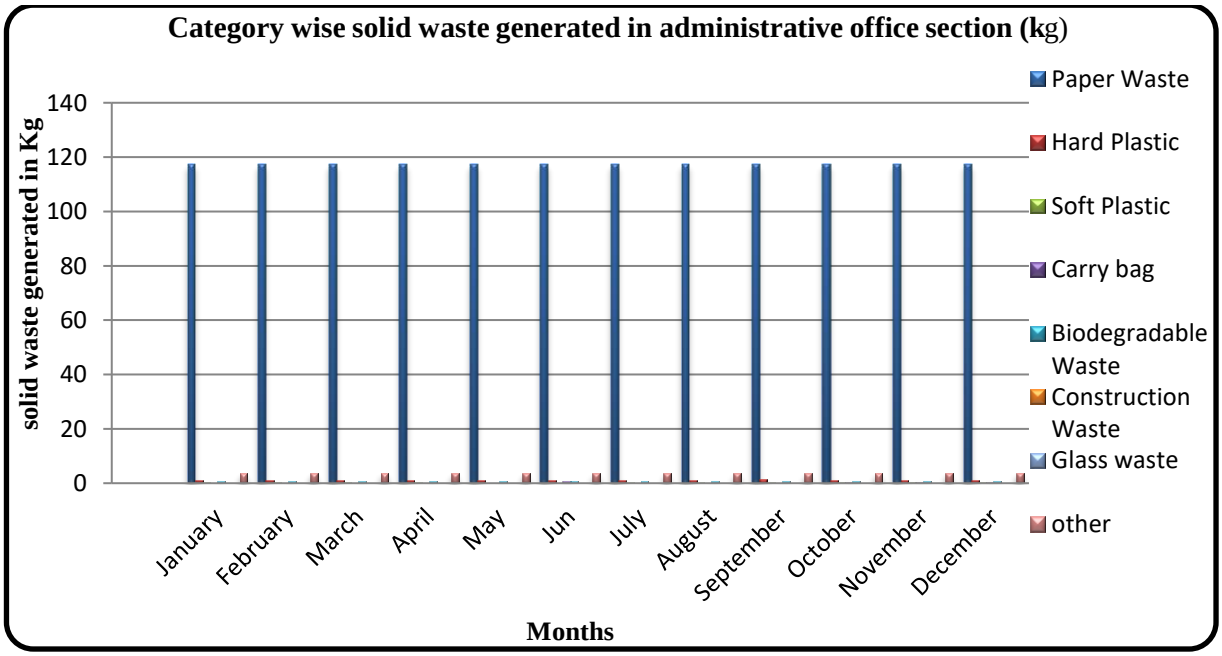
**Table No. 3.18 In Administrative office section category wise average solid waste generated (Kg/Month):**

| Sr. no | Sections Administrative office | Category of Waste | | | | | | | | Total solid waste | Description |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Paper Waste | Plastic | | | Biode-gradable Waste | Construc-tion Waste | Glass waste | other | | |
| | | | Hard | Soft | Carry bags | | | | | | |
| 1. | January | 117.25 | 1.00 | 0.200 | 0.100 | 0.600 | 00 | 00 | 3.6 | 122.75 | Moderate |
| 2. | February | 117.25 | 1.00 | 0.200 | 0.100 | 0.600 | 00 | 00 | 3.6 | 122.751 | Moderate |
| 3. | March | 117.25 | 1.20 | 0.200 | 0.100 | 0.600 | 00 | 00 | 3.6 | 122.95 | Moderate |
| 4. | April | 117.25 | 1.00 | 0.200 | 0.100 | 0.600 | 00 | 00 | 3.6 | 122.75 | Moderate |
| 5. | May | 117.25 | 1.00 | 0.100 | 0.100 | 0.600 | 00 | 00 | 3.6 | 122.75 | Moderate |
| 6. | Jun | 117.25 | 1.20 | 0.100 | 0.85 | 0.600 | 00 | 00 | 3.6 | 122.835 | Moderate |
| 7. | July | 117.25 | 1.20 | 0.200 | 0.100 | 0.600 | 00 | 00 | 3.6 | 207.835 | High |
| 8. | August | 117.25 | 1.25 | 0.200 | 0.100 | 0.600 | 00 | 00 | 3.6 | 123 | Moderate |
| 9. | September | 117.25 | 1.50 | 0.200 | 0.100 | 0.600 | 00 | 00 | 3.6 | 123.25 | Moderate |
| 10. | October | 117.25 | 1.20 | 0.25 | 0.50 | 0.600 | 00 | 00 | 3.6 | 123.095 | Moderate |
| 11 | November | 117.25 | 1.25 | 0.25 | 0.50 | 0.600 | 00 | 00 | 3.6 | 123.10 | Moderate |
| 12. | December | 117.25 | 1.20 | 0.25 | 0.50 | 0.600 | 00 | 00 | 3.6 | 123.095 | Moderate |
| | Total | 1407 | 14 | 2.250 | 1.135 | 7.200 | 00 | 00 | 43.2 | 1560.161 | |

For collection this information we distribute the questionnaires to all the section give the training for filling the questionnaires. Before filling the questionnaires the solid waste of that week in respective sections is collectively categorized in Paper Waste, Plastic waste, Biodegradable Waste, Construction Waste, Glass waste, other and again plastic waste is separated into Hard plastic, Soft plastic and carry bags , is weighted and recorded for month throughout year.

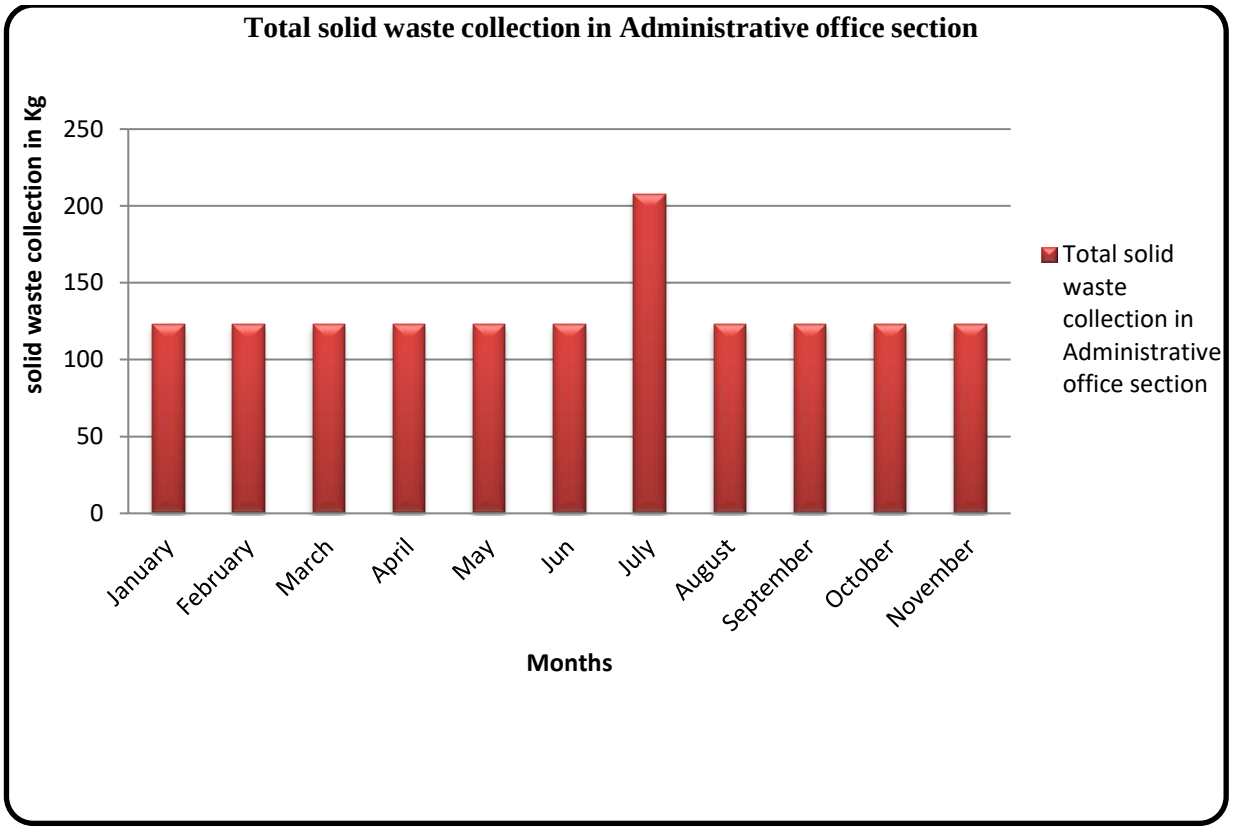
Above table shows the month wise and category wise solid waste generated in administrative office section for year in Kg. it reveals that there is no collection of constructional and glass waste, averagely 117 paper waste is collected in this section. In plastic waste , hard,soft plastic and carry bags is observed, from total solid waste column of above table it clear that in only July month the solid waste collection is higher(about 207 Kg) and in other months the collection of solid waste in this section is moderate and about 123kg/months.Total solid waste per year of this section is 1560 kg out of that 43.2 Kg is other waste, 1407 Kg is the paper waste and about 18 Kg is the plastic waste generated in this section.

**Graph No 3.19.In Administrative office section category wise solid waste generated (Kg/Month):**



This graph shows at glance month wise and category wise solid waste generated in administrative office section for year in Kg. it reveals that there is no collection of constructional and glass waste, averagely 118 Kg paper waste is collected in this section. In plastic waste soft plastic is not observed.

**Graph No 3.20.Total solid waste collection in Administrative office section (Kg/Month):**



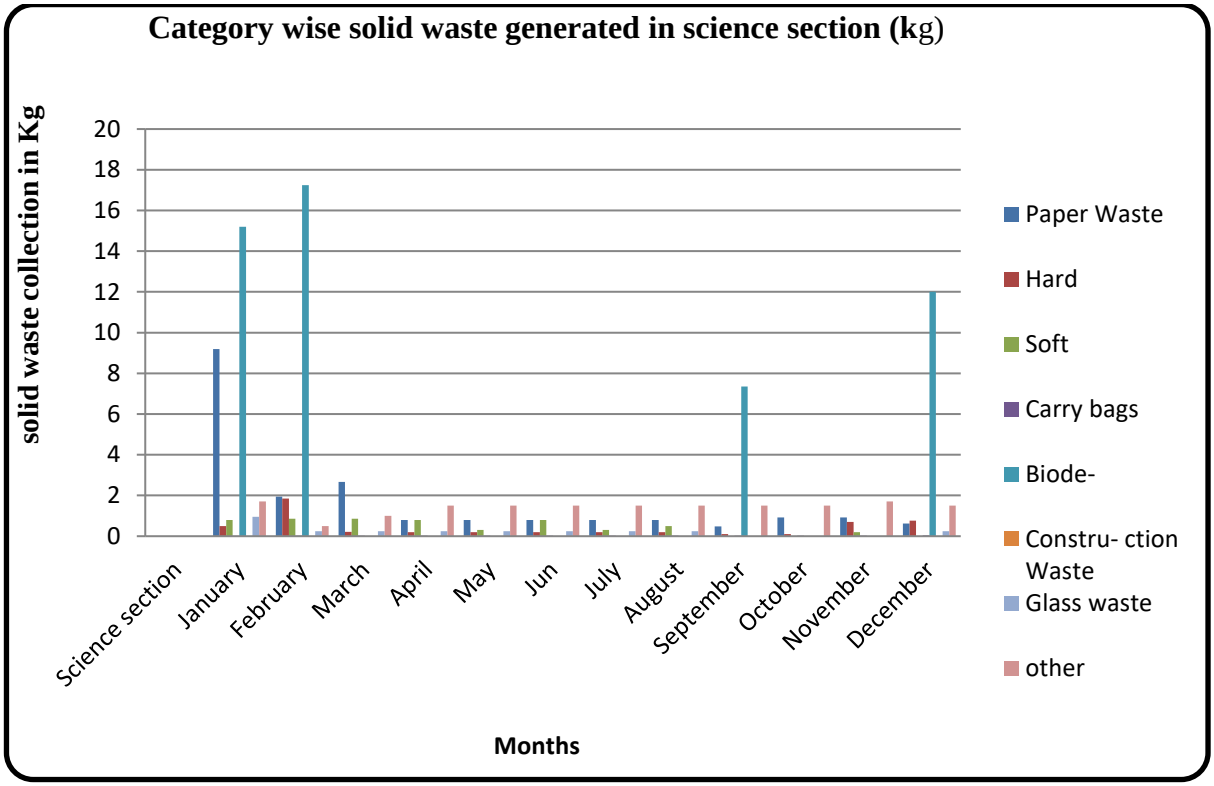

This graph shows month wise total solid waste generated in administrative office section for year in Kg. it reveals that July total collection of solid waste in greater than 200 Kg and in all other months it is about 125 kg per month.

**Table No. 3.19: In Science section category wise average solid waste generated (Kg/Month):**

| Sr. no | Sections Science section | Category of Waste | | | | | | | | Total solid waste | Description |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Paper Waste | Plastic | | | Biode-gradable Waste | Construc- tion Waste | Glass waste | other | | |
| | | | Hard | Soft | Carry bags | | | | | | |
| 1. | January | 9.2 | 0.500 | 0.800 | 0.01 | 15.2 | 00 | 0.950 | 1.7 | **28.36** | **High** |
| 2. | February | 1.94 | 1.85 | 0.85 | 0.02 | 17.25 | 00 | 0.240 | 0.50 | **22.65** | |
| 3. | March | 2.66 | 0.22 | 0.85 | 0.02 | 00 | 00 | 0.240 | 1.0 | **4.99** | |
| 4. | April | 0.800 | 0.200 | 0.80 | 0.02 | 00 | 00 | 0.240 | 1.5 | **3.56** | |
| 5. | May | 0.800 | 0.200 | 0.30 | 0.02 | 00 | 00 | 0.240 | 1.5 | **3.06** | |
| 6. | Jun | 0.800 | 0.200 | 0.80 | 0.02 | 00 | 00 | 0.240 | 1.5 | **3.56** | |
| 7. | July | 0.800 | 0.200 | 0.30 | 0.02 | 00 | 00 | 0.240 | 1.5 | **3.06** | **Low** |
| 8. | August | 0.800 | 0.200 | 0.50 | 0.02 | 00 | 00 | 0.240 | 1.5 | **3.26** | |
| 9. | September | 0.488 | 0.100 | 00 | 0.03 | 7.350 | 00 | 00 | 1.5 | **9.468** | |
| 10. | October | 0.92 | 0.100 | 00 | 0.03 | 00 | 00 | 00 | 1.5 | **10.83** | |
| 11. | November | 0.92 | 0.700 | 0.190 | 0.02 | 00 | 00 | 00 | 1.7 | **11.81** | |
| 12. | December | 0.624 | 0.7650 | 00 | 0.04 | 12.0 | 00 | 0.240 | 1.5 | **20.785** | |
| | Total | **21.328** | **5.235** | **5.39** | **0.27** | **51.8** | 0 | **2.87** | **16.9** | **125.393** | |

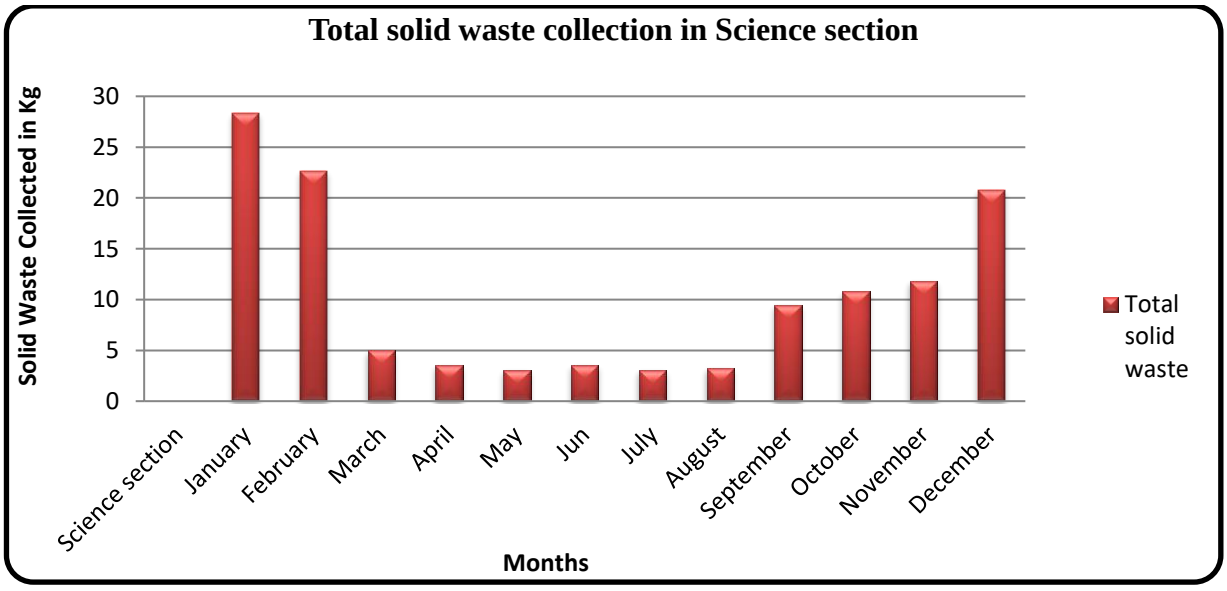
Above table shows the month wise and category wise solid waste generated in Science section for year in Kg. it reveals that there is no collection of constructional waste, averagely 9kg paper waste is collected in this section. In plastic waste , hard, soft plastic and carry bags is observed, from total solid waste column of above table it clear that in only January month the solid waste collection is higher (about 28.36 Kg) and in month of March to August the collection of solid waste in this section is less. Total solid waste per year of this section is 125.393 kg out of that 16.9 Kg is other waste, 21.328 Kg is the paper waste , about 11 Kg is the plastic waste generated in this section.

**Graph No 3.21.In Science section category wise solid waste generated (Kg/Month):**




This graph shows at glance month wise and category wise solid waste generated in Science section for year in Kg. it reveals that there is no collection of constructional waste but glass waste is observed. In plastic waste soft plastic is observed.

**Graph No 3.22.Total solid waste generated in science section (Kg/Month):**



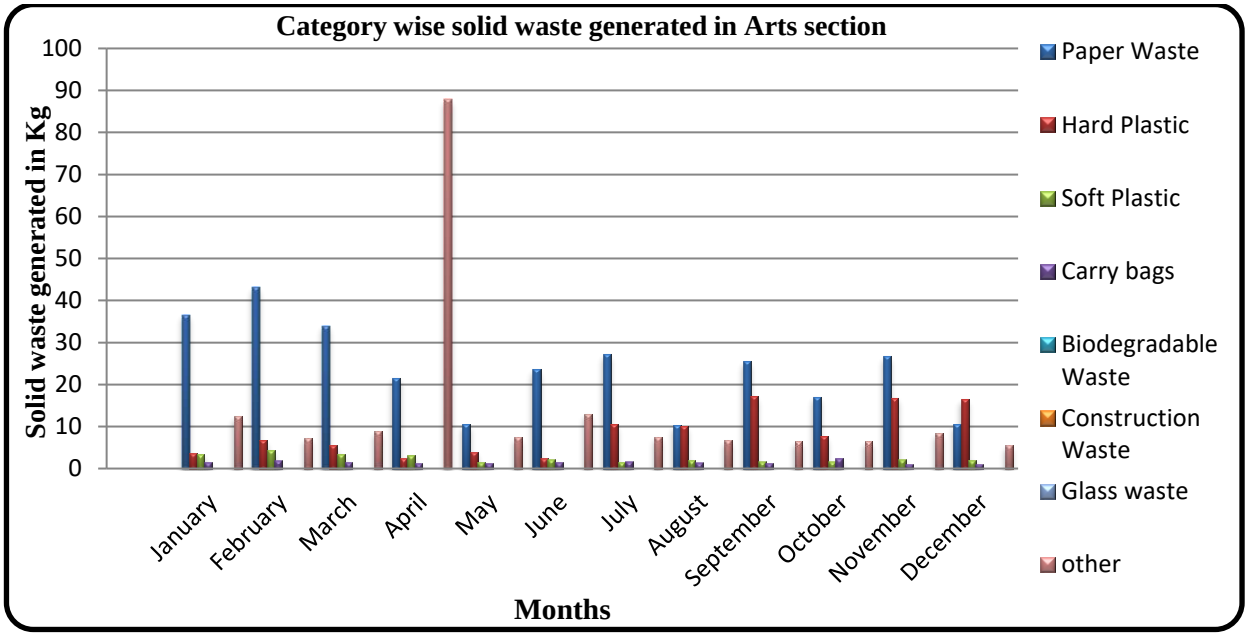
This graph shows month wise total solid waste generated in science section for year in Kg. it reveals that in month of January, February and December total collection of solid waste in greater than 20- 25 Kg and in all other months it is about 4-10 kg per month.

**Table no. 3.20: In Arts section category wise average solid waste generated (Kg/Month):**

| Sr. no | Sections Arts section | Category of Waste | | | | | | | | Total solid waste | Description |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Paper Waste | Plastic | | | Biode-gradable Waste | Construc-tion Waste | Glass waste | other | | |
| | | | Hard | Soft | Carry bags | | | | | | |
| 1. | January | 36.583 | 3.64 | 3.33 | 1.51 | 00 | 00 | 00 | 12.47 | 57.533 | Moderate |
| 2. | February | 43.125 | 6.76 | 4.31 | 1.91 | 00 | 00 | 00 | 7.307 | 63.412 | Moderate |
| 3. | March | 33.95 | 5.49 | 3.39 | 1.55 | 00 | 00 | 00 | 8.797 | 53.177 | Moderate |
| 4. | April | 21.575 | 2.49 | 3.08 | 1.30 | 00 | 00 | 00 | 87.81 | 116.255 | High |
| 5. | May | 10.4 | 3.95 | 1.53 | 1.24 | 00 | 00 | 00 | 7.44 | 24.56 | Less |
| 6. | Jun | 23.541 | 2.44 | 2.10 | 1.53 | 00 | 00 | 00 | 13.02 | 42.631 | |
| 7. | July | 27.086 | 10.422 | 1.60 | 1.63 | 00 | 00 | 00 | 7.46 | 48.198 | |
| 8. | August | 10.311 | 10.125 | 2.02 | 1.40 | 00 | 00 | 00 | 6.60 | 30.456 | |
| 9. | September | 25.431 | 17.12 | 1.66 | 1.35 | 00 | 00 | 00 | 6.51 | 52.071 | Moderate |
| 10. | October | 17.071 | 7.658 | 1.69 | 2.40 | 00 | 00 | 00 | 6.51 | 35.329 | |
| 11. | November | 26.726 | 16.812 | 2.08 | 1.01 | 00 | 00 | 00 | 8.34 | 54.968 | Moderate |
| 12. | December | 10.411 | 16.515 | 1.98 | 1.11 | 00 | 00 | 00 | 5.48 | 35.496 | |
| | Total | 286.21 | 103.422 | 28.77 | 17.94 | 0 | 0 | 0 | 177.744 | 614.086 | |

Above table shows the month wise and category wise solid waste generated in arts section for year in Kg. It reveals that there is no collection of constructional and glass waste, averagely 25 to 30 Kg paper waste is collected in this section. In plastic waste , hard, soft plastic and carry bags is observed, from total solid waste column of above table it clear that in only April month the solid waste collection is higher(about 116 Kg) and less in month of may it is (about 24 Kg)in other months the collection of solid waste in this section is shown in above table. Total solid waste per year of this section is 614 kg out of that 177 Kg is other waste, 286 Kg is the paper waste and about 150 Kg is the plastic waste generated in this section.

**Graph No 3.23.In Arts section category wise solid waste generated (Kg/Month):**




This graph shows month wise and category wise solid waste generated in Arts section for year in Kg. it reveals that there is no collection of constructional and glass waste, averagely 25 to 30 Kg paper waste is collected in this section. In plastic waste hard, soft plastic and carry bags are observed it is to be roughly of 150 Kg/month.

**Graph No 3.24.Total solid waste collection in Arts section (Kg/Month):**

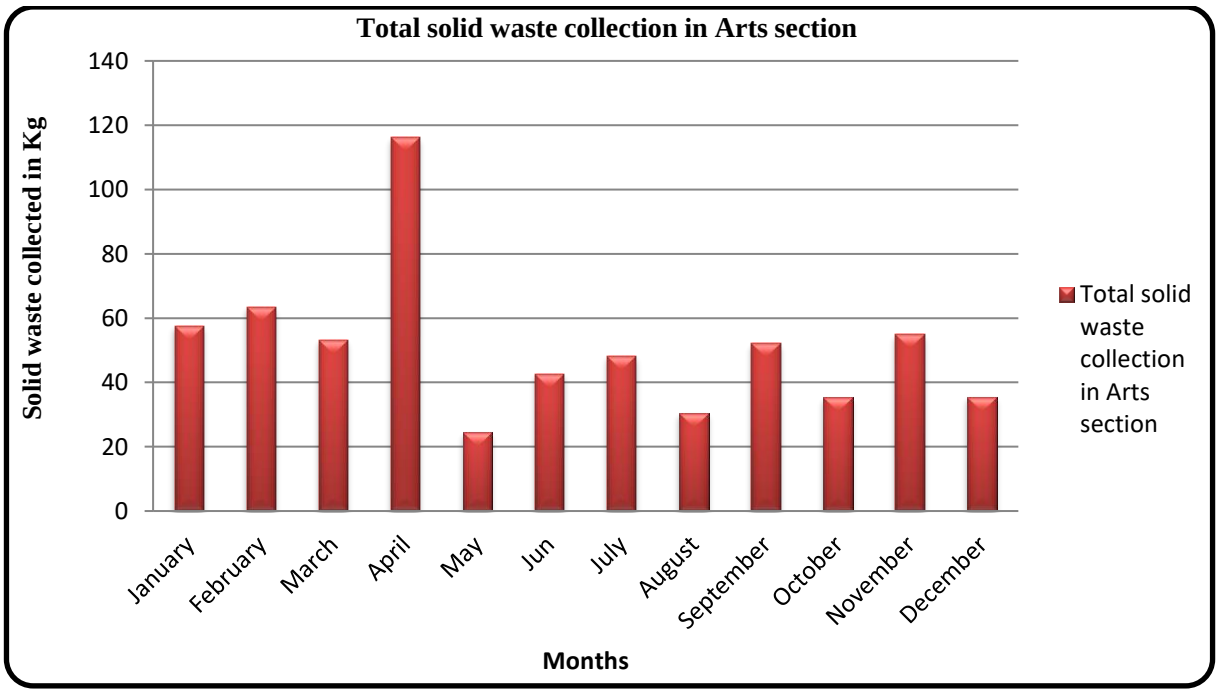



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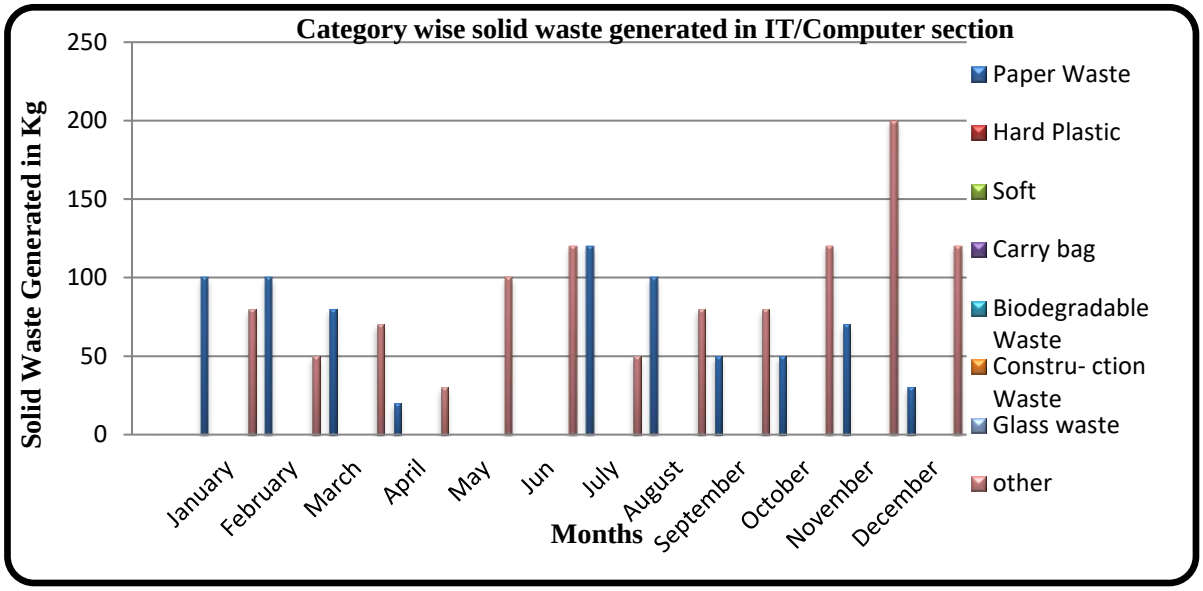
**Table No. 3.21: In IT/Computer section category wise average solid waste generated (Kg/Month):**

| Sr. no | Sections IT/ Computer section | Category of Waste | | | | | | | | Total solid waste | Description |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Paper Waste | Plastic | | | Biode-gradable Waste | Construc- tion Waste | Glass waste | other | | |
| | | | Hard | Soft | Carry bags | | | | | | |
| 1. | January | 100 | 00 | 00 | 00 | 00 | 00 | 00 | 80 | 180 | Moderate |
| 2. | February | 100 | 00 | 00 | 00 | 00 | 00 | 00 | 50 | 150 | |
| 3. | March | 80 | 00 | 00 | 00 | 00 | 00 | 00 | 70 | 150 | |
| 4. | April | 20 | 00 | 00 | 00 | 00 | 00 | 00 | 30 | 50 | Less |
| 5. | May | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 100 | 100 | |
| 6. | Jun | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 120 | 120 | |
| 7. | July | 120 | 00 | 00 | 00 | 00 | 00 | 00 | 50 | 170 | Moderate |
| 8. | August | 100 | 00 | 00 | 00 | 00 | 00 | 00 | 80 | 180 | Moderate |
| 9. | September | 50 | 00 | 00 | 00 | 00 | 00 | 00 | 80 | 130 | |
| 10. | October | 50 | 00 | 00 | 00 | 00 | 00 | 00 | 120 | 170 | Moderate |
| 11. | November | 70 | 00 | 00 | 00 | 00 | 00 | 00 | 200 | 270 | High |
| 12. | December | 30 | 00 | 00 | 00 | 00 | 00 | 00 | 120 | 150 | Moderate |
| | Total | **720** | **00** | **00** | **00** | **00** | **00** | **00** | **1100** | **1820** | |

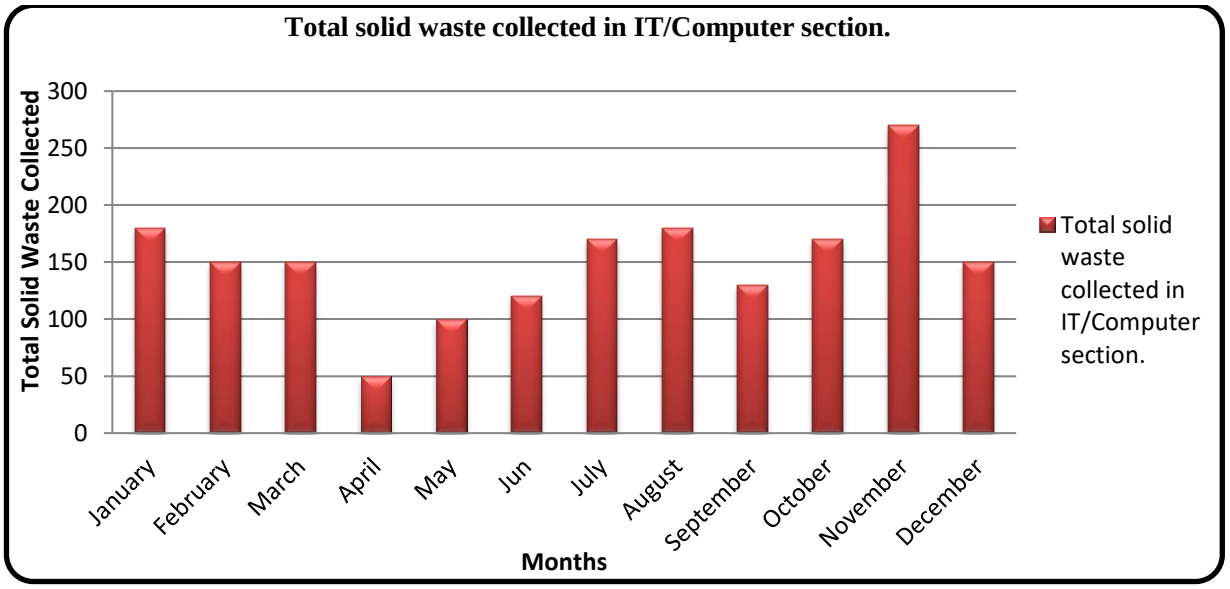
Above table shows the month wise and category wise solid waste generated in I.T/ Computer section for year in Kg. It reveals that there is no collection of constructional, glass, biodegradable and plastic waste is observed only paper and other waste is collected, averagely 60 Kg paper waste and 91Kg other waste is collected in month in this section.

**Graph No 3.25.In IT/Computer section category wise solid waste generated (Kg/Month):**




This graph shows month wise and category wise solid waste generated in IT/Computer section for year in Kg. it reveals that there is no constructional, glass, biodegradable and plastic waste is observed only paper and other waste is collected. High paper and other waste is collected in month of June, July, October, November and December.

**Graph No 3.26.Total solid waste collection in IT/Computer section (Kg/Month):**




This graph shows month wise total solid waste generated in IT/computer section for year in Kg. It reveals that total collection of solid waste in month of November is greater than

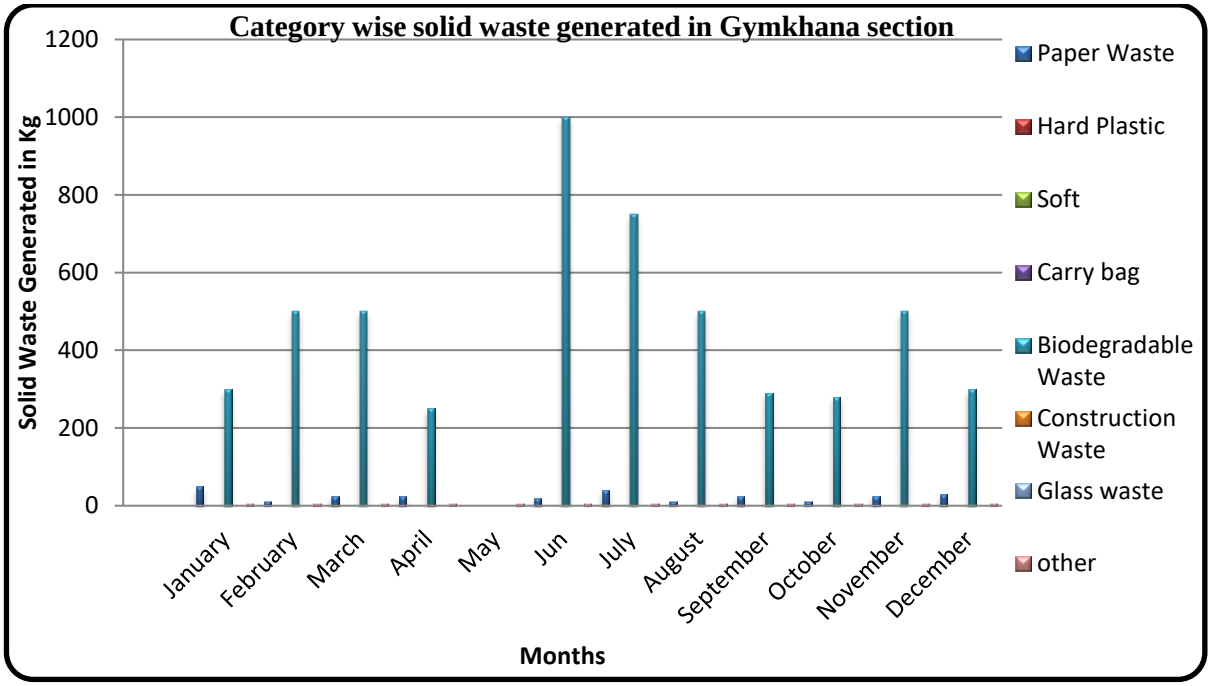
270 Kg and in month of January to March, July to December collection of solid waste is moderate it ranges from 150 to 170 kg per month.

**Table No. 3.22 In Gymkhana section category wise average solid waste generated (Kg/Month):**

| Sr. no | Sections Gymkhana section | Category of Waste | | | | | | | | Total solid waste | Description |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Paper Waste | Plastic | | | Biode-gradable Waste | Construc- tion Waste | Glass waste | other | | |
| | | | Hard | Soft | Carry bags | | | | | | |
| 1. | January | 50 | 0.5 | 0.4 | 00 | 300 | 00 | 00 | 05 | 355.9 | |
| 2. | February | 10 | 00 | 00 | 0.2 | 500 | 00 | 00 | 06 | 516.2 | Moderate |
| 3. | March | 25 | 00 | 00 | 00 | 500 | 00 | 00 | 06 | 531 | Moderate |
| 4. | April | 25 | 00 | 0.5 | 00 | 250 | 00 | 00 | 05 | 280.5 | |
| 5. | May | 00 | 00 | 00 | 00- | 00 | 00 | 00 | 06 | 6 | Less |
| 6. | Jun | 20 | 0.7 | 00 | 0.4 | 1000 | 00 | 00 | 06 | 1027.1 | High |
| 7. | July | 40 | 00 | 00 | 00 | 750 | 00 | 00 | 05 | 795 | |
| 8. | August | 10 | 00 | 0.5 | 00 | 500 | 00 | 00 | 06 | 516.5 | Moderate |
| 9. | September | 25 | 0.2 | 00 | 00 | 290 | 00 | 00 | 06 | 321.2 | |
| 10. | October | 10 | 00 | 00 | 00 | 280 | 00 | 00 | 05 | 295 | |
| 11 | November | 25 | 00 | 0.5 | 0.1 | 500 | 00 | 00 | 06 | 531.61 | Moderate |
| 12. | December | 30 | 0.5 | 00 | 0.2 | 300 | 00 | 00 | 06 | 336.7 | |
| | Total | 270 | 1.9 | 1.9 | 0.7 | 5170 | 0 | 00 | 68 | 5512.5 | |

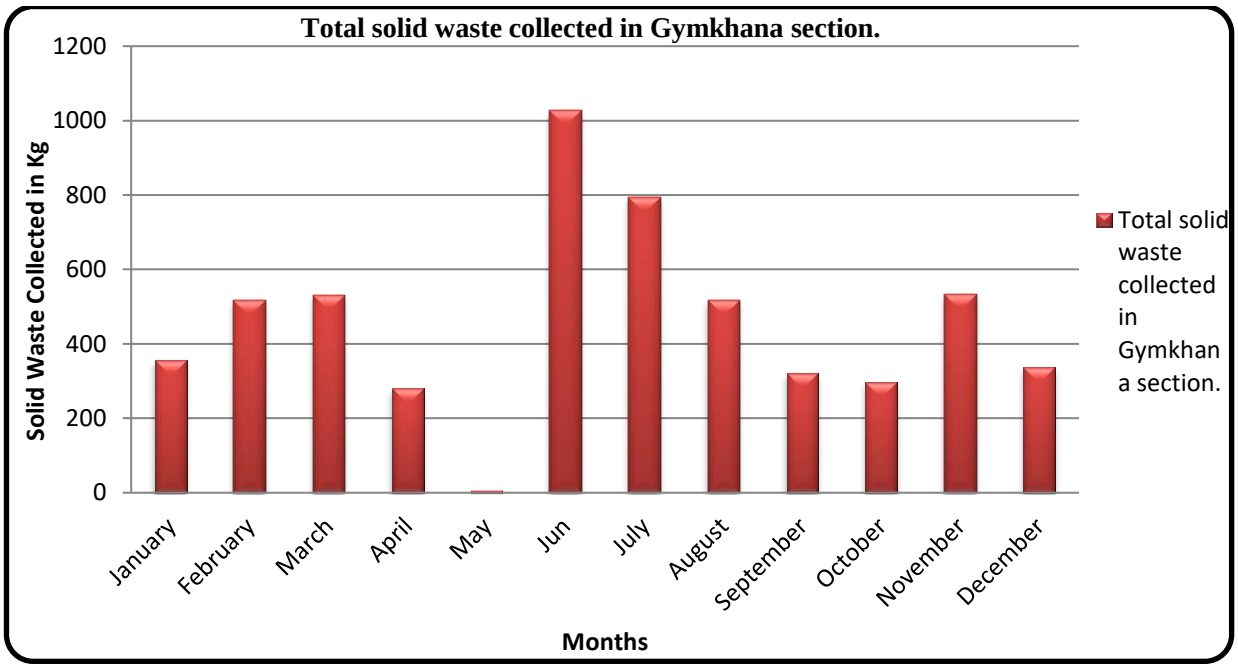
Above table shows the month wise and category wise solid waste generated in Gymkhana section for year in Kg. It reveals that there is no collection of constructional, glass, waste is observed but paper, biodegradable with other waste is collected,, averagely 25 t0 30 Kg paper waste and about 700Kg biodegradable waste is collected in this section.

**Graph No 3.27.In Gymkhana section category wise solid waste generated (Kg/Month):**




This graph shows month wise and category wise solid waste generated in Gymkhana sectionfor year in Kg. it reveals that there is no constructional, glass waste is observed only paper and biodegradable waste is collected. High biodegradable waste is collected in month of June, July, August, February and March.

**Graph No 3.28.Total solid waste collection in Gymkhana section (Kg/Month):**



This graph shows month wise total solid waste generated in Gymkhana section for year in Kg. It reveals that total collection of solid waste in month of June and July is greater about1027 Kg and 800 Kg respectively. In month of February, March, August and November collection of solid waste is moderate .

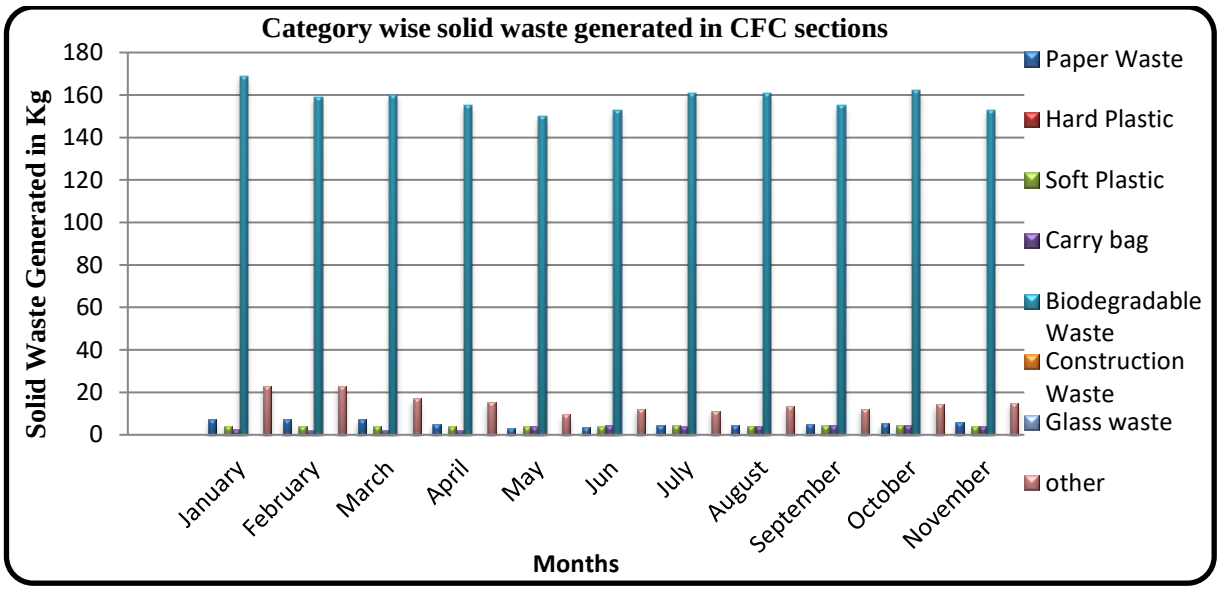
**Table No. 3.23 In Common Facility Center sections category wise average solid waste generated (Kg/Month):**

| Sr. no | Sections Common Facility Centers section | Category of Waste | | | | | | | | Total solid waste | Description |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Paper Waste | Plastic | | | Biode-gradable Waste | Construc- tion Waste | Glass waste | other | | |
| | | | Hard | Soft | Carry bags | | | | | | |
| 1. | January | 7 | 0.300 | 4.25 | 2.55 | 169 | 00 | 0.100 | 23 | **206.2** | High |
| 2. | February | 7 | 0.300 | 4.15 | 2.10 | 159 | 00 | 0.120 | 23 | **195.67** | High |
| 3. | March | 7 | 0.300 | 4.10 | 2.15 | 160 | 00 | 0.112 | 17.20 | **190.862** | |
| 4. | April | 5 | 0.100 | 4.00 | 2.14 | 155 | 00 | 0.100 | 15.20 | **181.54** | |
| 5. | May | 3.2 | 00 | 4.00 | 4.00 | 150 | 00 | 0.100 | 9.50 | **170.8** | Low |
| 6. | Jun | 3.6 | 0.150 | 4.15 | 4.40 | 153 | 00 | 0.120 | 12.10 | **177.52** | |
| 7. | July | 4.3 | 0.350 | 4.50 | 4.10 | 161 | 00 | 0.120 | 11.20 | **185.57** | |
| 8. | August | 4.5 | 0.250 | 4.25 | 4.25 | 161 | 00 | 0.130 | 13.20 | **187.58** | |
| 9. | September | 5 | 0.250 | 4.30 | 4.30 | 155 | 00 | 0.150 | 12.10 | **181.1** | |
| 10. | October | 5.2 | 0.150 | 4.45 | 4.30 | 162 | 00 | 0.125 | 14.20 | **190.425** | |
| 11 | November | 5.8 | 0.100 | 4.10 | 4.16 | 153 | 00 | 0.150 | 15.00 | **182.31** | |
| 12. | December | 6.2 | 0.100 | 4.10 | 4.13 | 160 | 00 | 0.125 | 16.30 | **190.955** | |
| | Total | **63.8** | **2.35** | **50.35** | **42.58** | **1729** | 00 | **1.352** | **182** | **2071.432** | |

Above table shows the month wise and category wise solid waste generated in Common Facility Centers section for year in Kg. It reveals that there is no collection of constructional waste, averagely 05to 07 Kg paper waste is collected in this section. In plastic waste , hard, soft plastic and carry bags is observed, from total solid waste column of above table it clear that in January, February month the solid waste collection is higher (about 200 Kg) and less in month of may it is (about 170 Kg)in other months the collection of solid

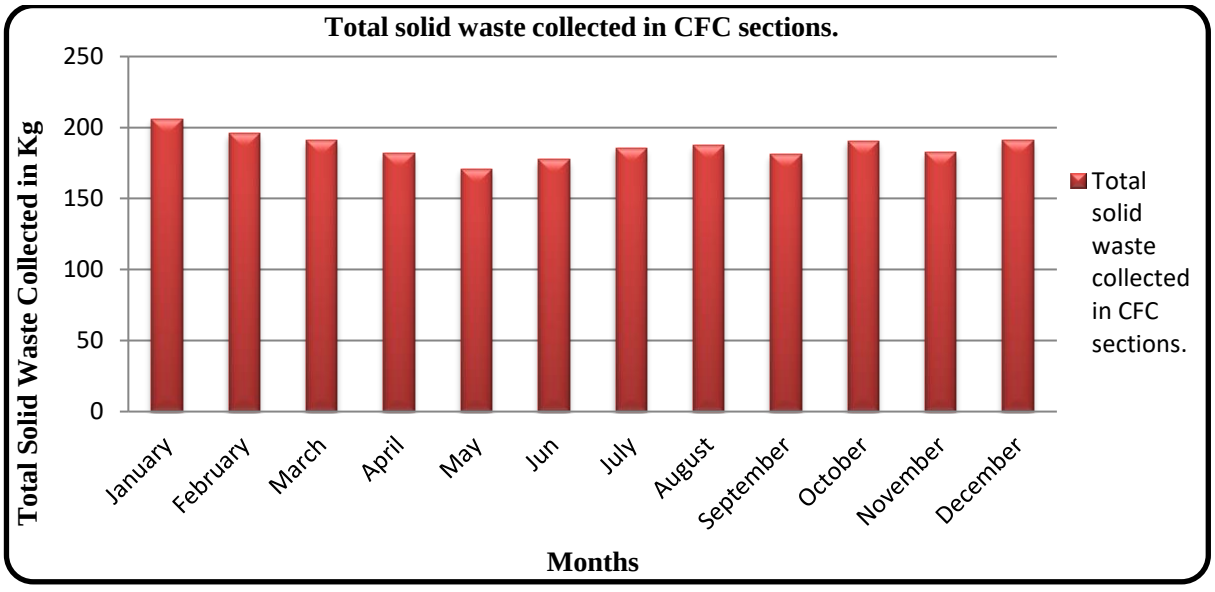
waste in this section is averagely 180 t0 190 Kg. Total solid waste per year of this section is 2071kg out of that182 Kg is other waste, 63.8 Kg is the paper waste, about 94Kg is the plastic waste and 1729 Kg biodegradable waste is collected.

**Graph No 3.29.In Common Facility Center sections category wise solid waste generated (Kg/Month):**




Above graph shows month wise and category wise solid waste generated in CFC sections for year in Kg. it reveals that there is no constructional, glass waste is observed only other and biodegradable waste is collected. High biodegradable waste is collected in throughout year is observed.

**Graph No 3.30. Total solid waste collection in Common Facility center sections (Kg/Month):**



This graph shows month wise total solid waste generated in CFC sections for year in Kg. It reveals that total collection of solid waste in month of June and July is greater about 206 Kg and 195 Kg respectively. In month of May collection of solid waste is loess and in other month of years it is in between 170 to 200 Kg.

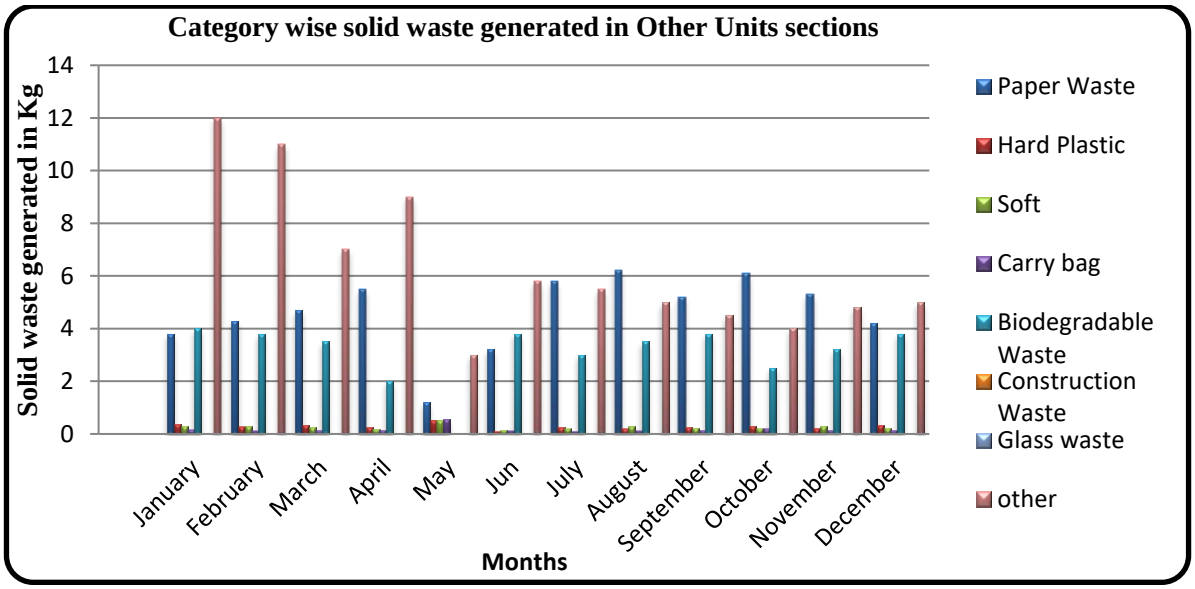
**Table No. 3.24: In other units sections category wise average solid waste generated (Kg/Month):**

| Sr. no | Sections Other Units section | Category of Waste | | | | | | | | Total solid waste | Description |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Paper Waste | Plastic | | | Biode-gradable Waste | Construction Waste | Glass waste | other | | |
| | | | Hard | Soft | Carry bags | | | | | | |
| 1. | January | 3.8 | 0.368 | 0.300 | 0.160 | 4.0 | 00 | 00 | 12 | **20.628** | High |
| 2. | February | 4.3 | 0.270 | 0.280 | 0.125 | 3.8 | 00 | 00 | 11 | **19.775** | High |
| 3. | March | 4.7 | 0.350 | 0.250 | 0.150 | 3.5 | 00 | 00 | 7 | **15.95** | |
| 4. | April | 5.5 | 0.250 | 0.180 | 0.155 | 2.0 | 00 | 00 | 9 | **17.085** | |
| 5. | May | 1.2 | 0.50 | 0.50 | 0.55 | 00 | 00 | 00 | 3 | **5.75** | Low |
| 6. | June | 3.2 | 0.120 | 0.150 | 0.125 | 3.8 | 00 | 00 | 5.8 | **13.195** | |
| 7. | July | 5.8 | 0.250 | 0.200 | 0.100 | 3.0 | 00 | 00 | 5.5 | **14.85** | |
| 8. | August | 6.2 | 0.200 | 0.280 | 0.125 | 3.5 | 00 | 00 | 5 | **15.305** | |
| 9. | September | 5.2 | 0.250 | 0.225 | 0.150 | 3.8 | 00 | 00 | 4.5 | **14.125** | |
| 10. | October | 6.1 | 0.300 | 0.200 | 0.200 | 2.5 | 00 | 00 | 4 | **13.3** | |
| 11 | November | 5.3 | 0.225 | 0.280 | 0.135 | 3.2 | 00 | 00 | 4.8 | **13.94** | |
| 12. | December | 4.2 | 0.325 | 0.225 | 0.140 | 3.8 | 00 | 00 | 5 | **13.69** | |
| | Total | **55.5** | **3.408** | **3.07** | **2.115** | **36.9** | 00 | 00 | **76.6** | **177.593** | |

Above table shows the month wise and category wise solid waste generated in other units section for year in Kg. It reveals that there is no collection of constructional and glass waste, averagely 03to 04 Kg paper waste is collected in this section. In plastic waste , hard, soft plastic and carry bags is observed, from total solid waste column of above table it clear that in January, February month the solid waste collection is higher(about 20 Kg) and less in month of may it is (about 5.75 Kg)in other months the collection of solid waste in this section is averagely 13 t0 19 Kg. Total solid waste per year of this section is 1781kg out of that 76

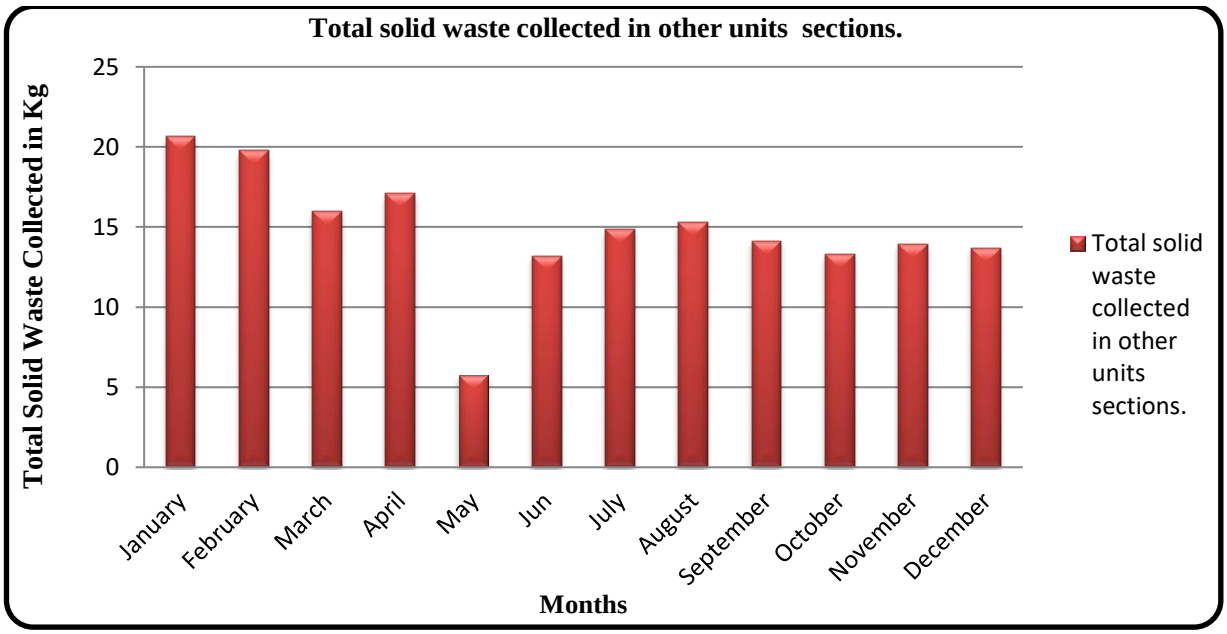
Kg is other waste, 55 Kg is the paper waste, about 9 Kg is the plastic waste and 36 Kg biodegradable waste is collected.

**Graph No 3.31.In other units sections category wise solid waste generated (Kg/Month):**




Above graph shows month wise and category wise solid waste generated in Other Units sections for year in Kg. it reveals that there is no constructional, glass waste is observed only other and biodegradable waste is collected. High other waste is collected in throughout year is observed.

**Graph No 3.32. Total solid waste collection in Other Units sections (Kg/Month):**



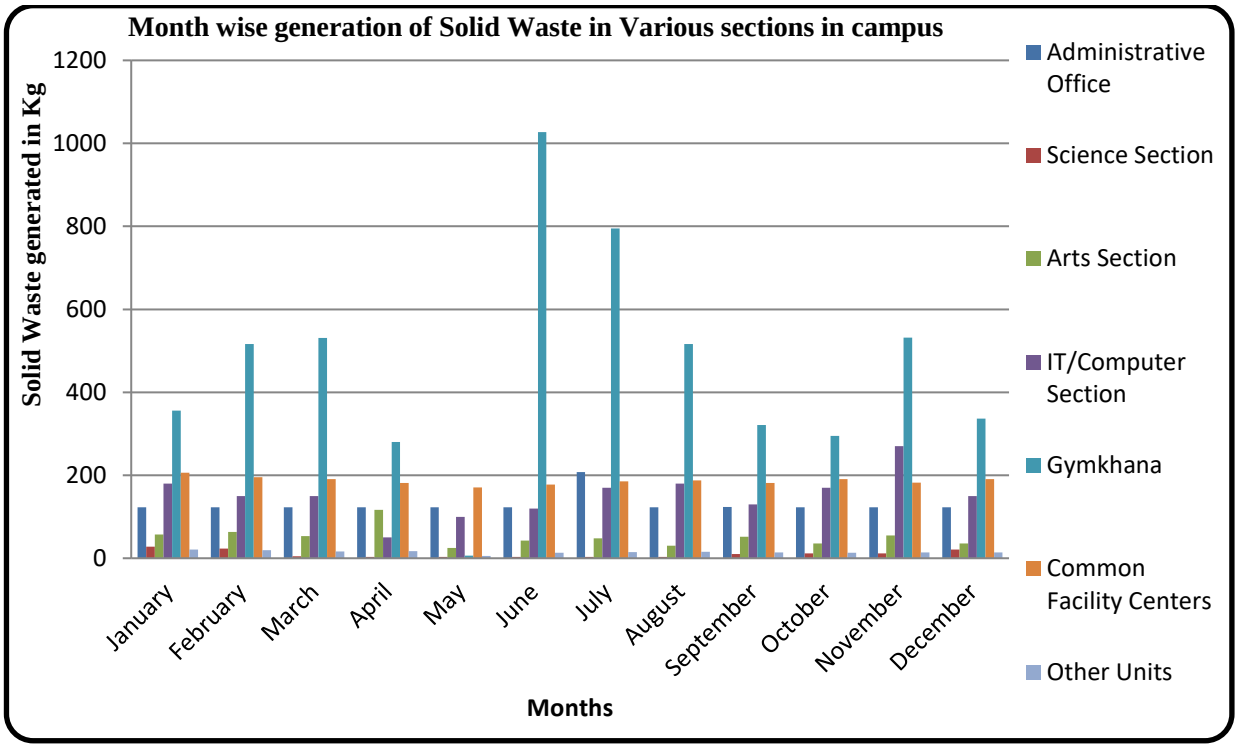
Above graph shows month wise total solid waste generated in Other Units sections for year in Kg. It reveals that total collection of solid waste in month of January and February is greater about 20Kg and 19 Kg respectively. In month of May collection of solid waste is less(6 Kg) and in other month of years it is in between 12 to 15Kg.

**Table No. 3.25.Month wise generation of Solid Waste in Various sections in campus:**

| Sr. no. | Month | Sections | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| | | Admini-strative Office | Science Section | Arts Section | IT/Computer Section | Gymkhana | Common Facility Centers | Other Units | |
| 1 | Jan. | 122.75 | 27.85 | 57.533 | 180 | 355.9 | 206.2 | 20.628 | 970.861 |
| 2 | Feb. | 122.751 | 22.99 | 63.412 | 150 | 516.2 | 195.67 | 19.775 | 1090.798 |
| 3 | March | 122.95 | 5.04 | 53.177 | 150 | 531 | 190.862 | 15.95 | 1068.979 |
| 4 | April | 122.75 | 3.13 | 116.255 | 50 | 280.5 | 181.54 | 17.085 | 771.26 |
| 5 | May | 122.75 | 3.13 | 24.56 | 100 | 6 | 170.8 | 5.75 | 432.99 |
| 6 | Jun. | 122.835 | 3.13 | 42.631 | 120 | 1027.1 | 177.52 | 13.195 | 1506.411 |
| 7 | July | 207.835 | 3.13 | 48.198 | 170 | 795 | 185.57 | 14.85 | 1424.583 |
| 8 | Aug. | 123 | 3.13 | 30.456 | 180 | 516.5 | 187.58 | 15.305 | 1055.971 |
| 9 | Sept. | 123.25 | 10.278 | 52.071 | 130 | 321.2 | 181.1 | 14.125 | 832.024 |
| 10 | Oct. | 123.095 | 11.64 | 35.329 | 170 | 295 | 190.425 | 13.3 | 838.789 |
| 11 | Nov. | 123.10 | 11.65 | 54.968 | 270 | 531.61 | 182.31 | 13.94 | 1187.578 |
| 12 | Dec. | 123.095 | 20.98 | 35.496 | 150 | 336.7 | 190.955 | 13.69 | 870.916 |
| Total | | 1560.16 | 126.078 | 614.086 | 1820 | 5512.71 | 2240.532 | 177.59 | 12051.161 |

Above table clearly give at glance detail of the month wise generation of solid waste in various sections in campus. It shows that highest solid waste collection is from Gymkhana which is 5512Kg throughout year while lowest solid state collection is from science section (126Kg). The total solid waste collection per year from different sections of campus is (12051Kg). Also less Solid waste is generated in month of May (432Kg) while less solid waste generated in month of Jun and November respectively(1506Kg) and(1187 Kg).This large amount of biodegradable solid waste till yet not used for vermi-composting .

**Graph No. 3.33. Month wise generation of Solid Waste in Various sections in campus (Kg):**

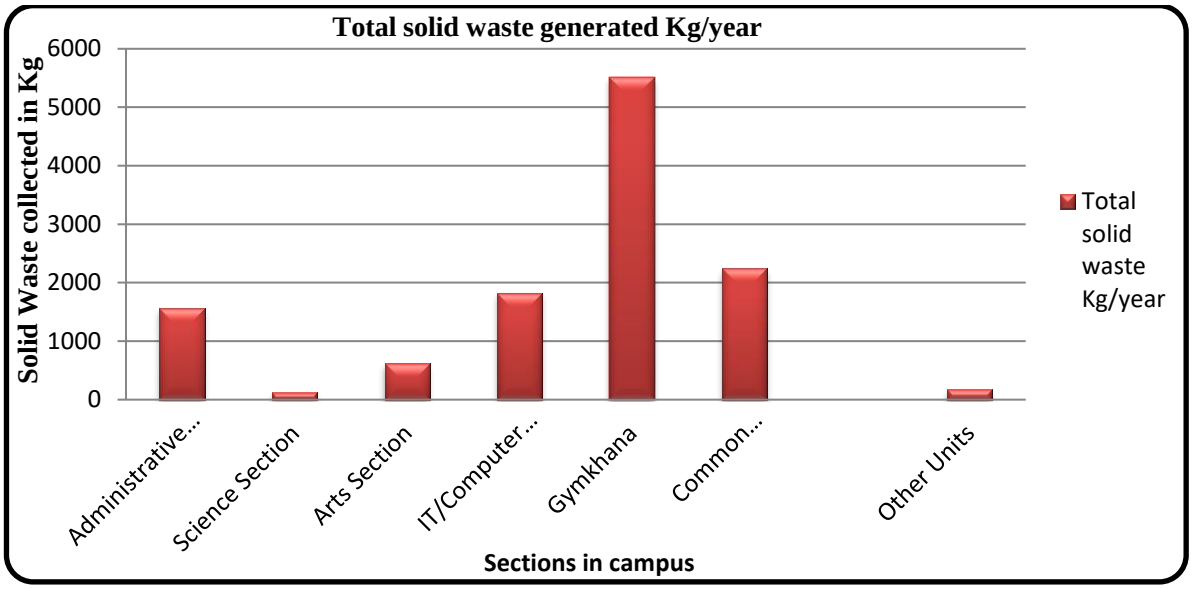



Above graph reveals detail of the month wise generation of solid waste in various sections in campus. It shows that highest solid waste collection is from Gymkhana and Common Facility centers sections while lowest solid state collection is from science and other units section. Also less Solid waste is generated in month of May while high solid waste generated in month of November and Jun .

**Table No. 3.26.Generation of Solid Waste in Various sections in campus in Kg/Year:**

| Sr. no | Sections | Total solid waste Kg/year | Percentage (%)with Total | Description |
|---|---|---|---|---|
| 1. | Administrative Office | 1560.16 | 12.94 | |
| 2. | Science Section | 126.078 | 1.04 | Less |
| 3. | Arts Section | 614.086 | 5.09 | |
| 4. | IT/Computer Section | 1820 | 15.10 | |
| 5. | Gymkhana | 5512.71 | 45.73 | high |
| 6. | Common Facility Centers | 2240.532 | 18.59 | |
| 7. | Other Units | 177.59 | 1.47 | |
| | Total | 12051.16 | 100 | |

**Graph No. 3.34. Graph Generation of Solid Waste in Various sections in campus in Kg/Year:**




Above table and graph shows section wise total solid waste generated in college campus, in table the percentage of solid waste generated in each sections of campus with total solid waste generated in year at is shown. It shows that about 45% of total solid waste is generated in Gymkhana section and only 1.05 % of total solid waste is generated by science section.

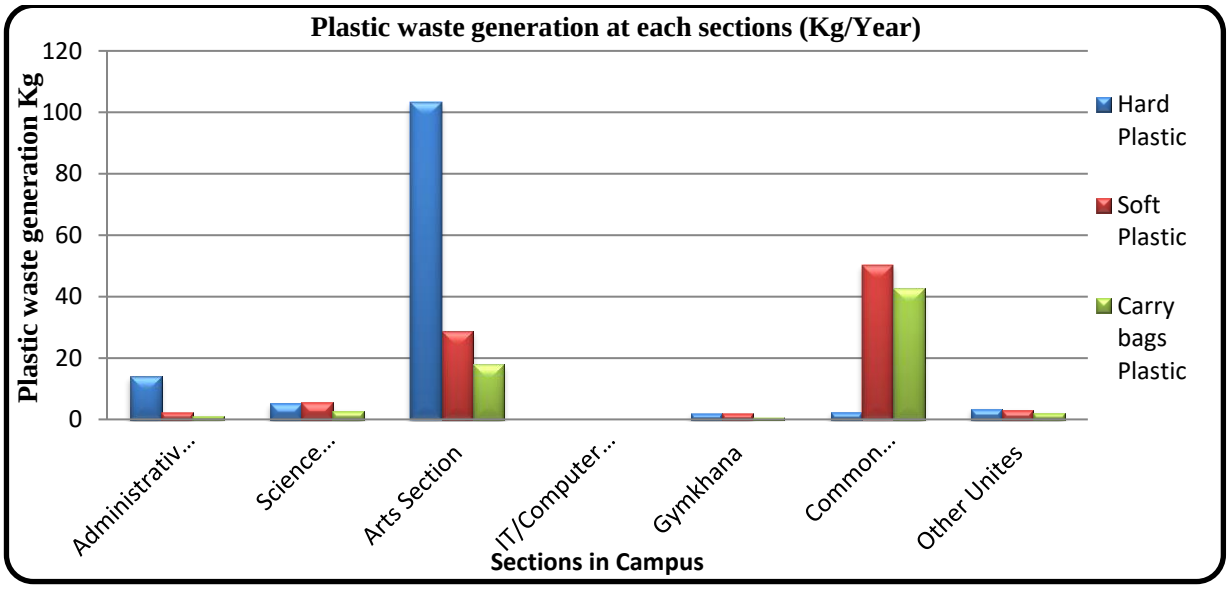
**Table No. 3.27. Category wise Plastic waste generation at each section in campus. (Kg/year):**

| Sr. no | Sections | Hard Plastic | Soft Plastic | Carry bags Plastic | Total plastic |
|---|---|---|---|---|---|
| 1. | Administrative Office | 14 | 2.250 | 1.135 | 17.385 |
| 2. | Science Section | 5.23 | 5.40 | 2.75 | 13.38 |
| 3. | Arts Section | 103.422 | 28.77 | 17.94 | 150.132 |
| 4. | IT/Computer Section | 00 | 00 | 00 | 0 |
| 5. | Gymkhana | 1.9 | 1.9 | 0.7 | 4.5 |
| 6. | Common Facility Centers | 2.35 | 50.35 | 42.58 | 95.28 |
| 7. | Other Units | 3.408 | 3.07 | 2.115 | 8.593 |
| Total | | 130.31 | 91.74 | 67.22 | 289.27 |
| % with total | | 45.04% | 31.72% | 23.24% | 100 |

Above table gives the data of category wise plastic waste generation at each section in campus. It is clear from table 45.04% of total plastic waste generated is the hard plastic , remaining 31.72% of plastic waste is the soft plastic and only 23.24% of plastic waste are

carry bags are observed which can't be decomposed by any mean .If these are not properly destroyed Which produces an environment pollution, soil pollution, water pollution etc.

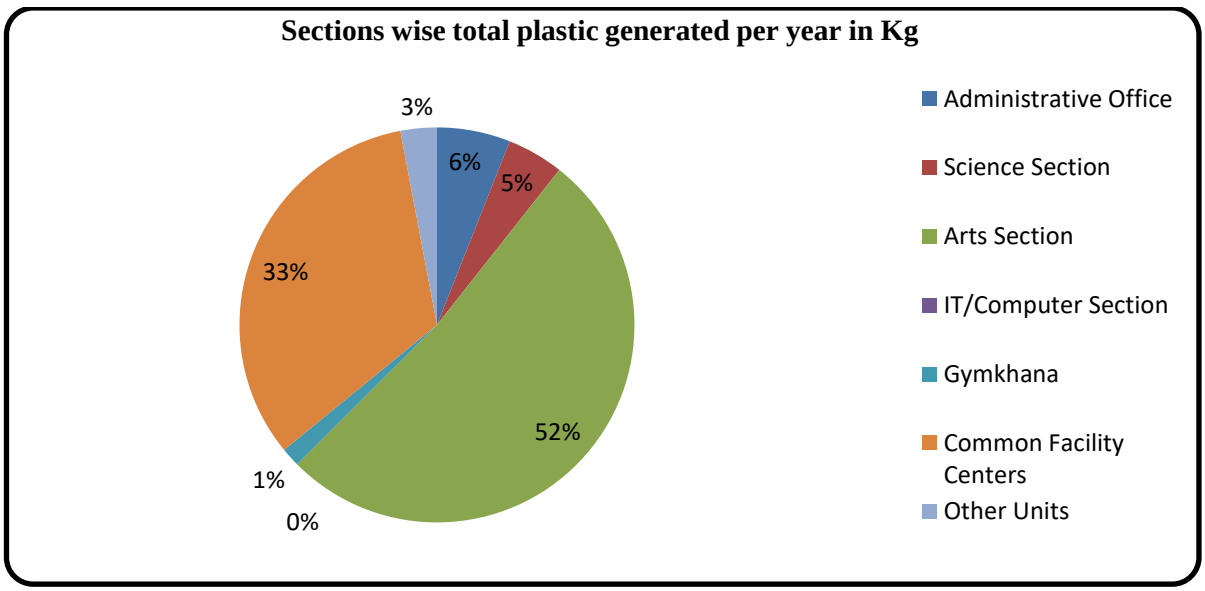
**Graph No. 3.35. Plastic waste generation at each sections (Kg/Year):**




Graph shows the total plastic waste generation at each section per year in campus.

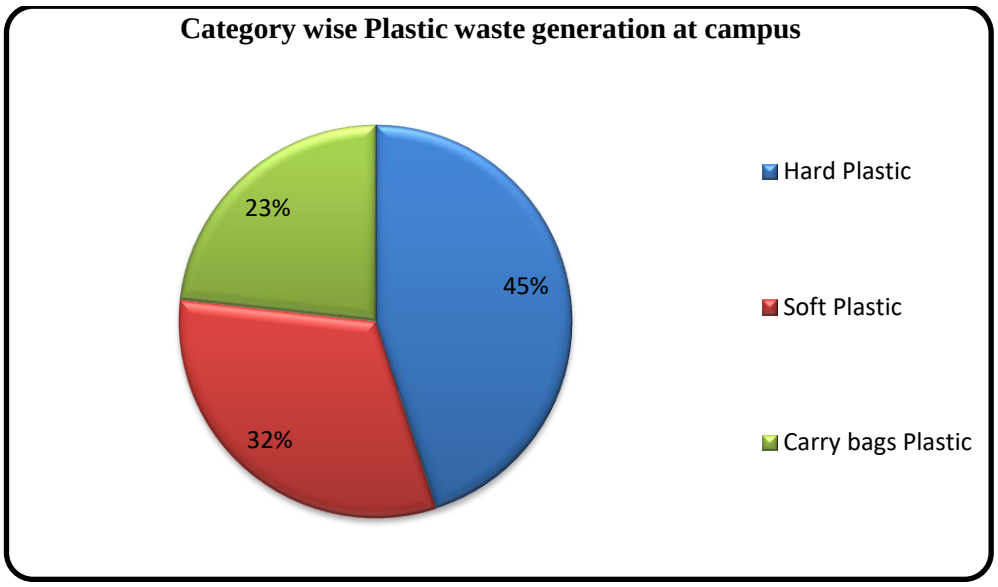
It is clear from table major hard plastic waste generated in Arts section and in Administrative office section of campus while very small amount of hard plastic waste is generated at science section and other unit sections of campus. Major carry bag plastic waste source in campus is common facility centers while minor carry bag plastic waste is generated gymkhana and science section.

**Graph No. 3.36. Section wise Plastic waste generation in year (Kg/Year):**



This pie graph shows the section wise plastic waste generation in campus per year. From above Pie graph it is clear that major plastic waste about 52% generated in Arts section and about 33% plastic waste generated in common facility sections , Administrative office section of campus, while very small amount of plastic waste is generated at science section and other unit sections of campus. Major carry bag plastic waste source in campus is common facility centers while minor carry bag plastic waste is generated gymkhana and science section.

**Graph No. 3.37. Category wise Plastic waste generated at campus:**




Above pie graph shows the category wise plastic waste generation at campus in auditing year. From above pie graph it is clear that major plastic waste generated is hard plastic category about 45% of total plastic is hard plastic, 32% is soft plastic and about 23% plastic is of carry bags plastic category.

### 3.4 Water audit:

Water is our most precious resource. Without it no plant or animal can survive. India is predicted to become drier, because of rising population and urban demand so the need to save water and ensure sustainability will grow. We all have a role to play by reducing our usage of water. We can secure our water supply for generations to come. We have to find new ways of source and preserve our precious water and we need educational institute to help by saving as much water as they can. This will save the money and reduce the impact on the environment.

Now-a-day colleges have become more aware regarding usage of water .The water audit of educational institute provide a fun and educational way to investigate ways that water is used every day, determine which areas of the campus may be causing problems and to spread the message of water conservation. These investigations will help to minimize water loss by detecting leakages and faulty fixtures so they can be repaired as soon as possible. This guideline will help to understand where and how more water is being used in our institute. It is divided into three parts; Part 1: Assessment of Water requirement in institute campus, Part 2 :Water storages in campus and Part 3 : collect information about water losses in campus. We all have a role to play so we can reduce our water usage and we can secure our water supply for generations to come. The Water Corporation has been finding new ways to preserve our precious water, and we need educational institutes to help by saving as much water as they can.

### 3.3.1 Water and waste water audit:

A water audit is an on-site survey and assessment of water using hardware, fixtures, equipment, landscaping, and management practices to determine the efficiency of water and to develop recommendations for improving water use efficiency. In simple words, a water audit is a systematic review of a site that identifies the quantities and characteristics of all water uses. The site may vary from a public water utility, facility (institutional or commercial properties like malls, office, schools etc.) or a household. The overall objective of conducting a water audit is to identify opportunities to preserve and save water more efficiently.

Since, water uses vary greatly from one type of business or institution to another and from site to site, water audit is crucial to determine quantity, nature and quality of water consumption. Water audit for water utility refers to tracking, assessing and validating all components of flow from the site of withdrawal or treatment through the water distribution

system and into the consumer's properties. On the other hand, water audit of an office building would review direction and quantity of water used for domestic, cooling/heating, sanitary and landscaping processes. Whereas usage of water for domestic purpose , audit examines the major areas in which a facility uses water, including human consumption, personal hygiene and sanitation, washing, cleaning, laundry, gardening etc.

Water audit comprises of preparation of layout of water sources, distribution network, and service / delivery points to water users and return flow of waste or excess water. The layout should include locations and capacities of flow measurement devices installed at key points, dimensions of pipes and fittings in the water supply system, locations and particulars of flow control devices and history sheets of all measuring and control devices including pipes and fittings. A study of the availability of water sources and past consumption patterns for various sectors is necessary to understand the present water utilization and projecting future requirement. Data on development of sustainable source of water through rainwater harvesting and effluent recycling should also be taken into consideration.

**3.3.2 Water Audit of college:** Data related the water audit is collected by circulating questionnaires, from water user profiles of it there are roughly 1007students, 106 employers, 27 visitors on an average come each day in campus.

**3.3.2.1 Assessment of water requirement at different sites in college:** It includes Bathroom , Toilet, Laboratory, Kitchen, Garden , Shower , Drinking , Washing etc sites in college campus and water consumption on these sites were studied .

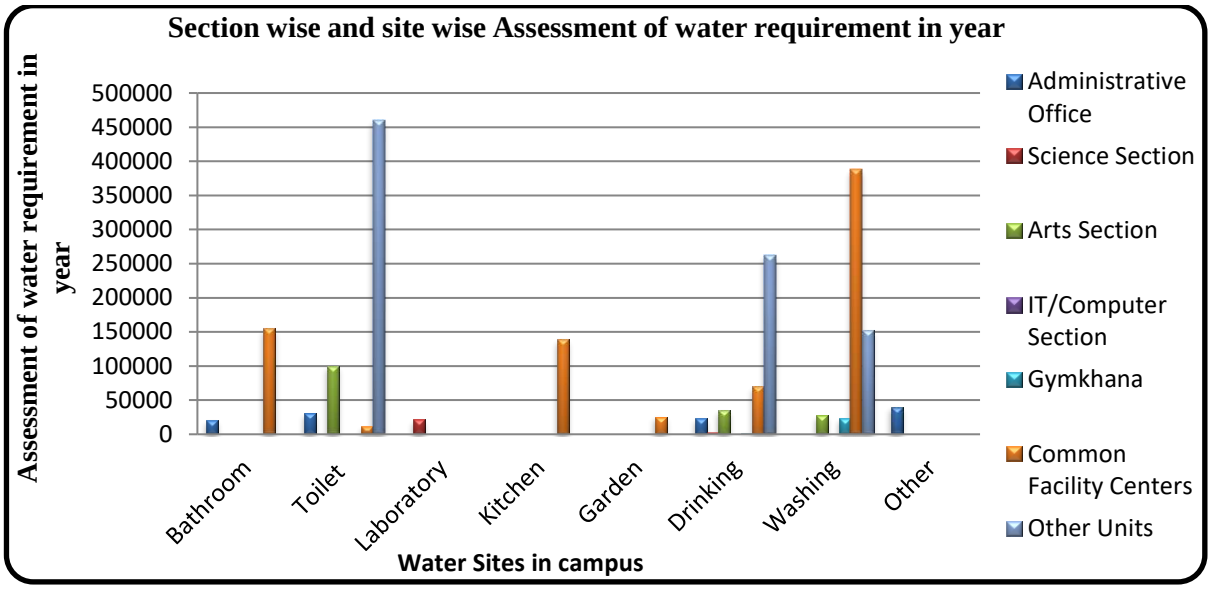
**Table No.3.28 Section wise and site wise Assessment of water requirement in year in liters:**

| Sr. no | Sections | Sites | | | | | | | | Total per year | Total per month |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Bathroom | Toilet | Laboratory | Kitchen | Garden | Drinking | Washing | Other | | |
| 1. | Administrative Office | 20160 | 31104 | 00 | 00 | 00 | 23040 | 00 | 39760 | 114064 | 9505 |
| 2. | Science Section | 00 | 00 | 21517.2 | 00 | 00 | 2570 | 00 | 00 | 24087 | 2007 |
| 3. | Arts Section | 00 | 99738 | 00 | 00 | 00 | 34953 | 27744 | 178.11 | 162613 | 13551 |
| 4. | IT/Computer Section | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 0 | 00 |
| 5. | Gymkhana | 00 | 00 | 00 | 00 | 00 | 1926 | 22950 | 00 | 24876 | 2073 |
| 6. | Common Facility Centers | 155036 | 11450 | 00 | 138460 | 25500 | 69417 | 388160 | 00 | 788023 | 65669 |
| 7. | Other Units | 00 | 460300 | 00 | 00 | 00 | 262335 | 152545 | 00 | 875180 | 72932 |
| Total | | 175196 | 602592 | 21517.2 | 138460 | 25500 | 394241 | 591399 | 39938 | 1988843 | 165737 |
| % with yearly requirement | | 8.80% | 30.28 % | 1.08% | 6.97% | 1.28% | 19.82% | 29.73% | 2.04% | 100% | |

**Yearly average water consumption at different sites of all sections at college premises is as below:**

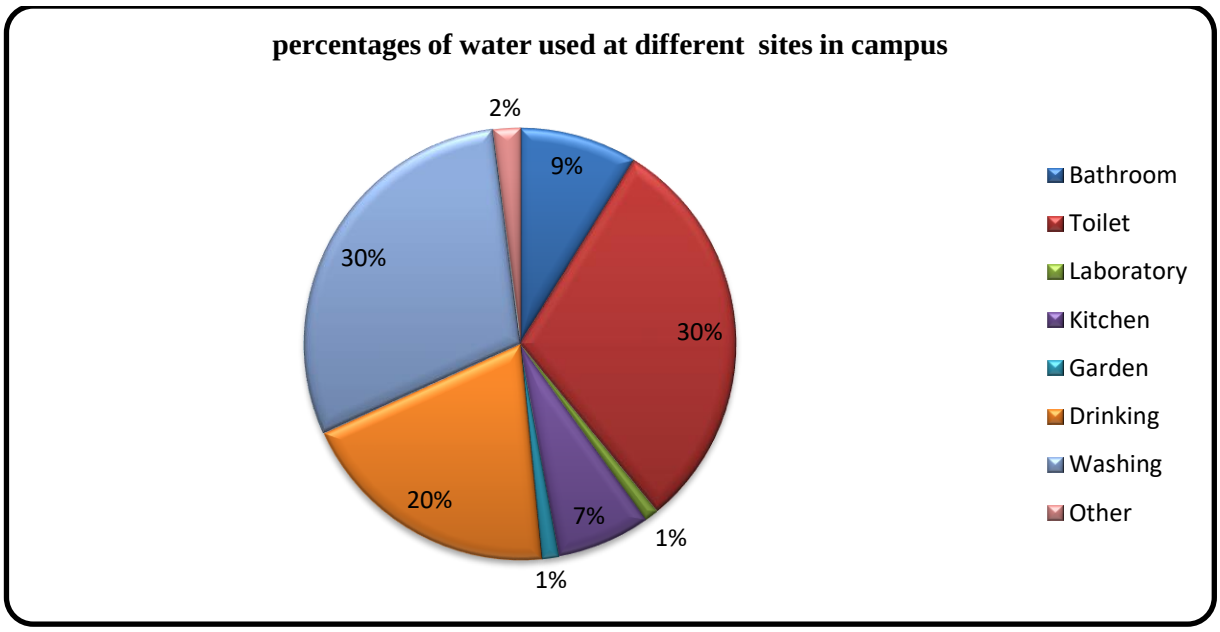
The total water consumption at different sites in college premise is 19,88,843 liters/ per year. The maximum water used to toilet purpose is 6,02,592 liters/ year ( 30.28%) ,to keep infrastructure clean washing is required, for washing purpose 5,91,399 liters of water per year is used which is around( 29.73%) ,followed by for drinking purpose throughout the year 3,94,241 liters water is used which is (19.82%) of total requirement of water. In campus for bathroom purpose 175196 liters per year water is used(8.80%) , for kitchen use 138460 liter water used per year which is (6.97%) of total requirement of water while laboratories require 21,517 liters water is required for practical purpose. For watering the plants 25,500 liters (i.e.1.28%) water used per year. Table also focus light on monthly average requirement of water is about 1,65,737 liter.

**Graph No.3.38 Section wise and site wise Assessment of water requirement in year in liters:**




Above graphical presentation reveals that section wise and site wise water assessment of water requirement per year in which maximum water use is seen in other units section for toilet purpose, at common facility centers sections for bathroom, kitchen and purpose. Major part of water used for curing new construction which is recorded in other purpose.

**Graph No.3.39.Percentage of water use at different sites in campus:**




Above pie graph shows that out of total used water 30% water is used for washing,30% used for washing, about 20% used for drinking, 9% used for bathroom purpose, 7% used for kitchen and remaining is used for laboratory, garden and other purposes such as for constructional.

**Table No.3.29 Site wise assessment of water requirement in year in liters**

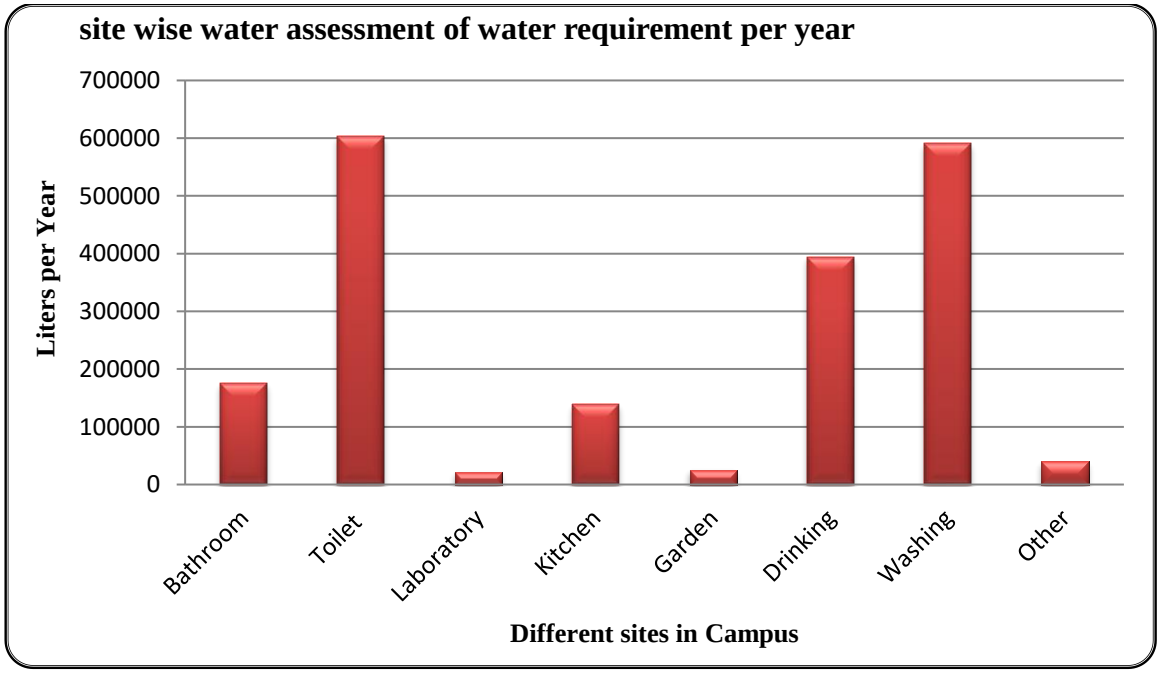
| Sr.No | Sections | Bathroom | Toilet | Laboratory | Kitchen | Garden | Drinking | Washing | Other |
|---|---|---|---|---|---|---|---|---|---|
| 1. | Administrative Office | 20160 | 31104 | 00 | 00 | 00 | 23040 | 00 | 39760 |
| 2. | Science Section | 00 | 00 | 21517.2 | 00 | 00 | 2570 | 00 | 00 |
| 3. | Arts Section | 00 | 99738 | 00 | 00 | 00 | 34953 | 27744 | 178.11 |
| 4. | IT/Computer Section | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 5. | Gymkhana | 00 | 00 | 00 | 00 | 00 | 1926 | 22950 | 00 |
| 6. | Common Facility Centers | 155036 | 11450 | 00 | 138460 | 25500 | 69417 | 388160 | 00 |
| 7. | Other Unites | 00 | 460300 | 00 | 00 | 00 | 262335 | 152545 | 00 |
| Total | | 175196 | 602592 | 21517.2 | 138460 | 25500 | 394241 | 591399 | 39938.11 |

Above table reveals that site wise water assessment of water requirement per year in which maximum water use is seen at toilet site (6,02,592Liters) , at washing sites (5,91,399 Liters) and at drinking site(3,94,241 Liters). The minimum water use at Laboratory (21,517 Liters), Garden (25,500 Liters) and other sites (39,938 Liters) while at bathroom site and at kitchen site it requires adequate.

**Table No.3.30 Total Site wise assessment of water requirement in year in liters**

| Bathroom | Toilet | Laboratory | Kitchen | Garden | Drinking | Washing | Other |
|---|---|---|---|---|---|---|---|
| 175196 | 602592 | 21517.2 | 138460 | 25500 | 394241 | 591399 | 39938.11 |

**Graph No.3.40.Site wise assessment of water requirement in year in liters:**



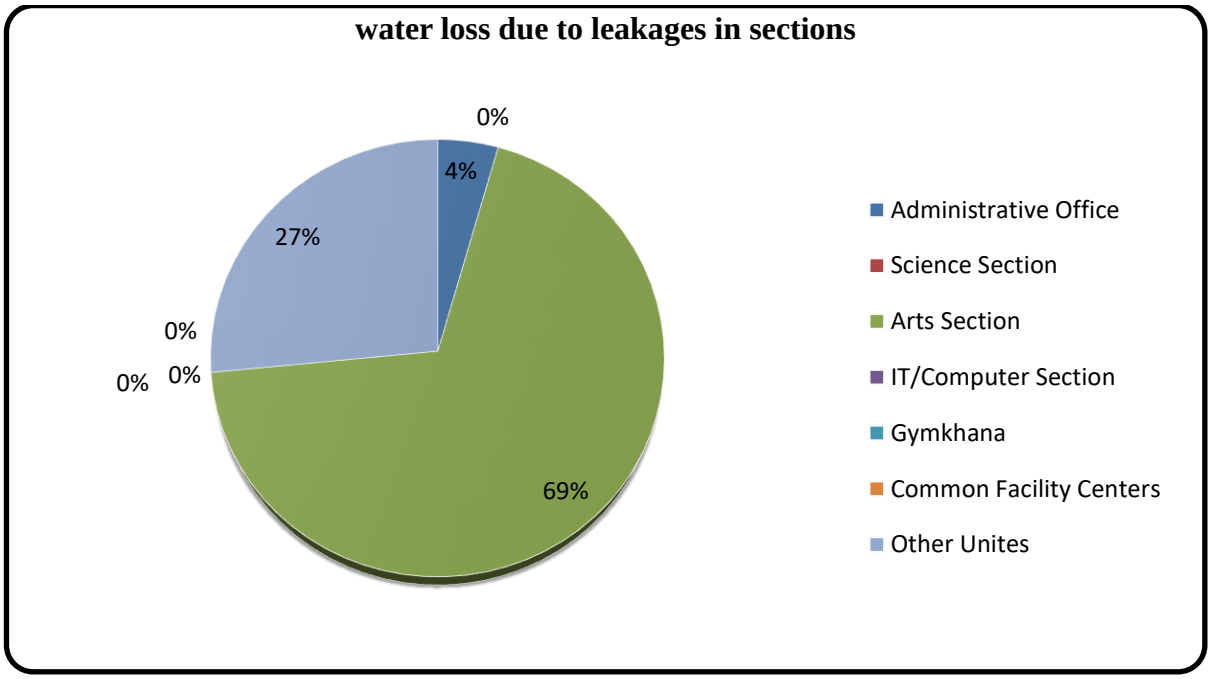
Above Table No.3.30 and Graph No.3.40 commonly reveals that site wise water assessment of water requirement per year in which maximum water use is seen at toilet site, at washing sites and at drinking site. Water requirement assessment shows less water used at Laboratory, Garden and other sites.

**Table No.3.31. Section wise Average Water Losses (Leakages) and water consumed in year in liters:**

**Section wise Average Water Losses (Leakages)**

| Sections | Administrative Office | Science Section | Arts Section | IT/Computer Section | Gymkhana | Common Facility Centers | Other Unites |
|---|---|---|---|---|---|---|---|
| water loss due to leakages in sections | **4320** | 00 | **67392** | 00 | 00 | **00** | **25920** |

**Graph No. 3.41. Section wise percentage of loss of water by leakages:**



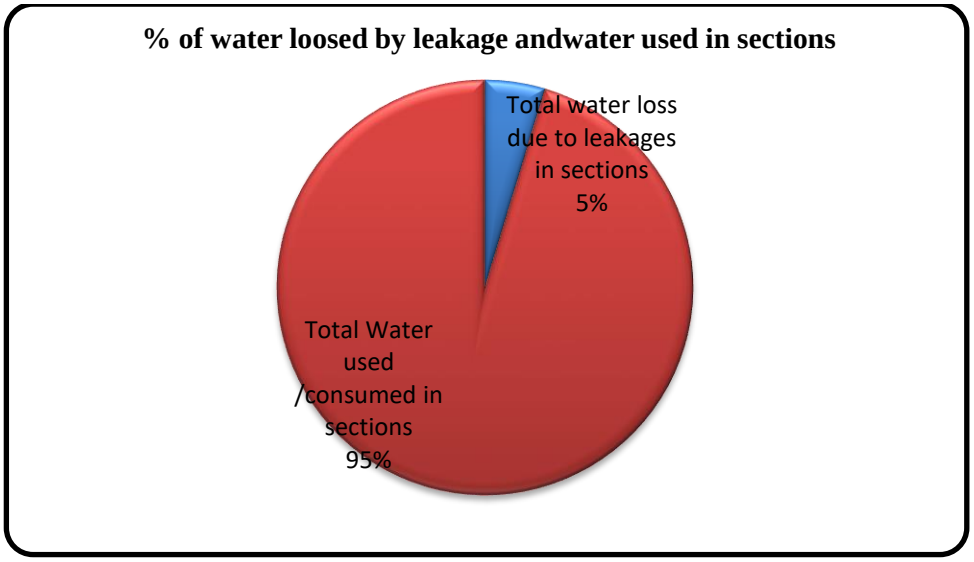

Above pie graph shows the section wise percentage of water leakages in college campus. Here water losses due to leakages is more at arts section ( at Male female urinals ) and water losses of **67,392** liters per year are recorded in this section. Here 69% of total water loss due to leakages is loosed at arts section. About 27% and 4% of total loss of water due to leakages is loosed at administrative office and common facility centers sections.

**Table No.3.32.Section wise Average Water Losses (Leakages) and water consumed in year in liters:**

| Sections | Administrative Office | Science Section | Arts Section | IT/Computer Section | Gymkhana | Common Facility Centers | Other Unites | Total |
|---|---|---|---|---|---|---|---|---|
| Total water loss due to leakages in sections | **4320** | 00 | **67392** | 00 | 00 | **00** | **25920** | **97632** |
| Total Water used /consumed in sections | **114064** | 24087 | 162613 | 00 | 24876 | 788023 | 875180 | **1988843** |
| Total water utilized at campus in different section | 118384 | 24087 | 230005 | 00 | 24876 | **788023** | 901100 | **2086475** |

Above table average water losses due to leakages observed in at different water consuming site, as well as and total water consumed at college campus in year in liters. Which clears in all sections about **97,632** liters per year water is loosed due to some small and large leakages. At time of the site verification we can seen some large leakages hence plumbing survey of water supplying line is necessary. In campus throughout year actual requirement of water from above chart is **19,88,843** liters, but due to losses by the leakages it is increases to **20,86,475** liters per year. It means our requirement of water at campus increases by 5% only by leakages which not only loss the water but also increases electricity bills/ charges for refilling, etc.

**Graph No. 3.42. Percentage of water loosed by leakage and percentage water used in campus:**



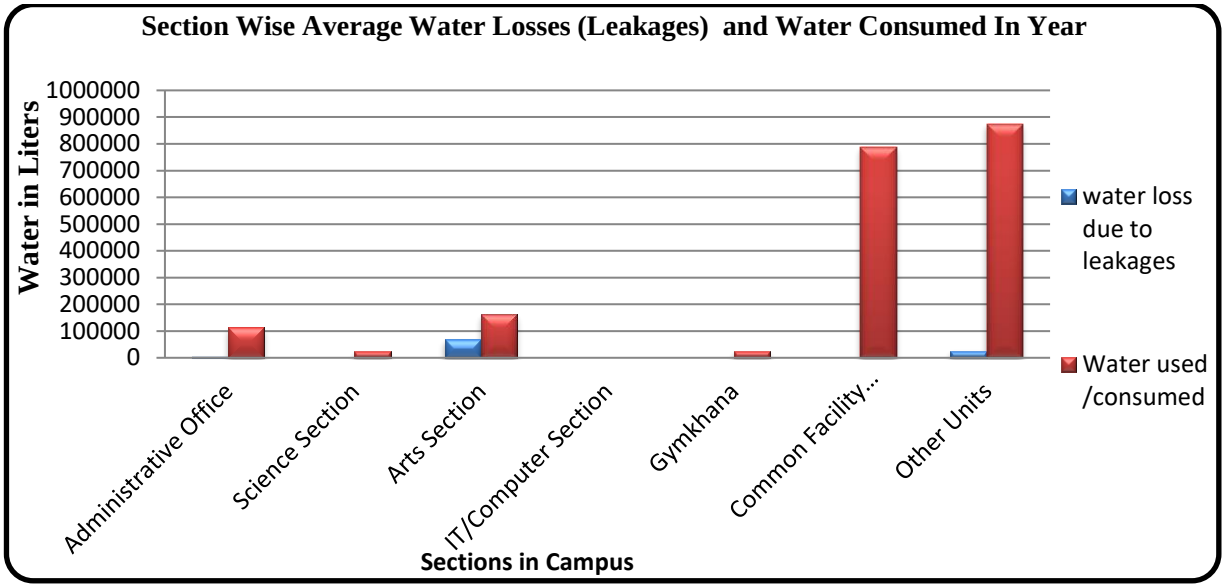

Above pie graph shows the percentage of water used and water loosed due to leakages in different water consuming sites in college campus.

**Table No.3.33. Section Wise Water Losses (Leakages) and Water Consumed In Year :**

| Sr. No. | sections | water loss due to leakages in liters | Water used /consumed in liters |
|---|---|---|---|
| 1. | Administrative Office | 4320 | 114064 |
| 2. | Science Section | 00 | 24087 |
| 3. | Arts Section | 67392 | 162613 |
| 4. | IT/Computer Section | 00 | 00 |
| 5. | Gymkhana | 00 | 24876 |
| 6. | Common Facility Centers | 00 | 788023 |
| 7. | Other Units | 25920 | 875180 |
| Total | | 97632 | 1988843 |

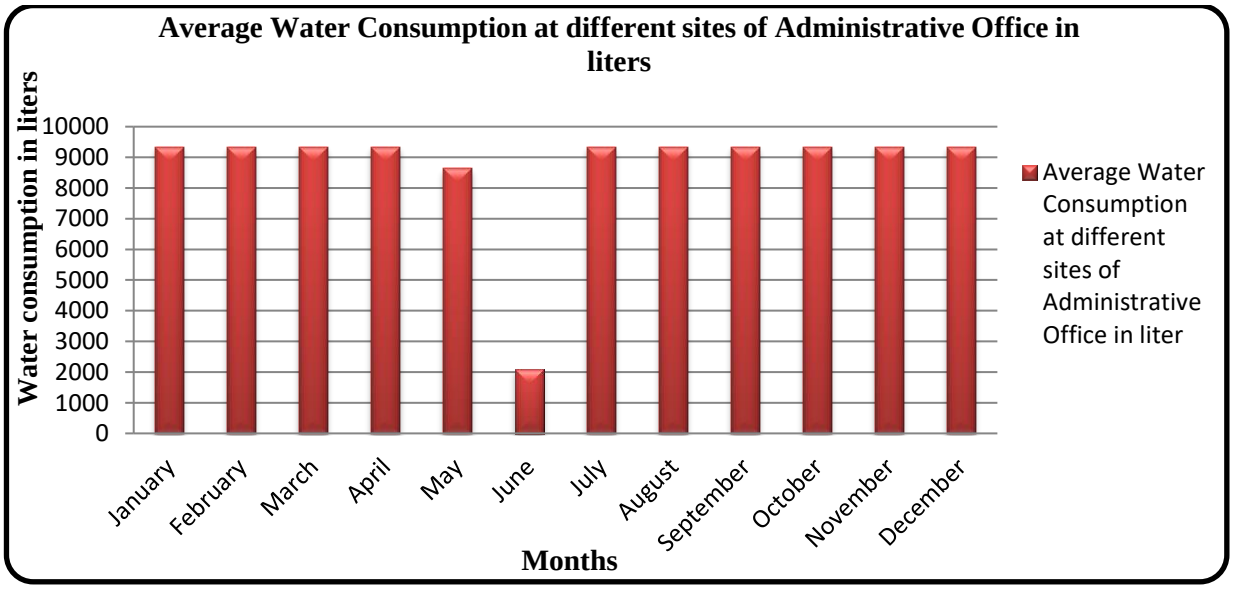
Table gives the information of water used / consumed in different sections and water losses in same sections.

**Graph No.3.43. Section Wise Water Losses (Leakages) and Water Consumed In Year :**



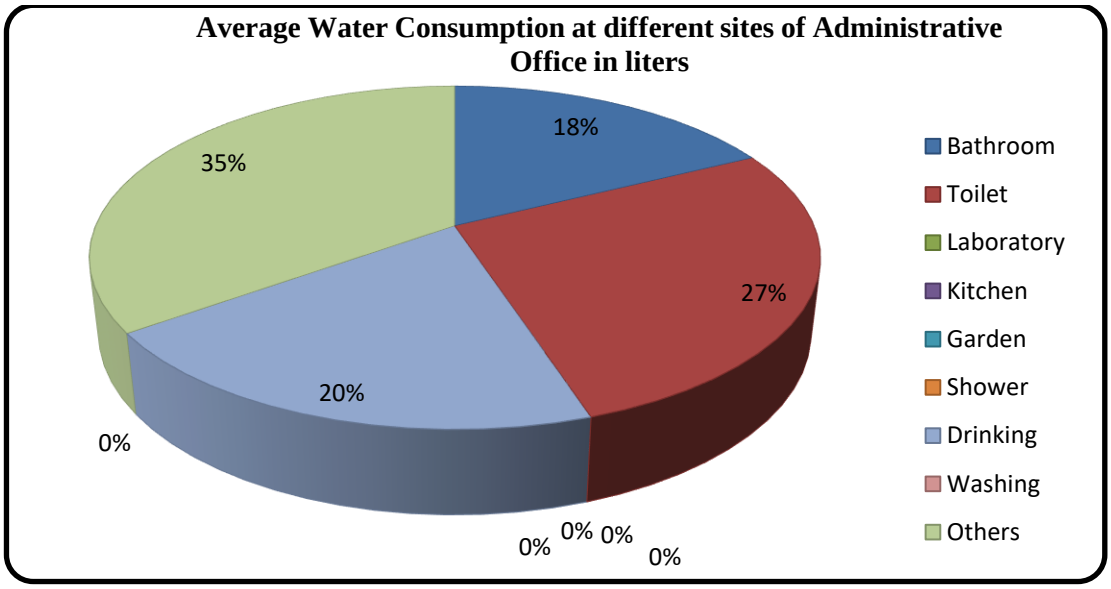

Above Table No.3.33 and Graph No.3.43 bar graph clearly reveals that in sections of campus premises water losses due to water leakages are moderate, these are arts section, Administrative office section, other units sections of premises. Also water consumption is seen higher at Common facility sections and other unit sections.

**Graph No.3.44. Average Water Consumption at Administrative Office section:**



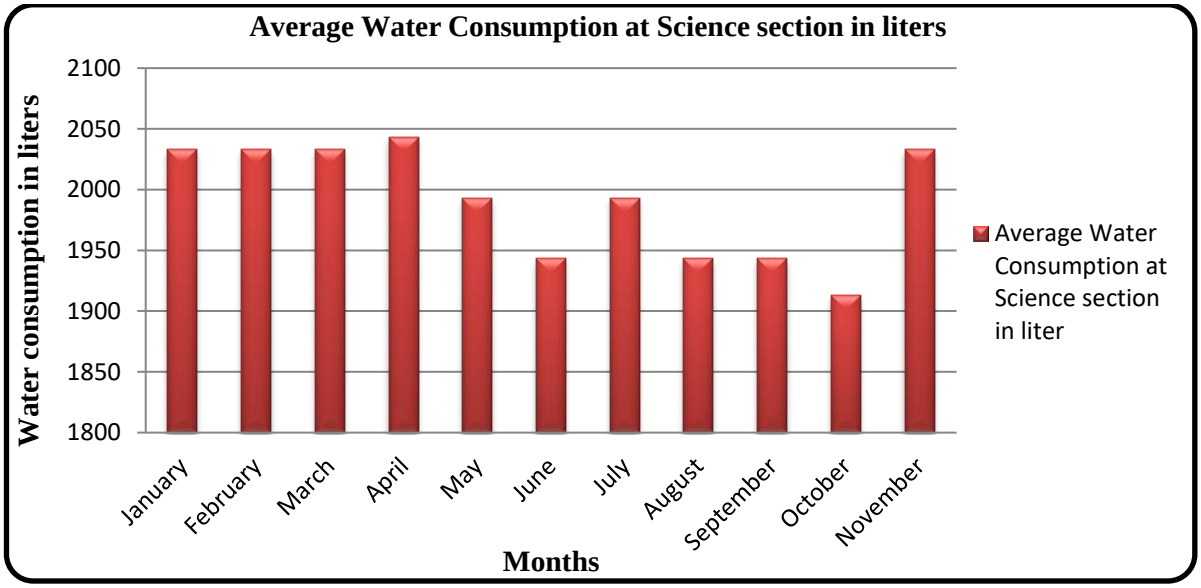

Above bar graph shows average water consumption at different sites of administrative office section which shows only in month of May and June requirement of water is less at this section. In other months requirement of water is greater than 9,000 liters per months.

**Graph No.3.45. Average Water Consumption at different sites of Administrative Office section in liters:**



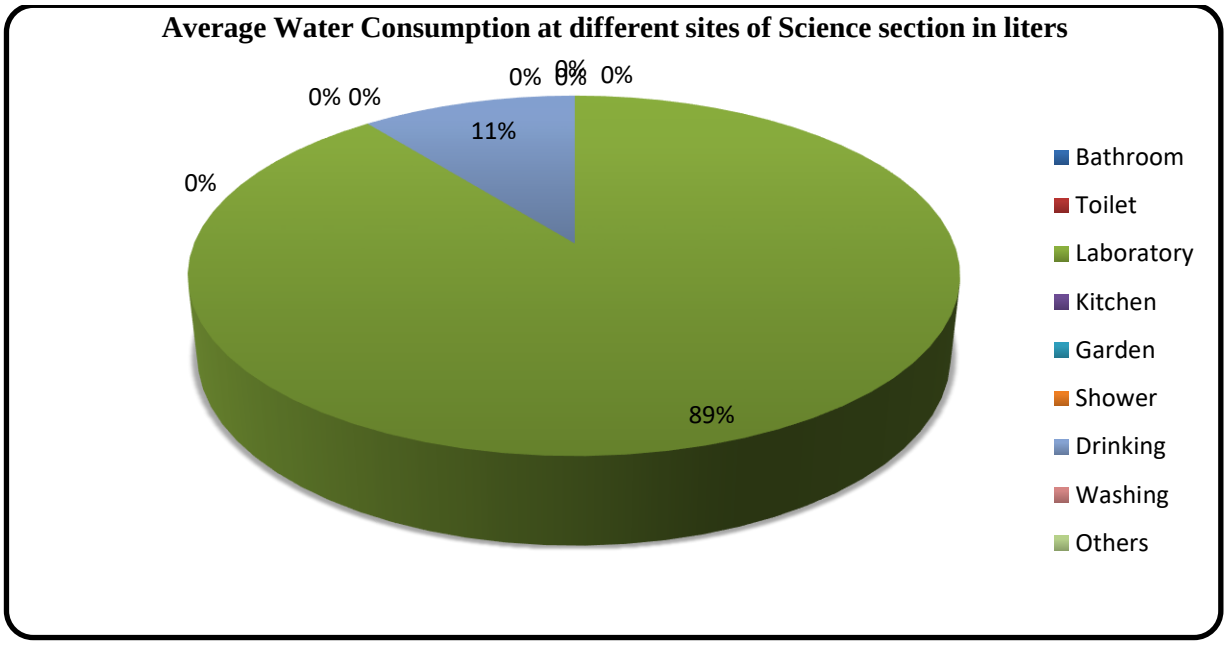

Above pie graph shows average water consumption at different sites of administrative office in liter. In this section 35% water is consumed for other purpose, 27% for toilet purpose, 20 % of water is consumed for drinking and1 8% for bathroom purpose.

**Graph No.3.46. Average Water Consumption at Science section:**



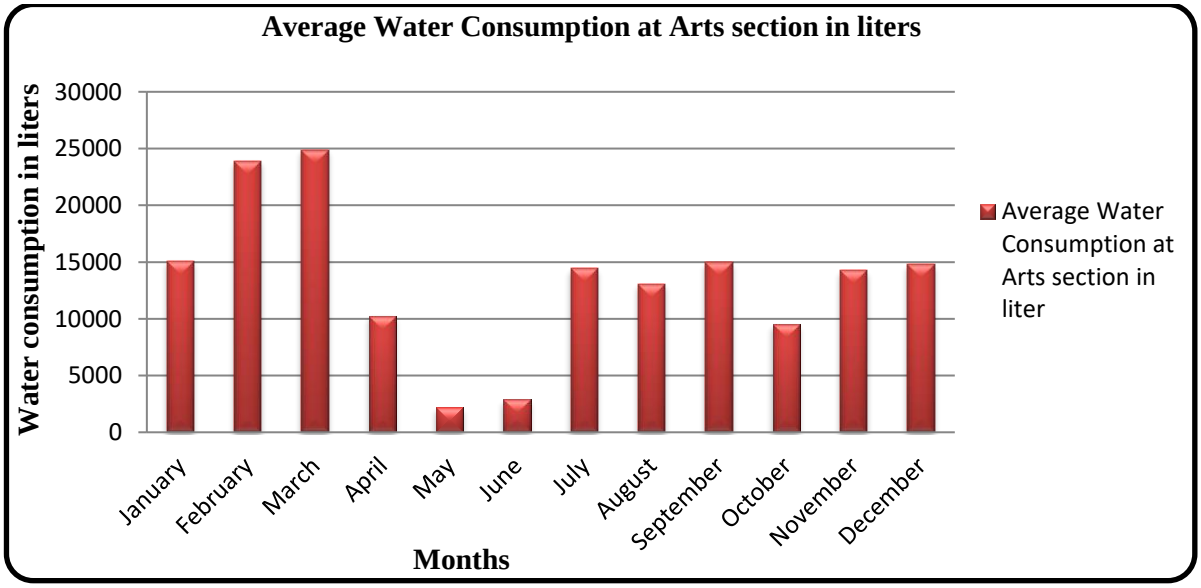

Above bar graph shows average water consumption at different sites of Science section which shows only in month of May to October requirement of water is less at this section. In other months requirement of water is greater than 2000 liters per months.

**Graph No.3.47.Average Water Consumption at different sites of Science section in liters:**




Above pie graph shows average water consumption at different sites of Science section in liters. In this section 89% water is consumed for laboratory purpose,11% water is used for drinking purpose.

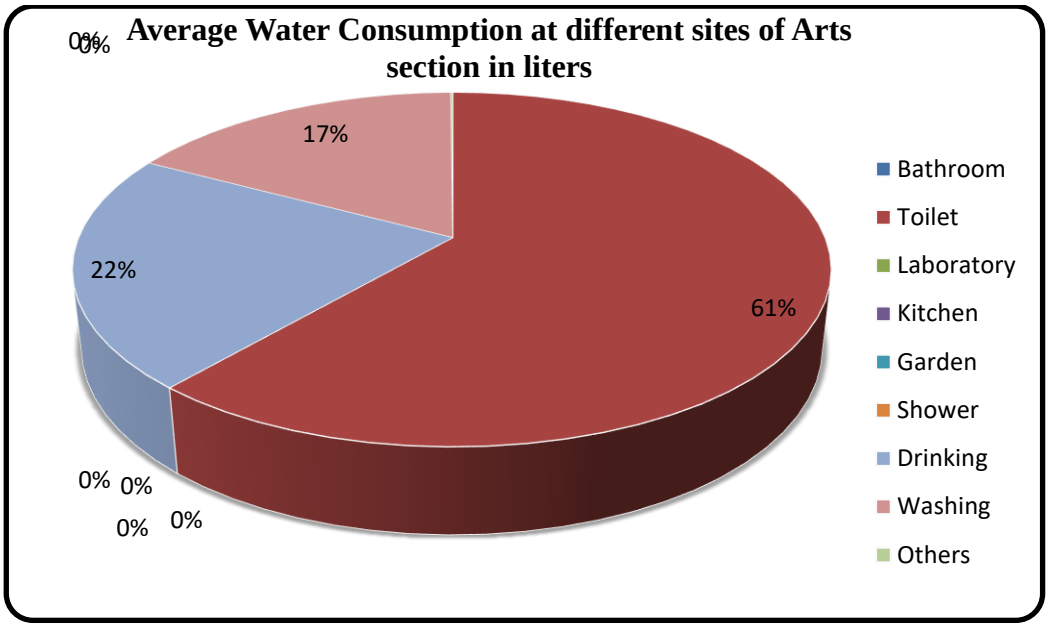
**Graph No.3.48. Average Water Consumption at Arts section:**




Above bar graph shows average water consumption at different sites of Arts section which shows only in month of April to June requirement of water is less at this section. In months February and March requirement of water is greater than 24,000 liters per months

and in other months July to December requirement of water is ranges from 10,000 to 15,000 liters.

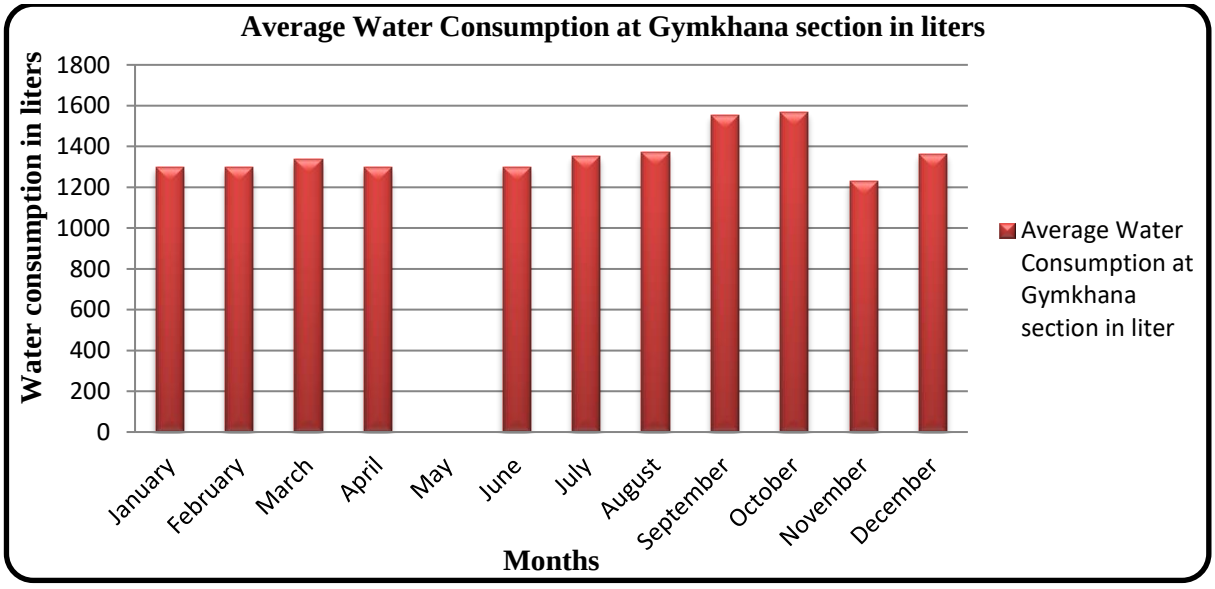
**Graph No.3.49.Average Water Consumption at different sites of Arts section in liter**




Above pie graph shows average water consumption at different sites of Arts section in liters. In this section 61% water is consumed for toilet purpose, 22% water is used for drinking purpose and 17% water used for washing purpose.

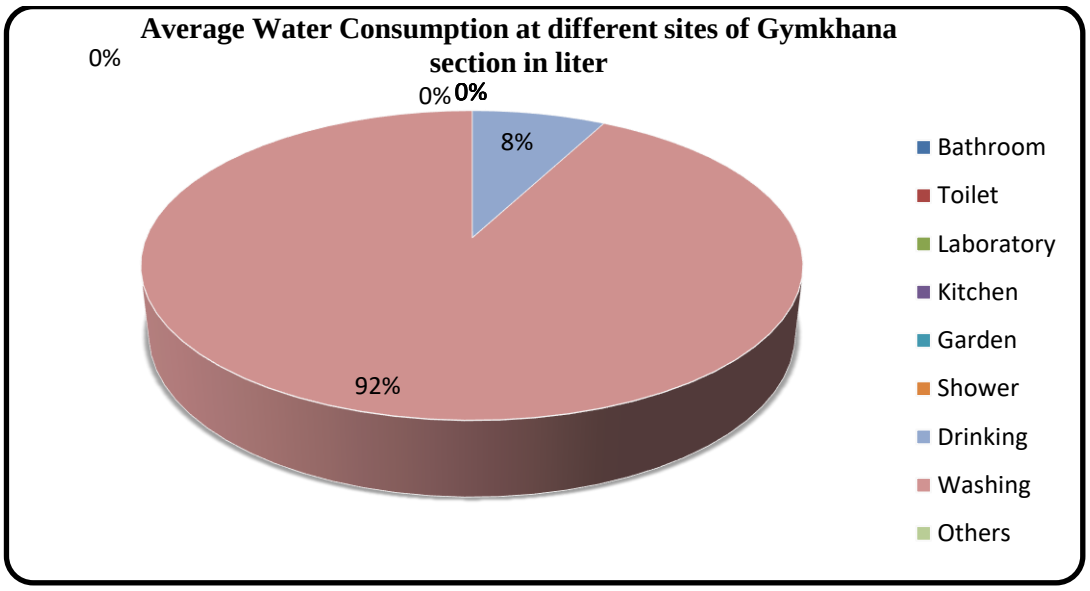
**Average Water Consumption at IT/computer section:** Data collection in this section does not shows any consumption/use of water in this section.

**Graph No. 3.50. Average Water Consumption at Gymkhana section:**



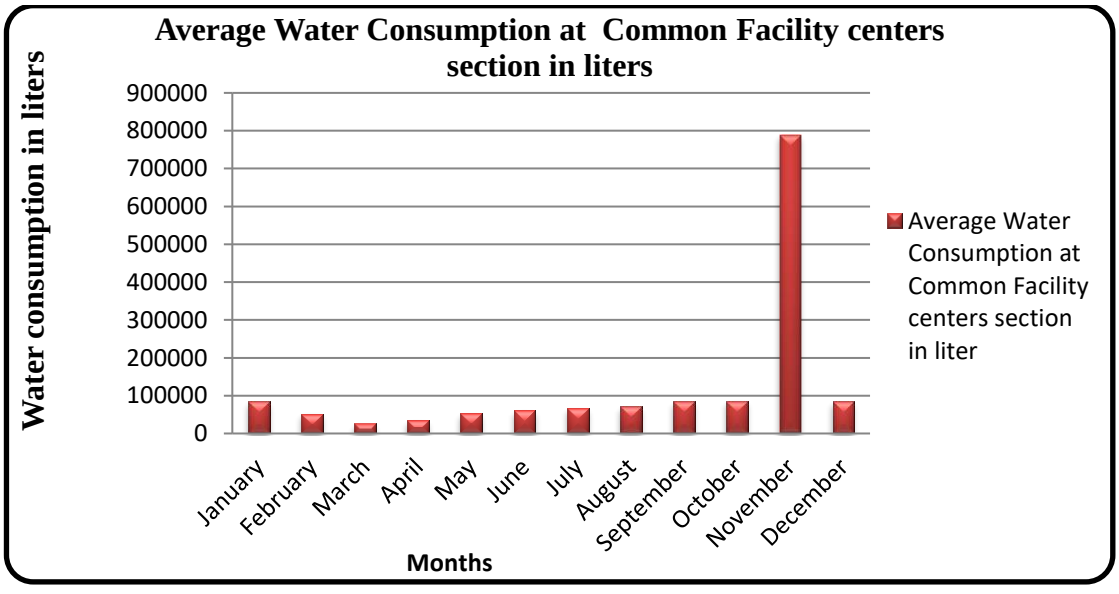
Above bar graph shows average water consumption at different sites of Gymkhana section which shows only in month of May requirement of water is zero at this section. In other months throughout year requirement of water is greater than 1300 to 1450 liters per months .

**Graph No. 3.51.Average water consumption at different sites of Gymkhana section in liters**



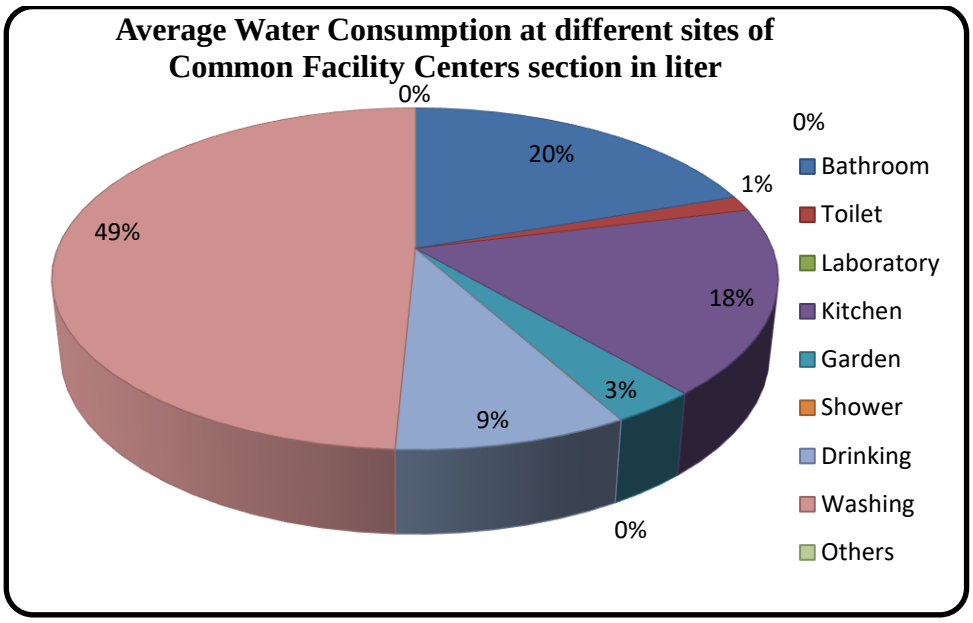

Above pie graph shows average water consumption at different sites of Gymkhana section in liters. In this section 92% water is consumed for washing purpose, 08% water is used for drinking purpose.

**Graph No.3.52. Average Water Consumption at Common facility centers section**



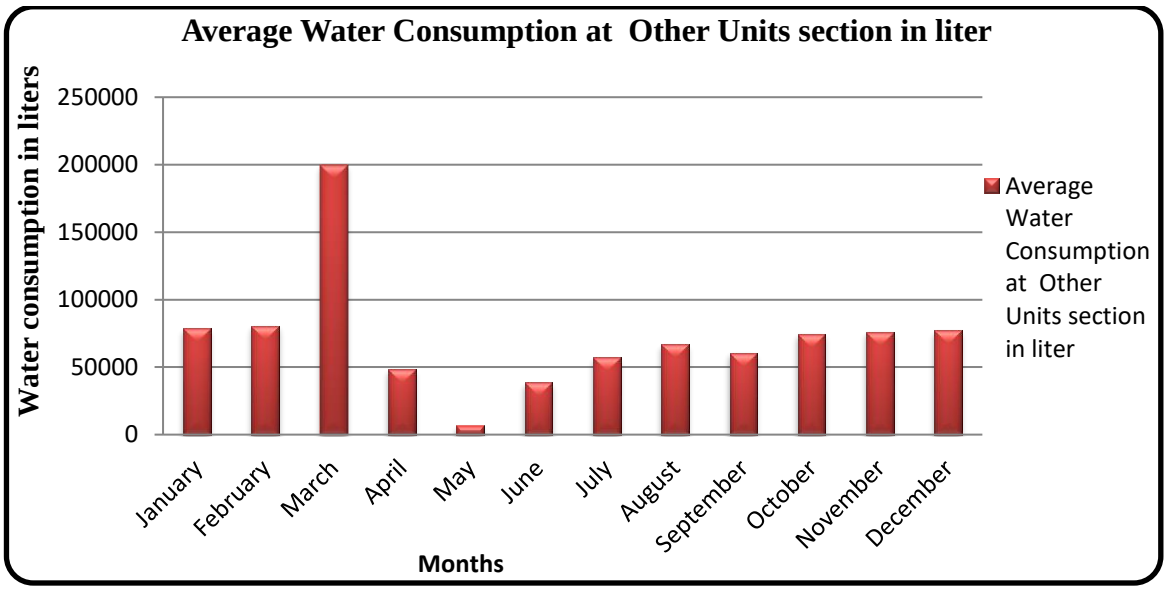
Above bar graph shows average water consumption at different sites of common facility centers sections which shows in month of February to April requirement of water is less at this section, April to June requirement is less and in months November requirement of water is nearly about 8,00,000 liters.

**Graph No.3.53.Average water consumption at different sites of common facility centers section in liters:**



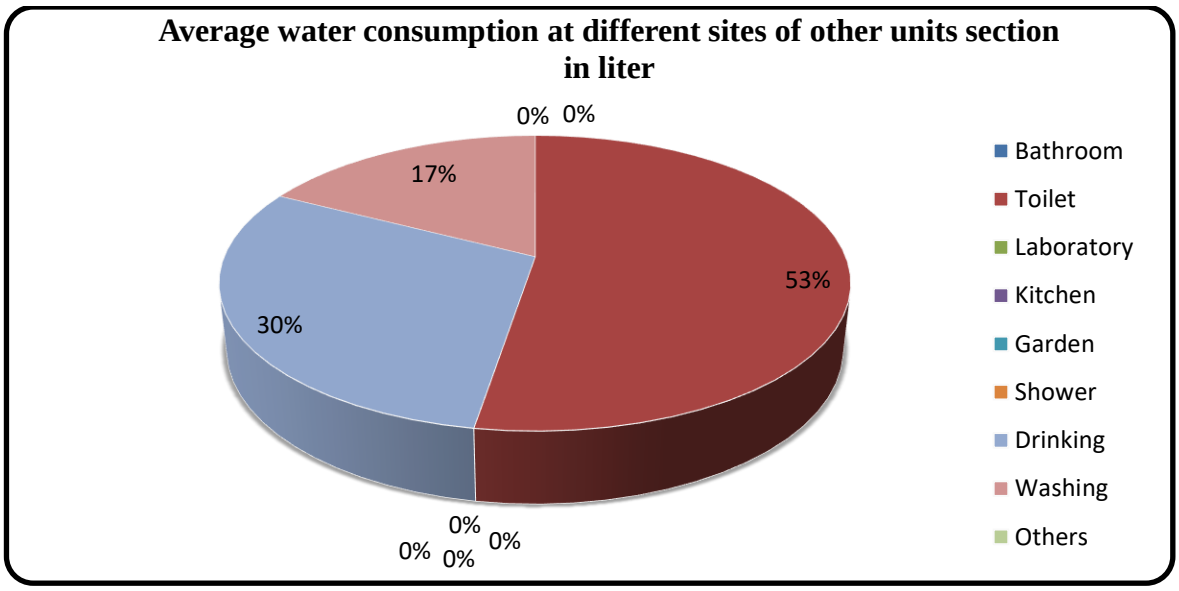

Above pie graph shows average water consumption at different sites of common facility centers section in liters. In this section 49 % washing, 20% water is consumed for bathroom purpose,18% water is used for kitchen purpose.

**Graph No.3.54, Average Water Consumption at other Units section:**



Above bar graph shows average water consumption at different sites of other units sections which shows in month of April to July requirement of water is less than this section and in months March requirement of water is greater than 200000 liters per months .

**Graph No.3.55.Average water consumption at different sites of other units section in liters**




Above pie graph shows average water consumption at different sites of other units section in liters. In this section 53% water used for toilet purpose, 30% water is consumed for drinking purpose,17% water is used for washing purpose.

### 3.3.3 Data collection of water loosed by tank overflows:

Information/ data of water loss in campus due overflow at water storage is collected through questionnaires **(Annexure -C- Table -3)**, again data is verified by Green Audit Committee Member with periodically visiting and monitoring the sites. To record water loss due to overflow audit committee arranged number of drills and visits. Committee monitored, personally measured, kept the record of time ( in minute ) of water flowing, flow rates (liter/minute) and recorded water loss at each visit. Taking an average following water structure of over flow is shown in below table.

Total water used from each storage tank is recorded by measuring the storage tank measurements and monitoring the height before filling the tank. With the help of

questionnaire **(Annexure –C table -4)** we calculate total water used per month in liters. Data recorded of total used water from monitoring the water tanks and water consumed at each water tank site is shown bellow.

**Table No.3.33/1 Water Audit-2017 :Water Tank Monitoring Illustrative Report-( Duration-One Week/month)**

| Sr. No. | Descri-ption Of tank | Dates of Monitoring | Type (Cement/ Syntax) and volume of Tank | No. of times tank filled | For Volume of empty tank | | | Daily Water expense in liter (5+8) | Tank Over Flow Monitoring | | | Total water used per day in Liters (9+12) | Remark if any |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Height of Tank in cm | Circum-ference Of Tank ($2\pi r$) | Volume of Tank in Liters used | | Rate of Flow in liter/ minute | Over flow in minute | Volume of water over flow In liters | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 1. | Main building (Office) | 11/12/2017 | Syntax | 3 times 2x5000 =10000 | 177.8 | 347.1 | 1705 | 11705 | 36 | 54 | 1944 | 13649 | day Average 12825 liters Week 89975 liters month 3,59,900 |
| | | 12/12/2017 | | | 170 | 347.1 | 1630 | 11630 | 36 | 36 | 1296 | 12926 | |
| | | 13/12/2017 | | | 150 | 347.1 | 1438 | 11438 | 36 | 30 | 1080 | 12518 | |
| | | 14/12/2017 | | | 155 | 347.1 | 1486 | 11486 | 36 | 32 | 1152 | 12638 | |
| | | 15/12/2017 | | | 165 | 347.1 | 1583 | 11583 | 36 | 34 | 1224 | 12807 | |
| | | 16/12/2017 | | | 154 | 347.1 | 1477 | 11477 | 36 | 40 | 1440 | 12917 | |
| | | 18/12/2017 | | | 150 | 347.1 | 1439 | 11439 | 36 | 30 | 1080 | 12519 | |
| 2. | Hostel | 11/12/2017 | Syntax | 2-time 3000 | 125 | 480 | 2292 | 5292 | 12 | 30 | 360 | 5652 | day Average 5635lit Week 39445lit month 157780 |
| | | 12/12/2017 | | | 120 | 480 | 2201 | 5201 | 12 | 35 | 420 | 5621 | |
| | | 13/12/2017 | | | 125 | 480 | 2292 | 5292 | 12 | 30 | 360 | 5652 | |
| | | 14/12/2017 | | | 120 | 480 | 2201 | 5201 | 12 | 35 | 420 | 5621 | |
| | | 15/12/2017 | | | 120 | 480 | 2201 | 5201 | 12 | 35 | 420 | 5621 | |
| | | 16/12/2017 | | | 125 | 480 | 2292 | 5292 | 12 | 30 | 360 | 5652 | |
| | | 18/12/2017 | | | 120 | 480 | 2201 | 5201 | 12 | 35 | 420 | 5621 | |
| 3. | Canteen | 11/12/2017 | Syntax | 1-time 000 | 110 | 380 | 1264 | 1264 | 4 | 3 | 12 | 1276 | day Average 1406lit Week 9842lit month 39368 |
| | | 12/12/2017 | | | 120 | 380 | 1379 | 1379 | 4 | 2 | 08 | 1387 | |
| | | 13/12/2017 | | | 130 | 380 | 1495 | 1495 | 4 | 3 | 12 | 1507 | |
| | | 14/12/2017 | | | 120 | 380 | 1379 | 1379 | 4 | 3 | 12 | 1391 | |
| | | 15/12/2017 | | | 110 | 380 | 1264 | 1264 | 4 | 3 | 12 | 1276 | |
| | | 16/12/2017 | | | 130 | 380 | 1495 | 1495 | 4 | 2 | 08 | 1503 | |
| | | 18/12/2017 | | | 130 | 380 | 1495 | 1495 | 4 | 2 | 08 | 1503 | |

Water tank monitoring gives the data of Water over flow in liters as well as water used per day. From above Table No.3.33/1 it is clear that there are three water tank sites i.e at administrative office, at hostel and at canteen. From column no.8 gives the volume of empty water tank in liters, column no. 9 gives the daily water expense, column no.12 Volume of

water over flow, column no.13 give a details of total water used. The remark in column no. 14 shows l day average use , week average use and month average use.

1)The recorded data shows at main building (Office) tank site averagely 12,825 liter water is used per day, 89,975 liters water used per week and 3,59,900 liter water used per month.

2) The recorded data shows at hostel tank site averagely 5635 liter water is used per day, 39,445 liters water used per week and 1,57,780 liter water used per month.

3) The recorded data shows at Canteen tank site averagely 1406 liter water is used per day, 9,843 liters water used per week and 39,368 liter water used per month.

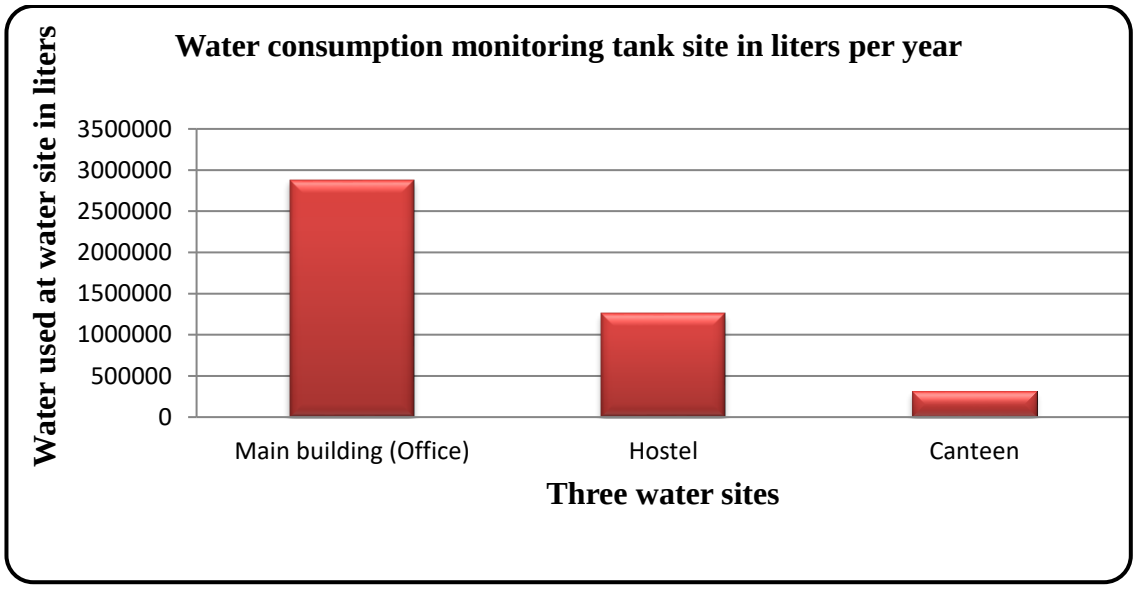
This study shows that between three water sites major water use is seen at main building water tank site and less water use is at canteen site water tank.

**Table No. 3.34.Water consumption monitoring tank site in liters per year(considering 8 month peak work)**

| Description of tank | Water use months | Water consumed calculated by monitoring per month | Water consumption in liters per year(considering 8 month peak work) |
|---|---|---|---|
| Main building (Office) | 8 | 359900 | 2879200 |
| Hostel | 8 | 157780 | 1262240 |
| Canteen | 8 | 39368 | 314944 |
| Total(Calculated for only 8 months) | | 557048 | 4456384 |

As we seen above our campus uses water from three water tank sites. Water tank monitoring data reported for week per month and illustrative report of one week is shown in Table No. 3.33.Considering three month rainy season and one month holidays, for simplicity neglecting water use for four months we summarized water consumption eight months is shown in above table. This reveals that in this year water consumption at main building office water tank site has largest water use of about 28,79,200 liter and canteen water site has very less water use of 3,14,944 liters. The following Graph No. 3.56.shows the graphical representation of water use at water site tanks.

**Graph No. 3.56.Water consumption monitoring tank site in liters per year:**




It reveals that in this year water consumption at main building office water tank site has largest water use of about 28,79,200 liter and canteen water site has very less water use of 3,14,944 liters. The above Graph No. 3.56.shows the graphical representation of water use at water site tanks.

**Table No. 3.35. Average Water looses by over flow per year in liters**

| Description of tank | Average Water looses by over flow per day in liters | Average Water looses by over flow per week in liters | Average Water looses by over flow per month in liters | Average Water looses by over flow per year in liters |
|---|---|---|---|---|
| Main building (Office | 1316 | 9216 | 36864 | 294916 ( 8 months) |
| Hostel | 345 | 2400 | 9600 | 76800 ( 8 months) |
| Canteen | 8.5 | 60 | 240 | 1920 ( 8 months) |
| Total | 1669.5 | 11676 | 46704 | 373636 |

Water tank monitoring data reported for week of each month and illustrative report of one week is shown in Table No. 3.33.Considering three month rainy season and one month holidays, for simplicity neglecting water use for four months we summarized water consumption eight months is shown in above table. Above table gives information of water overflow per week, per month and per year. It clearly shows the water flow at main building

tank water site 2,94,916 liter per year, hostel water tank losses76,800 liters per year and canteen water site losses on 1920 liter per year.

**3.4. Water Management Practices at college Campus.**

water conservation, water harvesting and management of water available on campus.

**a)Rain Water recharge:**

The two bores in campus located at such natural geographical places where the percolation of rain is trapped in these bores. The waste water from drinking and washing sites is directly given to the garden.

**b)Roof Top Rain water Harvesting and check dam–**

The Roof Top Rain water from buildings is recharged bores oat campus. At the wagjai site of college campus institute constructed one dam whose water collection capacity is 60,00,000 liters.

Water Harvesting site : Check dam constructed at Wagjai Site of 60,00000 Liter Capacity.(Photo- 1)

Water Harvesting site : Check dam constructed at Wagjai Site of 60,00000 Liter Capacity.(Photo- 2)

**c) Plantation in campus-**

College has green campus and efforts have been made on to bring part of land under cultivation of trees, green plants, medicinal plants as well as other productive plants through NSS students, Seniors students, teaching and nonteaching staff in college. In campus There is canopy of trees, in campus total 2076 tree/ plants of 78 varieties are present in which 1922 are trees, 08 are herbs and 146 are shrubs and climbers.

**3.5 Hazardous Waste Audit**

**3.5.1Chemical Waste:**

These wastes may be found in different physical states such as gaseous, liquids, or solids. A hazardous waste is a special type of waste because it cannot be disposed of by common means like other by-products of our everyday life. Depending on the physical state of the waste, treatment and solidification processes might be required. The four characteristics are Ignitability, Corrosively, Reactivity, and Toxicity.

As for simplicity we divided an college campus into five sections then small quantity of Hazardous waste is observed only in science and new building section, which is generated due to various chemicals handled in the science wing. It is in the form of solid as well as in

liquid state but waste is recorded in only liquid state. Data of Hazardous waste recorded is given below:

**Table No.3.36 Hazardous Waste Generated at College:**

| Sections | Administrative Office | Science Section | Arts Section | IT/Computer Section | Gymkhana | Common Facility Centers | Other Units | Total Chemical waste generation |
|---|---|---|---|---|---|---|---|---|
| Hazardous Waste and Management year | NIL | 29Ltr. HCL.NaOH.2 K2H2O8 .etc<br><br>7 kg solid | Nil | NIL | NIL | Nil | 4 Liter HCL<br><br>3kg solid | 33 liters<br><br>10 kg solid |
| Total waste | NIL | 7 kg solid 29 liters | Nil | NIL | NIL | Nil | 4 liters | 33 liters 10 kg solid |

Above Table no. 3.23 shows that data is recorded from seven different sections in college but hazardous Chemical Waste is generated only in Chemistry, Botany, Microbiology department, in junior science wing, in other section high school for practical purpose above chemicals are used. No other department generates any type of Hazardous Waste. Here liquid hazardous waste is 33 liters per year and solid hazardous waste generated is 10kg.

**3.5.2. E-Waste :-**

Generation of E-waste is apparent at every colleges. In academic colleges there are several equipments and instruments running in administrative as well as in various departments used for educational activities. Computers, Printers, Scanners, Xerox machines are mostly used for administrative work..At time of teaching, learning and evaluation in academic college we deal with electric material, electric equipments/ instruments ,measuring instruments, different electric circuits, wires, ICs, Microprocessors, PCBs, electronic components(like resistors, diodes, transistors, transformers, inductances, relays, etc),damages instruments, hardware's and peripherals of computer system, lighting equipments(like Bulbs,

tube), fans all these include in E-wastes. The more use of such listed materials generates E-waste when these instrument/ equipments get worn out with time.

**Table No.3.37 E-waste handled, treated and disposed at different sections of college:**

| Sr No. | Section | E-waste handled(kg) | E-Waste treated and disposed(kg) |
|---|---|---|---|
| 1 | Administrative Office | 9.200 Kg | 9.200 Kg. |
| 2 | Science Section | 6.970 Kg | 9.970 Kg. |
| 3 | Arts Section | 03.500 Kg | 7.500 Kg. |
| 4 | IT/Computer Section | 13.500 Kg | 1.500 Kg. |
| 5 | Gymkhana | Nil | 00 |
| 6 | Common Facility Centers | 3.370Kg | 3.370 Kg |
| 7. | Other units | 45.130Kg | 45.130 Kg |
| | Total | **76.67 Kg** | **76.67 Kg** |

Data collected shown in above table reveals that, major source of e-waste are generated in Science section as different electronic instruments, CRO, Power supply, Electronic components, diodes, resistors, electrical circuits, computers, printers etc are used for practical purpose. Other units generated highest amount of e-waste (45.130 Kg/Year) as compared to other sections. Total E-waste generated is 76.67 Kg/Year in college campus.It is followed by administrative building ,science, it/computer and cfc generated 9.2 kg/year and 6.9 Kg/year,13 Kg per year and 3.3 Kg respectively. E-waste is treated and disposed in proper manner, Above table shows e-waste generated is less in amount.

**3.6. Air Environment:**

Air pollution has long term and short term impact on the biotic and a biotic component of the environment. The ambient air quality with respect to the core zone around the campus was not monitored. Because this village Kotoli- Malwadi ,Tal: Panhala is situated in rural , backward hilly forest area. The college premises is far from village and rush area, free from noise , surrounded by agriculture zone and having speedy air which observe to be not polluted.

### 3.7 Water Environment:

The purpose of this study is to assess the waste water characteristics of the laboratory waste;

Waste water sample was examined for physico-chemical parameters in order to assess the characteristics of the laboratory waste. The sample was collected and analyzed as per the procedures specified in 'Standard Method for the Examination of Water and Wastewater' published by American Public Health Association (APHA).

Sample for chemical analysis was collected in polyethylene cans.

The results of sample are as given below:

**Table 3.38.:Laboratory waste analysis Results**

| Sr.No. | Parameters | Results | Unit |
|---|---|---|---|
| 1 | pH | 5.9 | --- |
| 2 | Total Dissolved Solids (TDS) | 143 | mg/l |
| 3 | Bio-chemical Oxygen Demand (BOD) | 60 | mg/l |
| 4 | Chemical Oxygen Demand (COD) | 442 | mg/l |
| 5 | Oil and Grease | 0.01 | mg/l |

From the analysis report of laboratory waste it is observed that Chemical Oxygen Demand (COD) is lightly higher.

From above report the COD of laboratory waste water sample is observed to be high , hence it is not suitable for irrigation purpose. It can be decreased and make suitable for irrigating by passing the sample through the filter made up of sands, charcoal, activated carbon.

### 3.8. Noise Environment:

The noise levels measurements were carried out using precision noise level meter. The noise level survey was carried out at three locations, located within the in campus . The major source of noise not identified in the study area. Sound pressure level (SPL)

measurements were automatically recorded with the help of an Integrated Sound Level Meter to give the equivalent noise level for every hour continuously for 06 hours in a day.

**Table 3.39: Noise Monitoring Results in the Study area:**

| **Name of Station** | **Noise Levels (dBA)** | **Ambient Noise Standard (dBA)** | |
|---|---|---|---|
| | **Day** | **Day** | **Category of area** |
| Near main gate | 64 | 50 | Silent zone |
| Near Administrative building | 46 | 50 | Silent zone |
| Near library | 44 | 50 | Silent zone |

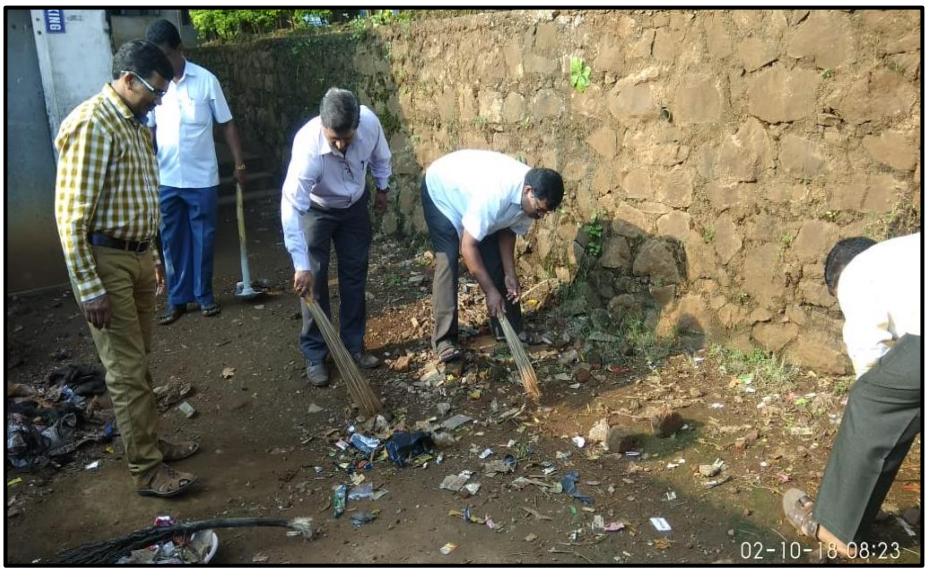
From the monitoring survey of noise levels it not was observed that the day time noise levels were observed in the range of 44 to 64 dB(A). Which are found to be in silent zone.

# Chapter- IV

# Green Practices

## (Photo, News evidence and Tree Counting)

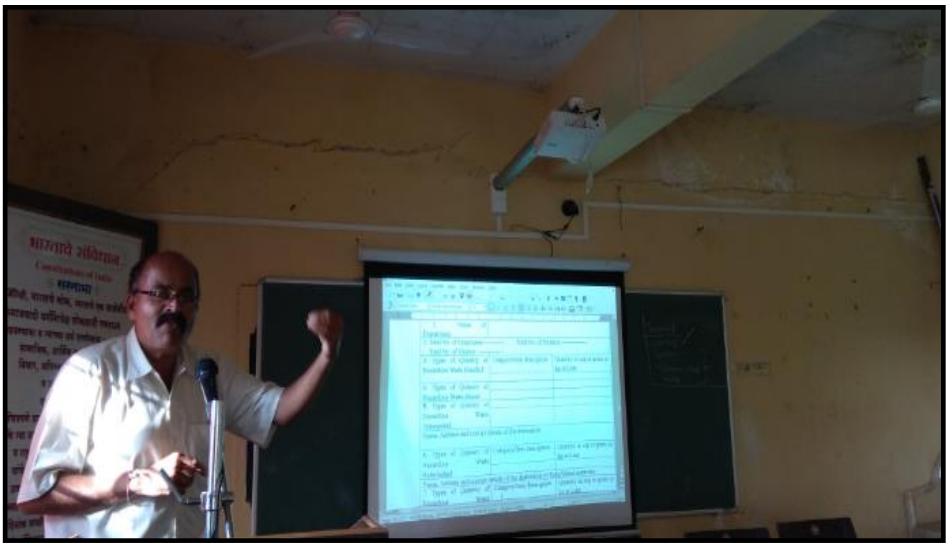

**Aids awareness rally organized by NSS at Kotoli.**




**Campus Cleanliness.**

**Cleanliness campaign organized at kasari river bridge by college**

**Our English Medium Students parent donate plant on his child birthday to our institution.**



**Green Audit Work shop : Concept and Scope- Vilas Patil,**

`

**Work shop :Gender Audit - Vilas Patil,**

**Green Audit Workshop: How to Fill Questionnaires**

**Health Check –up Camp Organized by NSS**

सातार्डे : येथे वृक्षारोपण करताना वनअधिकारी प्रियांका दळवी, जि. प. सदस्या कल्पना चौगुले आदी.

## पर्यावरणाचा असमतोल टाळण्यासाठी वृक्ष लागवड आवश्यक : दळवी

यवलूज : वार्ताहर

जमिनीची प्रचंड प्रमाणात होणारी धूप थांबवण्यासाठी, पर्यावरणात झालेल्या असमतोल पूर्ववत करण्यासाठी काळजी गरज म्हणून वृक्ष लागवड झाली पाहिजे. त्याच बरोबर त्याचे जतनही होणे गरजेचे आहे, असे प्रतिपादन पन्हाळा वनअधिकारी प्रियांका दळवी यांनी केले.

सातार्डे (ता. पन्हाळा) येथील वाघजाई डोंगर परिसरात श्रीपतराव चौगले महाविद्यालयाच्या वतीने १३ कोटी वृक्षरोपण मेहिमेअंतर्गत वृक्षारोपण करण्यात आले, याप्रसंगी त्या बोलत होत्या. सातार्डे-बिलवर टेकडी परिसरात विविध प्रकारची वृक्ष लागवड करण्यात आली. यावेळी जि. प. सदस्या कल्पना चौगुले, प्राचार्य डॉ. पी. ए. अत्तार, माजी सभापती के. एस. चौगुले, सचिव शिवाजी पाटील, डॉ. एस. के. कांबळे, विद्यार्थी, प्रध्यापक, शिक्षक व ग्रामस्थ उपस्थित होते.

**Tree Plantation news published at local news paper.**

**College students digging for tree plantation**

**Tree plantation**

**Tree Plantation in the presence of Honorable President Dr. K.S.Chougule**


**Rangoli Competition : Say No to Plastic**


**Rangoli Competition : Save Enviroment.**

**Inauguration ceremony with watering  to plant in the hands of principal and other guest**

**Cleanliness campaign at Nandari dam by College students and professor**

**Solid waste cleaning near drinking water after festival.**

**Waste management by high school Students : Composting**

**The wall paper presentation on occasion of wild life week organized by nature club and environment Department**


**Rangoli competition : Save Nature.**


**Rangoli competition : Save Planet.**


**Rangoli competition : Save Baby Girl.**


**Rangoli competition : Save Nature.**

**Use of Non- Conventional Energy: Solar lamp.**

**Vanbhojan**

**Trekking at Msai Pathar**

**Trekking at Masai Plateau by Senier arts and science Students.**

**Students and professor Giving water to plants organized by Nature ciub in summer season**.

**Awareness of solid waste management and Noise pollution in Ganesh Festival.**

**Water Harvesting site : Check dam constructed at Wagjai Site of 60,00000 Liter Capacity.**

Celebration of ‘Raksha Bandhan’

College girl students playing traditional ‘Zimma’

College Girl Students Playing ‘Fugadi’

**Dnyanganga Shikshan Prasarak Mandal Malwadi**
**Sanchalit**

# Shripatrao Chougule Arts And Science College Malwadi – Kotoli

**Green Audit – (2017)**

## (College Campus Plants Counting Report)

The green audit was conducted in the last week of September 2017. During these studies, we have reported presence of more than 2076 individuals of the plants belonging to variety of groups as foliage, flowering, fruiting trees, shrubs, herbs and climbers, making this campus lush green in appearance. The plants included large trees of evergreen species like Mango, Jackfruit, baniyan trees and palms. The roads are decorated by avenue trees namely Ficus benjamina, ashoka, royal palms etc. Ornamental foliage and flowering plants are cultivated in the carries between road dividers. The campus is well maintained by irrigating the vegetation. Campus includes hostel gardens namely ground garden, botanical garden, wagjai campus garden. The gardens are supported with lawns at front of college and at hostel campus. This gives a pleasant and eco-friendly feel to students and every visitor.

There are some flowering individuals those serve as source of pollen food and nectar for many insect likewise more than 540 individuals that bears delicious fruits are attraction for varieties of birds. The conserved area with dense vegetation, source of water, and least disturbance is an ideal place as habitat of biodiversity.

Shripatrao Chougule Arts and Science College Malwadi – Kotoli has small botanical garden supported 189 trees addition to many seasonal plants. Cryptogams included 6 algae, 7 bryophytes and 9 pteridophyte species. This phyto-diversity included many medicinal plants. Studies further showed 06 species of birds and many insects. The diversity of plants and birds is seen in college campus.

**Table 4.40College Campus TreesCounting:**

| Sr.No | Botanical Name | Family | Common Name | Total No. |
|---|---|---|---|---|
| 1. | Cocos nucifera | Arecaceae | Coconut/ Nariyal | 47 |
| 2. | Prunus dulcis | Rosaceae | Almand/Badam | 3 |
| 3. | Saraca asoca | Caesalpiniaceae | Ashok Tree | 2 |
| 4. | Psidium guajava | Myrtaceae | Peru | 5 |
| 5. | Annona reticulata | Annonaceae | Custared apple | 1 |
| 6. | Emblica officinalis | Euphorbiaceae | Avala | 1 |
| 7. | Moringa oleifera | Moringaceae | Drumsticks/shevaga | 1 |
| 8. | Michdia chammpla | Mangoliaceae | Son champa | 1 |
| Total | | | | 61 |

**Table 4.41 College Campus Shrub PlantCounting:**

| Sr.No | Botanical Name | Family | Common Name | Total No. |
|---|---|---|---|---|
| 1. | Lowsonia inermis | Lythraceae | Heena/Mehandi | 126 |
| 2. | Plutycladus orientalis | Capressaceae | Morapankhi | 2 |
| Total | | | | 128 |

**Table 4.42 Garden campus treesCounting:**

| Sr.No. | Botanical Name | Family | Common Name | Total No. |
|---|---|---|---|---|
| 1. | Mangifera indica | Anacardiaceae | Mango | 3 |
| 2. | Tectona grandis | Lamiaceae | Teak /Sagavan | 9 |
| 3. | Psisium guajava | Myrtaceae | Peru | 7 |
| 4. | Dendrocalamus giganteus | Poaceae | Bamboo bunch | 5 |
| 5. | Emblica officinalis | Euphorbiaceae | Avala | 7 |
| 6. | Eucaluptus tereticornis | Myrtaceae | Nilagiri | 4 |
| 7. | Prunus avium | Rosaceae | Chery | 2 |
| 8. | Delonix regia | Fabaceae | Gulmohar | 4 |
| 9. | Syzygium cumini | Myrtaceae | Jambhul | 10 |
| 10. | Artocarpus heteropyllus | Moraceae | Jackfruit | 1 |
| 11. | Dalhergio sissoo | Fabaceae | Shee sham | 3 |
| 12. | Grevillea rohusta | Proteaceae | Silverok | 2 |
| 13 | Acacia auriculifomis | Fabaceae | Australium babul | 3 |
| Total | | | | 60 |

**Table No.4.43 Botanical garden Tree's counting:**

| Sr.No. | Botanical Name | Family | Common name | Total No. |
|---|---|---|---|---|
| 1. | Focus benghalensis | Moraceae | Banyan Tree/ Vad | 1 |
| 2. | Ficus religiosa | Moraceae | Pepal | 1 |
| 3. | Emblica officinalis | Euphorbiaceae | Avala, Amla | 1 |
| 4. | Azardirachtha indica | Meliaceae | Neem | 1 |
| 5. | Delonix regia | Fabaceae | Gulmohar | 1 |
| 6. | Saraca asoca | Caesalpinaceae | Ashok Tree | 1 |
| Total | | | | 6 |

**Table No.4.44 Botanical garden shrub's counting:**

| Sr.No. | Botanical Name | Family | Common Name | Total No. |
|---|---|---|---|---|
| 1. | Cycas revaluta | Cycadaceae | Sago plant | 1 |
| 2. | Rosa damascena | Rosaceae | Gulab | 2 |
| 3. | Oscimum santum | Lamiaceae | Tulsi | 1 |
| 4. | Boganvillea spectabli | Nyctaginaceae | Pink Paper/Boganvel | 1 |
| 5. | Nicotiana tobacum | Solanaceae | Tambakhu | 2 |
| 6. | Curcuma longa | Zingiberaceae | Haldi | 2 |
| 7. | Justica adhatoda | Acanthaceae | Adulsa | 1 |
| 8. | Polianthus nberosa | Agavaceae | Tuberose | 1 |
| 9. | Hibiscus rosasinesis | Malvaceae | China rose | 1 |
| 10. | Plumbago auriculata | Plumbaginaceae | Chitrak | 1 |
| 11. | Citrus lemon | Rutaceae | Lemon | 1 |
| Total | | | | 14 |

**Table No.4.45 Botanical garden herbs counting:**

| Sr.No. | Botanical Name | Family | Common Name | Total No. |
|---|---|---|---|---|
| 1. | Echinocactus grusonii | Cactaceae | Golden ball | 1 |
| 2. | Euphorbia millii | Euphorbiaceous | Crown of thorns | 1 |
| 3. | Eicchornia Crassipies | Pontederiaceae | Water hyacinth | 1 |
| 4. | Catharanthus roseas | Apocynaceae | Sadafuli | 1 |
| 5. | Alovevera | Liliaceae | Korphad | 1 |
| 6. | Zingiber officinale | Zingiberaceae | Ale | 1 |
| 7. | Mentha Piperita | Lamiaceae | Pappermint | 1 |
| 8. | Jasminum Sambae | Oleaceae | Mogra | 1 |
| Total | | | | 8 |

**Table No.4.46 Hostel campus shrubs Counting:**

| Sr.No. | Botanical Name | Family | Common Name | Total No. |
|---|---|---|---|---|
| 1. | Bougainvillea spectabili | Hyctaginaceae | Boganvel | 1 |
| 2. | Crestrum nocturnum | Solanaceae | Ratrani | 1 |
| 3. | Jasminum sambae | Oleaceae | Mogara | 1 |
| 4. | Tabernaemontana | Apocynaceae | Tagari | 1 |
| Total | | | | 4 |

**Table No.4.47 Hostel campus tree Counting:**

| Sr.No. | Botanical Name | Family | Common Name | Total No. |
|---|---|---|---|---|
| 1. | Azadirachta indica | Meliaceae | Neem , Limb | 1 |
| 2. | Pongamina Pinnata | Fabaceae | Karanj | 1 |
| 3. | Murriaya koenigii | Rutaceae | Kadipatta | 1 |
| Total | | | | 3 |

**Table No.4.48 Bilwar Tekadi Tree Plant:**

| Sr.No | Botanical Name | Family | Common Name | Total No. Plant |
|---|---|---|---|---|
| 1 | Emblica officinalis | Euphobiaceae | Avala,Amla | 26 |
| 2 | Delonix regia | Fubaceae | Gulmohar | 10 |
| 3 | Dalhergio sissoo | Fabaceae | Shee sham | 150 |
| 4 | Syzygium cumini | Mytaceae | Jambhul | 25 |
| 5 | Tectona grandis | Lumiaceae | Teak/Sagavan | 1345 |
| 6 | Saraca asoca | Caesapi naceae | Ashok tree | 05 |
| 7 | Prunus dulcis | Rosaceae | Almond/Badam | 05 |
| 8 | Psidium guajava | Myraceae | Peru | 10 |
| 9 | Michelia champaca | Mangoliaceae | Sonchmpa | 06 |
| 10 | Azadirachta indica | Meliaceae | Neem,Limb | 25 |
| 11 | Mangifera indica | Anocardiceae | Mango | 04 |
| 12 | Ficus benghalensis | Moraceae | Bangan tree/Vad | 08 |
| 13 | Annona reticalo | Annonaceae | Custed apple | 05 |
| 14 | Grevillea rohusta | Proteaceae | Silverok | 06 |
| 15 | Artocarpus heteropyllus | Proteaceae | Jackfruit | 20 |
| 16 | Justica adhatoda | Acanthceae | Adulasa | 05 |
| 17 | Murriaya koenigii | Rutaceae | Kaddipatta | 05 |

| | | | | |
|---|---|---|---|---|
| 18 | Tamarindus Indica | Fabaceae | Acmmlica | 20 |
| 19 | Papanamia pinnate | Fabaceae | Karaj | 05 |
| 20 | Ficus racemosa | Moraceae | Umber | 05 |
| 21 | Area catechu | Areaceae | Pam | 05 |
| 22 | Crocus sativus | Lridaceae | Kumkum | 05 |
| 23 | Bauhinia racemosa | Fubaceae | Aapata | 2 |
| 24 | Aegle Marmelos | Rutaaceae | Bael | 10 |
| 25 | Acacia Conna | Fubaceae | Shikakai | 10 |
| 26 | Semecorpus anacardium | Anacardiaceae | Biba | 03 |
| 27 | Terminalia | Combretaceae | Behada | 06 |
| 28 | Sapinddus mukorossi | Sapindoceae | Reetha | 15 |
| 29 | Mimusops elengi | Sapindtoceae | Bakul | 06 |
| 30 | Swietenia marcrophylla | Neiliaceae | Mahogany | 25 |
| 31 | Alstonia Schdaris | Apacyhaceae | Saptparni | 10 |
| 32 | Neolanarckia cadamb | Rubiaceae | Radamb | 05 |
| Total | | | | 1792 |

**Table No.4.48 Tree Survey:**

| Sr. No. | Campus sections | Herbs | Shrubs | Tree | Total |
|---|---|---|---|---|---|
| 1. | College Campus Tree | 00 | 128 | 61 | 189 |
| 2. | Garden campus | 00 | 00 | 60 | 60 |
| 3. | Botanical Garden | 08 | 14 | 06 | 28 |
| 4. | Hostel campus | 00 | 04 | 03 | 7 |
| 5. | Bilwar Tekadi Tree Plants | 00 | 00 | 1792 | 1792 |
| Total ( Variety -78) | | 08 | 146 | 1922 | 2076 |

Above table shows the total survey of tree , plant counting of campus in which 78 variety are seen and 08 herbs146 shrubs,1922 trees recorded.

# Chapter-V

# Conclusion and Recommendations.

**5.0 CONCLUSION AND RECOMMANDATIONS:**

"Green Audit" of Dnyanganga Shikshan Prasarak Mandal Malwadi Sanchalit Shripatrao Chougule Arts And Science College Malwadi – Kotoli is conducted by Vilas S. Patil., Green Audit Expert, Assistant Professor in Physics in Y.C.W.M. Warananagar and Green Audit committee of college for the calendar year 2017. In year -2017 all the indicators of Green Audit

are keenly studied and information's about indicators according are collected, analyzed and following conclusions, recommendations and remedies given by the experts. As we know that 'Green auditing' is the process of identifying and determining whether institutions practices are eco-friendly and sustainable. This is the first attempt to conduct green audit of our college campus. After the process of green auditing of college campus we record the in detail, record all the green practices followed by college, according to which there are following conclusions, recommendations and a management plan which can be adopted as an 'Green Policy' of college in future for keeping college campus environment eco-friendly.

**5.1Conclusions:**

From the green audit following are some of the conclusions which can be taken for improvement in the campus:

- LPG is handled in science building section for Physics, Chemistry, for practical for educational or practical purpose and in old building for tea club but its consumption of is very less .
- Biodegradable waste is used efficiently for composting and vermi composting and composting is used for tree as fertilizer..
- Electricity consumption is more at some section like Other sections.
- LED lamps are used in all sections, use of fluorescent tubes and bulb is minimized.
- There are a good number of trees and plants. The college campus has Total 1922 trees including flower plants, medicinal plants, fruit plants and local varieties. Also shrubs and herbs are 154 , Steps for plantation are already taken by college.
- College cannot take efforts to dispose majority solid waste by proper vermin composting. Classroom waste, office paper waste and dry grass are brunt on site at different places.

- Students and staff of the college are encouraged for walk and staff uses vehicle in sharing to minimize fuel energy consumption for daily work.
- Dispose confidential, unused office record and paper waste properly by supplying for recycle to registered vendor.
- Waste bins are not placed at solid waste collection spots in different sections.
- Dust bins are seen in classrooms
- Separate gas room to keep the filled and empty gas cylinder is one of green practices is functioned in campus
- Toilets and bathrooms, in office, science and exterior section are consuming more water.
- Good waste water management is not in practice, so design it in campus for proper recycle.
- Majority non teaching and CHB teaching staff using two wheeler vehicles.
- Major electricity required for water fetching and irrigating.
- Drips and sprinklers are not used for watering the gardens and lawns
- Roof top rain water harvesting is not in force.
- Water filtration Plant or RO water is functioning near staffroom, near office section and in hostel section of campus for students.
- A special days like, Teachers Day, Guru panama are celebrated by new plantation in campus, also 'Use of Book Not Bouquet' for Welcome and appreciation of guests indifferent program.
- The air-conditioners are not used anywhere else in the campus than principal room .
- E-waste segregation, handling and disposal are not properly deployed at campus.
- Air quality on the campus is good.
- It seen at some places Biodegradable wastes from gardens, lawns is burnt on site , it is not composted.

- In infrastructure at all places LED bulb and LED tubes are used, total 56 LED tubes and 27 LED bulbs for lighting and no CFL lamps are used is one of the best green practice is deployed.
- The college employs persons for periodic pruning of the trees and the plants
- Classroom waste is not sent for composting.
- College arrange the events, such as Cultural Events, Internal and External contact seminars in order to literate the student in both how to minimize the waste produced and maximize what is recycled / reused.
- Adequate ventilation and natural light is present hence ventilation survey is not required.
- To promote use of cycling or Cycle Bank Scheme for girl students .
- All the rooms in all sections of college are airy and sunny and do not need electricity during day time for lightning in clear day.
- No solar power lamps are used to light the exterior of college during night session.
- Roof top rain water harvesting is not practiced, but up in some extent, by the department of chemistry, by storing rain water, using and distributing it as distilled water to other departments for the practical use.
- In all sections electricity was not shut downed after occupancy time.
- No central valve for to stop water circulation after occupancy time

**5.2Recommendations:**Following are some of the key recommendation for improving campus Environment:

- Conduct switch off drills at regular intervals and fix its responsibility on teaching / non teaching staff.
- Provide energy efficient heating systems, with adjustable controls for individual heating appliances wherever possible, and ensure that comprehensible instructions are available

to staff and students on the use of heating controls (Especially for science building section)

- Institution has done Water Audit that has helped to save water in this year . Responsibility of monitoring the overflows of water tank is fixed on peons/ non -teaching staff in the concerned section.
- Save electricity by proper maintenance of the wiring and electrical equipment, maintenance of electrical appliance and fitting is essential.
- Preference is already given to the most energy efficient and environmentally light appliances such as energy-saving CFL and LED bulbs and LED tubes with reflectors.
- Adopt solar power to light up the roads, exterior site of campus section.
- Do not burn on site the biodegradable wastes from gardens, lawns and classroom waste in campus, but compost it.
- Sufficient big waste bins are placed where essential(in classroom, near office etc) and monitored periodically.
- Segregate solid waste in to wet, dry, glass and constructional at source and biodegradable is sent for composting, while other sold waste are send to recycle or proper disposal.
- Segregate Classroom waste on is sent for composting.
- College purchases recycled resources where they are both suitable and available.
- Use the facility of counter of any bank for bank mode payment.
- At science laboratories large amount of water wasted during the process practical, design small water recycle system for science building.
- An environmental Green policy has to be prepared with all the conclusions, recommendations and current green practice carried by college.
- A frequent visit should be conducted to ensure that the generated waste is measured, monitored and recorded regularly and information should make available from concerned staff.

- The waste should be reused or recycled at maximum possible places.
- Glass waste should be disposed properly and send it for recycle.
- Reduce chemical wastes formation in chemistry laboratory. Adopt the principles of green chemistry to reduce chemical wastes
- A proper method of disposal / recycle to be followed for hazardous waste treatment.
- Pipes, overhead tanks and plumbing system should be maintained properly to reduce leakages and wastages.
- Start an *E-banking suvidha* for admissions , examination, paying money as experimental for one of faculty.
- The college should develop internal procedures to ensure its compliances with environmental legislation and responsibility should be fixed to carry out it in practice.
- The college should develop internal procedures to ensure its compliances with environmental legislation and responsibility should be fixed to carry out it in practice.

# Chapter VI

# EnvironmentManagement Plan

After Visiting, monitoring, making interaction studying a present situation of different sections of generating wastes, consumption of energy, it's utilization, methods adopted for waste disposal and current green practices followed in college campus. I am Vilas s. Patil , as Green Audit Expert preparing and recommending an Environment Management Plan for Shripatrao Chougule Arts And Science College Malwadi – KotoliCollege campus. This plan will reveal the strengths, weaknesses and suggests remedies for the green and clean campus.

## 6.0ENVIRONMENTAL MANAGEMENTPLAN

### 6.1ENERGY-ELECTRICITY

| SRENGTHS | WEAKNESS | SUGGESTIONS | PRIORITY |
|---|---|---|---|
| 1)Use of incandescent lamp and fluorescent lamp is not seen anywhere in campus.<br>2) In all the sections of campus everywhere LED Bulbs and Tubes are used. Total 56 tubes and 27 bulbs used.<br>3) As LED bulbs and Tubes are used electricity required for lightning is very less(=1150KWh/Year) is one of the green practice in functioning.<br>4) Use of air conditioner at only principal chamber in campus.<br>5) Adequate ventilation and natural light is present in classrooms, laboratory, library, hostel etc in all sections.<br>6) Use of LCD,LED monitors in everywhere. (no CRT monitors are observed.)<br>7) Five solar lamps are used in campus for lightning the exterior during night.<br>8) In all section classrooms, labs are volumes, spacious, airy and broad windows on face to face in | 1) More electricity is used for water fetching purpose.<br>2) More electricity is used in other units at IIT.<br>3) Use of electricity is more in some section like admin. Office. Science building, New building.<br>4) Unnecessary use of Lights , fans and computers at some places is seen when no one is using.<br>5) Use of conventional power / only electricity provided by MSEB is the main resource in campus.<br>6)No solar lamps are used in campus for lightning the exterior during night.<br>7) Some heating coil (energy consuming) equipments are used in science building. e.g. Botany,Microbiology.<br>7) Monitor the meter reading of consumption and electricity bill<br>8) Requirement of electricity for IT/computer section and administrative office is large. | 1)Accelerateuse CFL/LED lamps for lightning purpose everywhere.<br>2)Use proper reflectors for LED blubs and LED tubes which increases luminescence of light.<br>3)Avoid use of light / fan (electricity) when adequate natural light / ventilation is present.<br>4) Use solar lamps are used in campus for lightning the exterior of infrastructure during night.<br>5)Create an awareness about electricity saving with internal memos (e.g. circular, notice, supplying instructions , frequently organizing drills etc)<br>5)Take steps to use renewable energy resources i.e. wind mills. Solar energy panels where use of electricity is | Medium |

| | | | |
|---|---|---|---|
| some places.<br>9)Location of college is far from village in field, hence there is no obstruction for sun light and wind. Campus has plenty wind and sunlight.<br>10)The location of village kotoli, Tal :- Panhala is east part of kokan, as is rainy region has nearly four month raining is present.<br>11)As location situated in rural area in week about six day 24 hour electricity is supplied by MSEB without interruption.<br>12) Use of diesel generator in occupancy time is rare. | 9)electricity supply is not closed off/ shut down after occupancy time in any section of campus<br>10)For watering drip, sprinklers irrigating system are not used<br>11) Electric maintenance, old wiring and fittings survey by the expert is essential.<br>12) Large (13850 KWh/year) electric energy is consumed in campus distributed by only two MSEB meters.<br>13) Electricity consumption by less energy consuming equipment is large (~8639.19KWh/year). | maximum viz computer /I.T. lab, science building and administrative office.<br>6)Monitor and control the overflows of water tank or use off sensors.<br>7) Place central electricity cut- off switch to shut down / close electric supply in all sections after occupancy time.<br>8) Use solar pump for fetching water in tanks from water bores.<br>9)Reduce the electricity consumption for fetching the water tanks by using drip/sprinklers for watering the trees, lawns and gardens etc.<br>10)Use separate electricity connection for each unit to avoid higher billing rate of MSEB.<br>11)Monitor electricity consumption by less energy consuming equipment .<br>12) Monitor electricity consumption at science laboratory. | |

**6.1.1FUEL**

| STRENGTHS | WEAKNESS | SUGGESTIONS | PRIORITY |
|---|---|---|---|
| 1)65.84% students are using S.T. for transportation.<br>2)54.72% staff has residence near the campus.<br>3)45.28% staff has residence at some distance from campus but some of them using the vehicles in sharing.<br>4)Very less number of students using (4.47 %) use their own two wheelers for college occasionally.<br>5)49.95%are female student and 50.05% are male students while 6.16 % using bicycle for college. Data shows 41 boys and 21 girls uses bicycles for transportation.<br>6) 19.76% students are come by walk.<br>7) Use of LPG according to strength of student, staff and location of college campus is less(about 1740 Kg per year) ,it is used at Science and in other units where is it essential.<br>8) In college LPG is only used for practical purpose.<br>9)Number of green practices like Tracking, study tour, poster presentation, debates, writings | 1) 7four wheeler and two 96 two wheelerare used which is large and for transportation 1990 liters per month fuel is consumed<br>2)Major use of LPG at CFC (common facility center) like canteen and hostel.<br>3) PUC checking camp till yet not organized.<br>4)Less number of student as well as staff come by walking.<br>5) Avoid use of carbon paper and don't fill the cartridges of computer printer in office or inside the campus.<br>6)Use of bicycle by student and staff is less.<br>7)Some parents use their vehicles for leaving their pupils to college. | 1)General awareness about walk and health fitness should be created among stake holders. Give the message of walk and accelerate it.<br>2) Organize PUC checking camp periodically for awareness of pollution.<br>3)Produce an awareness among stakeholders of institution to use vehicle in sharing.<br>4)Plan bio-gas project for kitchen purpose of canteen, mess, hostel and form the tea club.<br>5)Frequently organize No Vehicle days, bicycle days etc.<br>6)Starts Bicycle bank scheme for girl student with taking the help of alumni association.<br>7)Make well Counseling of student who living at distant place from college for staying in hostel. | Low |

| | | | |
|---|---|---|---|
| rangoli competitions, Plantation, Rallis, Hb checking camp, cleaning etc are in functioning periodically inside college campus which can produce awareness between stake holders,hard efforts are taken by some departments for this.<br>10)Diesel generator is occasionally /rarely used.<br>11) There is canopy of trees, in campus total 2076 tree of 78 varieties are present in which 1922 are trees, 08are herbs and 146 are shrubs and climbers.12)Separate gas room is available to kept the filled and unfilled LPG gas cylinders.<br>13)About 35.24%staff uses ST,12.38% come by walking,46.67% uses two wheelers and 2.85% of staff came with sharing the vehicles.<br>14)No any student can use the private vehicles like Vdap for transportation. | | | |

## 6.2 SOLID WASTE

### 6.2.1PAPER

| STRENGTHS | WEAKNESS | SUGGESTIONS | PRIORITY |
|---|---|---|---|
| 1)Use of two sided printing on paper at all section.<br>2) One sided papers from students laboratory journals, project reports are used for rough printing / writing.<br>3)Old journal files/ covers are used for office and departmental records.<br>4)Very less amount of papers, piece of papers is observed in classroom waste.<br>5)Large paper waste is collected from office and in science building.<br>6) Some online objective tests are arranged.<br>7)For notice Social media like whatapps, face book, emails etc are used frequently.<br>8)Internal memos, text communication is made by email.<br>9)All the Teaching / non-teaching staff is techno-savvy using computers, Laptops, PD,CD, mobile etc for text communication. | 1)Large amount of paper stationary was required for office work.<br>2)Major printed stationary was required internal evaluation work, internal memos, notices, unit tests etc.<br>3) Number of set of copies is required for official record.<br>4) major consumption of paper is observed at time of admission and examination<br>5) Solid waste( paper waste) from office and classroom is burned in campus at different location i.e. near library.<br>6) At different places paper waste is burned. | 1)Avoid use of carbon paper in bill section of office.<br>2)For internal Memos and notices use e-mail, sms, Intercom , mobile network and advanced techniques of ICT .<br>3)Start an *'E-banking suvidha'* and cashless economy for office.<br>4) Switch towards the paperless office work.<br>5) Send all type of the paper waste for recycle or for proper destroy.<br>6) Adopt the online tutorials. Tests for B.A., B.SC. experimentally, after successful implementation apply for other classes.<br>7)Use the OCR reader of evaluation of objective type examination.<br>8)Adopt advanced teaching learning and evaluation minimize the paper work.<br>9)Use the central store for distributing required paper stationary in college. | High |

| | | | |
|---|---|---|---|
| 10) Carbon billing copy is not given in office. | | | |

6.2.2 **PLASTIC**

| **STRENGTHS** | **WEAKNESS** | **SUGGESTIONS** | **PRIORITY** |
|---|---|---|---|
| 1)Total plastic of 289.27 Kg per year is collected in college campus which is less.<br>2) Out of total plastic collected 45.04%is hard plastic, 31.72 % is soft plastic and 23.24% is plastic of carry bags.<br>3)Large amount of hard plastic is collected and small amount of carry bags are collected. | 1)Plastic thrown with the general waste in many sections. Can't be segregated in different category.<br>2)23.24% of total plastic is carry bags plastic which is dangerous of environment. .<br>3) At some places in campus hard, soft and carry bags plastic is burned at different places in campus with paper waste.<br>4)Waste bins are not placed for plastic waste collection in college campus.<br>5)No any awareness programs, workshops, lectures etc for how the plastic is injurious to human life cycles are organized.<br>6) Collected waste plastic can not be send for recycling. | 1) Make the segregation of waste at the sources.<br>2)Send all type of plastic waste for recycle.<br>3)Declare the college campus as 'Plastic Free'<br>4) Frequently organize different events like elocution, easy, Rangoli, painting, best from waste, etc competitions for awareness to prohibituse of plastic in campus. | Medium |

### 6.2.3BIODEGRADABLE WASTE

| STRENGTHS | WEAKNESS | SUGGESTIONS | PRIORITY |
|---|---|---|---|
| 1)Clean Campus.<br>2)Classrooms are clean.<br>3)Total green trees / plants are 2076 having 78 variety(green campus).<br>4)Every year new tree plantation.<br>5) NSS student as well a staff gave their devoted efforts for cleaning the classroom as well as campus.<br>6)Waste bins are placed in some classrooms only and not to be placed in corridor.<br>7)Periodically cutting and cleaning of lawns and gardens<br>8)Composting is carried on campus site.<br>9)Average in year about an 12051.60 Kg per year biodegradable waste is collected in campus.<br>10) Some mess and canteen waste is collected . | 1) Biodegradable waste in campus and small paper waste is burned on site at different places.<br>2) Some wet garden waste is burned near the west wall of building ..<br>3) Small composting is seen but vermi-composting is not seen in campus.<br>4)All collected biodegradable waste is not composted properly.<br>5)Small quantity of food waste from canteen and mess is thrown nearer, is not composted well.<br>6) Classroom waste (plastic piece, paper waste, soft plastic, carry bags, dust etc.) is thrown at site and burned.<br>7)Garden waste from, waste of big trees (big pieces of wood ,grass, leaves , coconut branches etc.) and grass on the ground is burned near the plantation is seen. | 1) Provide small readymade composting plant at different places for biodegradable waste composting.<br>2)Start major vermi-composting plant on campus at proper location.<br>3)Use the output of composted plant for nursery, plantation and gardening purpose.<br>4)Sufficient, big waste bins are placed where essential (in classroom, near office etc) and monitored periodically<br>5)Do not throw Food waste from canteen on site. | Medium |

**6.3.1WAER UTILIZATION**

| STRENGTHS | WEAKNESS | SUGGESTIONS | PRIORITY |
|---|---|---|---|
| 1) In campus very much availability of water, campus is self sufficient in water.<br>2) The water filtration is functioning and which supplies filter water for drinking purpose.<br>3)AtWagjai site check dam is constructed having 6000000 liters capacity.<br>4) Water harvesting is practiced by Refilling campus rain water to bores and tracks are graved through which the campus rain water refill the bores in college campus.<br>5) Campus is self sufficient in water for irrigating the lawns, gardens etc by these two bores<br>6) No any major leakages are observed while verification of data drills are conducted.<br>7) Scope for rain water harvesting.<br>8) Collage campus region is east part of kokan having about four and half month raining.<br>9)Campus has natural geographical location that with | 1) The major use of water is in administrative office,science building, common facility centers.<br>2)1988843liters water per year is actually used in campus.<br>3)97632 liters water per year is wasted due to small leakages.<br>4) 373636liters water per year is wasted due to overflows.<br>5)Reuse of waste water is not observed.(implementation of Green Chemistry is essential)<br>6)Leakages are less but observed at Bathroom, toilets and exteriors.<br>7) For trees and garden traditional watering is used.<br>8)No any small/ large water recycle plant under progress.<br>9) In lavatory/ urinal at some places the water outlets are open and water is wasting.<br>7) Drainage outlets of some laboratory directly drain out on campus site.<br>8) No Proper attention toward Rain water harvesting .<br>9)Water in large quantity is | 1) Inspection of infrastructure and plumbing survey of water supply line is necessary.<br>2) To stop water supply after occupancy time central on /off halve is necessary.<br>3)Install the water guard at overhead water tank or pressure valves / sensor valves to make control on overflow of tanks .<br>4) Install roof top rain water harvesting in college building site.<br>5) Apply the proposals to UGC or other funding authority for water reuse/ recycle system.<br>6) Immediately install small scale waste water Reuse/ recycle plant.<br>7)Make the process of recycle on laboratory waste water. | Medium |

| | | | |
|---|---|---|---|
| making small tracks to drain the rain water are directly refill bore and remaining to river.<br>10)Roof top water harvesting is practiced by the department of chemistry and microbiology. | used . For watering the garden, plants, lawns use drip, sprinklers irrigating system . | | |

**6.3.2 WASTE WATER**

| STRENGTHS | WEAKNESS | SUGGESTIONS | PRIORITY |
|---|---|---|---|
| 1)The two bores on campus site are naturally at such geographical location where rain water directly refill the bores automatically.<br>2)As campus is geographically at higher location, hence campus is free from drainage problem.<br>3) Also rain water at unpaved ground is percolated and easily trapped in college bores. | 1) The waste water from different departments of science wing drainedon site open to air.<br>2) Whole roof water is not trapped for water harvesting.<br>3)Large amount of drinking water is wasted for near water cooler.<br>4) No steps taken toward waste water harvesting and rain water harvesting.<br>5) Mush of water is consumed for cleaning purpose.<br>6) Large amount of water is used for onsite construction.<br>7) Laboratory waste water has BOD 60 mg/liter and COD 440mg/liter is higher in future taking care it is essential. | 1)Design the new drain piping to collect the used water for washing, blush , bathroom etc.<br>2)Install the water recycle/ reuse plant for above mentioned drain water.<br>3)Use the drip irrigation for garden and lawns to less the drain water.<br>4)Build up small check dam to trap the rain water in campus geographical location.<br>5) Stop draining the laboratory waste water at campus site.<br>6) minimize the water consumption on cleaning purpose. | |

### 6.4.1 CHEMICAL WASTE

| STRENGTHS | WEAKNESS | SUGGESTIONS | PRIORITY |
|---|---|---|---|
| 1)Less chemical waste is handled only by Chemistry, Botany and Zoology departments in science building.<br>2)The dilution of hazardous chemical is very high.<br>3) Chemical waste and it is of category III which is less dangerous to health.<br>4) In chemistry, Botany, zoology different chemical bottles are labeled properly, tight with unbroken caps.<br>5)The study data reveals that solid hazardous waste 10 Kg and liquid hazardous waste 33 liters are generated which is less in quantity, it drained with making 100 times dilution. | 1) Waste of chemistry, zoology, microbiology and botany Department is directly drained on site of campus.<br>2) In some extent it produces an air, soil, water pollution<br>3)In campus at some places plastic is burned on site which produces some poisonous gases.<br>4) The exhaust fans are not provided in these laboratories to expel gaseous waste.<br>5) In laboratory dust bin are not provided for wet solid waste.<br>6) Some time dilution of chemical waste is not seen properly. | 1) Segregation of waste at the sources.<br>2) Collect the chemical waste of Chemistry, Zoology and botany in air tight cement chamber/ Plastic tank .<br>3) Send the collected chemical waste frequently it for recycle or to destroy properly to approved chemical industry.<br>4) Immediately fix exhaust fans to expel gaseous waste in these laboratory where it essential.<br>5)Place the dust bins for wet solid waste collection in laboratory.<br>6)Take steps to start small influent treatments plant at campus. | High |

### 6.4.2 HAZARDOUS WASTE

| STRENGTHS | WEAKNESS | SUGGESTIONS | PRIORITY |
|---|---|---|---|
| 1) Chemical Wastes are drained out after hundred times dilution.<br>2) Hazardous chemicals are kept in sealed containers.<br>3) Use of Hazardous chemicals only under expert supervision and with proper training.<br>4) Very small amount in diluted form is used. | 1) Proper disposal methods for hazardous chemicals are not used.<br>2)Some time proper handling methods are not used at the time of preparation of solutions. | 1)Properly transfer hazardous chemical waste to government approved disposal facility centre.<br>2) Fix the collection tank to collect hazardous and collected hazardous waste should be send to recycled . | Medium |

### 6.4.3 GLASS WASTE

| STRENGTHS | WEAKNESS | SUGGESTIONS | PRIORITY |
|---|---|---|---|
| 1)Less handling of glassware ( i.e. only by some departments in science)<br>2)Already reuse of bottles in some departments at science.<br>3)Very small glass waste generation. | 1)Glass waste is thrown in regular waste and send it is for recyclable.<br>2)Glass waste is not segregated while throwing in waste bin.<br>3)Some pieces of glassware are directly thrown in campus near some science laboratory. | 1) Sent broken glassware for recycle.<br>2)Collect the pieces of glass ware nearer to science departments by NSS/NCC students. | High |

### 6.4.4 E-WASTE

| STRENGTHS | WEAKNESS | SUGGESTIONS | PRIORITY |
|---|---|---|---|
| 1)E-waste generated in this college is of schedule III and it is generated 76 Kg in last year, is appears to be in very less quantity.<br>2)Some dumped e-waste is seen in different sections. | 1) Institute have some e-waste like chips, bulbs, circuit boards, mother boards, computers, batteries, relays, and switches with garbage.<br>2)E-waste thrown along with the regular waste, some of the E-waste is hazardous and some of it is recycled.<br>3) Carbon emission in printers, carbon copy of bills and filing of cartridge inside the office and in several sections is observed.<br>4) The non-working computer spare parts and other non-working electrical equipments are dumped in different sections at several places is observed.<br>5) Buy back policy at the time of purchase is not in force. | 1)Purchase committee should decide specific policy for the destroying E-Waste. Adopt Green Policy.<br>2)Adopt an buy back policy at the time of purchase if available.<br>3) The cartridge of laser printers should be refilled outside the college campus or in closed room.<br>4) Conduct the awareness programmers regarding -E-waste Management with help of department of physics, electronics in science.<br>5) All the e-waste generated per year within campus will be stored separately and disposed off through authorized vendors. | High |

**1)Vilas S. Patil.**
Green Audit Expert,
Assistant Professor in Physics,
Department of Physics,
Yashwantrao Chavan.Warana Mahavidyalaya, Warananagar

**2) Bharati S. Shinde**.
Coordinator
Assistant Professor, Department of Geography,
Shripatrao Chougule Arts and Science College ,Malwadi – Kotoli

# Annexure

**Annexure-A**
**Shripatrao Chougule Arts and Science College, Malwadi- Kotoli**
**Green Audit: Year-2017**
**Energy Audit : Form A**
**(Please see instructions carefully before filling the data sheet)**

| **Energy Use Survey** | | |
|---|---|---|
| | Department- office | Month-Jan-2017 |
| Energy is –<br>□ Generated on –site<br>□ Supplied by utility(MSEB)<br>□ Other supplier | Energy products used-<br>□ Electricity<br>□ Liquid petroleum/Fluid oil<br>□ Natural gases<br>□ Renewable(solar,wind, etc) | Main Energy Use-<br>□ Office use<br>□ Laboratory<br>□ Transportation<br>□ For classroom practices/ICT<br>□ Other (mention if any) |
| Number of Employees(All)- | Number of students-<br>Number of Visitors- | Total average occupancy-<br>Hours: hr |

**Form A:-I: Electricity Consumption.**

**(Table.1.) Existing Major Energy - Consuming Equipments in Departments, Labs., and others:**

| Sr. No. | Equipments | Location | Type | Units | Make / Model | Energy use in watts (see chart enclosed) | Total use of all units in day in hour (sum of use of units) | Total use per day in Watt – Hour (col.7 x col.8) | Total Use / week (col.9 x 6 days) in Watt-hour | KWh/week ($\frac{col.10}{1000}$ kWh | kWh\/Month (Col.11x 4 weeks) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1. | | | | | | | | | | | |
| 2. | | | | | | | | | | | |
| Total | | | | | | | | | | | |

(**Table.2.) Existing Less Energy – Consuming ( i.e, Fans, Computers and other )Electrical Equipments:**

| Sr. No. | Equip-ments | Location | Type | Units | Make / Model | Energy use in watts | Total use of all units in day in hour (sum of use of units) | Total use per day in Watt – Hour (col.7 x col.8) | Total Use / week (col.9 x 6 days) in Watt-hour | KWh/week ($\frac{col.10}{1000}$ kWh | kWh/Month (Col.11x 4 weeks) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1. | | | | | | | | | | | |
| 2. | | | | | | | | | | | |

**Form A:-II**

| **Lightning Use Survey-** | | |
|---|---|---|
| | Department -office | Month-Jan-2017 |
| For Lighting is Used –<br>□ Incandescent bulbs<br>□ Fluorescent Tubes<br>□ CFL(Compact Fluorescent Lamp)<br>□ HID(High Intensity Discharge) Lamp<br>□ LED Bulbs<br>□ LED Tubes | Fluorescent Ballasts used-<br>□ Electronic<br>□ Magnetic<br>□ Mechanical<br>□ Unknown<br>□ None | Main Lighting Usages-<br>□ Office use<br>□ Laboratory<br>□ For classroom practices<br>□ Exterior<br>□ Other (specify if any) |
| Number of Employees(All)- | Number of students-<br>Number of Visitors- | Total average occupancy-<br>Hours |
| Occupancy Schedule | Week Days:<br>------am to -------pm | Weekends/Holiday (If applicable)<br>-------am to --------pm |
| Is there enough ventilation and adequate natural light in department, and in classroom? | | □Yes □No |

**(Table.3.)Existing Lighting Equipments Used**

| Sr. No. | Equip-ments/ Lighting Type | Locat-ion | Ballasts Type (If applicable) | Type | Units | Make / Model | Energy use in watts | Total use of all units in day in hour (sum of use of units) | Total use per day in Watt – Hour (col.8 x col.9) | Total Use / week (col.10x 6 days) in Watt-hour | KWh/week ( $\frac{col.10}{1000}$ kWh | kWh/Month (Col.12x 4 weeks) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 1. | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | |

**Form A:-III**

**(Table.4.) Transportation Survey/ Carbon Footprint Survey:-**

| Jr. wing / Sr. Wing | | | Department-Office | | Month- | |
|---|---|---|---|---|---|---|
| **Department / Institute Owned Vehicles** | | | | | | |
| Sr. No. | Type ofVehicle | Vehicle Make/ Model/Year | Vehicle Number | Average Km/Liter | Total Km/Month | Average liter of Fuel/ Month |
| 1 | Two wheeler | -- | -- | -- | -- | -- |
| 2 | Four wheeler | | | | | |
| 3 | Other | | | | | |

**(Table.5.)Employee, Students and Visitors Vehicle Survey**

| Number of students come to college by walk- | | | | | |
|---|---|---|---|---|---|
| Number of students using bicycle - | | | | | |
| Number of students using state transportation vehicle (ST bus) - | | | | | |
| Number of students using Private transportation - | | | | | |
| Number of students using vehicles in sharing- | | | | | |
| Type of Vehicle | Vehicle Make/Model/Year | Vehicle Number | Average Km/Liter | Total Km/Month | Average liter of Fuel/ Month |
| Two wheeler | | | | | |
| Four Wheeler | | | | | |
| Other | | | | | |

**Form A:-IV -Consumption of Fuel.**
**(Table.6.) Total Energy Use Worksheet for** …….

| Sr. No. | Year- Month | Natural Gas Kg | Natural Gas Total Amount | Electricity kWh | Electricity Total Amount | Fuel Oil (in Liters) Liters | Fuel Oil (in Liters) Total Amount |
|---|---|---|---|---|---|---|---|
| 1 | January | | | | | | |
| 2 | February | | | | | | |
| 3 | March | | | | | | |
| 4 | April | | | | | | |
| 5 | May | | | | | | |
| 6 | June | | | | | | |
| 7 | July | | | | | | |
| 8 | August | | | | | | |
| 9 | September | | | | | | |
| 10 | October | | | | | | |
| 11 | November | | | | | | |
| 12 | December | | | | | | |

Head of Department

**Instructions-**

**1)** Please tick **(√)** if applicable.

**2)** Use separate sheet/forms for Jr. wing and Sr. wing. Submit the information through HOD's .

**3)** Please confirm the wattage of electrical equipments carefully before filling data sheet. For reference see the chart enclosed showing Basic Energy Consumption for different electrical equipments on page no-4(use for **Table-1,Table-2,Table-3** respectively only for col.7 & col.8).If any confusion take help from **Vilas s. Patil sir and Bharati Shinde madam.**

**4)** Record the electrical instruments with their existing locations (like Principal chamber, HOD chamber, Sr. lab, Jr. lab, in corridors, On staircase, in office, etc).

**5)** In **Table .1.**record only high electric energy consuming equipments like- Air conditioner, Air cooler, Freeze. Xerox machine, LAN servers, Water cooler ,Vacuum cleaner, motor pump etc.

**6)** In **Table .2.**record all types of fans separately like( ceiling fans, table fans, wall fans, exhaust fans, pedestal fans etc) and categories desktop computers separately as with CRT monitors, with LCD monitors, with LED monitors etc.

**7)** Record institutional as well as employee's laptops in **Table .2.**

**8)** Record computer accessories separately in **Table .2** for example-inkjet printer, dot matrix printer, laser printer, printer cum Xerox, fax machine, scanners, multimedia, routers/DSL/ cable modems, D.C.battery chargers, micro-ovens, etc .

**9)** Record ICT tools like Handicam, camera, LCD projector, OHP, T.V.,VCD/VCR, etc in **Table .2 .**

**10)** Equipments like incubator, thermostat heating coils (small or large), sound system, amplifier, speakers etc list in **Table .2.**

**11)** While indicating the number of employer consider all( teaching – non-teaching, permanent, part-time, CHB) staff .

**12)** While indicating total number of students at Sr. wing, record only III$^{rd}$ year student strength . Compulsory subjects at B.A. / B.Sc. I &II year ( i.e.English) take into account year wise total strength.(i.e. I,II)

**13)** At Jr. wing total strength of students is combined strength of XI$^{th}$ and XII$^{th}$ for respective subject.

14)All other wings Like English medium school, semi English medium school, High school, ITI,etc record total student strengths.

**14)** Before filling the **Table.5**.all the departments of Sr. wing circulate questionnaire to students of B.A/B.Sc./B.Com. III and **analyzed** data should fill in it.

**15)** For **Table-1, Table-2 and Table-3** to determine the total usage of piece of electrical equipment per year use mathematical Formula (wattage X hours of use per day X days of use per year) Watt/ hours.

For example :- A single desktop computer used 8 hours per day and 260 days per year then total energy usage = (175 w X 8 hours X 260 days) = 364000 Watt-hours or 364 kWh. For easy understanding convert it for month.

**16)** Any doubt please contact ***Vilas.S.Patil, of Y.C. College , warananagar***. Submit the same at the end of each month in audit duration.

**Annexure-B**

**Shripatrao Chougule Arts and Science College, Malwadi- Kotoli**
Green Audit: 2017
**Solid Waste Audit: Form B**
**Departmental Information**

**Name of the Department:** ……

Month : ……. Year : ……

Total No.of Students : ……
Total No. of Employee : ……
Visitors : ……
Events : ( Workshops, Conferences, Competitions etc.)
No of visitors and duration of event.(attach separate sheet if necessary)
……..

---

**From-B-1 : FORM FOR MAINTAINING RECORDS OF SOLID WASTE HANDLED**

(Roughly in Kg/month)

Month : …… Year : ……

Paper waste : ……
Plastic waste :
Hard plastic : ……
Soft plastic : ……
Carry bags……
Other : ……
Biodegradable waste : ……
(Kitchen , garden etc,)
Construction waste : ……
Glass waste : ……
( Bottles, glass, wares etc.)
Other : ……

**B.2 : FORM FOR MAINTAINING RECORDS OF DIDPOSAL OF SOLID WASTE**

| Sr. No. | Specification | Yes | No | NA |
|---|---|---|---|---|
| 1. | Are the solid wastes generated at the facility segregated and stored in designated accumulation areas? | | | |
| 2. | Are street sweepings burned and stored on pavement ? | | | |
| 3. | Are solid wastes properly stored/ containerized for offsite disposal? (trash stored in a covered dumpster)? | | | |

| | | | | |
|---|---|---|---|---|
| 4. | Is there evidence of improper disposal in the trash dumpster<br>( batteries, lamps, waste oil , etc.) | | | |
| 5. | Are solid waste accumulation areas labeled? | | | |
| 6. | Do the accumulation areas have clearly marked boundaries? | | | |
| 7. | Are empty containers ( containing less then ½ inch of residue ) labeled with the word “EMPTY” | | | |
| 8. | Are Empty Compressed gas cylinders labeled “EMPTY”? | | | |
| 9. | Is the Biodegradable waste used for composting? | | | |
| 10. | Is the waste from garden /classroom is in burned? | | | |

**B.3 : FORM FOR MAINTANINING RECORDS OF SOLID WASTE RECOVERY**

| Sr.No. | Specification (Y/N) | Segregated (Y/N) | Recycled (Y/N) | Reuse (Y/N) | Other (Specify) |
|---|---|---|---|---|---|
| 1. | Paper | | | | |
| 2. | Cardboard | | | | |
| 3. | Scrap wood | | | | |
| 4. | Wood pallets | | | | |
| 5. | Scrap Metal | | | | |
| 6. | Plastic Scrap | | | | |
| 7. | Glass | | | | |
| 8. | Laboratory Rags | | | | |
| 9. | Fluorescent Lamps | | | | |
| 10. | Air Filters | | | | |
| 11. | Empty Drums | | | | |
| 12. | Used Tires | | | | |
| 13 | Waste of medical center | | | | |
| 14 | Any other | | | | |

**Head of Department.**

***Give month wise report on separate sheet.**

**Annexure-C**

**Shripatrao Chougule Arts and Science College, Malwadi- Kotoli**

Green Audit: 2017

WATER Audit :**Form C**

**Form C:-I**

Name of the Department ……Month and Year-

**Water User Profile**

(Water users include students, staff, visitors etc.)

1. Total number of water users …….

2. Number of Employee …….

3. Number of students …….

4. Number of visitors (Monthly) …….

5. Total working days (Monthly) …….

6. Office time ……

7.Area of paved surfaces in merter$^2$ -(if applicable)------Rain water collected----- liters/year

8.Area of unpaved surfaces in merter$^2$-(if applicable)---- Rain water collected----- liters/year

9. Rain water harvesting system availability – Yes / No

If Yes Specific Detail…….

10. Is rain water harvesting system working – Yes / No

If Yes Specific Detail…….

11. Daily water supply -liters ( for office use) ……..

**Table -1-Assessment of water requirement**

| Sr. No. | Site | Total No. of Sources | Measurement of Water Uses ( Daily) | | | | | Total use in week in liters | Total use in month in liters |
|---|---|---|---|---|---|---|---|---|---|
| | | | Rate of discharge Liter/min | Average duration of Use (Min) | Average Quantity per use (Liters) | Average Number of Uses of sources (No.) | Total daily use in (liter) | | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| 1 | Bathroom | | | | | | | | |
| 2 | Toilet | | | | | | | | |
| 3 | Laboratory | | | | | | | | |
| 4 | Kitchen | | | | | | | | |
| 5 | Garden | | | | | | | | |
| 6 | Shower | | | | | | | | |
| 7 | Drinking | | | | | | | | |
| 8 | Washing | | | | | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 9 | Others | | | | | | | | |
| TOTAL | | | | | | | | | |

**Table-2-Water losses (leakages)**

| Sr. No. | Site | Total No. of Leakages | Measurement of Water Uses ( Daily) | | | | Total loss in week (col.7x6 days) | Total loss in month (col.8x4 week) |
|---|---|---|---|---|---|---|---|---|
| | | | Rate of discharge Liter/min | Rate of discharge Liter/Hour (col.4x 60 min) | Daily loss Liters (col.5x24 hours) | Total loss Liters (col.6xcol.3) | | |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** |
| 1 | Bathroom | | | | | | | |
| 2 | Toilet | | | | | | | |
| 3 | Laboratory | | | | | | | |
| 4 | Kitchen | | | | | | | |
| 5 | Garden | | | | | | | |
| 6 | Shower | | | | | | | |
| 7 | Drinking | | | | | | | |
| 8 | Washing | | | | | | | |
| 9 | Others | | | | | | | |
| Total- | | | | | | | | |

**Table-3-Water Storage (Details of water structures of overflow)**

| Sr. no. | Storage Tank site | Capacity in liters | Number of tanks | Number of times it is filled (or topped)Daily | Daily Average time of water over flowing min | Flow rate Liter/ min | Daily Water losses due to overflow liter | Water loss in week liter | Water loss per month liter |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| | | | | | | | | | |

**Table-4-Monitoring of Water Tanks to calculate water used per day.**

| Sr. no. | Storage Tank site | Capacity in liters | Number of tanks | Daily Measurement of water used in liters at early morning (Monitoring before filling) Y / N | Average water used Per day in Liters | Working days of the month | Total water used per month in liters. |
|---|---|---|---|---|---|---|---|
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** |
| | | | | | | | |
| | | | | | | | |

Head of department

**Annexure-D**
**Shripatrao Chougule Arts and Science College, Malwadi- Kotoli**
Green Audit: 2017
**Hazardous Waste and Management: Form D**

**Department of ----------**
**Month----------** **Year----------**

| | | |
|---|---|---|
| 1. Name of Department : | | |
| 2. Total No. of Employees:---------- Total No. of Students :----------<br>Total No. of Visitors :---------- | | |
| 3. Types of Quantity of Hazardous Waste Handled | Category/Item description | Quantity in mg or gram or kg or Liter |
| | | |
| 4. Types of Quantity of Hazardous Waste Stored | | |
| | | |
| **5.** Types of Quantity of Hazardous Waste Transported | | |
| | | |
| Name, Address and contact details of the destination | | |
| **6.** Types of Quantity of Hazardous Waste Refurbished | Category/Item description | Quantity in mg or gram or kg or Liter |
| | | |
| Name, Address and contact details of the destination of Refurbished materials | | |
| 7. Types of Quantity of Hazardous Waste Dismantled | Category/Item description | Quantity in mg or gram or kg or Liter |
| | | |
| Name, Address and contact details of the destination | | |
| 8. Types of Quantity of Hazardous Waste Recycled | Category/Item description | Quantity in mg or gram or kg or Liter |
| | | |
| . Types of Quantity of Hazardous Waste Recovered | | |
| Name, Address and contact details of the destination | | |
| 10. Types and Quantity of Waste treated and disposed | Category/Item description | Quantity in mg or gram or kg or Liter |
| | | |
| | | |

**Head of the Department**

**Annexure-E**
**Shripatrao Chougule Arts and Science College, Malwadi- Kotoli**
**Green Audit : 2017**
**E-Waste : Form-E**
**Departmental Information**
**MAINTAINING RECORDS OF e-WASTE HANDLED**

Department of:-
Month :- Year :-

| | | |
|---|---|---|
| 1. Name of department :- | | |
| Total no of employees:-<br>Total no. of students:- Total no. of visitors :- | | |
| 3. Types & Quantity of e-waste handled - | Category/ Item description | Quantity in mg or kg |
| | | |
| 4. Types & Quantity of e-waste stored | | |
| | | |
| 5. Types & Quantity of e-waste transported | | |
| | | |
| Name, address and contact details of the destination | | |
| 6.Types& Quantity of e-waste. refurbished | Category/ Item description | Quantity in mg or kg |
| | | |
| Name, address and contact details of the destination of refurbished materials | | |
| 7.Types it Quantity of e-waste dismantled | Category / Item Description | Quantity in mg or kg |
| Name, address and contact details of the destination. | | |
| 8. Types & Quantity of e-waste recycled | Category / Item Description | Quantity in mg or kg |
| | | |
| Types & Quantity of materials recovered | | |
| | | |
| Name, address and contact details of the destination | | |
| 9. Types & Quantity of waste treated & disposed | Category/ Item Description | Quantity in mg or kg |
| | | |

Head of the Department

**Annexure-F**

**Shripatrao Chougule Arts and Science College, Malwadi- Kotoli Green Audit: 2017**

**Energy Audit : Form F**

**Employees Questionnaires**

(for the completion of Form A-III-Table.5.)

| | |
|---|---|
| 1.Name of Employee Dr./Prof./Mr. | Teaching staff / Non-teaching staff |
| 2.Department- | Designation- |
| □Male □Female | Experience - years. |
| Wing □Junior wing □Senior wing | Qualification- |
| Faculty □ Arts □commerce □ science □MCVC | Qualification related to environment (if any) |
| Class taught:- □XI □B.A.-I □B.Sc.I □B.Com.I<br>□XII □B.A.II □B.Sc.II □B.Com.II<br>□B.A.III □B.Sc.III □B.Com.III | Blood group-<br>Mobile no-1)<br>2)<br>e-mail -1)<br>2) |

| | |
|---|---|
| Resident is | □In campus □ In campus |
| Permanent residential place / Address | |
| Distance of residential place from college location | Kilometers. (Roughly ) |
| Mode of transportation adopted to college | □By Walk □ By Bicycle<br>□By own Vehicle □By State transportation(ST)<br>□ By Private transportation |
| If by own vehicle | □Two wheeler □three wheeler □ four wheeler □other |
| Mention vehicle number in detail | |
| If two wheeler | □used by single □Used in sharing |
| If four wheeler or other | □used by single □Used in sharing □Used in groups |
| If by the vehicle, you have the driving license? | □ Yes □No |
| If No | □Have learning □Applied for it □Not applied yet |
| If by the two wheeler, you use the helmet? | □Yes □No |

| | |
|---|---|
| The fuel used to vehicle is | □Petrol □Diesel □Natural gas □CNG |
| Mention the mileage/ average of vehicle. | KM/Liter |
| Total kilometers/ month | kilometers/ month |
| Total average liter of fuel required for transportation per month | |
| PUC checking of own vehicle for carbon neutrality awareness | □Mostly □Usually □Rarely |
| PUC camp is organized in campus for carbon neutrality awareness | □Yes □No |
| College can run an eco-friendly activities / practices | □Yes □No |
| What is that? Select if applicable. | □plantation □Bicycle bank □eco-friendly Diwali □Celebration of festivals without water, soil and noise pollution □Formation of Environmental club □Programs of yoga □Celebrating of Environmental Day □Say to no plastic □Beautification of campus □Study tours to biodiversity place □Placing waste bins |
| Departmental contribution for eco-friendly activities / practices. | |

Employee signature

**Annexure-G**
**Shripatrao Chougule Arts and Science College, Malwadi- Kotoli**
**Green Audit: 2017**
**Energy Audit : Form G**
**Student Questionnaires** (only for B.A/B.Sc./B.Com. III)
(for the completion of Form A-III-Table.5.)

| | | |
|---|---|---|
| | 1.Name of student- | Mr./Miss- |
| Gender | □Male □Female □Third | |
| Wing - | □Junior wing | □Senior wing |
| Faculty- | □ Arts □commerce □ science □MCVC | Faculty- □ Arts □commerce □ science |
| Class- | □XI<br>□XII | □B.A.-I □B.Sc.I □B.Com.I<br>□B.A.II □B.Sc.II □B.Com.II<br>□B.A.III □B.Sc.III □B.Com.III |
| Subjects | Only for III$^{rd}$ year B.A./B.Sc. | |
| e-mail- | | Mobile no. |
| Blood group- | | |

| | |
|---|---|
| Permanent residential place / Address | |
| Distance of residential place from college location | Kilometers. (Roughly ) |
| Mode of transportation adopted to college | □By Walk □ By Bicycle<br>□By own Vehicle □By State transportation(ST)<br>□ By Private transportation |
| If by bicycle | □ by own bicycle □by bicycle from college scheme |
| If by own vehicle | □Two wheeler □three wheeler □ four wheeler □other |
| Mention vehicle number in detail | |
| If two wheeler | □used by single □Used in sharing |
| If three wheeler/ If four wheeler or other | □used by single □Used in sharing □Used in groups |
| If by the vehicle, you have the driving license? | □ Yes □No |
| If No | □Have learning □Applied for it □Not applied yet |

| | |
|---|---|
| If by the two wheeler, you use the helmet? | □Yes □No |
| Fuel used for vehicle | □Petrol □Diesel □Natural gas □CNG |
| Mention the mileage / average of vehicle | KM/Liter |
| Total kilometers/ month | kilometers/ month |
| Total average liter of fuel required for transportation per month | |
| Parents lifted you at college | □Yes □No |
| If yes | □Daily □Occasionally □Sometime □Rarely |
| PUC camp is organized in campus for carbon neutrality awareness | □Yes □No<br>□Mostly □Usually □Rarely |
| Your college can run an eco-friendly activities | □Yes □No |
| What is that? select if applicable. | □plantation □Bicycle bank □eco-friendly Diwali □Celebration of festivals without water, soil and noise pollution □Formation of Environmental club □Programs of yoga □Celebrating of Environmental Day □Say to no plastic □Beautification of campus □Study tours to biodiversity place □Placing waste bins |

Student signature

**Annexure-H**
**Shripatrao Chougule Arts and Science College, Malwadi- Kotoli**
**Green Audit: Year-2017**
**Classroom data: Form H**
**Energy Audit : Form A**

**Students data (details on Class)**

(for the completion of Form A-III-Table.5.)

| Sr. no. | Wing | Class and division | Day | Date | Time | Professor on Class | | Member of Green audit committee collecting information | | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Name | signature | Name | signature | |
| 1 | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

**Annexure-I**
**Shripatrao Chougule Arts and Science College, Malwadi- Kotoli**
**Green Audit: Year-2017**
**(Energy Audit : From A)**
**Staff Data (For the Fuel Consumption)**

**Senior Wing**

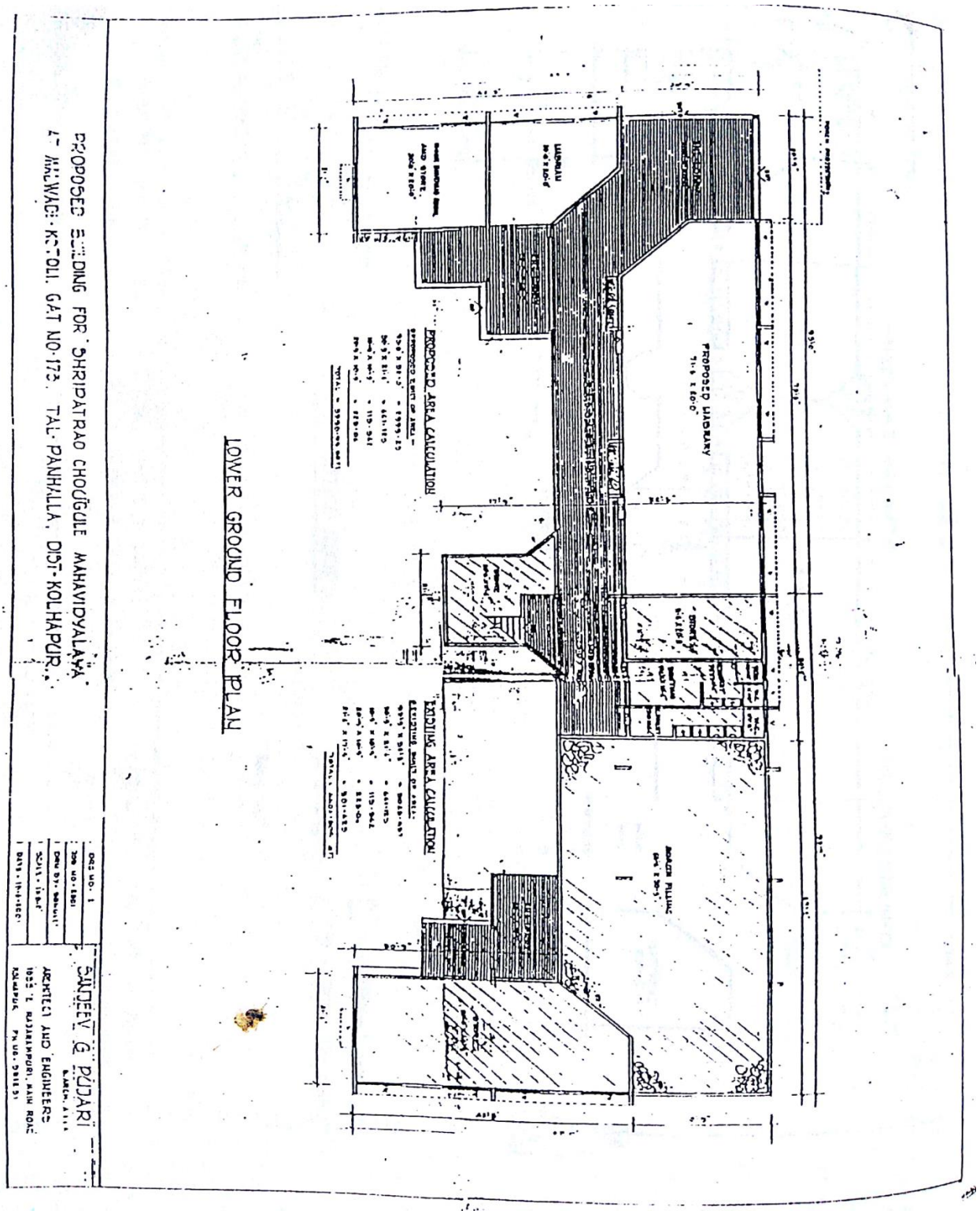
| Sr. No. | Name | Residential Place | | | Average KM/ Month | Average Liters/ Month | Vehicles | | | Walk | Bicycle | ST |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Below 10 KM | Below 20 KM | Above 20 KM | | | Two Wheeler | Four Wheeler | Sharing | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 1 | DrAttar Peermohammad Abu | | | Y | 1000 | 50 | | Y | | | | |
| 2 | Dr.Ravan Babasaheb N. | | | Y | 1500 | 25 | Y | | | | | |
| 3 | Mahajan Anil Ramchandra | | | Y | 672 | 11 | Y | | | | | |
| 4 | Shinde Bharati Santosh | | | Y | | | | | Y | | | |
| 5 | Kamble Mahadev Krishna | | | Y | 1000 | 18 | Y | | | | | |
| 6 | Patil Manisha Hindurao | Y | | | 300 | 6 | Y | | | | | |
| 7 | Patil Uma Uttam | Y | | | | | | | | Y | | |
| 8 | Sardesai Jagdish Appasaheb | | | Y | 1250 | | | | | | | Y |
| 9 | Kamble Snehalata Gautam | | | Y | | | | | Y | | | |
| 10 | Patil Vandana Prakash | Y | | | | | | | | Y | | |
| 11 | Dr.Mangore Nivrutti D. | | | Y | 1125 | 25 | Y | | | | | |
| 12 | Powar Mahadev Yashwant | | Y | | 650 | 10 | Y | | | | | |
| 13 | Lad Udaykumar Narayan | Y | | | | | | | | Y | | |
| 14 | Khade Pandit Shankar | | | Y | 1100 | 22 | Y | | | | | |
| 15 | Patil Bharat Ganpati | | | Y | 1250 | 22 | Y | | | | | |
| 16 | Kamble Sambhaji Shankar | Y | | | | | | | | Y | | |
| 17 | Dr.Patil Manisha Vilasrao | | | Y | 1750 | | | | | | | Y |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 18 | Inamdar Dayanand Bajrang | | Y | | 600 | 12 | Y | | | | | |
| 19 | Mane Prakash Dhondiram | | | Y | 1050 | 52 | | Y | Y | | | |
| 20 | Shirsat Harichand Sugriv | | | Y | 672 | 11 | Y | | | | | |
| 21 | Dr.Chougule Ajay Kerba | | | Y | 2000 | 100 | | Y | | | | |
| 22 | Patil Pratibha Sambhaji | | | Y | 1440 | 28 | Y | | | | | |
| 23 | Lavhate Prakash Balwant | Y | | | | | | | | | | Y |
| 24 | Ghorpade Priyanka Dhodiram | Y | | | | | | | | | | Y |
| 25 | Sapate Manisha Prakash | | Y | | | | | | | | | Y |
| 26 | Chougule Shital Maruti | | Y | | 100 | 3 | Y | | | | | |
| 27 | Suryawanshi Tejaswini Vishawas | | | Y | | | | | | | | Y |
| 28 | Ingale Amita Anandrao | Y | | | | | | | | Y | | |
| 29 | Kazi Asamaparveen Mahammad | | | Y | | | | | | | | Y |
| 30 | Thanekar Gautami s. | | Y | | 1450 | 24 | Y | | | | | |
| 31 | Patil Manisha B. | Y | | | 120 | 2.4 | Y | | | | | |
| | | | | | | | | | | | | |
| JUNIOR WING | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| 32 | Powar Usha P. | | | Y | | | | | | | | Y |
| 33 | Kumbhar Sanjeev P. | Y | | | 60 | 1 | Y | | | | | |
| 34 | Patil R.B. | Y | | | 120 | 2 | Y | | | | | |
| 35 | Powar A .S. | Y | | | 300 | 5 | Y | | | | | |
| 36 | Dhadel D.R. | Y | | | | | | | | Y | | |
| 37 | Patil S.S. | Y | | | 150 | 3 | Y | | | | | |
| 38 | Attar R.B. | Y | | | | | | | | | | Y |
| 39 | Patil K.V. | Y | | | | | | | | | | Y |
| 40 | Kumbhar S.R. | | Y | | | | | | | | | Y |
| 41 | Patil V.R. | Y | | | | | | | | | | Y |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 42 | Khot V.M. | | Y | | 720 | 12 | Y | | | | | |
| 43 | Jabhilkar V.V. | Y | | | 400 | 6 | Y | | | | | |
| 44 | Patil B.S. | | | Y | 960 | 19 | Y | | | | | |
| **DE.D** | | | | | | | | | | | | |
| 45 | Shinde G.A. | | | Y | 1200 | 24 | Y | | | | | |
| 46 | Patil S.M. | | Y | | 750 | 13 | Y | | | | | |
| 47 | Kumbhar S.R. | | Y | | | | | | | | | Y |
| 48 | Dhavale T.T. | Y | | | 420 | 12 | Y | | | | | |
| 49 | Powar U.S. | Y | | | 400 | 11 | Y | | | | | |
| 50 | Chougule A.M. | | Y | | 660 | 10 | Y | | | | | |
| 51 | Chougule S.J. | Y | | | 200 | 4 | Y | | | | | |
| **ITI** | | | | | | | | | | | | |
| 52 | Patil S.S. | | Y | | 800 | 13 | Y | | | | | |
| 53 | Ambale S.V. | | | Y | 1750 | | | | | | | Y |
| 54 | Patil P.P. | | | Y | 1000 | 16 | Y | | | | | |
| 55 | Kamble S.A. | Y | | | 200 | 4 | Y | | | | | |
| 56 | More P.N. | | Y | | 300 | 6 | Y | | | | | |
| 57 | Ghorpade S.D. | Y | | | 180 | 2 | Y | | | | | |
| 58 | Kamble Y.K. | Y | | | 13 | | | | | | | Y |
| **HIGH SCHOOL** | | | | | | | | | | | | |
| 59 | Patil T.K. | Y | | | 416 | | | | | | | Y |
| 60 | Patil S.S. | | Y | | 780 | 15 | Y | | | | | |
| 61 | Patil M.H. | Y | | | | | | | | Y | | |
| 62 | Vanjire S.S. | | | Y | 3000 | | | | | | | Y |
| 63 | Gavit R.S. | Y | | | | | | | | Y | | |
| 64 | Turbekar V.R. | Y | | | | | | | | Y | | |
| 65 | Vadam Supriya | | Y | | 624 | | | | | | | Y |
| **SEMI-ENGLISH** | | | | | | | | | | | | |
| 66 | Bhosale P.B. | Y | | | 110 | 2 | Y | | | | | |
| 67 | Kalgavkar S.S. | Y | | | 200 | 4 | Y | | | | | |
| 68 | Gurav J.V. | | | Y | | | | | | | | Y |
| 69 | Mane M.P. | Y | | | 150 | 2 | Y | | | | | |
| 70 | Kamble D.B. | | | Y | 1200 | 13 | | | | | | Y |
| 71 | Bhogavkar P.B. | | Y | | 850 | | | | | | | Y |
| 72 | Gurav A.S. | | Y | | 312 | 5 | Y | | | | | |
| 73 | Kumbhar D.N. | Y | | | 26 | | | | | | | Y |
| **ENGLISH MEDIUM** | | | | | | | | | | | | |
| 74 | Amberkar P.M. | | | Y | 1500 | 23 | Y | | | | | |
| 75 | Khapane V.P. | Y | | | | | | | | Y | | |
| 76 | Kalekar V.A. | Y | | | | | | | | | | Y |
| 78 | Kamble J.S. | Y | | | | | | | | | | Y |
| 79 | Shelar A.S. | Y | | | | | | | | | | Y |
| 80 | Patil S.L. | Y | | | | | | | | | | Y |
| 81 | Patil S.B. | Y | | | | | | | | | | Y |
| 82 | Gaikwad P.S. | Y | | | | | | | | | | Y |

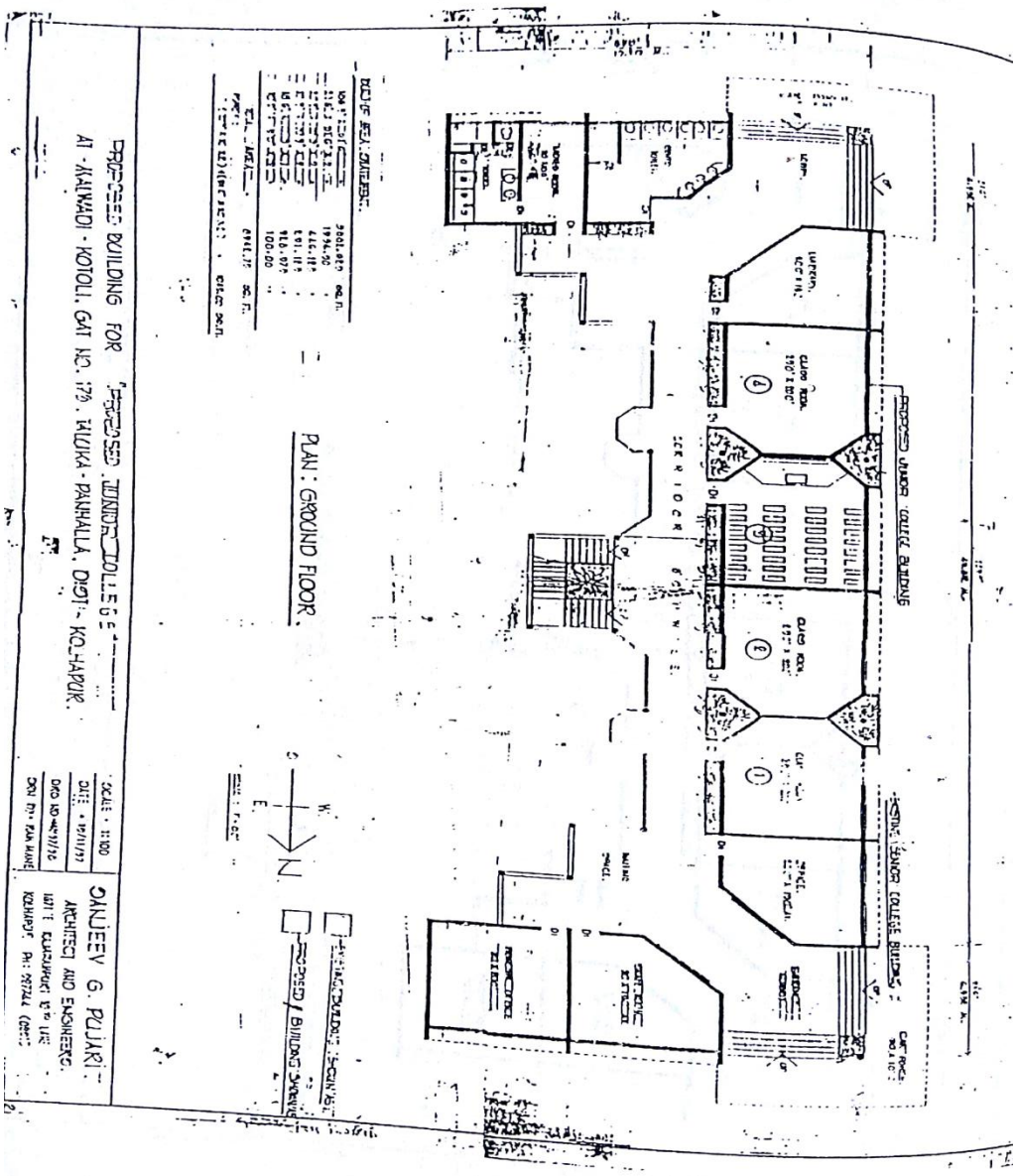
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **NON –TEACHING STAFF** | | | | | | | | | | | | |
| 83 | Patil S.S | Y | | | 728 | 40 | | Y | | | | |
| 84 | Shelar P.S. | Y | | | | | | | | Y | | |
| 85 | Satpute P.N. | Y | | | 400 | 8 | Y | | | | | |
| 86 | Chougule B.G. | Y | | | 450 | 7 | Y | | | | | |
| 87 | Agatekar V.K. | Y | | | 200 | 4 | Y | | | | | |
| 88 | Patil B.N. | | | Y | 1200 | 20 | Y | | | | | |
| 89 | Patil P.A. | Y | | | 500 | 10 | Y | | | | | |
| 90 | Powar G.S. | Y | | | 30 | 1 | Y | | | | | |
| 91 | Satpute V.S. | | | Y | 1500 | 28 | Y | | | | | |
| 92 | Vadd S.S. | Y | | | | | | | | | | Y |
| 93 | Khot S.J. | | | Y | 500 | 7 | Y | | | | | |
| 94 | Sagavkar V.G. | Y | | | | | | | | | Y | |
| 95 | Kamble S.B. | | | Y | | | | | | | | Y |
| 96 | Patil P.R. | | | Y | 1880 | 26 | Y | | | | | |
| 97 | Khapane S.C. | Y | | | | | | | | Y | | |
| 98 | Raykar V.D. | Y | | | 142 | 2 | Y | | | | | |
| 99 | Patil R.P. | Y | | | 380 | | | | | | | Y |
| 100 | Sate V.B. | Y | | | 312 | | | | | | | Y |
| 101 | Gurav R.S. | Y | | | 780 | | | | | | | Y |
| 102 | Kamble P.G. | Y | | | | | | | | | | Y |
| 103 | Khapane S.S. | Y | | | | | | | | | | Y |
| 104 | Kamble S.P. | | Y | | 504 | 8 | Y | | | | | |
| 105 | Khapane S.H. | Y | | | 150 | 3 | Y | | | | | |
| 106 | Lagade P.H. | Y | | | | | | | | Y | | |

**Annexure-J-1**



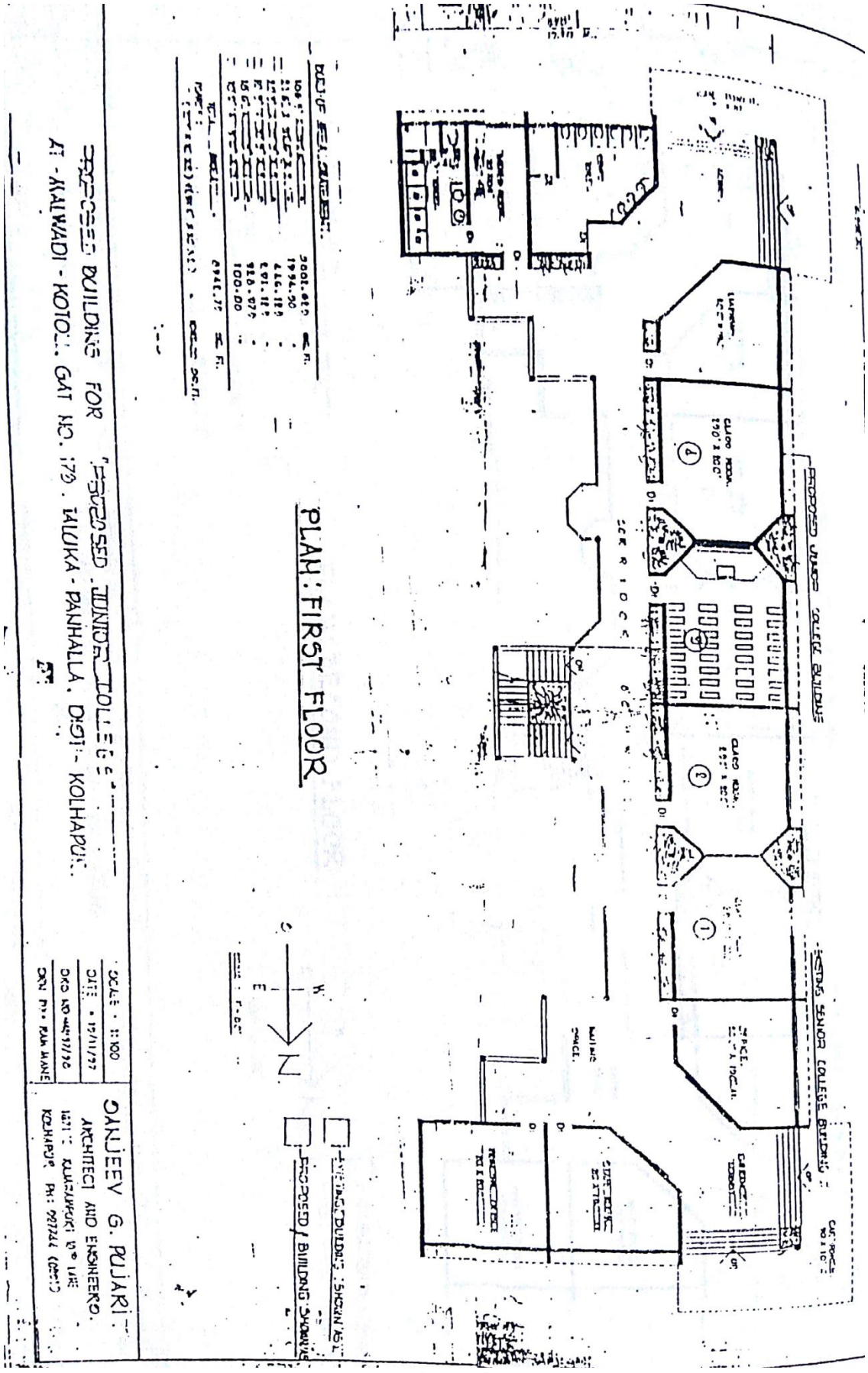

**Lower Ground Floor Plan**

**Annexure-J-2**



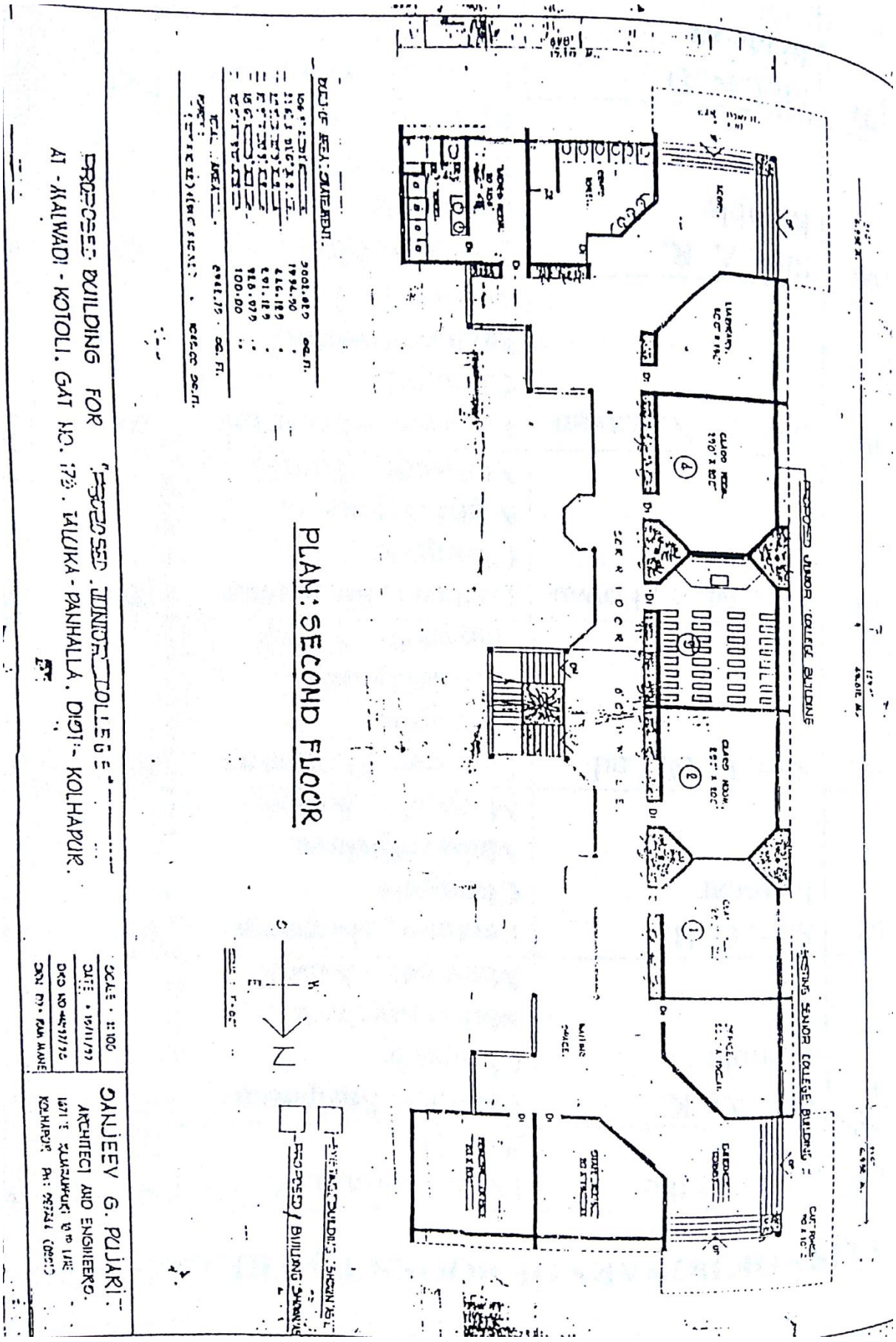

**Ground Floor Plan**

**Annexure-J-3**




**First Floor Plan**

**Annexure-J-4**




**Second Floor Plan**

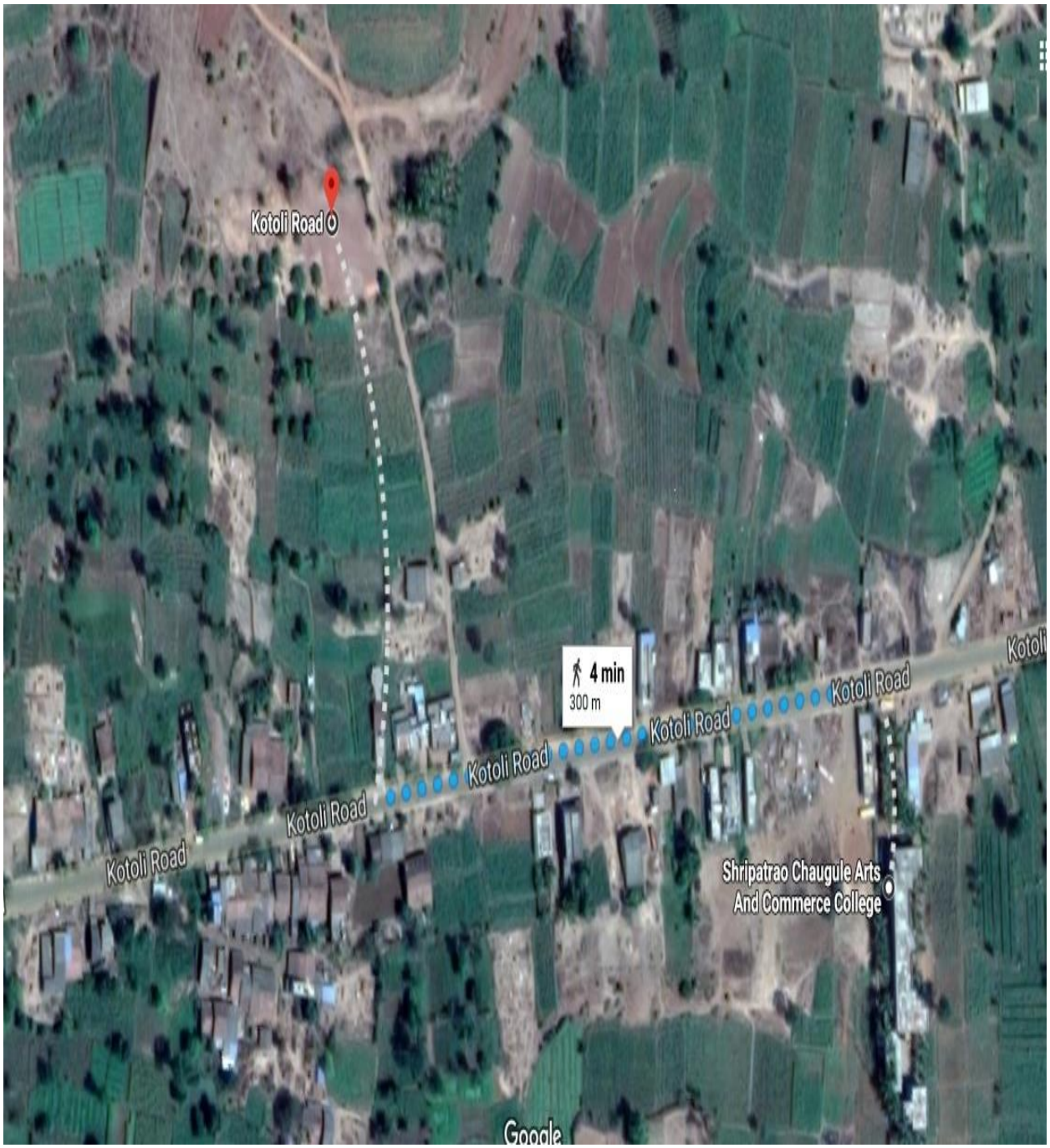
**Annexure-K-1**


**College Campus Google Map**

**Annexure-K-2**


**College Hostel Campus Google Map**

**Annexure-K-3**




**College Ground Google Map**

**Annexure-K-4**


**Wagjai Campus Google Map.**

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