RAYAT SHIKSHAN SANSTHA'S,
SHRI SADGURU GANGAGEER MAHARAJ SCIENCE,
GAUTAM ARTS, SANJIVANI COLLEGE,
KOPARGAON, DIST: AHMEDNAGAR 423601

GREEN AUDIT REPORT

PREPARED BY
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GREEN AUDIT TEAM

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5. **Mr. Kailas D. Ahire**
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B) INTERNAL AUDIT TEAM:

Sr. No.	Name of Member	Designation	Title in Committee
1	Prin. Dr. R.R. Sanap	Principal	Chairman
2	Dr. B. D. Varpe	Professor	Coordinator
3	Dr. C. B. Chaudhari	Professor	Member
4	Mr. V. R. Jiwtode	Asst. Professor	Member
5	Dr. P.V. Randhavane	Asst. Professor	Member

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1. INTRODUCTION

1.1 About Parent Institution:

A premier education institution like the Rayat Shikshan Sanstha, known and honoured far and wide, not only at the national level, but also at the global level, needs no introduction. The institution itself is regarded as a noble mission, a noble cause, so earnestly and so endearingly pursued by its founder- father Karmaveer Bhaurao Patil, the educator of the educators and his legendary wife, Sou. Laxmibai Patil, with her good sacrifices, made to turn the mission into a reality.

The Rayat Shikshan Sanstha is one of the leading educational institutions in Asia. The value of its contribution to education, in general, is enormously great as it has, from the very beginning, tried all its best to lay emphasis on the education of the down-trodden, the poor and the ignorant, who really form the major bulk of society. The founder of the institution, late Dr Karamaveer Bhaurao Patil, was a man of the masses who devoted all his mind and heart to the cause of their education. He had an incisive understanding of the social ills that beset his times and fully realized the dire need of the spread of education. He believed that education alone could correct the social ills such as caste-hierarchy, money-lending, illiteracy, untouchability, superstitions and social and economic inequality. Throughout his life, he tried to translate this belief into reality. He was the champion of the poor, the weak, the dispossessed and left no stone unturned for their upliftment. He was a great humanitarian who endeavoured hard to educate the masses to bring a kindly light of hope in their lives of misery and ignorance. He realised that the social ills could be remedied through the education of the masses alone and laid the foundation of the Rayat Shikshan Sanstha by opening a Boarding House at Kale (Tal-Karad, Dist-Satara) in 1919. Soon, however, in 1924, he shifted the headquarters of his educational institution to Satara. There are 42 Senior College run by Rayat Shikshan Sanstha.

1.2 Achievements of Institutes:

Since 1919, the Government of Maharashtra, the Central government of India and some social organizations have appreciated the work by awarding the following prestigious awards.

- Dr. Babasaheb Ambedkar Rashtriya Puraskar' by the Government of India in 1994.
- 'Dr. Babasaheb Ambedkar Dalit Puraskar' by the Government of Maharashtra in 1993 - 94.
- Rajarshi Shahu Puraskar' by Rajarshi Chhatrapati Memorial Trust, Kolhapur in1997- 98. • Adarsha Shikshan Sanstha Puraskar' by the Government of Maharashtra in 2001 - 02.

- ‘Shri Sant Gadage Maharaj Seva Puraskar’ by Gadage Maharaj Mission, Mumbai in 2002 -03.
- Dalit Mitra Puraskar " (1993-1994) by the state Govt for the outstanding work for the poor and deprived performed by the Sanstha, in the spirit of the Missionaries.
- Shikshan Maharshi Dr. Panjabrao Upakhya Bhausaheb Deshmukh Smruti Puraskar 2003 - byYashwantrao Chavan Maharashtra Open University, Nashik.
- Excellence in Education Award-2011- by Dr. D.Y. Patil Pratishthan, Navi Mumbai.
- Shahu, Phule, Ambedkar Puraskar - 2012-13 by Government of Maharashtra.
- Jivangourav Puraskar - 2013-14 by Maharashtra Foundation (America & Sadhana Trust).
- Vatvruksha Shiv-Puraskar -2014-15 - Krutisamiti, Shivaji University, Kolhapur

1.3 About College:

History of College with the establishment of the department. Total courses offered. Establishment of different departments. NAAC accreditation. Different activities are available for students.

A great need for a science college at Kopargaon was keenly felt to fulfil the expectations of the rural people of Kopargaon taluka. The people and the sugar factories in Kopargaon taluka rose to the occasion, rendered all possible help and shouldered the responsibility to establish the desired College. Their efforts bore fruit. Their contributions and aspirations took shape as Science College's primitive phase of this College.

Thus the College was established as 'Science College' in June 1965, and it became fully-fledged with the inception of Arts and Commerce streams in June 1971. Now it is a well-flourished institution imparting higher education, leading to 'Bachelor' and 'Master's degrees in various faculties. It was renamed as Shri Sadguru Gangageer Maharaj Science, Gautam Arts & Sanjivani Commerce College Kopargaon, from October 2, 1976.

In the late 1950s, the enlightening visit of Padmabhushan Dr. Karmaveer Bhaurao Patil to Kopargaon-Shrirampur, the heavily irrigated area of north Ahmednagar District, initiated the great stalwarts like Late Hon. Shankarraoji Kale, Hon. Shankarraoji Kolhe shouldered the responsibility of the noble work and planted the two branches of Rayat Shikshan Sanstha's K.B.P. High School and Kanya Vidya Mandir in 1959 and 1963 respectively. The sense of educational awareness among the populace masses and the creative zeal of Late Swami Sahajanand Bharati, Late Hon. Shankarraoji Kale, Hon. Shankarraoji Kolhe, Late Chimanlal Mehta, Late Madhavrao Adhav, Late Mhalusheth Avhad, Late. Late

Gangadhar Muktaji Gaware (Mama), Late Vishnu Vaze and many well-wishers sincerely felt the crying need of a college in the Kopargaon town. The College was started as a Science College in June-1965. It was renamed after Shri Sadguru Gangageer Maharaj in 1966. For the sake of growth and expansion of the academic front, Arts & Commerce faculties were started in June 1971. The two faculties, Arts & Commerce, were renamed after the sages Gautam & Sanjeevani, respectively.

The College, working on this line of thought, covers conventional and advanced courses i.e. UG and PG courses and professional courses like BBA, BCS etc. To make the students employable, the College runs various short-term courses. The College by using ICT facilitates the students of advanced technology. The College also encourages developing a research culture, consultancy and extension activities. The College has adequate infrastructure for effective teaching and learning. It facilitates student support and progression. Good governance is reflected in the hierarchical structure of administrative and academic bodies. There are best and innovative practices in every field.

1.4 Highlighting Features:

- Grant-in-Aid Co-Education College.
- Affiliated to Savitribai Phule Pune University, Pune.
- 2(f) status from10 th July 1989 enabling UGC assistance and schemes.
- Situated in Rural Area.
- Campus of 22.5 acres.
- Significant girl students.
- Accredited previously ‘B++’

1.5 Environmental Conservation Committee:

Table 1 Environmental Conservation Committee

Sr. No.	Name of Member	Designation	Title in Committee
1	Prin. Dr. R.R. Sanap	Principal	Chairman
2	Dr. B. D. Varpe	Professor	Coordinator
3	Dr. C. B. Chaudhari	Professor	Member
4	Mr. V. R. Jiwtode	Asst. Professor	Member
5	Dr. P.V. Randhavane	Asst. Professor	Member

1.6 Function of Environmental Conservation Committee:

The College has established an Environmental Cell to educate student teachers about environmental issues and challenges, as well as to motivate them to spread information and educate school children and the general public about these issues.

- To raise awareness among student teachers about the Institute and environmental issues.

- To instil a sense of responsibility for the development of planet Earth, as well as an appreciation for its beauty, by giving chances to gain knowledge, skills, attitudes, and dedication to environmental preservation.
- To teach students about the interconnectedness of economic, social, and environmental concerns.
- To prepare student teachers to teach environmental education to students in the classroom through curricular and extracurricular activities.
- To improve the college campus's environment.
- To raise student awareness of the importance of environmental preservation in society.
- To handle the College's solid trash, liquid waste, and e-waste.

1. 7 Objectives of Study:

The green audit's major goal is to encourage environmental management and conservation on the college campus. The audit's goal is to identify, measure, explain, and prioritise a framework for environmental sustainability that adheres to all applicable legislation, policies, and standards. The following are the major goals of a Green Audit:

- To introduce and make students aware of real concerns of environment and its sustainability.
- To secure the environment and cut down the threats posed to human health by analyzing the pattern and extent of resource use on the campus.
- To establish a baseline data to assess future sustainability by avoiding the interruptions in environment that are more difficult to handle and their corrections require high cost.
- To bring out a status report on environmental compliance.

1.8 Methodolgy:

The approach for doing a green audit comprised several instruments such as questionnaire development, physical inspection of the campus, observation and study of paperwork, interviewing key people, data analysis, measurements, and suggestions.

1. 9 Steps in Green Audit:

- Pre-Audit

1. Make a plan for the audit.
2. Form an auditing team
3. Schedule for an audit.
4. Gather the necessary background information.
5. On Site Visit

- On Site
    1. Understand the scope of audit
    2. Analyse the strengths and weaknesses of the internal controls
    3. Conduct the audit
    4. Evaluate the observations of audit program
    5. Prepare a report of the observations side by side
- Post-Audit
    1. Produce a draft report of the data collected
    2. Produce a final report of the observations and the inference with accuracy
    3. Distribute the final report to the management
    4. Prepare an action plan to overcome the flaws
    5. Keep a watch on the action plan

1.10 Scope of Work:

The following Environmental Issues were studied for the above-mentioned campus area.

- Water Environment including rain water harvesting potential of the campus.
- Plant diversity.
- Noise Environment.
- Solid Waste Management Practices.
- Air Environment.
- Energy Audit

This study has been created based on the available data, samples, and information supplied by the S. S. G. M. College, Kopargaon, Dist Ahmednagar and recommendations for improving the campus environment have been made by college officials.

1.11 Background Data

A science college was urgently needed in Kopargaon to meet the demands of the rural inhabitants of Kopargaon taluka. People and sugar companies in Kopargaon taluka rose to the occasion, offering all available assistance and taking on the burden of establishing the required institution. Their efforts were rewarded. Science College, the first phase of this College, grew out of their contributions and objectives.

As a result, the College was founded as a 'Science College' in June 1965, and it became fully fledged in June 1971 with the addition of Arts and Commerce programmes. It is now a well-established institution that offers higher education leading to bachelor's and master's degrees in a variety of fields.

The College, which follows this line of thought, offers both traditional and advanced courses, such as UG and PG courses, as well as professional courses such as BBA, BCS, and others. The institution offers a variety of short-term courses to help students gain employment. The College provides modern technologies to its pupils through the use of ICT. In addition, the College promotes the development of a research culture, as well as consulting and extension operations. The infrastructure of the College is adequate for successful teaching and learning. It makes student support and progression easier. The hierarchical organisation of administrative and academic bodies reflects excellent governance. In every industry, there are best and creative approaches.

1.12 Courses Offered:

Table 2 Course Offered

Sr. No.	Name of Faculty	Name of Program	Name of Subject
1	Faculty of Arts	BA	English
2			Marathi
3			Hindi
4			Economics
5			Geography
6			History
7			Politics
8		M.A.	Marathi
9			Hindi
10			English
11			Economics
12			Geography
13	Faculty of Commerce	B.Com	Banking
14			Business Administration
15			Business Economics
16			Cost & works Accounting

17			Marketing Management
18		M.Com	Business Administration
19			Advanced Accounting
20	Faculty of BBA	BBA	Finantial Management
21			Marketing Management
22	Faculty of Science	B.Sc.	Botany
23			Chemistry
24			Electronics
25			Mathematics
26			Physics
27			Zoology
28		M.Sc.	Organic Chemistry
29			Analytical Chemistry
30			Physics
31			Mathematics
32			Botany
33	Research centres	Ph. D	Chemistry
35		Ph. D.	Botany
36	Faculty of computer science	BCS	Computer science

1.13 Total Population of Campus:

Table 3 Total Population of Campus

Sr.No.	Particulars	Total number
1	College Staff (Teaching & Non-Teaching)	236
2	College Students (Girls and Boys)	5000
3	Residential Students	Nil (Hostels are not started since covid-19)
4	Residential Staff	12
5	Floating Population (Visitors)	250
	Total	5498

2. WATER AUDIT

Water benefits biodiversity, agriculture, the human population, and the economy. Water scarcity and security are becoming increasingly important issues as a result of recent events in India and around the world. In recent years, Maharashtra has also been severely affected by water scarcity. As a result, water management has been included as a critical component of achieving sustainable development in the Sustainable Development Goals (SDGs).

Unprecedented strains on natural resources, particularly water, have resulted from unplanned urban growth and economic development. The growing demand for water in places like Kopargaon that have high amount of dissolved solids and hardness in underground water underscores the significance of total water management. According to the National Water Mission's standard standards, metro cities should have a water supply of 150 lpcd, smaller cities/towns with sewage systems should have 135 lpcd, and cities/towns without sewage systems should have 70 lpcd.

2.1 Calculation of Water Requirement:

In the investigation, five bore well were identified as important sources of water. Drinking water in the hostels and college premises were obtained through the RO system. Borewell water is used in the canteen, bathrooms, laboratories, hostels, staff quarters and on the grounds. There were no leaks or overflows of water from above tanks throughout the survey, thus there was no water loss.

The following water sources was identified in the college campus:

1. Bore well No.1: Front of Chemistry laboratories
2. Bore well No.2: Near Junior College Building
3. Bore well No.3: Near Gymkhana on ground
4. Bore well No.4: Near Gymkhana inside shade
5. Bore well No.5: Near Ladies Hostel

Table 4 Source of water

Sr. No.	Source of water	Number of times the water is uplifted from the source	Average quantity of water uplifted. (Lit)
1	Bore wells No.1	2 times a day (total 5 hrs)	10000
2	Bore wells No.2	2 times a day (total 5 hrs)	10000
3	Bore wells No.3	No water Available	00
4	Bore wells No.4	1 time a day (3 hrs)	10000
5	Bore wells No.5	1 time a day (3 hrs)	10000
		Total Water uplifted in the campus: 40000	

Major Unground Water Source in the College Campus

Table 5 Total Average requirement of water in campus

Sr. No.	Particulars	Total population	Required Water Supply (litre per person per day)	Water Requirement (litre per day)
1	College Staff (Teaching and Non-Teaching	236	20	4720
2	College Students (Girls and Boys)	5000	20	1,00,000
3	Residential Students	Nil (Hostels are not started since covid-19)	00	00
4	Residential Staff	12	45	540
5	Floating Population (Visitors)	250	20	5000
Total		5498	-	1,10,260

Note: The water requirement is calculated as per Rule of World health Organisation (WHO)

The data gathered from all departments is double-checked and verified. The college uses 1,10,260 L/day on average, with 4720 L/day for staff and 1,00,000L/day for students. While the residential staff uses total 540 L water per day. During the study period the hostels were empty due to covid-19 rules of online mode of education, the stress on underground water was reduced during 2020-2021. That means the water demand for whole year is 33078 m3.

2.2 Waste Water Management:

Water usage can be described as the amount of water consumed on campus for all activities from various water sources. This applies to all residences, academic buildings, on-campus, and on-grounds usage. Water that is moved off campus is referred to as wastewater. Based on data on water usage and the fact that around 80% of the water supplied is converted to waste water via washrooms, chemical laboratories, and other means, the campus created approximately 1,10,000 litres of waste water every day.

As was revealed, there is no separate drainage system for collecting and transferring sewage and liquids from laboratories. There is currently a combined drainage system in place that carries all liquid effluent to a sewage system. It is necessary to collect grey and black water. After minimal treatment, grey water must be used for plant irrigation, and black water must be effectively treated with a simple septic system and soak pits.

1. Drainage system of Hostel

2. Sewer for wastewater from laboratory

2.3 Quality of Water in the Campus:

Total five Ground water sources (Borewell) main sources of water at the College. The water is used to flush toilets, water gardens, drinking, hostels and laboratories. The water is treated with a purification system before being made available for drinking. The results of the potable water tests are shown in the table below.

Table 6 Potable water reports

Sr. No.	Parameters	Borewell No.1	Borewell No.2	Borewell No.3	Borewell No.4	Borewell No.5	Acceptable Limit as per IS 10500 : 2012	Units
1	pH	8.3	8.5	9.2	8.6	8.1	6.5-8.5	-
2	Total Dissolved Solids	2200	2000	3210	2658	2968	500	mg/lit
3	Calcium	122	131	158	125	122	75	mg/lit
4	Chloride	366	358	389	321	325	250	mg/lit
5	Alkalinity	401	465	553	462	460	200	mg/lit
6	Total Hardness	625	548	750	487	425	200	mg/lit
7	E. Coli	Absent	Absent	Absent	Absent	Absent	Should be Absent	/ 100 ml
8	Total Coliform	Absent	Absent	Absent	Absent	Absent	Should be Absent	/ 100 ml

From above analysis it can be concluded that all the underground water source consists high amount of Hardness and Total Dissolve solid. If water is consumed without proper purification technology, it may cause severe health effects like kidney stone. The College, have RO system installed for drinking water in the hostels and college grounds.

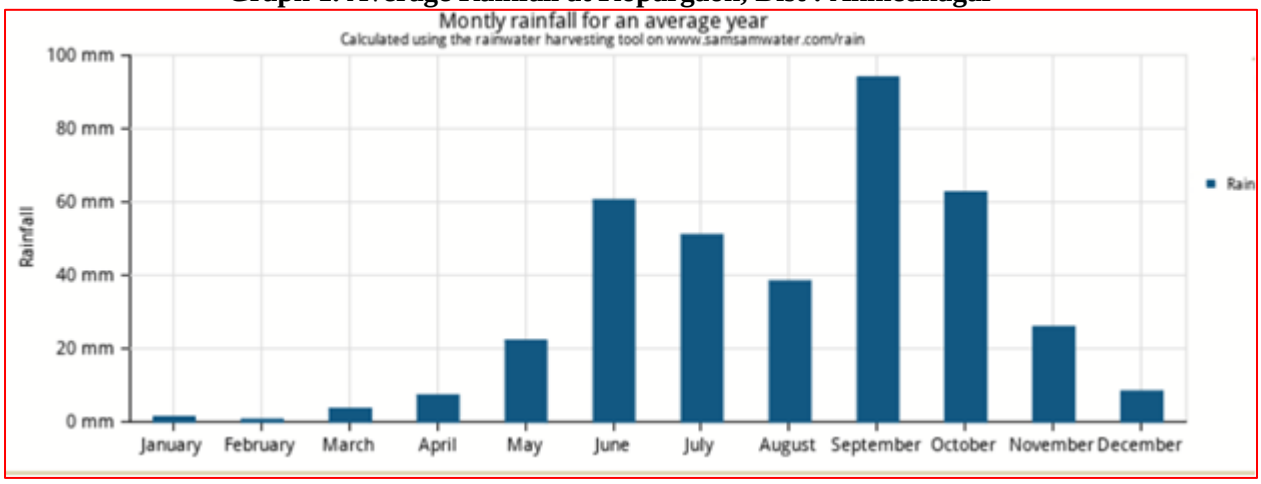
1. RO system on playground

2. RO system in Hostel

2.4 Rainwater Harvesting Potential:

The campus buildings possess large terrace areas and paved surface. Currently, all of the buildings have Rain Water Harvesting (RWH) System implementation work in progress. The campus has a potential for RWH but due to average rainfall the harvested rain water could fulfil whole requirement of College but can help to reduce the stress on upliftment of underground water. As only underground reservoirs are the main source of water the rain water harvesting system may help the college management to fulfil the need of depended population. Keeping this as an objective of water management, installation of Rain water harvesting system work is in progress in the college campus.

Graph 1. Average Rainfall at Kopargaon, Dist : Ahmednagar



(This calculation is based on the average monthly rainfall. The actual rainfall differs from month to month and year to year. The amount of available water and filling of the tank might therefore be different and change from year to year.)

Rain Water Harvesting Installation unit (Work in progress)

Table 7 Rainfall

Sr. No.	Month	Rainfall	Rainfall	Runoff coefficient	Roof top area	Total Rain Water Harvested (m3)
1	Jan	4 mm	2.8 mm	0.7	4739 Sq.m	9.2
2	Feb	2 mm	1.4 mm	0.7	4739 Sq.m	4.6
3	Mar	5 mm	3.5 mm	0.7	4739 Sq.m	11.61
4	Apr	9 mm	6.3 mm	0.7	4739 Sq.m	20.8
5	May	22 mm	15.4 mm	0.7	4739 Sq.m	51.08
6	June	60 mm	42 mm	0.7	4739 Sq.m	139.32
7	July	50 mm	35 mm	0.7	4739 Sq.m	116.10
8	Aug	39 mm	27.3 mm	0.7	4739 Sq.m	90.5
9	Sept	95 mm	66.5 mm	0.7	4739 Sq.m	220.6
10	Oct	60 mm	42 mm	0.7	4739 Sq.m	139.3
11	Nov	25 mm	17.5 mm	0.7	4739 Sq.m	58.05
12	Dec	10 mm	7 mm	0.7	4739 Sq.m	23.2

The average rainfall at this location varies between 2 mm in the driest month (February) and 95 mm in the wettest month (September). The total annual rainfall in an average year is 375 mm. The rainwater harvested that could be harvested from all type of roof is anually is 33078 L which is about only 30 % of the total water requirement. The amount of water that can be collected from the roof is less than the water demand. Only a part of the water demand can be fulfilled using a rainwater harvesting system. However, it is worthwhile to use the harvested water rather that uplifting the underground water with high solids, also the use of it might still be worthwhile to construct a rainwater harvesting system.

2.5 Waste Quantification and Management:

This indicator considers the creation and disposal of a variety of wastes, including paper, food, plastic, biodegradables, construction, glass, dust, and other materials, as well as recycling. Furthermore, solid waste often contains wasted material resources that may be better

utilised through recycling, repair, and reuse. Solid waste generation and management is a hot problem. Solid waste management that isn't based on science can put everyone in danger. The survey sought information on the volume, kind, and current management of solid waste generated on campus. Various solid wastes were collected, as previously stated.

3. SOLID WASTE AUDIT

Solid waste generation and management has been a major issue in recent years. The rate of solid waste generation is extremely significant, but we lack adequate technologies to manage the garbage generated. All non-liquid garbage is classified as solid waste. If solid trash is not properly disposed of, it can cause serious health problems as well as an unpleasant living environment. As a result, it is critical to properly manage solid waste in order to lessen the pressure on waste management systems. The goal of this inventory is to determine the amount, volume, type, and present management practise of solid waste generated on S.S.G.M. College campus, Kopargaon. This study will aid in the continued management of solid waste and the construction of a green campus.

3.1 Generation of Solid Waste:

Category wise solid waste generation (kg / month)

Table 8 Category wise solid waste generation (kg / month)

Category of waste	Paper waste	Plastic	Biodegradable-waste	Construction waste	Glass waste	Total solid waste
Quantity	700 kg	352 kg	1200 kg	3 kg	25 kg	2280 kg

Throughout the study period 2280.00 kg of solid waste was generated. On the basis of obtained results in which highest quantity of solid waste is Biodegradable-waste and is about 1200.0 kg/month. Paper waste is at second place amounting 700.00 kg/month and Construction waste is lowest and is 3.0 kg/month.

Table 9 Segregation of solid waste

Sr. No.	Specification (Y/N)	Segregated (Y/N)	Recycled (Y/N)	Reuse (Y/N)	Other (specify)
1.	Paper	Y	N	N	NA
2.	Cardboard	Y	N	N	NA
3.	Plastic	Y	N	N	NA
4.	Food waste	Y	Y	Y	NA
5.	E Waste	Y	N	N	NA
6.	Hazardous waste	Y	N	N	NA
7.	Glass	Y	N	N	NA
8.	Laboratory Rags	Y	N	N	NA
9.	Metals	Y	N	N	NA
10.	Plant waste	Y	Y	Y	NA

3.2 Vermicomposting plant for biodegradable waste processing:

College has made the manure and used for plant situated around College. The institution has implemented vermiculture composting unit with plant capacity of 25 Kg. The major goal is to limit the amount of disposable garbage on campus. The species used for Vermicomposting is *Eisenia foetida*. It is utilised as manure in the garden and lawns when the vermicomposting process is completed.

4. HAZARDOUS WASTE AUDIT

4.1 Chemical waste:

A hazardous waste is a solid, liquid, or gaseous item with a "Hazardous Characteristic" or that is officially "designated" as a hazardous waste by name. Despite the fact that characteristic wastes are not specified by their chemical name, they are controlled as hazardous wastes because they exhibit one or more harmful features. Ignitability, Corrosivity, Reactivity, and Toxicity are the four traits.

Various compounds created in science departments' laboratories are classified as hazardous waste. It exists as a liquid as well as a solid state. Because only a small portion of the population generates hazardous waste, only roughly 5 departments have been included.

4.2 Hazardous Waste Generated at departments

Table 10 Hazardous Waste Generated at departments

Sr. No.	Department Name	Type of Hazardous Waste	Hazardous waste in (kg)	Hazardous waste in (liters)
1	Chemistry	laboratory chemicals and other	1.0	25
2	Zoology	laboratory chemicals and other	1	2
3	Botany	laboratory chemicals and other	1	3
4	Physics	laboratory chemicals and other	1	1
5	Electronics	laboratory chemicals and other	2	1
Total			6 kg	32 liters

Chemistry Department generated maximum amount of chemical and hazardous solid waste from laboratories and other sources and is about 1 kg per month. It is followed by Department of Electronics and Physics which generated about 2 kg and 1 kg. of hazardous waste respectively. Arts and Commerce faculty departments are free of hazardous waste.

Hazardous waste in the form of liquid is also been generated by the Chemistry, Zoology, , Physics, Electronics. Chemistry department generates 25 liters of liquid hazardous waste per month. It was followed by the Department of Zoology which is about 2 liters. The total amount of liquid hazardous waste generated by five science departments is about 32 liters/month.

5. E-WASTE

E-waste generation is evident in every educational institution. Particularly at the college level, there are less equipment and instruments in use for administrative and scientific purposes. In administrative work, computers, printers, and Xerox machines are required. The wire necessary for connecting is likewise thrown away with the e trash. Similarly, numerous scientific instruments and equipment from science laboratories deteriorate over time. These, too, contribute to the e-waste problem.

Generation of E –waste at the various departments

Table 11 Generation of E –waste at the various departments

Sr. No	Department	E-waste (kg/year)	E-waste treated and disposed (kg/year)
1	Office	5	5
2	B.Sc. (entire Computer Science)	3	3
3	Chemistry Department	2	2
4	Physics	12	12
5	Electronics	11	11
Total		33	33

Major source of e-waste generation is the Science Departments of the College. Department of Physics generated highest amount of e-waste i.e. 12 kg as compared to other Science Departments. It is followed by Electronics Department which generated 11 kgs of e-waste. Chemistry Department generated about 2 kg. The E-waste and malfunctioning items from the computer lab are appropriately kept. In order to dispose of E-waste in a scientific way, the institution has opted to contact an approved E-waste management and disposal facilities unit.

The audit team observed that the technical life time / service life of most electronic instruments has not yet expired, resulting in little waste creation. However, the College must device a long-term and consistent e-waste disposal strategy.

6. ENVIRONMENTAL QUALITY AUDIT

6.1 Air Quality Audit

The health of the students, instructors, and staff at the academic institute is dependent on the air quality. Windstorms, pollen grains, natural dust, traffic emissions, generators, fires, and laboratory smells, among other things, are all causes of air pollution on the college campus. But in the present study whole city is considered and the data is extracted from nearby government air quality monitoring stations.

Graph 2 Air Quality Index

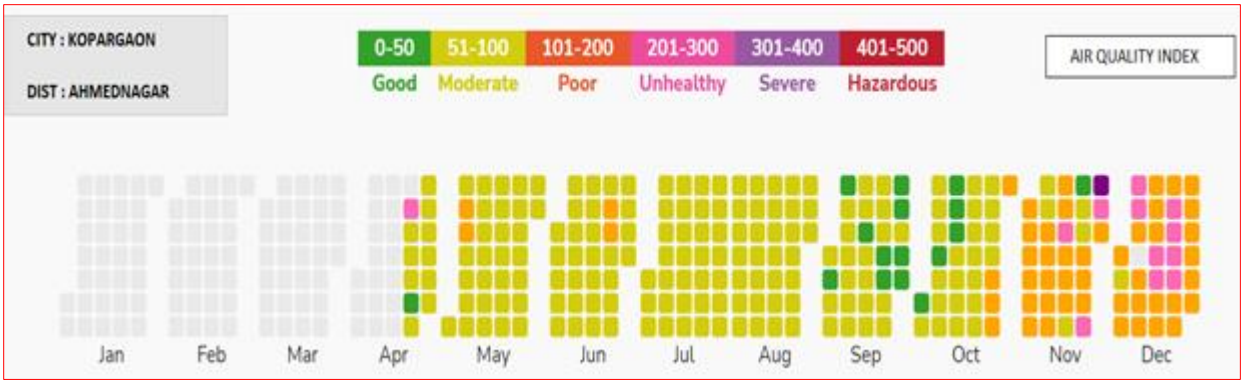


Table 12 Air Quality Index

Sr. No.	Parameter	Result	NAAQS 2009	Unit
1	Average Wind	25.9	-	Km/h
2	Wind Direction	E-W	-	-
3	Pressure	1007	-	mb
4	Temperature	30/18	-	^{o}C
5	Sulphur Dioxide	03	80	$\mu g/m^3$
6	Nitrogen Dioxide	12	80	$\mu g/m^3$
7	Carbon Monoxide	0.54	4	mg/ m^3
8	Particulate matter < 10µm	100	100	$\mu g/m^3$
9	Particulate matter < 2.5 m	33	60	$\mu g/m^3$
10	Ozone	27	180	$\mu g/m^3$

6.2 Causes of Air Pollution in Kopargaon :

(i) The primary causes of outdoor air pollution are solid, liquid particles called aerosols & gas from vehicles emissions, construction activities, factories, burning stubble & fossil fuels and wildfire, etc.

(ii) Main causes of indoor air pollution are harmful gases from cooking fuels (such as wood, crop wastes, charcoal, coal and dung), damp, mould smoke, chemicals from cleaning materials, etc.

6.3 Noise Quality Audit:

One of India's most critical environmental issues is noise pollution, although most of us are unaware of the harm it brings. We are all exposed to loud noises for lengthy periods of time in India, both on a daily basis and during festival seasons such as Ganesh Festival, Diwali, and others throughout the year. Unwelcome noises like horns, other traffic noise, loudspeakers, and, of course, residential noise like television and music system sounds are inevitable on a daily basis. There is a common idea in our country that happiness can only be shown by making loud noises.

Table 13 Noice Level of the Campus

Sr. No.	Location	Avg Noise Level dB (A)	Noise Standards dB (A)*
1	Play Ground	62.00	50
2	Staff Quarters	53.00	50
3	Principal Quarters	49.32	50
4	Canteen	54.66	50
5	1st Floor Porch	49.33	50
6	2nd floor Porch	47.58	50
7	Garden Area	56.98	50
8	Main gate	67.22	50
9	Girl's hostel	51.34	50
10	Boys Hostel	53.68	50
11	Administrative Office	64.32	50

*Note: Ambient Air Quality Standards in respect of Noise dB (A), in accordance with Noise Pollution Regulation and Control) amendment rules, 2000 Silent Zone

The institution has explored a variety of methods to eliminate sound pollution on campus or to avoid producing noise. The campus has been designated as a Silent Zone, and pupils have been educated using silent zone signs. Students have been instructed to use their cellphones in silent mode, particularly in the library and theatre. So that sound pollution is decreased, suggestion boards for no honking have been placed across the campus. The majority of trees have been planted on the college campus to minimise the intensity of noise pollution; thus, sound pollution levels will be lower in the future.

7. GREEN COVER OF COLLEGE CAMPUS

As we face increasing climate and environmental issues, green campuses are becoming increasingly important. Through both practical reforms and the teaching they give, larger institutions have the ability to positively contribute to the climate change movement. A green area is defined as any place with grass, trees, or horticulture. Tree canopy analysis is a good way to estimate how much green cover there is in a given area. Canopy cover is the covering created by the branches and crowns of plants or trees (green cover). Green cover refers to the percentage of a given area of the ground that is covered by tree crowns. According to earlier national forest policy and the National Mission for Green India (GIM), one of eight missions under the National Action Plan on Climate Change (NAPCC), 33 percent of total accessible land should be covered by vegetation. Because plants and trees are the best carbon sinks, it will aid in the decrease of greenhouse gas emissions. Green cover of the college campus is calculated by using following formula

$$Green\ Cover\ (\%) = \frac{Total\ Green\ Cover\ in\ sq.meter}{Total\ area\ of\ campus\ in\ sq.meter}\ x\ 100$$

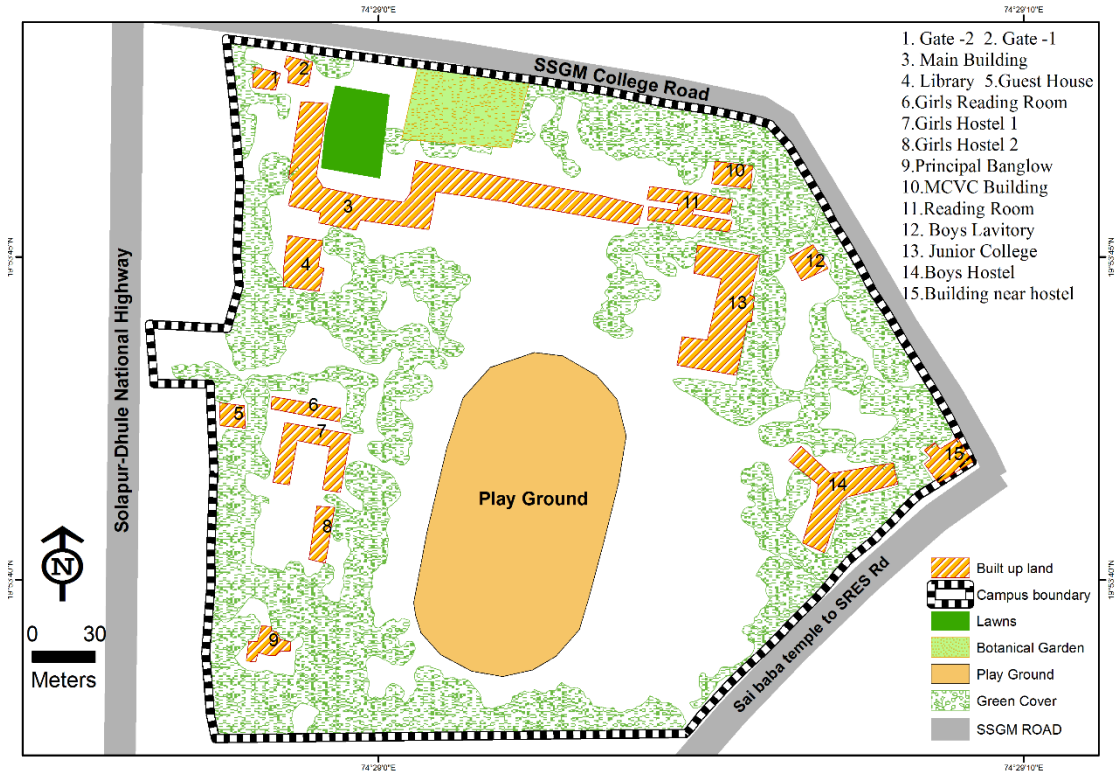
Table 14 Green Cover Calculations

Sr.No.	Total Area of Campus (sq. meter)	Total Green Cover (sq. meter)	Percent Green Cover
1.	89030	37117	41.69

The college campus has a total size of 89030 square metres, according to information acquired during the site visit. Out of the entire accessible space, there are approximately 7700 square metres under construction and 81340 square metres of open space. Using Google Earth Pro, tree canopies are scanned and the area of each tree canopy is calculated. The tree canopy cover is predicted to be 37117 square metres, which comprises about 41.69 percent of the total open space. Total green cover in the SSGM college campus is far better than the prescribed levels.


GPS Map Camera
Kopargaon, Maharashtra, India
SSGM College, Kopargaon, Maharashtra 423601, India
Lat 19.895532°
Long 74.484465°
28/01/22 10:58 AM
Google

Map No. 2 Green Cover Map of the College Campus



Trees are not only important, but they are also essential for survival. They produce oxygen, filter CO_2, prevent soil erosion, and maintain ecological equilibrium, among other things. They also give us with food, housing, and a variety of other necessities. The tree selection is critical while plating trees on campus. Increased canopy coverage from trees helps to reduce the urban heat island effect. Pedestrians will benefit from the shade provided by trees, which will provide relief from the heat. They will also provide shade to surrounding buildings, decreasing the need for air conditioning.

Table 15 List of available trees on college campus

Sr. No.	Botanical Name	Local Name	Family	Number of Plants
1.	*Adathoda vasica*	Adulasa	Acanthaceae	3
2.	*Albizia lebbak*	Shirish	Mimosaceae	4
3.	*Alstonia scolaris*	Saptaprni	Apocynaceae	19
4.	*Annona reticulate*	Ramphal	Annonaceae	1
5.	*Annona sqamosa*	Sitaphal	Annonaceae	10
6.	*Aurocaria*	Chrismas tree	Aurocariaceae	8
7.	*Azadirachta indica*	Kadunimb	Meliaceae	58
8.	*Bamboo sp.*	Bamboo	Poaceae	2
9.	*Bougainvillea spectabilis*	----	Nyctaginaceae	41
10.	*Caesalpinia pulcherima*	Shankasur	Caesalpinaceae	5
11.	*Callistemon lanceolatus*	Bottle brush	Myrtaceae	1
12.	*Cassia spp.*	----	Caesalpinaceae	7
13.	*Casurina equisetifolia*	Suru	Casurinaceae	4
14.	*Ceiba pentandra*	----	Malvaceae	2
15.	*Chrysalidocarpus lutescens*	----	Arecaceae	5
16.	*Cicca acida*	Awala	Euphorbiaceae	1
17.	*Citrus limetta*	Mosambi	Rutaceae	4
18.	*Coccus nucifera*	Naral	Arecaceae	157
19.	*Cycas*	Cycas		3
20.	*Dypsis lutescence*	Palm	Arecaceae	68
21.	*Elaeis guanensis*		Arecaceae	4
22.	*Eucalyptus globulus*	Nilgiri	Myrtaceae	9
23.	*Euphorbia spp.*	Sabar	Euphorbiaceae	178
24.	*Ficus benghalensis*	Vad	Moraceae	4
25.	*Ficus nigrum*	Ficus	Moraceae	2
26.	*Ficus racemosa*	Pimpal	Moraceae	2
27.	*Ficus religiosa*	Pimpal	Moraceae	3
28.	*Ficus spp.*	Ficus	Moraceae	37
29.	*Grevilia robusta*	Silver Oak		4
30.	*Karyota urens*	Fish Tail Palm	Arecaceae	5
31.	*Lawsonia inermis*	Heena	Lythraceae	1
32.	*Leuceana leucocephala*	Subabhul	Mimosaceae	2
33.	*Licuala grandis*	----	Arecaceae	24
34.	*Magnolia champaca*	Sonchafa	Magnoliaceae	3
35.	*Mangifera indica*	Amba	Anacardiaceae	16
36.	*Manilakara zapota*	Chiku	Sapotaceae	10
37.	*Mimusops ellengi*	Bakul	Sapotaceae	3
38.	*Murraya coenigi*	Kadipatta		8
39.	*Nolina recurvate*	-----	Asperagaceae	1
40.	*Nyctanthus arbor-tristis*	Parijat	Oleaceae	2
41.	*Oreodoxa regia*	Bottle Palm	Arecaceae	14
42.	*Peltoforum pterocarpum*	----	Caesalpinaceae	61
43.	*Pheonix spp.*	Tadi	Arecaceae	1
44.	*Polyalthia longifolia*	Ashok	Myrtaceae	41
45.	*Pongamia pinnata*	Karanj	Fabaceae	8
46.	*Psidum guava*	Peru	Myrtaceae	3
47.	*Ricinus communis*	Yarand	Euphorbiaceae	2
48.	*Samanea saman*	-------	Caesalpinaceae	6
49.	*Santalum album*	Chandan	Santalaceae	12

50.	*Sizygium cumini*	Jambhul	Myrtaceae	3
51.	*Spathodia companulata*	Pichkari	Bignoniaceae	5
52.	*Tabernemontana divaricate*	-----	Apocynaceae	1
53.	*Tamarindus indica*	Chinch	Caesalpinaceae	14
54.	*Tecoma stans*	------	Bignoniaceae	8
55.	*Terminalia alata*	-----	Combretaceae	1
56.	*Terminalia altilis*	-----	Combretaceae	2
57.	*Terminalia belerica*	Behada	Combretaceae	1
58.	*Terminalia catapa*	Badam	Combretaceae	5
59.	*Thespecia populnea*	Bhendi	Malvaceae	1
60.	*Zizypus jujuba*	Bor	Rhamnaceae	1
TOTAL				**911**

8. ENERGY AUDIT

An energy audit is an inspection, survey, and analysis of energy flow for energy conservation in a building, process, or system to reduce the amount of energy input into the system without negatively affecting the output(s). An energy audit is the first step in identifying opportunities to reduce energy expenses and carbon footprints in Educational institutions

Table 16 Connected load list

Sr No	Floor	Area/Dept	Room No	Type of fitting	Light type LED/Flour	Watt	Nos.	Ceiling Fan (60 Watt	Exhaust Fan	pedestal Fan	computers	Printers/ Scanner	Other	LUX lumen/ m2 (Daylight)
1	G	Meeting Room		Con	LED	12	8	5			1		3 AC	41
2	G	A	103	O	LED	18	2							98
3	G	A	102	O	Flour	36	2							98
4	G	A	101	O	LED	18	2							89
5	1	A	221	O	LED	18	13	6			6	6		163
6	1	A	222	O	CFL	12	4	3			4			69
		English			Flour	36	4							
7	1	Eng Lab		O	Flour	36	12	6			15	P 1	LCD 1	162
8	2	Passage		0	Flour	36	3							390
9	2	A	220	O	LED	18	1	1				P 1		197
10	2	A	219	O	LED	18	2	1				P 1		90
11	2	A-Electro	218	O	LED	18	6	5			1	P 1		66
12	2	A	217	O	LED	18	4	3			9	4	1 Adopter, 1 AC	30
13	2	Passage-2		O	LED	18	3							550
14	2	A-Phy Lab	216	O	LED	18	2	2					HOT PLATE-1*1500, 1 AC	229
15	2	A-Staff	214	O	LED	18	5	5					1 Geysers	220
16	2	A	215	O	LED	18	8	5			1	1		210

17	2	A	213	O	Flour	36	2	3						90
					LED	18	2							
18	2	A-Dark Room	211	O	LED	18	2	4	1					0
			212		Flour	36	2							
19	2	A	210	O	LED	18	2	2						30
20	2	A	207	O	LED	18	3	3			3	1&P-1		100
21	2	A	208	O	Flour	36	3	2			20		1-2100W	20
					CFL	10	9							
22	2	A	209	O	Flour	36	2	2			13			180
23	2	A	206	O	LED	18	10	8						172
24	2	A	205	O	LED	18	2	1		1	1	1	1	93
25	2	A	204	O	Flour	36	4	5						52
26	2	A	203	O	Flour	36	4	4				P-2	AUTOCLAVE-1	103
27	2	A-Dept	202	O	LED	18	4	3		2	2		2 UV CABIN-1*280W, 1AC	27
					Flour	36	3							
					LED	18	1	3			2	1		27
28	2	A	201	O	Flour	36	6	6		1			OVEN-2	629
					LED	18	1						HOT PLATE 1*200W	
29	2	B	207	O	Flour	36	5	3				P-1	OVEN- 1	702
30	2	B	206	O	Flour	36	6	3				P-1		166
					LED	18	1							
31	2	B	205	O	Flour	36	5	4			2	1	1	205
					LED	18	2							
32	2	B	204	O	LED	18	3	2		1	1	1		218
33	2	B	201	O	Flour	36	6	4	4				OVEN-1	206
					LED	18	2							
34	1	B	101	O	LED	18	1	2						127
					Flour	36	2							
35	1	B	102	O	LED	18	1	1			1	1		27
					Flour	36	3							
36	1	B	103	O	LED	18	2	2			1	1	OVEN-1	105
					Flour	36	2							

					CFL	10	2							
37	1	B-Passage		O	Flour	40	2						1	447
38	1	B	104	O	LED	18	3		3					83
					Flour	36	3							
39	1	B	105	O	LED	18	2	1			1	1		80
40	1	B	106	O	LED	18	3	1			1			57
41	1	B	107	O	LED	18	4		2					160
					Flour	36	2							
42	G	B	3	O	LED	18	2							52
43	G	B	2	O	LED	18	2							52
44	G	B	5	O	LED	18	2							52
45	G	B	4	O	LED	18	2	2						52
46	G	B	7	O	LED	18	4							52
47	G	B	6	O	LED	18	2							52
48	G	A	112	O	LED	18	5	1		1				37
					Flour	36	3							
49	G	Exam Dept		O	LED	12	4	4			1	2	XEROX-2	73
					Flour	36	4							
					LED	18	3							
50	G	A	111	O	Flour	36	8	7						274
51	G	Karmveer Dalan		O	LED	20	12						COOLING SYSEM-1	300
					LED	9	5							
52	G	Principal Pass		O	LED	20	45	12		1	15	12	XEROX-2	76
					LED	18	4						SERVER-1	
53	G	A	106	O	LED	20	8	2	1		1	1	LCD SCREEN-1	10
54	G	Semi Hall		O	LED	20	26	15				P-1	SOUND SYSTEM-1	99
					LED	9	4							
55	G	Staff Room	104	O	LED	12	15	7					XEROX-1	55
56	3	A	309	O	Flour	36	1							120
57	3	A	310	O	Flour	36	2							120
58	3	Passage		O	Flour	36	3							40
59	3	A	308	O	Flour	36	1	1						120
60	3	A	307	O	Flour	36	2	2						120

61	3	A	306	O	Flour	36	2	6			4	1		91
					LED	20	8					P-1		
62	3	A	304	O	LED	18	4							130
63	3	A	303	O	LED	18	2							130
64	3	A	302	O	LED	18	2							135
65	3	A	301	O	LED	18	2							140
66	3	Staff Commerce			LED	20	4	2			2	2		211
67	3	B	306	O	LED	18	4	3						200
68	3	B	305	O	LED	18	5	5						90
69	3	B	304	O	LED	18	6	3			3	1		90
					Flour	36	2							
70	3	B	303	O	LED	18	1	2			13	P-1		120
71	3	B	302	O	LED	18	5	5						242
72	3	B	301	O	LED	18	5	5						242
73	G	Librarian Cabin		O	LED	18	1	1			1	1		79
74	G	Library Issue Count			LED	18	4	2			3	ICARD PRINT-1		79
75	G	Lib Stack Room		O	Flour	36	7	2						79
					LED	18	5							
76	1	Lib Server Room		O							1		LED SET-1	60
77	1	Reading Room Lib		O	Flour	36	22	4						100
78	1	Reading Room Lib-2			Flour	36	15	4						100
79	1	Journal & Magazine Room			Flour	36	2	1			10		CPU-1	110
80	G	Principal Cabin		O	LED	20	14	4			1	1	LED MONITOR-1, 1AC	67

8.1 Observations:

The Institute has about 324 LED Tub lights, which are more Energy Efficient than fluorescent tube lights. All LED tubes and fluorescent lights are fitted with electronic ballast.

2. The College has 213 fans in different departments, labs and offices. All fans are fitted with an electronic regulator, which is more energy-efficient.

3. Energy saving instruction displayed on the College campus to sensitise students and staff to save energy.

4. Various electronic items throughout the building continue to draw power as they sit idle after class/work hours.

8. 2 Alternative Energy Initiative:

Percentage of power requirement met by renewable energy sources

= (Power requirement met by renewable energy sources / Total power requirement) X 100

=0 %

Percentage of lighting power requirement met through LED bulbs

Percentage of lighting power requirement met through LED bulbs

= (Lighting power requirement met through LED bulbs / Total lighting power requirement) X 100

= 324/481

= 67%

8.4 Recommendation:

1. 250 lux light level is sufficient in the classroom where students spend most of their time and focus on learning. To draw attention to the area where the teacher is located, contributing to the students' concentration of 750 lux light level can be done here.

2. Homogeneous lighting achieved with LED lighting systems reduces shadows and improves visibility.

3. LED lighting systems are a good option for College. These systems provide energy-efficient lighting and reduce maintenance costs to a minimum. The College suggests that the College use LED lights instead of fluorescent tube lights.

4. Natural lighting can be considered for corridors.

5. Utilizing Hibernating feature to power down computers outside of class/work hours will reduce the current wasted energy associated with keeping computers powered on when the building is unoccupied.

6. It is suggested to the college that they should use conventional energy sources such as solar energy wind power.

9. OTHER ACTIVITIES

9.1 Management of Human Health And Safety:

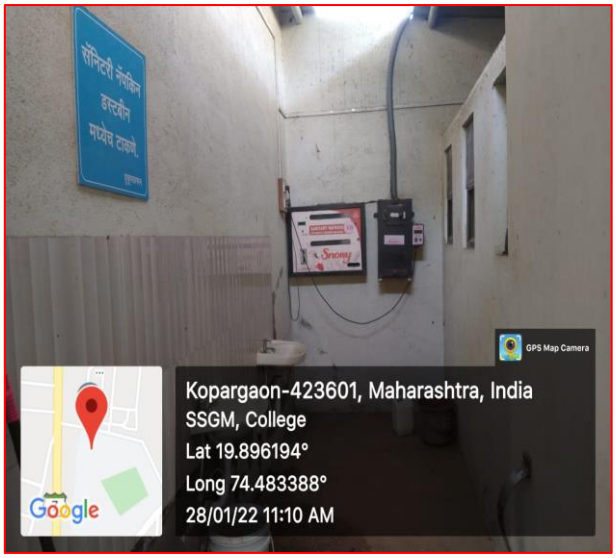
The College has given human health and safety a high priority. The following factors contribute in the management of human health and safety.

9.1.1 Regular Health Check-up:

College has regularly arranges health check up activities for students as well as staff.

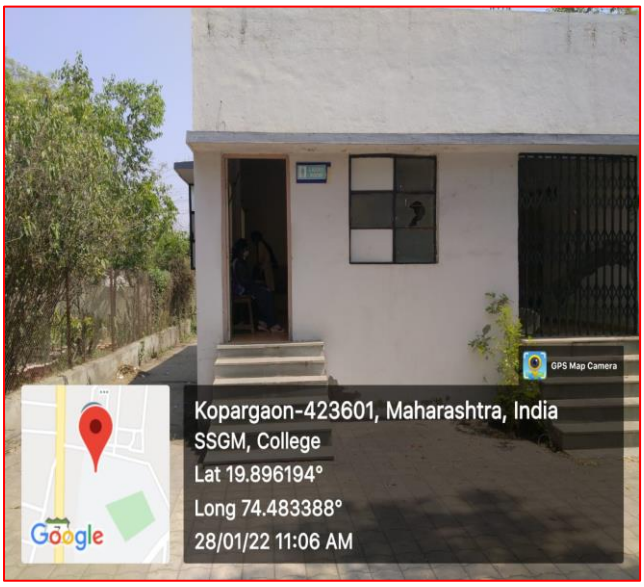
9.1.2 Convenience of Sanitary Napkin Machine:

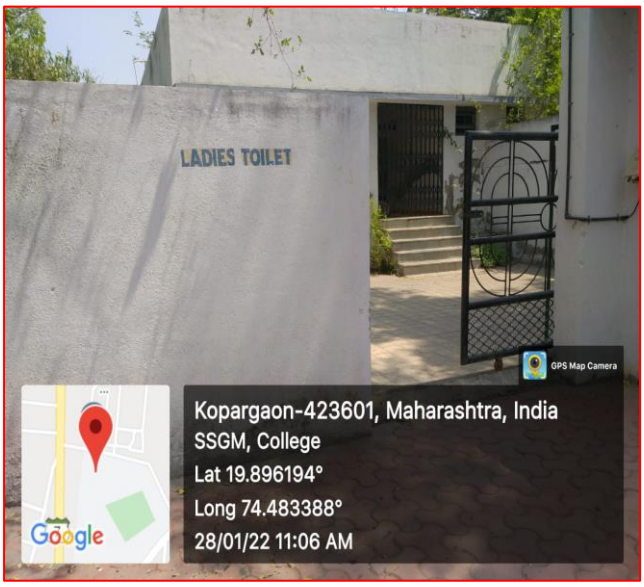
Sanitary napkin machine facility has been made available for girls' students and women employee.



9.1.3.Separate Toilet facility:

Separate toilets are available for students (male and female) and staff (male and female) in the College.





9.1.4. First AID Box:

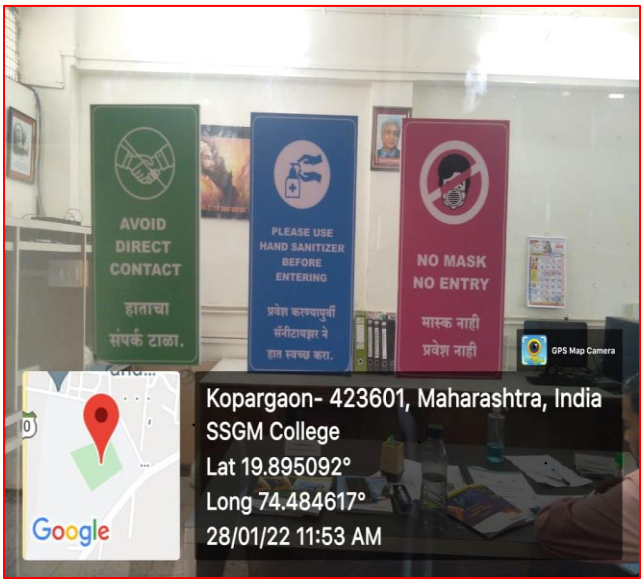
First aid boxes are available in the College in case of an accident.

9.1.5 Fire Safety:

Fire Extinguishers have been placed throughout the College to prevent loss of life and property due to fire.

9.1.6 Flexes of Health Awareness:

The College has set up flexes to spread health-related information among students and the public on campus to raise health awareness.



10. Recommendation

1. Due to the high level of Total Dissolved Solids on campus, there is a need to additional RO systems on campus.
2. To keep the hardness level consistent, water softning systm much be provided near driking water souces.
3. The Rain Water Harvesting collecting tank should have a large storage capacity so that the collected water can be used during dry periods.
4. To treat sewage and chemical waste water on campus, the college should made provisions to treat generated waste water.
5. According to the Solid Waste Management Rule, 2016, an appropriate segregation system must be implemented for solid waste management. Separate arrangement should be made for wet waste and dry waste collection.
6. The college campus has a large number of deciduous trees, the leaves of a large number of trees, lying in their natural state in campus, which, if properly managed, can bring financial benefits. As such, it can be used for composting.
7. The number of dustbins should be expanded in proportion to the campus population.
8. The vermicomposting unit's capacity can be increased, and the compost can be used in the botanical garden and trees.
9. The lawn should be well-kept in order to increase its visual value.
10. The conditions of green shed net and polyhouse use for nursery is critical. It need to be properly managed.
11. Drip irrigation is provided to irrigate the trees. But in many places they are not in good conditions, there proper maintenance is required
12. In the classroom, where students spend the majority of their time and concentrate on studying, a light level of 250 lux is acceptable. Contributing to the pupils' concentration of 750 lux light level can be done here to call attention to the area where the teacher is located.
13. LED lighting systems create homogeneous lighting, which decreases shadows and enhances visibility.
14. For college, LED lighting systems are a good choice. These systems deliver energy-efficient lighting while also lowering maintenance expenses. The College recommends that fluorescent tube lights be replaced with LED lights.
15. Natural lighting can be considered for corridors.

16. Utilizing Hibernating feature to power down computers outside of class/work hours will reduce the current wasted energy associated with keeping computers powered on when the building is unoccupied.
17. It is suggested to the college that they should use conventional energy sources such as solar energy wind power.
18. Flexes on following public awareness about Environmental Conservation should be placed at appropriate places within college campus:

    a. Individual Role Related to Environmental Conservation.

    b. Importance of Trees

    c. Benefits of Organic Farming

    d. Side Effects of Chemical Fertilizers/Pesticides

    e. Side Effects of Pollution due to Fire Crackers

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