

Rayat Shikshan Sanstha's
Mahatma Phule Mahavidyalaya, Pimpri, Pune
*Reaccredited with 'A' Grade by NAAC/ DST-FIST funded /An ISO 9001:2015 Certified College
Affiliated to Savitribai Phule Pune University, Pune (PU/PN/ACS/053)*

**2019-20 /
2020-21**

**GREEN /
ENVIRONMENT
AUDIT**



Rayat Shikshan Sanstha's

MAHATMA PHULE MAHAVIDYALAYA

PIMPRI, PUNE - 411 017.

Establishment : 1983

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Affiliated to Savitribai Phule Pune University, Pune.

Re-accredited by NAAC (Third Cycle) with 'A' Grade, CGPA : 3.16



Green Audit Report

© Principal,

Mahatma Phule Mahavidyalaya,

Pimpri, Pune-411017

Published by

Dr. Pandurang Gaikwad

Principal

Mahatma Phule Mahavidyalaya,

Pimpri, Pune - 411017.

Edition

Feb. 2020

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Second Campus

From The Principal's Desk

Man has the fundamental right to freedom, equality and adequate conditions of life, in an environment of a quality that permits a life of dignity and well-being and he bears a solemn responsibility to protect and improve the environment for present and future generations.

Most countries today face environmental threats due to increase in pollution of the atmosphere, water and land. Water scarcity, water contamination and air pollution are the critical problems are linked closely to the rapid growth of population, as well as to technological advancement.



Green audit is defined as an official examination of the effects of industries and educational institutions have on the environment. It also examines the efforts and initiatives taken by them to make the campus environment ecofriendly. The process of green audit enables us to assess our life style, action and assess its impact on the environment.

Rayat Shikshan Sanstha's Mahatma Phule Mahavidyalaya has often been at the forefront of environmental campaigning, viz., water and energy conservation campaigns, no plastic drive campaign, cleanliness drive etc. With these efforts, our institution tries to create environmental awareness among all the stakeholders of the society thereby creating social change and development. Thus all students, faculty members and non-teaching staff of Mahatma Phule Mahavidyalaya are committed to undertake this green audit as a means to make college campus ecofriendly and to conserve the natural resources for sustainable development.

However, undertaking this audit is the first step towards the green approach and needs to be pushed for constant improvement. We need to lead to campaign and aim to change not just ourselves, but all those around us, from the way our students think and lead their lives, to the college, other institutions, Nation and ultimately the world.

Editorial...

The aim of the green audit is to safe guard the environment and conserve resources for sustainable development. The green audit was undertaken to show the areas of strengths and weaknesses, how well the college follows the legislative regulations related to the environment, how it would help to solve environmental problems in the college and its environs, disposal of waste techniques, potential environmental management constraints and the focus of the future audits. The research objectives were to find out if the college is complying with environmental audit regulations. The main aims were to evaluate the recurring problems like paper, water and solid waste generation and its management and to assess the best way forward for improving environmental quality. Three statistical hypotheses were also formulated. These hypothesis were on paper, water and solid waste. The study was conducted using questionnaires as the principal data collection tool to obtain primary data from the staff and students of Mahatma Phule Mahavidyalaya. The sampling frame was obtained by selecting the students and staff using the random sampling method.

Mahatma Phule Mahavidyalaya administration is very keen on undertaking this audit which is the first step towards the green approach. **The responsibility of carrying out scientific green audit was given to the Environment Protection Club of the college and Energy Audit Firm, Pune.** The Committee has followed all the rules and regulations of Ministry of Environment and Forest, Government of India and Central Pollution Control Board, New Delhi.

During the preparation of the 'Green Audit Report-2020-2021 all the HODs of Mahatma Phule Mahavidyalaya supported us in carrying out this work. We must extend thanks to all the members' of Environment Protection Club for their help in preparing this report and our F.Y.B.Sc., S.Y.B.Sc. students for their help in the field work.

I hope the efforts made would be helpful for the college to take one green step ahead.

Prof. Swapna Hajare

Dr. Sangeeta Ahiwale

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Introduction

A clean and healthy environment aids effective learning and provides a conducive learning environment. Educational institutes are the leaders in pursuing environmentally sustainable solutions. Rayat Shikshan Sanstha's Mahatma Phule Mahavidyalaya, Pimpri, Pune-411017 expresses its commitment towards sustainability in variety of ways. To preserve the environment within the campus, various viewpoints are applied by the this institute to solve various environmental problems through the activities such as promotion of the energy savings, waste management, water reduction, water harvesting, etc.. The college has conducted the internal green audit for the academic year 2019-20.

The institution has taken initiatives towards Conservation of Energy and conducted Energy Audit separately in 2019-2020 by an external agency (Separate Energy Audit Report).

Mahatma Phule Mahavidyalaya comprises of two campuses (Campus I and Campus II). Environment Protection Club of Mahatma Phule Mahavidyalaya has conducted green audit of the college campus I in the academic year 2019-20. The area under study of Campus I is about 6070 sq. meters. The area under study of campus II is about 1229.73 sq. meters

Objectives of Green Audit:

1. To verify legislative and regulatory compliances for the green environment.
2. To find out the **strengths** and **weaknesses** of the environment systems available in the college campus.
3. To establish eco-friendly practices in the college campus and to identify environmental opportunities in the campus.

Green audit create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of Green impact on campus. To conduct green audit in the college campus the various criteria are taken into consideration to get baseline data from every department of the college including office, library, exam section, laboratories, common rooms by providing questionnaires for use of water, hazardous wastes and paper waste were prepared as per the guidelines, rules, acts and formats set by Ministry of India, Central Pollution Control Board, New Delhi. The surveyors then visited all the departments of the college, interacted with the staff members, survey was and then questionnaires were filled. The data

generated was used for further analysis. From the outcome of the study, a final report was prepared and then the final conclusions were drawn. SWOT (Strengths, Weaknesses, Opportunities and Threats) unit analysis was carried out and finally recommendations were made.

The initiatives taken by the college to make the campus eco-friendly

- ✓ Energy conservation
- ✓ Awareness campaign
- ✓ Tree plantation
- ✓ Establishment of Shadenet for medicinal plants and Vermicompost plant
- ✓ Hazardous waste management
- ✓ Biodegradable waste management
- ✓ E-waste management

Energy Conservation:

- Implementation of energy saving technique by displaying informative boards
 - Lights and fans are switched off after completion of work.
 - Shutting down of computers, electrical appliances when not in use.
 - Use of LED bulbs to generate less heat and reduce carbon emission.
 - The coolant water from the distillation plant in the science laboratories is reused.
- Design of our college is based upon the use of light and ventilation which saves power.
- The wooden window shutters in the classrooms, library and office have been replaced by sliding glass windows which helps natural light let in even when they are closed.
- Awareness on energy conservation is projected in models and exhibits prepared by students from the Science Exhibition organized every year.
- A step towards sustainable development

Rain Water Harvesting and Water Conservation:

- Chemistry Laboratory of our college collects rain water and uses it as mineral free water for routine practical's of UG Classes.
- Awareness lectures, Film show, etc.
- Students prepare models/miniatures on rain water harvesting as a part of environment awareness activity.

Carbon Neutrality:

- Some of the efforts in this regard are as follows:
 - Use of public transport by faculty/staff and students on No Vehicle Day.
 - Car pooling
 - Tree Plantation
 - Offering saplings to greet the guests to honor
 - Plant donation by botany department students
 - No Bouquets but books
 - Optimal use of paper by reusing
 - Plastic free campus.

Hazardous Waste Management:

- Hazardous chemicals are used in micro quantity for the practical's of chemistry and other science subjects where **Semi-Micro Analysis Technique** is used.
- Lab waste in chemistry labs is disposed-off carefully by diluting and detoxifying it.
- Bio-waste generated in Microbiology, Zoology and Botany Laboratories is destroyed by decontamination through autoclaving and incineration methods.

E- Waste management:

- It is done by parent institute of this college situated at Satara in which outdated computers, printers and other ICT equipment's are collected and are sold to the vendors for recycling.

Awareness Activities:

- S.Y. B.A., B.Sc., B.Com. students were registered as **members of Environmental protection club** for the year 2019-20.
- S.Y. B.Sc. students (B.A., B.Sc., B.com.) came out with various **Environmental awareness projects** as a compulsory academic activity.
- **No immersion of Ganesh idols** in rivers and well.
- Participation of students in the **Swacchata Rally, Cleanliness Drive at campus I and II , Participation in Nirmalya Sankalan during Ganesh Idol Visarjan, Celebration of No vehicle Day etc.**

OVERVIEW OF THE AUDIT

A] WATER AUDIT

Water audit in the college campus was conducted to determine quantity of water consumption by the institutions, the efficiency of water use and to develop recommendations for improving water use efficiently. Water audit process consists of a preparation of layout of water sources and its distribution through pipelines and finally its delivery points to water users.

Water audit was conducted in the college campus I at various important sites, viz., Science laboratories (Chemistry, Physics, Microbiology, Botany and Zoology), Toilets, Staff room, Pantry etc. Water audit was conducted at campus II at various sites viz., Toilets, Garden, Lawn etc.

Water sources and its consumption:

1. Source of water is corporation supply and well within the campus.
2. Total 7000 liter capacity storage tanks on terrace on Campus I.
3. 5 drinking water coolers and filters are there in the college campus.
4. Microbiological testing of drinking water through Microbiology Laboratory is done.

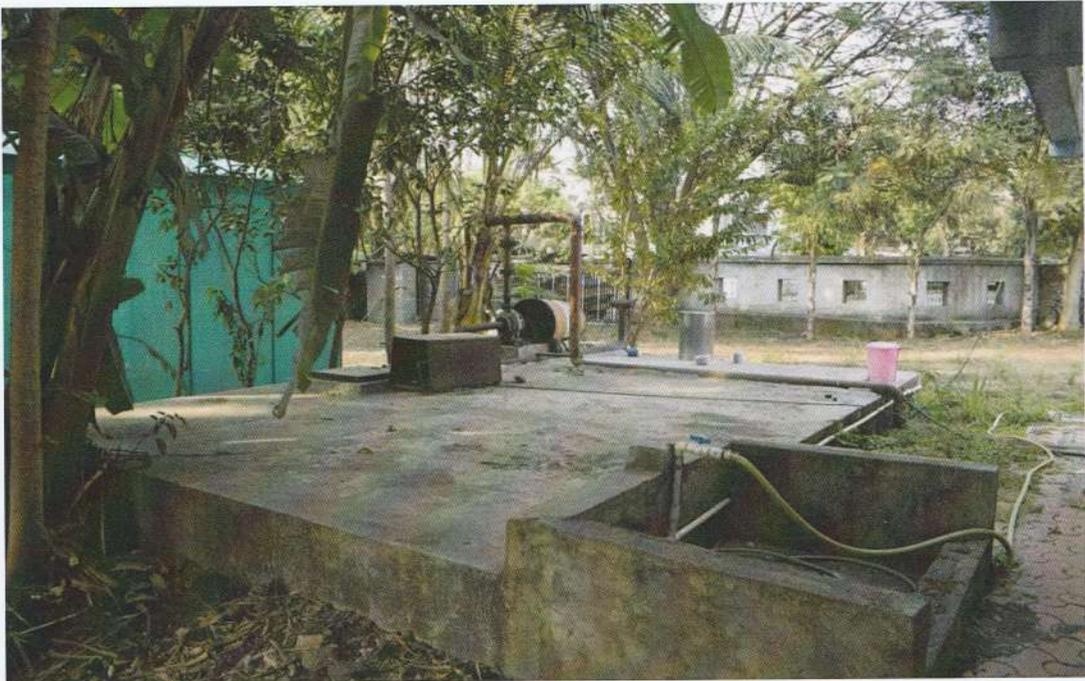
Daily Water supply in Tank (Capacity of the Tank): There is a continuous water supply in all the storage tanks from the main source of PCMC storage tank.

Table 1. Water Storage tanks in the college

Sr. No.	Storage Tanks	Capacity (Lit.)	Number of times it is topped (Filled)	Average time of water overflow
1.	Tank 1	2000	Continuously filled with a self-control float valve system to prevent overflow	Nil
2.	Tank 2	1000	Continuously filled with a self-control float valve system to prevent overflow	Nil

3.	Tank 3	1000	Continuously filled with a self-control float valvesystem to prevent overflow	Nil
4.	Tank 4	500	Continuously filled with a self-control float valve system to prevent overflow	Nil
5.	Tank 5	500	Continuously filled with a self-control float valve system to prevent overflow	Nil
6.	Tank 6	2000 (for Science wing)	Continuously filled with a self-control float valve system to prevent overflow	Nil
7.	Storage Tank	10000 (Second campus)	Bore-well connection Continuously filled with a self-control float valve system to prevent overflow	Nil

Water Storage Tank at Second Campus (Capacity 10000 Liters)



Storage Tanks in Campus I



Department wise Questionnaire for water Audit Year: 2019-20

Department: Chemistry

1. Total number of water users : 343 (Students, Teaching Staff, Non-teaching Staff)
2. Total number of Employees :
 - Teaching Staff : 11
 - Non-teaching Staff : 02
3. No. of Students : 330
4. Average Working Days : 180/yr
5. College Working Days : 25 days/month
1. College working Hours : 10 hr./day
6. Science Timing : 7.50 am to 6.10 pm
7. Purpose of use of water : For washing glass wares, cleaning apparatus and for preparing various solutions for practical's.

Table 2. Consumption of water by chemistry department

Sr. No.	Site	Source of water	Rate of Discharge Lit./min.	Average Quantity Lit./per user/day	No. of Users per day	Total daily use Lit./day
1.	Chemistry Department	Storage Tank	10	3	80	240

Per week- $240 \times 6 = 1440$ Per month: $1440 \times 4 = 5760$ Lit. /month, Per six months: $5760 \times 6 = 34560$ Lit./six months

Department: Microbiology

1. Total number of water users : 147 (Students, Teaching Staff, Non-teaching Staff)
2. Total number of Employees :
 - Teaching Staff : 06
 - Non-teaching Staff : 01

3. No. of Students : 140
4. Average Working Days : 180/yr
5. College Working Days : 25 days/month
6. College working Hours : 10 hr/day
7. Science Timing : 7.50 am to 6.10 pm
8. Purpose of use of water : For practical purpose, washing of glasswares.

Table 3. Consumption of water by microbiology department

Site	Source of water	Rate of Discharge lit./min.	Glassware washing Lit./Week A	Average Quantity used for practicals Lit./per user/day	No. of Users per day	Total daily use by users Lit./day	Total use Lit./week B	Total use Lit./Week A+B
Microbiology Department	Storage Tank	12	2000	4	70	280	1680	3680

Per month: $3680 \times 4 = 14,720$ Lit./month, Per six months: $14,720 \times 6 = 88,320$ Lit./six months

Questionnaire for water Audit Year : 2019-20

Department : Zoology

1. Total number of water users : 145 (Students, Teaching Staff, Non-teaching Staff)
2. Total number of Employees :
 - Teaching Staff : 03
 - Non-teaching Staff : 01
3. No. of Students : 141
4. Average Working Days : 180/yr
5. College Working Days : 25/month
6. College working Hours : 10 hrs/day
7. Science Timing : 7.50 am to 6.10 pm
8. Purpose of use of water : For laboratory purpose, for washing and cleaning of glass wares

Table 4. Consumption of water by Zoology department

Sr. No.	Site	Source of water	Rate of Discharge Lit./min.	Average Quantity Lit./per user/day	No. of Users	Total Daily use Lit./day
1.	Zoology Department	Storage Tank	12	1	45	45

Per week: $45 \times 6 = 270$, Per month: $270 \times 4 = 1080$ Lit./month, Per six months: $1080 \times 6 = 6480$ Lit./six months

Questionnaire for water Audit Year: 2019-20

Department : Botany

1. Total number of water users : 127 (Students, Teaching Staff, Non-teaching Staff)
2. Total number of Employees :
 - Teaching Staff : 02
 - Non-teaching Staff : 01
3. No. of Students : 124
4. Average Working Days : 180/yr
5. College Working Days : 25/month
6. College working Hours : 10 hr./day
7. Science Timing : 7.50 am to 6.10 am
8. Purpose of use of water : Washing and cleaning of glassware, for practical work

Table 5. Consumption of water by Botany department

Sr. No.	Site	Source of water	Rate of Discharge Lit./min.	Average Quantity Lit./per user/day	No. of Users	Total Daily use Lit./day
1.	Botany Department	Storage Tank	04	1	40	40

Per week: $40 \times 6 = 240$, Per month: $240 \times 4 = 960$, 960 Lit./month, Per six months: $960 \times 6 = 5760$ Lit./six months

Questionnaire for water Audit Year: 2019-20

Department : Physics

1. Total number of water users : 161(Students, Teaching Staff, Non-teaching Staff)
2. Total number of Employees :
 - Teaching Staff : 04
 - Non-teaching Staff : 01
3. No. of Students : 156
4. Average Working Days : 180 days/yr
5. College Working Days : 25/month
6. College working Hours : 10 hours/day
7. Science Timing : 7.50 am to 6.10 pm
8. Purpose of use of water : For practical and research purpose, for washing purpose

Table 6. Consumption of water by Physics department

Sr. No.	Site	Source of water	Rate of Discharge lit./min.	Average Quantity Lit./per user/day	No. of Users	Total Daily use Lit./day
1.	Physics Department	Storage tank	12	05	11	55

Per week : $55 \times 6 = 330$ Lit./week Per month: $330 \times 4 = 1,320$ Lit./month, Per six months: $1,320 \times 6 = 7920$ Lit./six months

Total water consumption in college campus

1. Total number of water users : 161 (Students, Teaching Staff, Non-teaching Staff, Visitors)
2. Total number of Employees :
 - Teaching Staff : 76
 - Non-teaching Staff : 25
3. No. of Students : 2943
 - A) Total no. of boys : 1378
 - B) Total no .of girls : 1565

4. No. of visitors : 50-60/day
5. Average Working Days : 180 days/yr
6. College Working Days : 25/month
7. College working Hours : 10 hours/day
8. College Timing
 - a) Arts and Commerce : 7.50 am to 1.30 pm
 - b) Science : 7.50 am to 6.10 pm
 - c) Office : 9.00 am to 6.30 pm
9. Purpose of use of water : For practical and research purpose, for washing purpose
10. Is there Rain Water Harvesting System in the college campus: There is no proper rain water harvesting system in the premises, but in the chemistry department rain water from the roof tops is collected in storage containers.
11. Daily Water supply in Tank (Capacity of the Tank): There is a continuous water supply in all the storage tanks from the main source of PCMC storage tank.

Table 7. Total water consumption by various sites in the college

Sr. No.	Site	Source of water	Rate of Discharge Lit./Min	Average Quantity per use (Lit.)	No. of Users	Total water use Lit./day	Total water use Lit./week
1.	Gents Toilet 1(Ground floor)	Storage tanks 1 to 5	10	10	400	4000	24000
2.	Gents Toilet 2(First floor)	Storage tanks 1 to 5	12	10	500	5000	30000
3.	Ladies Toilet 1(Ground floor)	Storage tanks 1 to	10	10	600	6000	36000
4.	Ladies Toilet 2 (First Floor)	Storage tanks 1 to 5	12	10	500	5000	30000
4.	Pantry (Tea making and washing utensils)	Storage tanks 1 to 5	13	10	100	1000	6000
5.	Staff room	Storage tanks 1 to 5	10	05	80	400	2400
6.	Campus trees and Plants	Storage tanks 1 to 5	05	300	-	300	1800
7.	Chemistry Lab.	Storage tanks 1 to 5	11	03	80	240	1440
8.	Botany Lab.	Storage Tank 6	12	01	40	40	240
9.	Physics Lab.	Storage Tank 6	12	05	11	55	330
10.	Microbiology Lab.	Storage Tank 6	12	4	70	280	3680
11.	Zoology Lab.	Storage Tank 6	12	01	45	45	270
Total water consumption						22,360	1,36,160

Figure 1. Total water consumption by various sites and departments per day

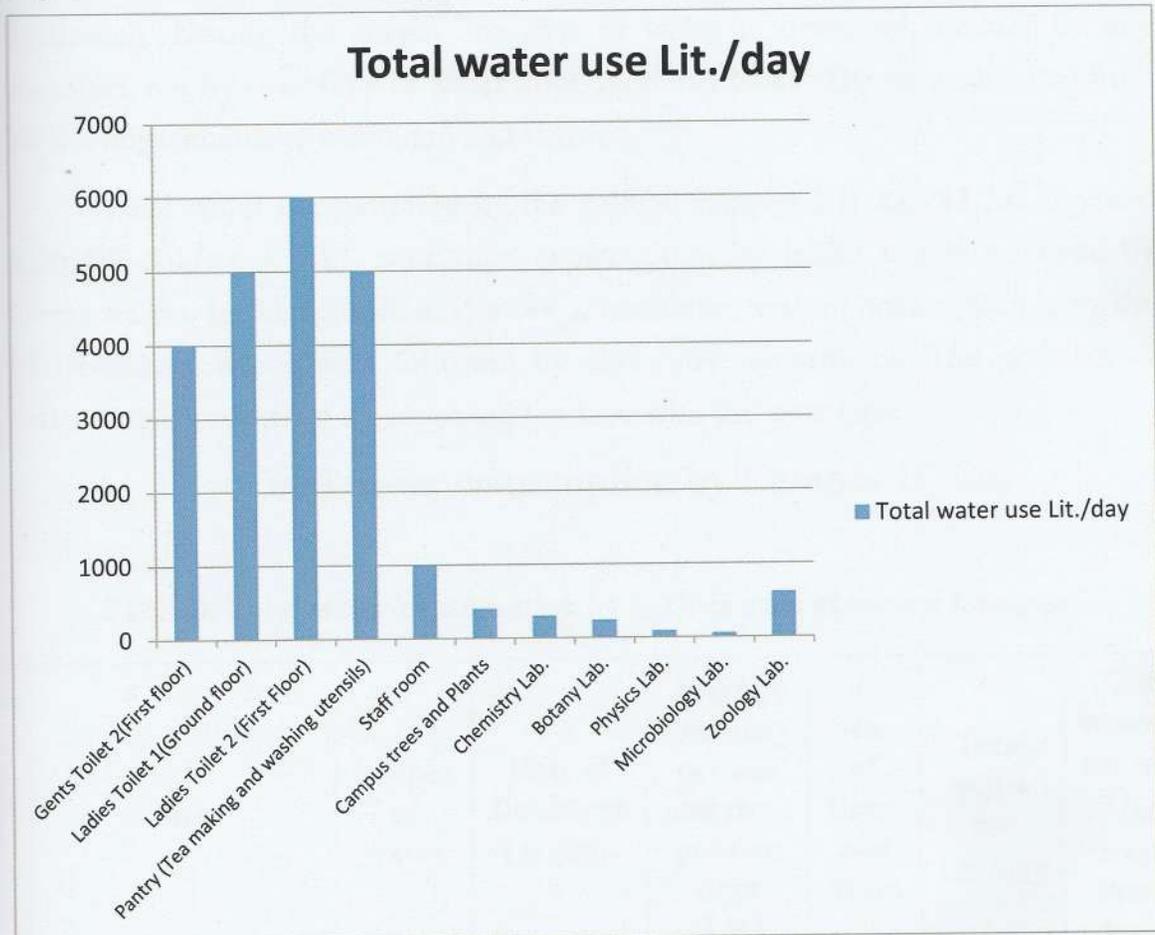
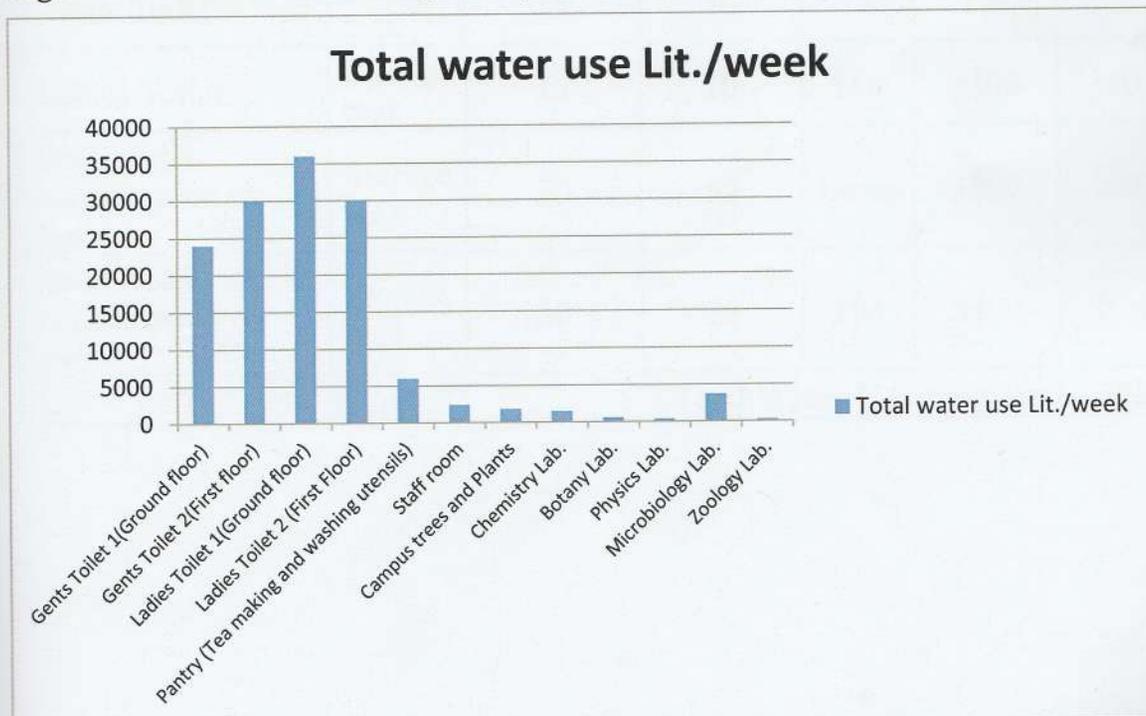


Figure 2. Total water consumption by various sites and departments per Week



Water is used for drinking purpose, pantry, toilets, laboratory and gardening. During the survey, no loss of water is observed, neither by any leakages, nor by over flow of water from overhead tanks. The data collected from all the departments is examined and verified.

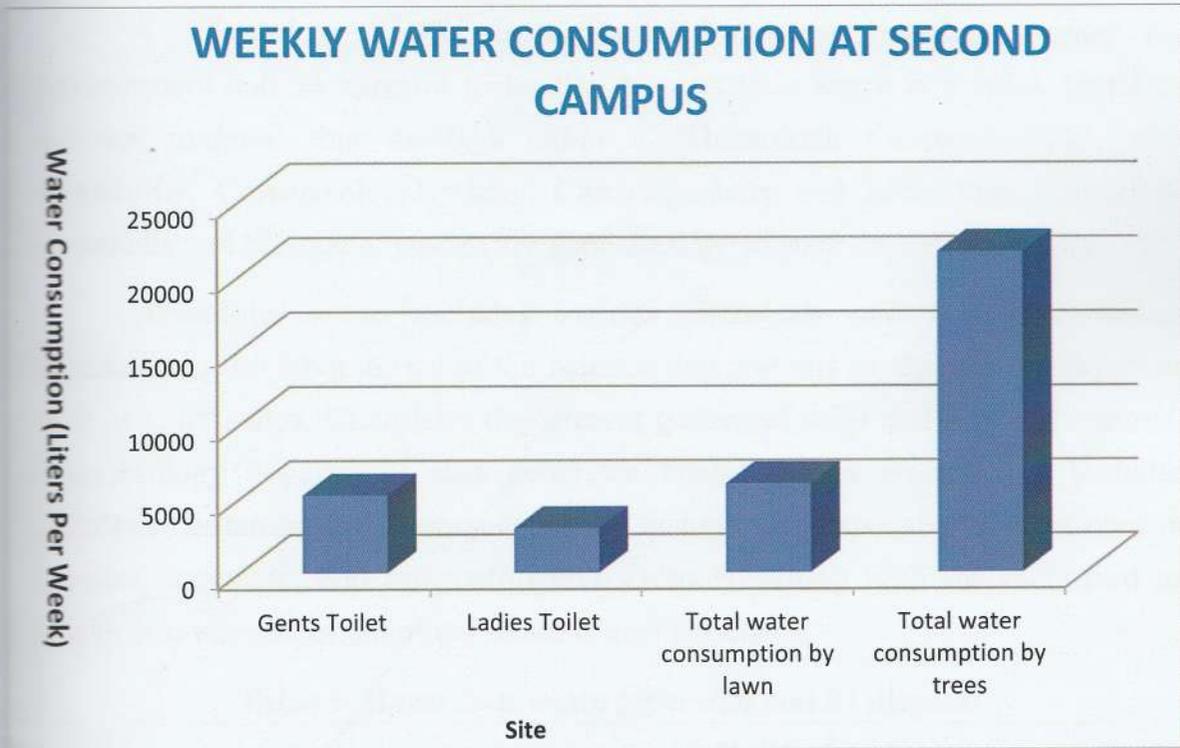
Total water consumption by the college campus I is **22,743** Lit./day and **1,36,458** Lit./week with maximum consumption by ladies toilets followed by Gents toilets. In the science laboratories, maximum water consumption is by the Microbiology department followed by chemistry department. The problem of water loss is prevented by replacing the taps with the new taps.

Total water consumption by Campus II

Table 8. Total water consumption by various sites at second Campus

Sr. No.	Site	Source of water	Rate of Discharge Lit./Min	Average Quantity per use and /tree per two days (Lit.)	No. of Users and /trees	Total water use Lit./day	Total water use Lit./week (for trees-4 times a week)
1.	Gents Toilet	Storage tank	15	10	75	750	5250
2.	Ladies Toilet	Storage tank	15	10	150	1500	3000
3.	Total water consumption by lawn	Storage tank	50	50	Lawn	3000	6000
4.	Total water consumption by trees	Storage tank	50	50	108	5400	21600
Total Water Consumption							35850

Fig.3 Weekly water consumption at various sites at Campus II



B] HAZARDOUS WASTE MANAGEMENT

A "Hazardous Waste" is a discarded material that can damage the environment and be harmful to health. A hazardous waste is a solid, liquid or gaseous material that displays either a "Hazardous Characteristics", viz., Ignitability, Corrosively, Toxicity, Carcinogenicity and Infectivity. Hazardous chemicals and biological wastes are generated by science departments only.

Hazardous waste includes various chemicals and biological wastes generated in the laboratories of the science departments in the form of liquid as well as solid states. Chemistry department generates solid and liquid chemicals. Microbiology department also generates bio-hazardous wastes that includes pathogen-contaminated disposable culture dishes, and disposable devices used to transfer, inoculate, and mix pathogenic cultures. Along with the biohazard us waste, less amount of chemical waste is also generated.

Table 9. Hazardous waste generated and its disposal

Sr. No.	Department	Type of hazardous waste	Quantity of Hazardous waste generated per month	Method used to destroy the hazardous waste
1.	Chemistry	Laboratory chemical and other	7-8Kg	Sufficiently diluted and drained off
2.	Microbiology	Chemical and Biological (Solid and Liquid)	4-5 kg	Decontamination of biological hazardous waste materials followed by burning
3.	Physics	Nil	Nil	--
4.	Botany	Nil	Nil	--
5.	Zoology	Nil	Nil	--

Chemistry department generated maximum amount of chemicals and hazardous wastes from laboratory and is about 8 kg./Month. Lab waste in the chemistry lab is disposed off carefully by detoxifying. It is followed by the department of Microbiology which generated about 5 kg/month. Hazardous chemical and biological wastes. Departments viz., Physics, Botany and Zoology generated no hazardous wastes.

Following are some of the guidelines for the effective disposal of non-hazardous biological wastes:

Guidelines for non-hazardous biological waste disposal:

- Solids must be thermally or chemically treated and placed in a properly labeled, leak-proof container for disposal. Liquids must be thermally or chemically treated and then discharged into the sanitary sewer system.
- Most biological waste that is not infectious or otherwise hazardous to humans, animals, plants, or the environment may be discarded as regular waste or sewage.
- In addition, there are no record-keeping requirements for non-hazardous biological waste.
- It is recommended to autoclave or disinfect all microbial products, even if they are not bio-hazardous

Record keeping Requirements

Each department that generates bio-hazardous waste must comply with the record keeping requirements. Written records must contain the following information:

- Date of treatment
- Amount of waste treated
- Method/conditions of treatment
- Name (printed) and initials of person performing the treatment

C] E-WASTE MANAGEMENT

Generation of E-waste is apparent at every educational institute. Computers, Printers and Xerox machines are must in the administrative work. The wire required for the connectivity also gets included in the E-waste. Similarly, various scientific equipment's and instruments are worn out with time. These too contribute to the E-waste. The amount of E-waste generated in the college by various departments is less. The Institution has taken following initiative to tackle the problem of E-waste.

The institution has taken following initiative to tackle the problem of E-waste.

- E-waste audit is conducted routinely by parent institution.
- The old versions of computers and electronic equipment's, hardware are reused by donating to the schools in the tribal areas.
- Interdepartmental sharing of electronic instruments.
- Outdated computers, printers and other ICT equipment's are sold to the vendors for recycling.

D] SOLID WASTE MANAGEMENT

Solid waste management is a burning issue now days all over the world. Solid waste should be handled scientifically. Solid waste audit focuses on type, amount and its management practice.

The solid waste collected was paper waste, reagent bottles in the form glass wastes in the science laboratories, sanitary napkin wastes in the ladies toilets and pantry waste.

Among all these types of wastes, paper waste is a major solid waste generated by all the departments. Answer papers were preserved for five years period. After every five year period, answer papers are destroyed. Remaining paper waste (question papers, bills, used papers) are sent to scrap collector.

Used reagent bottles (mainly glass bottles) are generated only by chemistry and microbiology departments. These reagent bottles are reused by both the departments. Therefore, very less amount of glass waste is generated by the departments. In other science departments, negligible amount of glass waste is generated. In language department also, no glass waste is generated.

In both the ladies toilets, in all approximately, 1-2 kg/day of solid waste in the form of sanitary napkins are generated and are destroyed by incineration machine installed in ladies toilet.

Table. 10 Types of solid waste generated in various departments and sites

Sr. No.	Name of the Department	Type of Solid Waste generated (Papers, glass material, sanitary napkins etc.
1.	Office	Papers
2.	Library	Papers
3.	Chemistry	1.Papers 2.Glass material-negligible
4.	Microbiology	1.Papers 2.Glass material-negligible
5.	Physics	Papers
6.	Zoology	Papers
7.	Botany	1.Papers,2.Plant specimen- Negligible
8.	Mathematics and Statistic	Papers
9.	Arts Department	Papers
10.	Commerce Department	Papers
11.	BCA	Papers
12.	Exam Department	Papers
13.	Washrooms	Tissue papers, Sanitary Napkins-40 kg / year
14.	Pantry	Pantry waste-20 kg/year

Table. 11 Generation of Paper wastes in various departments

- (1 A4 size Rim = 2 Kg)

Sr. No.	Departments	Papers utilized (Kg/Year) (No. of rims, question papers , answer papers)	Paper waste generated (Kg./Year)	Use of one sided paper (Y/N)
1.	Administrative office	200	01	Y
2.	Exam Section	300	10	Y
3.	Library	120	02	Y
4.	Chemistry Department	30	15	Y
5.	Commerce Department	16	02	Y
6.	BCA Department	14	02	Y
7.	Botany Department	08	01	Y
8.	Physics Department	10	02	Y
9.	Zoology Department	08	02	Y
10.	Microbiology Department	07	02	Y
11.	Mathematics Department	04	01	Y
12.	Statistics Department	08	02	Y
13.	Hindi Department	06	02	Y
14.	Psychology Department	20	02	Y
15.	History Department	08	01	Y
16.	Geography Department	20	10	Y
17.	Politics Department	05	02	Y
18.	Marathi Department	10	01	Y
19.	English Department	15	10	Y
20.	Second campus (B.Voc, MPSC and Fasion Designing dept.)	15	<1	Y

Figure 4. Papers utilized and paper waste generated in various departments of college

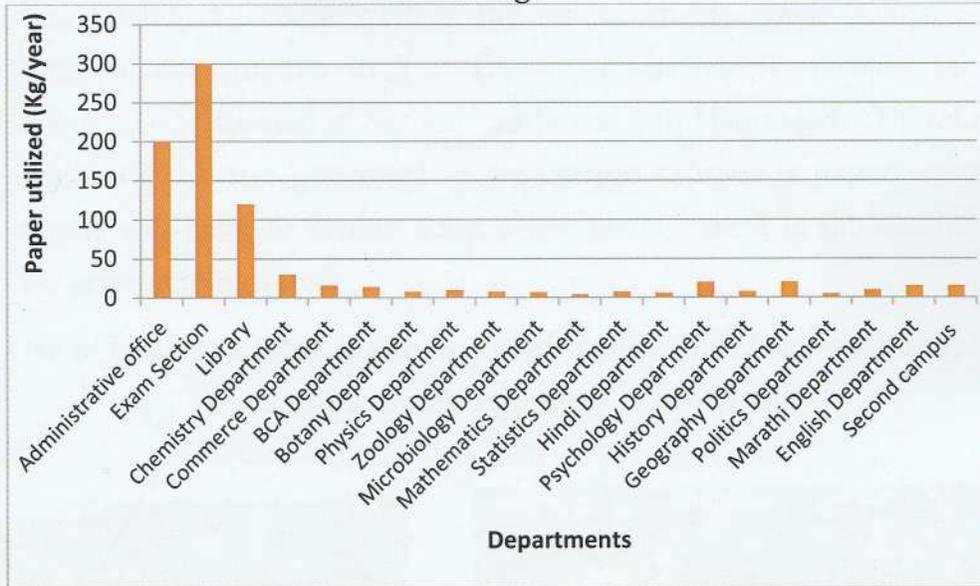
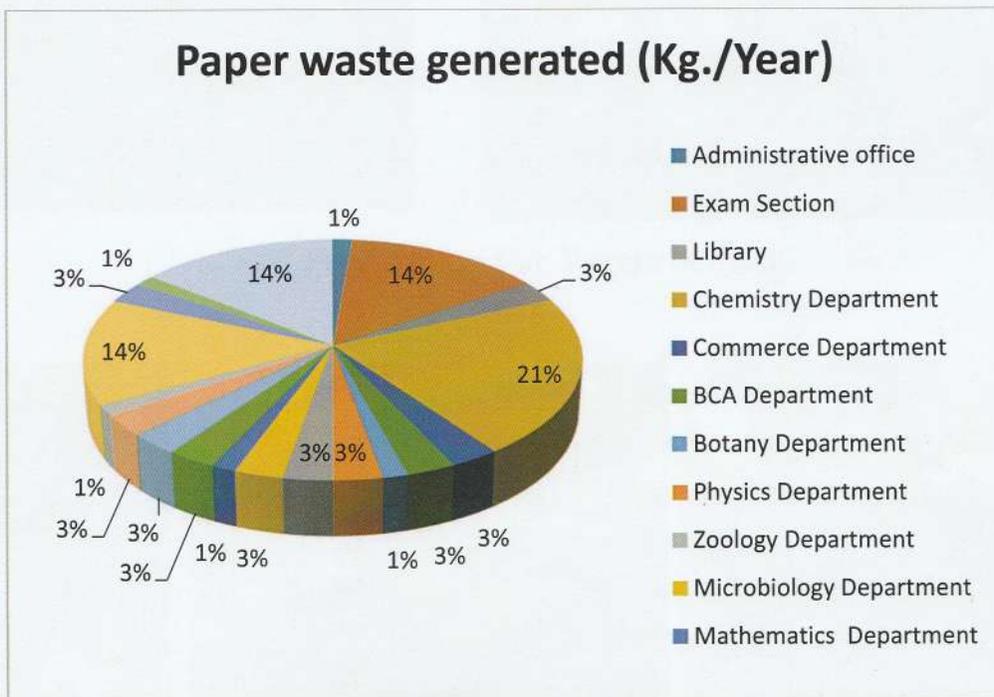


Fig. 5 Paper waste generated (Kg/year) in the college



Utilization of papers in Kg/year by the administrative office (200Kg/year) followed by the exam section (300Kg/year). Maximum paper waste is generated by the administrative office followed by exam (200 Kg/year) which is followed by the Library (120 Kg/year). In rest of the departments use of papers are limited and therefore paper waste generated is also limited. From Table no.11 it is clear that all the departments use one sided papers for printing and writing purposes.

Biodegradable waste

- The kitchen waste as well as the biodegradable waste generated from different departments such as Botany, Zoology, etc. is used in vermi-compost unit located at Second campus at Sambhajinagar. Therefore, the major solid waste generated in the college campus is paper waste. This report will help for further solid waste management in the campus to go for green environment.

Use of biodegradable waste in Vermi-compost unit located at second campus, Sambhajinagar, Chinchwad



Bed Preparation For Vermicompost



CONCLUSIONS

1. Environmental Awareness programs were organized to create awareness among students and teachers.
2. Gardens and Toilets are consuming more water.
3. Glass waste generated is reused by some departments.
4. Reuse of one sided papers by almost all the departments.

Table 12. Strengths, Weaknesses, Opportunities, Challenges (SWOC) Analysis

Domain	Strengths	Weaknesses	Opportunities	Challenges
Green Office/Environment protection club (Environment Awareness Program)	<ul style="list-style-type: none"> • Well established Environment Protection Club in the campus • Ecofriendly campus- in Infancy stage • College engaged in various environmental awareness programs for teachers and students by organization of Expert's lecture, Poster competition, Essay writing competitions etc. through Environment Protection Club. • Participation of students in the Swacchata rally, cleanliness drives, campaign <i>Nirmalyadan, No Plastic Day, No vehicle Day</i> etc. • Tree Plantation drive at Campus I and Campus II • Cleanliness Drive at college campus I and II. • Green Audit is done every year. 	<ul style="list-style-type: none"> • Non conduct of extensive training programs for teachers and students for environment management 	<ul style="list-style-type: none"> • The blue print of five years eco-friendly campus plan to be prepared • College campus II can be converted into an ideal Ecofriendly campus 	<ul style="list-style-type: none"> • Location of the college (Campus I) is in the industrial belt. • Growing traffic around the college • Lack of environmental awareness among people
Plastic free campus				

Legislation/ Laws	<ul style="list-style-type: none"> • Institution is performing well under existing guidelines. 	<ul style="list-style-type: none"> • There are no laws or guidelines in the Indian legal system for environmental management in educational system. 	<ul style="list-style-type: none"> • Green Office concept may help in this regard. 	<ul style="list-style-type: none"> • Absence of any prescribed format of guidelines for educational institutes may result in lack of proper running of Green office in the college.
Solid waste Management	<ul style="list-style-type: none"> • Reuse of reagent bottles at some departments • Use of one side paper in almost all the departments. • There is sanitary nappy vending machine and proper incineration system in the ladies toilet. 	<ul style="list-style-type: none"> • Record of solid waste management is not well maintained by departments. 	<ul style="list-style-type: none"> • Year wise plan for solid waste management should be prepared. • E -documents should be prepared and maintained. 	
Hazardous waste management	<ul style="list-style-type: none"> • Hazardous Microbial wastes are decontaminated and then incinerated properly at microbiology department • Chemical solutions sufficiently diluted and drained off . 	<ul style="list-style-type: none"> • Improper disposal of hazardous chemical 	<ul style="list-style-type: none"> • Proper waste disposal management with Maharashtra waste disposal 	
Water	<ul style="list-style-type: none"> • Awareness of water conservation through personal counseling ,slogans,essay writing competition, etc. 	<ul style="list-style-type: none"> • No proper control on use of water 		

RECOMMENDATIONS

- ✓ Establishment of Green office concept.
- ✓ Establishment of an Ideal Eco-Friendly campus (Campus II)
- ✓ E-documents should be prepared.
- ✓ Waste management program
- Proper E-waste management program should be followed.
 - A proper method to be followed for hazardous waste treatment.
 - Each department that generates bio-hazardous waste must maintain the record.
 - To reduce chemical waste formation, principles of green chemistry should be used.
- ✓ Water management program
 - Monitoring system for consumption of water may be installed at every node.
 - Rain water harvesting mechanism may be implemented at large scale in the campus.
 - Water loss should be prevented by changing old taps with the new taps.
- ✓ Quantification of carbon foot print should be conducted in the college campus.
- ✓ No vehicle day should be celebrated in **every month** to make the campus environment pollution free.



GREEN AUDIT 2020-21

In the academic year 2020-2021, due to COVID 19 pandemic, major lockdown was declared from March 2020 to February 2021 for students as well as teachers. Major teaching work was done by online mode. From the month of July, for teaching and non-teaching faculty members, it was made compulsory to join the college. Therefore, from July onwards only teaching and non-teaching staff members were present in the college campus I and campus II.

Total Staff at Campus I :

- **Teaching Staff**
 1. Gents Staff :53
 2. Ladies Staff :43
- **Non- Teaching Staff**
 1. Gents Staff :15
 2. Ladies Staff :10

Total Staff at Campus II : 10

Table 1. Total water consumption by various sites in the college at campus I

Sr. No.	Site	Source of water	Rate of Discharge Lit./Min	Average Quantity per use (Lit.)	No. of Users	Total water use Lit./day	Total water use Lit. /week
1.	Gents Toilet 1(Ground floor)	Storage tanks 1 to 5	10	10	50	500	3000
2.	Gents Toilet 2(First floor)	Storage tanks 1 to 5	12	10	45	450	2700
3.	Ladies Toilet 1(Ground floor)	Storage tanks 1 to 5	10	10	30	300	1800
4.	Ladies Toilet 2 (First Floor)	Storage tanks 1 to 5	12	10	45	450	2700

4.	Pantry (Tea making and washing utensils)	Storage tanks 1 to 5	13	10	70	700	4200
5.	Staff room	Storage tanks 1 to 5	10	05	80	400	2400
6.	Campus trees and Plants	Storage tanks 1 to 5	05	300	-	300	1800

Water audit is conducted for both the campuses where major stress was given on water consumption by the staff and for second campus water consumption by the trees was checked.

Campus II of Mahatma Phule Mahavidyalaya is a huge campus with area of about 1229.73 square meter .with various trees, viz., *Mangifera indica* -Mango (35 trees), *Phyllanthus embillica* –Amla (43 trees), *Conus nucifera* –Coconut (17 tress) and *Roystonea regia* –Palm (13 trees). Major part of storage water is utilized for trees. Beautiful Lawn is also prepared in the campus second. In this academic year initiatives are taken for maintenance of green campus. For this the plants are regularly watered and fertilizers are also given for proper plant development. College students and NSS students are involve in maintenance of these plants by regular cleaning and weeding at college campus. The medicinal plant garden is established which containing 50 medicinal plants are also maintained through students participation. Medicinal Plant Donation activity is carried out by students of Botany department.

Table 1. Total water utilization by in the college at campus II

Sr. No.	Site	Source of water	Rate of Discharge Lit. /Min	Average Quantity per use and /tree per two days (Lit.)	No. of Users and /trees	Total water use Lit. /day	Total water use Lit./week (for trees-4 times a week)
1	Total water consumption by lawn	Storage tank	50	50	Lawn	3000	6000
2	Total water consumption by trees	Storage tank	50	50	108	5400	21600
Total Water Consumption							27600

As for about 8-9 months teaching was by online mode, less papers were utilized by the departments. There was use of papers in the administrative office only but that too in less number.

Cleanliness drive was conducted at Campus II by all the staff members as a part of environmental awareness programme on 13-02-2021. To create awareness about the nature, a short film named "TADOBA BUFFER : THE UNEXPLORED WILDERNESS" was shown to all the employees of the college.



ECO-FRIENDLY GREEN CAMPUS



Mango and Amla trees at second campus



Coconut Trees at second Campus





PHOTOGRAPHS



CLEANLINESS DRIVE AT CAMPUS - II

