Karmveer Vitthal Ramji Shinde Shikshan Sanstha's

Shivraj College of Arts, Commerce &

D. S. Kadam Science College, Gadhinglaj.

Estd-1964, Affiliated to Shivaji University, Kolhapur.

|| सेवा परमो धर्म ||

Environment Audit

(2021-22)

Introduction

a. **Environment Audit for Environmental Protection:**

- Environment Audit is a process of systematic identification, quantification, recording, reporting and analysis of components of environmental diversity of various establishments. It aims to analyze environmental practices within and outside of the concerned sites, which will have an impact on the eco-friendly ambience. The purpose of Environment auditing is to assess periodically the compliance of completed or on-going activities with the requirements of legislation, measures proposed in environmental policies, environmental management systems and environmental schemes or the provisions of standards and contracts.

b. **Benefits of Environment Audit:**

- Ensuring legislative compliance.
- Reducing environmental impacts.
- Reducing waste, water and energy costs.
- To safeguard the environment and natural resources.
- Empower the organization to frame a better environmental performance.
- It portrays good image of institution through its clean and Environment campus.
- Finally, it will help to built positive impression for the upcoming NAAC visit.

c. **NAAC criteria VII Environmental Consciousness :**

Environment Audit is assigned to the criterion VII of NAAC. National Assessment and Accreditation Council which is a self-governing organization that declares the institutions as Grade A, Grade B or Grade C according to the scores assigned at the time of accreditation of the institution. The intention of Environment audit is to upgrade the environmental condition in and around the institution. It is performed by considering some environmental parameters like water and wastewater management, energy conservation, waste management, air monitoring, etc. for making the institution more eco-friendly.

Students are the major strength of any academic institution. Practicing Environment actions in any educational institution will inculcate the good habit of caring nature in students. Many environmental activities like plantation and nurturing saplings and trees, cleanliness drives, bird watching camp, no

vehicle day, rain water harvesting visits to ecologically important places through Environment clubs will make the student a good citizen of country.

Need of 'Environment and Environmental Audit' is a management tool which comprises systematic assessment of the different components of the ecosystem in which the establishments have been made. It is the process of identifying and determining whether the institution's practices are eco-friendly and sustainable. With modernization, use of resources and chemicals have increased which have negatively impacted the environment creating an imbalance in nature. This is now a great matter of concern. Environment and Environmental audit is a way to ensure that such negative impacts on the campus environment, due to the development and other activities, are kept at a minimum. Realising the importance of Environment and Environmental audit, the Internal Quality Assurance Cell (IQAC) of the University has constituted a team to work towards such environment-related assessments on the Campus. An Eco-Friendly University agenda for Assam Don Bosco University is its road map for building and operating a healthy and self-renewing vibrant Campus community. With an idea to create an environment where youth can be educated to live a sustainable life in harmony with nature, the University has formulated the eco-friendly policy with the following objectives:

- Creating a collaborative effort among the University fraternity in fostering an eco-friendly learning and working environment.

- Ensuring the sustenance of biodiversity by maintenance of the natural environment in addition to conservation, restoration, and remediation of existing land and water.

. - Managing waste generated in the Campus through proper disposal and treatment.

- Commitment to sustainable management of land through agroforestry and kitchen gardening for meeting the food requirements in the Campus.

- Raising awareness of real-world issues affecting the rural communities living adjacent to the University Campus and working towards addressing these issues in partnership with the communities through teaching, research and extension activities.

- Encouraging students to participate in outreach education programmes as a part of Service Learning.

- Protecting, monitoring, and conserving flora and fauna of the Campus and preservation of their natural habitat.

- identifying existing invasive species to reduce their negative impact on the indigenous flora and fauna.

- Involving local communities in the custodianship of natural resources and utilizing local resources for infrastructure construction purposes.

The Environment audit report consists of five components- Land, Energy, Air, Waste and Water.

Objectives: The major objectives of the Environment auditing are:

1. To document the land use patterns in the Campus

2. To estimate the energy requirements of the Campus

3. To estimate the water quality of the Campus

4. To inventoried the biodiversity of the Campus

5. To document the waste disposal system of the Campus

d. ABOUT KARMVEER VITTAL RAMJI SHINDE SANSTHA'S

In the year 1974 Shivraj College was handed over to Karmveer Vitthal Ramaji Shinde Shikshan Sanstha, Gadhinglaj. Hon. Shri. Balasaheb alias R. S. Mane, the President of Karmveer Vitthal Ramaji Shinde Shikshan Sanstha, Gadhinglaj gave the dynamic leadership to this institute. He tried his best to fulfill the educational needs of the students of this area by introducing the faculty of Science both at Junior and Senior College level. Shri. D. S. Kadam then Vice-president donated Rs. Two Lac to meet the expenses of the faculty of Science.

Hon. Shri. Balasaheb alias R. S. Mane, Shri. D. S. Kadam concentrated on the construction of new buildings. The foundation stone of the new building was laid at the hands of Hon. Yashavantrao Chavan and Hon. Vasantdada Patil the then Chief Minister of Maharashtra.

e. Shivraj College of Arts, Commerce & D. S. Kadam Science College, Gadhinglaj, Kolhapur

I am grateful to the representative of Chhatrapati Shivaji Maharaj and the work of Karmveer Vitthal Ramji Shinde and keeping the representative reflection of the progress of the 'shivraj' that has passed from the year 1964 to the Golden Jubilee. Our Shivraj has made an impression of our independence in the educational, social, cultural and sports fields. Today, this college is known as an ideal and perfect college. The leadership of the shaikshnik movement in rural areas has been able to get thousands of students from self-sufficiency, self-control and self-government and have continuously kept the lamp of knowledge in their life. Art, sports literature, commerce, science, electronics, computers, science and technology are all in full swing. Now they are transformed into 'Shivraj Vidhya Sankul'. Many such students come enthusiastically for knowledge and knowledge, with the degree of happiness, along with the degree of happiness, the stubbornness of life is realized.

In June, 1964, the then MP of Kolhapur, Late V.T.Patil gave a generous response to this college established by Dr. S.S.Ghali. In June 1974, this college was transferred to the Karamvir Vitthal Ramji Shinde Education Society from Tararani College. In view of the requirement of the Department in the year 1982 in the month of july, the branches started.Under the guidance of MP Late Balasaheb Mane and Late D.S.Kadam the college flourished. Then chairmanship was offered to, Prof. Kisanrao Kurade. The college has made huge strides under their studious and skilled leadership. Their dreams have got a tangible look. Today B.B.A.,B.C.A.,B.C.S.,B.Sc(Comp.),M.Sc(Comp.),B.Sc.Micro Biology,M.B.A, along with the traditional education of B.A, B.Com, B.Sc., M.A., M.Com, M.Sc., Chemistry. These business curriculum have been started. An independent department has been started for this. All the departments of the college are progressing and the best results are in the cost. Our students are shining due to quality of the College .The academic year 2015-2016 art department and 2016-17 science department have secured the first position in the 'Shivaji College Quality Scholarship' scheme in Municipal section. N.S.S., N.C.C., Fine Arts Forum, Various Wangmi Mandals, Seminars, Camps, Trips, Studies, Various Competitions, Fraternity, 70634 Library of Library, Science Department Laboratory, 250 Computer Labs etc. The children develop children's overall development. There is no doubt that this college will continue to be progress as a proportion of the 'Parmo dharma' of the organization .We heartily Welcome you to this college. We wish you luck for moulding your personality in this college.

The college is located in rural and hilly area of Kolhapur district. The college meet the needs of students belonging to main stream of the society. It has tried to enrich the aspiration of the students belonging to educationally backward region of Kolhapur.

The main goals of our institution are to transmit education at grass root level and to build up all round personality of a student.

Vision

- Giving higher education to the students and preparing them to build strong India based on reasoning, conscience, compassion and philanthropy.

Mission

- Our mission is to provide quality education to the students of Gadhinglaj, Ajara, Chandgad Tahsils and Maharashtra, Karnataka, Goa-Kokan border areas to change their minds with newly advanced Socio-Economic knowledge and technology.

Goal

- To promote professional education to the rural students in the field of Humanities, Commerce, Science and Technology
- To motivate and to encourage research activities among the teachers and students for upliftment of the society.
- To maintain discipline, decorum and nationality in the students.
- To create awareness regarding environmental conservation.

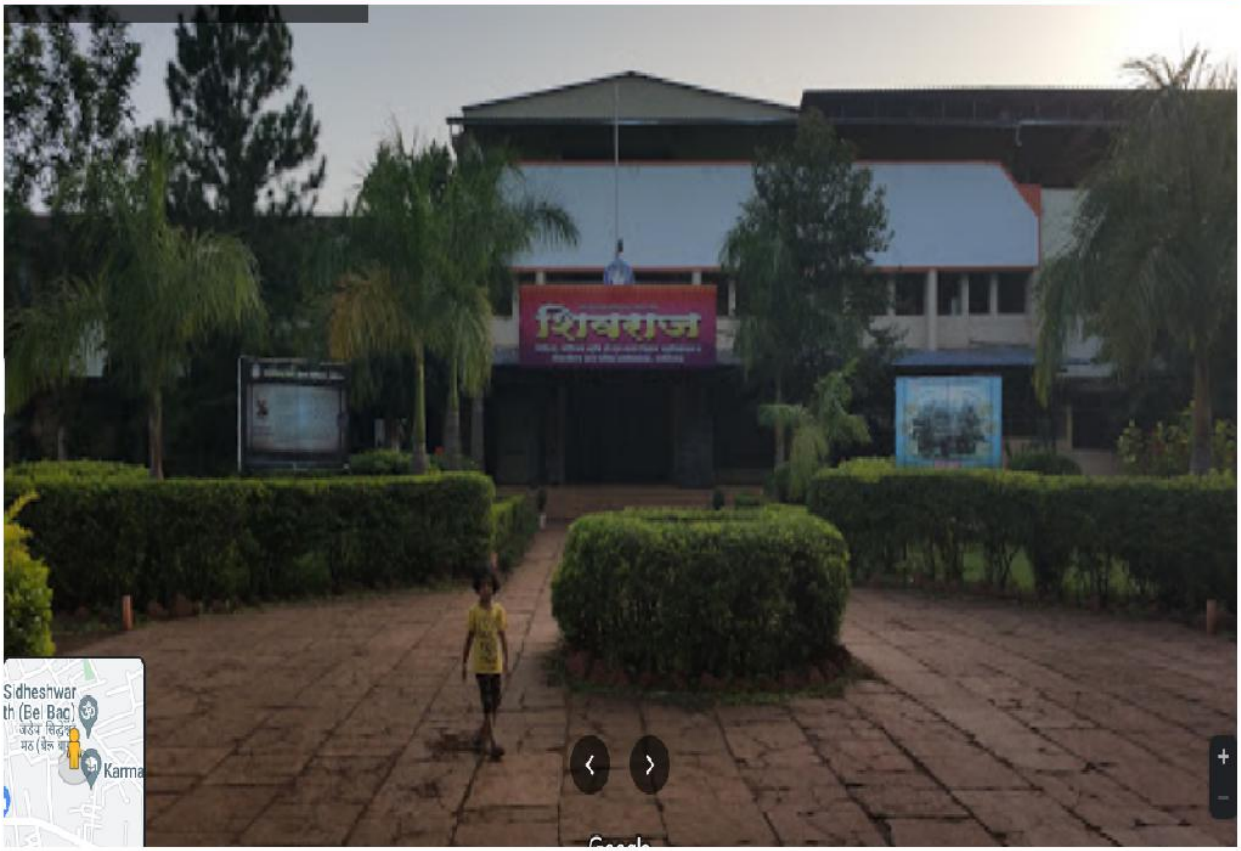
OBJECTIVES

- To create awareness about standards of education and to develop self-respect in the personality of students.
- In the wake of growing needs of e-governance to expose the students to the new technologies and trends so as to prepare them to face the challenge at global level.
- To undertake faculty development programmers to enhance the academic quality of the institute.
- To start professional's courses based on computer technology to prepare our products for the growing demands of job market.

Infrastructure Shivraj College of Arts, Commerce & D. S. Kadam Science College, Gadhinglaj, Kolhapur

Institution, consist of Ground floor and G+2 buildings, is situated at Gadhinglaj with necessary infrastructure for the departments of all the faculties. A proper care is taken to provide basic amenities for the students & the staff members. The facilities are as follows….

- **Classroom:** 45 spacious classrooms with necessary furniture & blackboards in all buildings of the college.
- **Library:** The library of the college with qualified staff and more than 50 thousand books.
- **Laboratory:** 21 spacious laboratories with Computers with Battery backup, Printer, Scanner, LCD projectors & equipment's & furniture etc.
- **Administrative Office:** The spacious LAN computerized administrative office with 06 cabins and modern technology & with necessary facilities.
- **Open Air Theatre:** An open air theatre of 6000 sq. ft. with paving blocks & stage is used for the big functions.
- **Covered Auditorium:** 3121 sq. ft. Covered Auditorium with a proper sitting capacity.
- **Seminar Hall:** Independent seminar hall with necessary facilities for different activities of the departments.
- **Study Room**: In the library building one study room for students & one study room for boys & girls students. Both the study rooms are spacious & necessary furniture & facilities, drinking water, toilet etc.
- **Reading Room**
- **Ladies room: 1** **BoysRoom: 1**
- **Canteen:**One canteen in the campus providing tea & snacks with the size of 2000 sq. ft.
- **Hostel:** Girls' hostel with facility of rooms with beds, canteen, T.V., Study Room with newspapers. With proper capacity as per requirement.
- **Toilets:**Total number of toilets are 06 including college, office, hostels, etc.
- **Botanical Garden:**We have developed 15000 sq. ft. garden for trees & plants with many types of species.


शिवराज
Sidheshwar
th (Bel Bag)
Karma


Kadam

Methodology

The college has conducted Environment Audit in the year 2018-19, on a yearly basis. The audit was carried out in three phases.

a. Questionnaire survey:

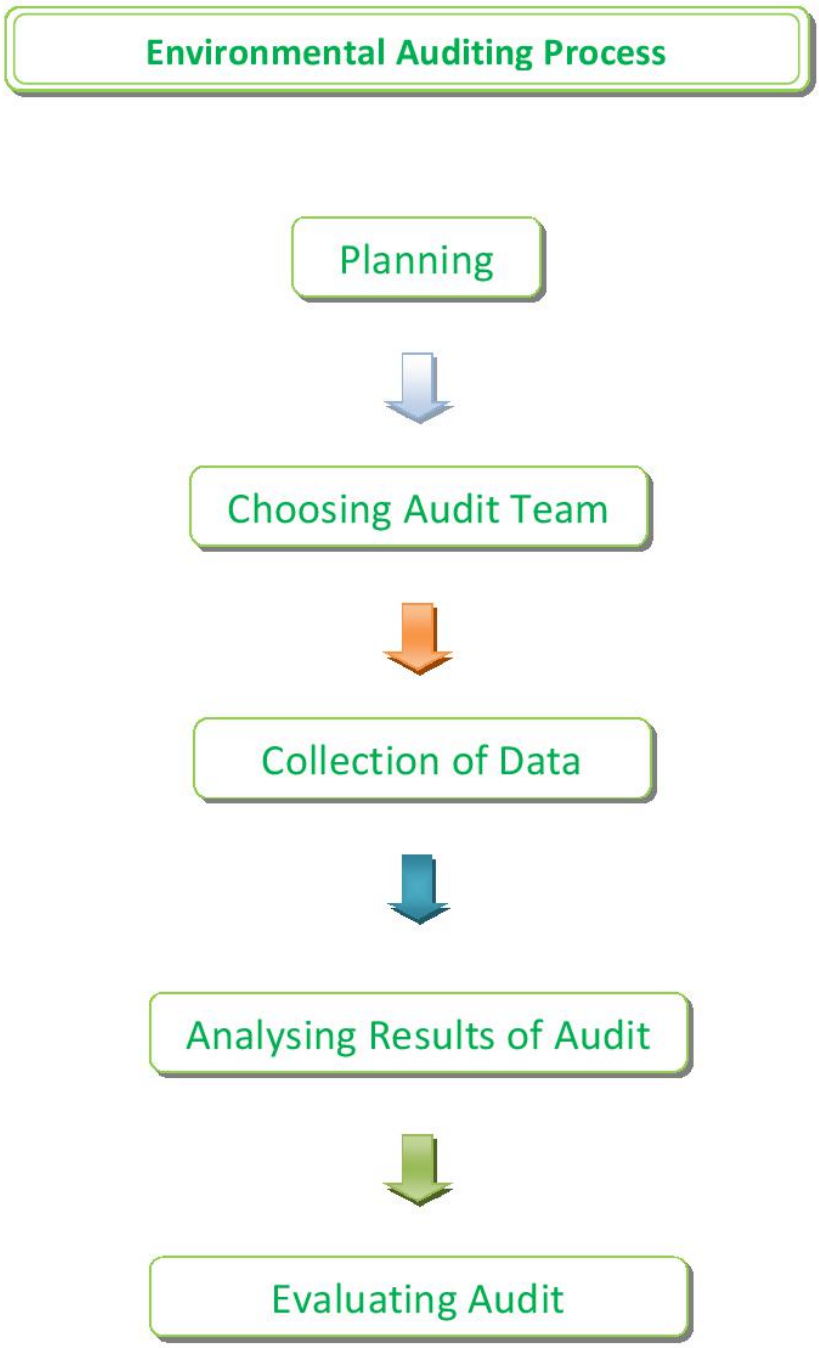
It includes administrative issues associated with the planning of audit, selecting the personnel for the audit team, preparing the audit protocol used by organization, obtaining background information, etc. The scope of the audit was defined at this step. It was decided that the information related to Water and Wastewater management, Energy conservation, green belt, Carbon inventory, Solid waste management, Hazardous waste management, Air and noise quality status, activities of nature club, etc. should be gathered for the audit purpose. For collecting data related to these different areas, specific questionnaires were prepared.

b. Onsite visit and observations:

The data related to above mentioned areas was collected by visiting each and every facility of college campus. The questionnaires were filled up according to the present situation. Photographic documentation was also done with the help of sophisticated camera.

c. Data analysis:

After collection of secondary data, the reviews related to each environmental factor were taken by the Environment audit team. The data was tabulated, analysed and graphs were prepared using computer. Depending upon the observations and data collected, interpretations were made. The lacunas and good practices were documented. The Environmental Management Plan (EMP) was prepared for the next academic year in order to have better environmental sensitization. Finally, all the information was compiled in the form of Environment Audit Report.


Environmental Auditing Process
Planning
Choosing Audit Team
Collection of Data
Analysing Results of Audit
Evaluating Audit

Overview of Environment Audit

Shivraj College of Arts, Commerce & D. S. Kadam Science College, Gadhinglaj, Kolhapur is situated in Maharashtra at **16°22'89289"N**and **74°34'51064"E**, in the Kolhapur District and it is at altitude of 700 fts above mean sea level.

Satellite image of Shivraj College of Arts, Commerce & D. S. Kadam Science College, Gadhinglaj, Kolhapur Campus

Source: Google Earth

a) Entrance

b) College Main Building

c) Parking

d) Library

e) Lecture Building

f) Botanical Garden

g) Sanstha Office

h) Labs

In its effort towards creating an eco-friendly campus, the college encourages its Faculty and Students to engage in conserving the Campus environment, its flora and fauna, through activities that

include individual and collaborative study, conservation practices, activities and initiatives of the Eco Club.

b.Water and Wastewater Audit:

Water audit can be defined as a qualitative and quantitative analysis of water consumption to identify means of reducing, reusing and recycling of water. Water Audit is nothing but an effective measure for minimizing losses, optimizing various uses and thus enabling considerable conservation of water in irrigation sector, domestic, power and industrial as well. A water audit is a technique or method which makes possible to identify ways of conserving water by determining any inefficiencies in the system of water distribution. The measurement of water losses due to different uses in the system or any utility is essential to implement water conservation measures in such an establishment.

Water accounting is the process of communicating water resources related information and the services generated from consumptive use in a geographical domain, such as a river basin, a country or a land use class; to users such as policy makers, water authorities, managers, etc.

Importance of Water Audit:

- Water audit improves the knowledge and documentation of the distribution system.
- Identifies the problem and risk areas and a better understanding of what is happening to the water after it leaves the source point.
- Leads to reduced water losses.
- Improved financial performance.
- Improved reliability of supply system.
- Efficient use of existing supplies.
- Better safeguard to public health and property and reduced legal liability.
- Reduced disruption, thereby improving level of service to customers.
- Large potential cost savings that can be achieved by water harvesting, through the recycling of water and the use of rain water.

It is observed that a number of factors like climate, culture, food habits, work and working conditions, level and type of development, and physiology determine the requirement of water.The community which has a population between 20,000 to 100,000 requires 100 to 150 liters per person (capita) per day. The communities with a population can consume over 100,000 — 150 to 200 liters person (capita) per day. As per the standards provided by WHO Regional office for South East Asia Schools requires 5-7liters per student; 15-20liters per student if water-flushed toilets, Staff accommodation requires 45liters per person per day and for sanitation purposes it depends on technology.

i) Water Audit:

Water usage can be defined as water used for all activities which are carried out on campus from different water sources. This includes usage in all residential halls, academic buildings, on campus and on grounds. Wastewater is referred as the water which is transported off the campus. The wastewater includes sewerage, residence, hall waters used in cooking, showering, clothes washing as well as wastewater from chemical and biological laboratories which ultimately going down in sink or drainage system.

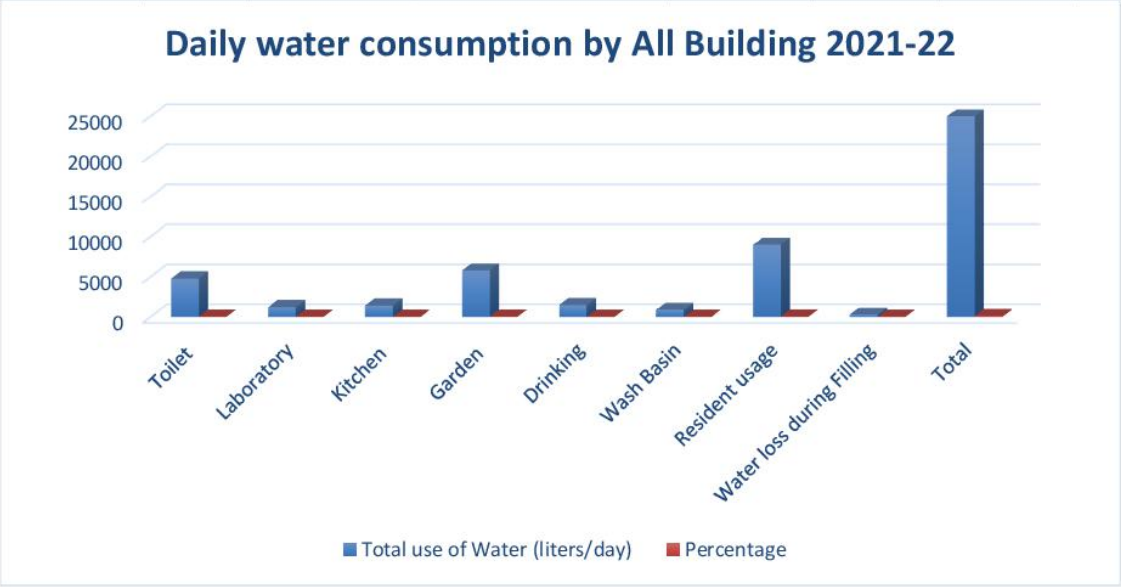
Water Audit Process:

ii) Overall water consumption in Shivraj College of Arts, Commerce & D. S. Kadam Science College, Gadhinglaj, Kolhapur:

From the data collected for water audit of Institution, Kolhapur, the water distribution and water consumption pattern is noticed as follow. The college is having main building for administrative work as well for teaching work. For the water audit purpose we categorized the college campus area into three buildings namely as Medical college, Hospital, Girls & Boys hostel, Garden, etc.

In water audit study the daily water consumption by all Buildings is found to be as follows.

Daily water consumption by All Building 2021-22									
Site	Toilet	Laboratory	Kitchen	Garden	Drinking	Wash Basin	Resident usage	Water loss during Filling	Total
Total use of Water (liters/day)	4800	1250	1450	5800	1500	900	9000	300	25000
Percentage	19.2	5	5.8	23.2	6	3.6	36	1.2	100



Graph No. 3.1 Daily water consumption by all buildings

The total water consumption per day for all buildings is found to be 25,000 lit/day.

Water management Practices:

● Rain Water Harvesting (RWH) is practiced by means of recharge wells, recharge bore, and water tanks (for storage of rainwater). The institution Campus is independent of the city water supply system as it relies on three bore wells and four natural ponds, present in the Campus, to cater to the water requirements. Bore wells were made to help with the construction as well as to ensure drinking water for the campus. Three Bore Wells and Four natural ponds which helps with the construction as well as to ensure drinking water for the campus.

What is RWH?

Rain water harvesting is collection and storage of rain water that runs off from roof tops, parks, roads, open grounds, etc. This water run off can be either stored or recharged into the ground water. A rainwater harvesting systems consists of the following components:

1. catchment from where water is captured and stored or recharged,
2. conveyance system that carries the water harvested from the catchment to the storage/recharge zone,
3. first flush that is used to flush out the first spell of rain,
4. filter used to remove pollutants,
5. storage tanks and/or various recharge structures.

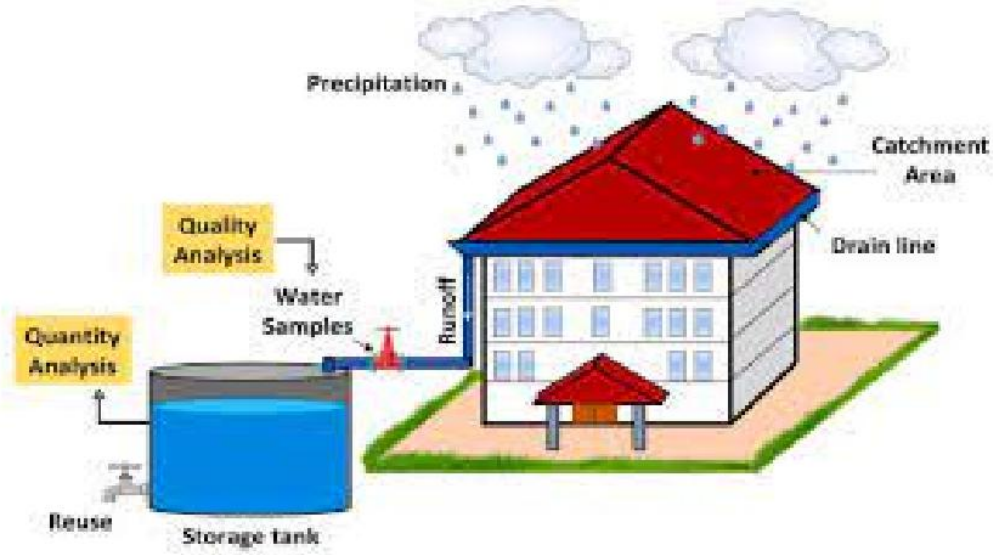
Why do RWH?

Rain may soon be the only source of clean water. Rainwater harvesting systems use the principle of conserving rainwater where it falls and have the following benefits:

- Helps meet ever increasing demand of water.
- Improves quality and quantity of groundwater.
- Reduces flooding.

How?

Setting up a rainwater harvesting is not difficult but requires some sort of understanding of hydrology and architecture and as a result most people find it too complicated to do it themselves. In order to make it simple and convenient for everyone to set up a rainwater harvesting system suitable for their needs, we have prepared a set of guidelines which will help you to set up your own rainwater harvesting system quickly and efficiently.



Solar Water Heating System

Solar water heating system is a device that helps in heating water by using the energy from the SUN. This energy is totally free. Solar energy (sun rays) is used for heating water. Water is easily heated to a temperature of 60-80o C. Solar water heater of Solar water heaters (SWHs) of 100-300 liters capacity are suited for domestic use. Larger systems can be used in restaurants, canteens, guest houses, hotels, hospitals etc. A 100 liters capacity SWH can replace an electric geyser for residential use and may save approximately 1500 units of electricity annually. The use of 1000 SWHs of 100 liters capacity each can contribute to a peak load saving of approximately 1 MW. A SWH of 100 liters capacity can prevent emission of 1.5 tones of carbon dioxide per year.

Working Of a Solar Water Heater

The Sun's rays fall on the collector panel (a component of solar water heating system). A black absorbing surface (absorber) inside the collectors absorbs solar radiation and transfers the heat energy to water flowing through it. Heated water is collected in a tank which is insulated to prevent heat loss. Circulation of water from the tank through the collectors and back to the tank continues automatically due to thermo siphon system. Based on the collector system, solar water heaters can be of two types: A solar water heater consists of a collector to collect solar energy and an insulated storage tank to store hot water. The stored hot water can be used later any time.

Main Components Of Solar Water Heating System

Main components of solar water heater system are

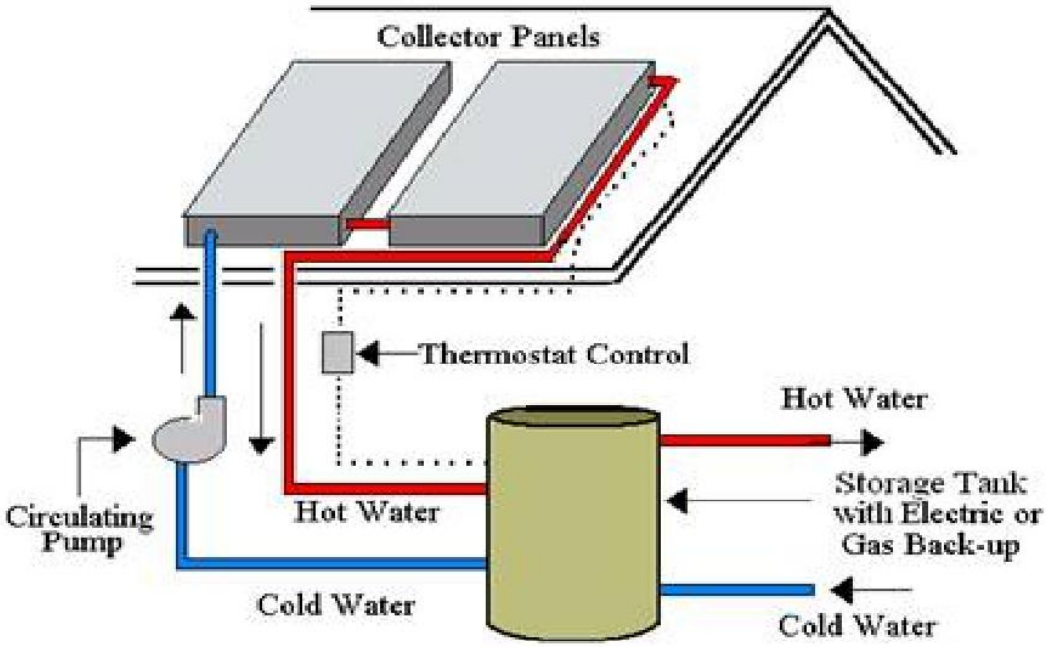
- Solar Collector(to collect solar energy)
- Insulated tank (to store hot water)

- Supporting stand
- Connecting pipes and instrumentation etc.

Applications Of Solar Water Heater

- Water heating is one of the most cost-effective uses of solar energy. Every year, several thousands of new solar water heaters are installed worldwide. Solar water heaters can be used for Homes, Community Centers, Hospitals, Nursing homes, Hotels, Restaurants, Dairy plants, Swimming Pools, Canteens, Ashrams, Hostels, Industry etc. Use of solar water heater can curtail electricity or fuel bills considerably.

- Usage of solar water heater for any application where steam is produced using a boiler or steam generator can save 70-80% of electricity or fuel bills. A residence can save 70-80% on electricity or fuel bills by replacing its conventional water heater with a solar water heating system. Solar water heaters are known to have the fastest repayment of investment in 2 to 4 years depending upon use and fuel replaced.



Active Solar Water Heating System

The solar is installed on institution building of hostels with capacity of 5000 litres/day.

c. Total Electric Energy Audit :

An electricity audit is simply an audit or calculation of how much electricity you are using in your home and of where that electricity is going.

An energy audit is an analysis of a facility, indicating how and where that facility can reduce energy consumption and save energy costs. Its insight to energy efficiency and conservation can lead to significant savings on the company's utility.

Importance of Electric energy Audit:

- The audit will not only inform you of opportunities but provide you with financial analysis. This will enable prioritization based on financial benefit and return on investment.
- Provide you with solid, easy to understand technical information regarding the proposed energy conservation measures.
- A good quality audit will analyze your historical energy use and find potential issues using statistical methods.
- Provide you with emissions analysis to help you understand the benefits of your decisions from an environmental standpoint.
- Understand where energy is used and which areas are worth focusing on the most (energy hogs).
- Provide you with benchmark information to help you understand your energy use performance compared to others in your field and area.

Electricity and energy audit:

This indicator addresses energy consumption, energy sources, energy monitoring, lighting, appliances, natural gas and vehicles. Energy use is clearly an important aspect of campus sustainability and thus requires no explanation for its inclusion in the assessment. However, many may not realize how much influence the higher education sector has in the larger energy market. Energy sources utilized by all the departments and common facility centres include electricity, liquid petroleum and LPG. Major use of energy is in Science Department, office, canteen, and laboratories for lighting, transportation, cooking and laboratory work. Energy consumption by energy consuming in college is **1360.86 KwH/Week.** Due to lack of adequate ventilation and natural light in rainy season some part of infrastructure more consumption of electricity at air and light appliances in the college is increased. Hence, survey of adequate ventilation and natural light of infrastructure is essential. Also high consumption of electricity

is observed at office in duration of admission and examination. In science department like Physics, Chemistry, Mathematics, Botany and Zoology electricity was shut downed after occupancy time is one of greening practices for energy conservation. Audit shows major non-teaching staff is nearer to campus for resident and mass number of students are come from nearby villages of Gadhinlaj hence consumption in fuel is less. As our college is situated in rural area very less number of students are using vehicles, 50 % of staff using four wheelers is high in number. Study shows about 1.5% students were use two wheeler, 9.92% students come to the college by walking, 0.90 % student are using bicycle and, 3.05% students were lifted by their parents to college, 84.57 % are using state transportation vehicles and no any student make use of public transportation like bus.

Staff members who lived out campus are using the vehicles in sharing for daily transportation. Study tours, collection tours, visits are followed by college which gives the message of importance of walking which is very good green practice. Consumption of LPG for education or practical purpose is very less. The LPG connection in name of the college and LPG is handled by departments of Chemistry. For heating purpose at the time of practical, no leakages and off mode regulators are seen at time of verification.

Total Energy usage per week in KwH = 1360.86

Total lightning usage per week in KwH = 249.89

From total lightning regular light usage = 108.08 KwH/week

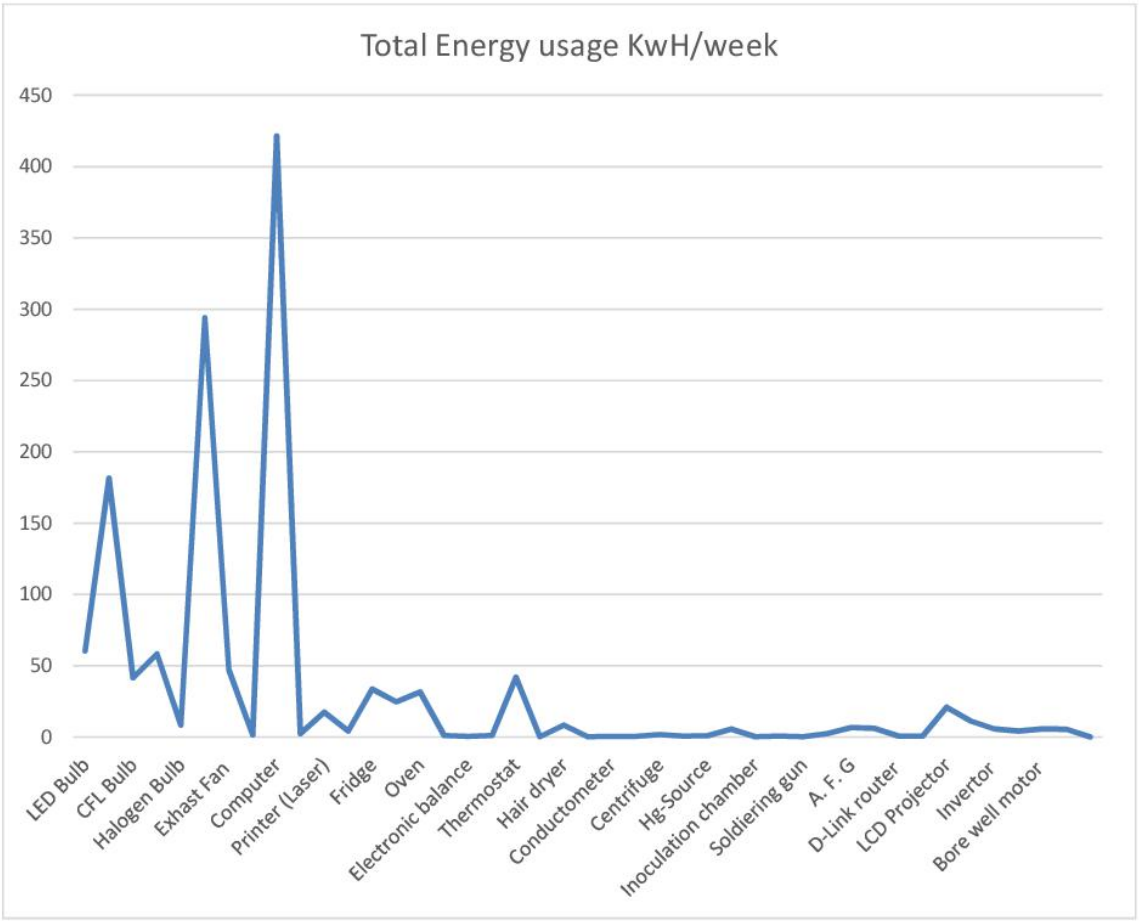
From total lightning LED light usage = 141.81 KwH/week

That is percentage of LED light usage against regular light per week is 56.75%

Electricity Usage Survey calculations chart of Shivraj college, Gadhinglaj as follows :

Type	Quantity	Watts	Total Watts	Hours per day	Energy per day	KWH/week
LED Bulb	**77**	14	1078	8	8624	**60.368**
LED Tube Lights	**180**	18	3240	8	25920	**181.44**
CFL Bulb	**37**	20	740	8	5920	**41.44**
Tube Lights	**52**	40	2080	4	8320	**58.24**
Halogen Bulb	**2**	150	300	4	1200	**8.4**
Ceiling fan	**140**	75	10500	4	42000	**294**
Exhast Fan	**14**	60	840	8	6720	**47.04**
Wall Fan	**1**	50	50	4	200	**1.4**
Computer	**172**	175	30100	2	60200	**421.4**
Printer (inkjet)	**4**	40	160	2	320	**2.24**
Printer (Laser)	**5**	250	1250	2	2500	**17.5**
Printer (All in one)	**2**	300	600	1	600	**4.2**
Fridge	**2**	150	300	16	4800	**33.6**
Freezer	**1**	220	220	16	3520	**24.64**
Oven	**3**	1500	4500	1	4500	**31.5**
Furnace	**1**	300	300	0.5	150	**1.05**
Electronic balance	**4**	15	60	1	60	**0.42**
Vacuum pump	**2**	80	160	1	160	**1.12**
Thermostat	**2**	3000	6000	1	6000	**42**
Colorimeter	**2**	20	40	1	40	**0.28**
Hair dryer	**1**	1200	1200	1	1200	**8.4**
pH Meter	**2**	10	20	2	40	**0.28**
Conductometer	**3**	10	30	2	60	**0.42**
Potentiometer	**3**	12	36	2	72	**0.504**
Centrifuge	**1**	120	120	2	240	**1.68**
Na-Source	**1**	80	80	1	80	**0.56**
Hg-Source	**1**	55	55	2	110	**0.77**
Freq Gen	**10**	40	400	2	800	**5.6**
Inoculation chamber	**1**	20	20	1	20	**0.14**
Dimmer stat	**2**	20	40	2	80	**0.56**
Soldiering gun	**3**	25	75	0.5	37.5	**0.2625**
DC power supply	**8**	10	80	4	320	**2.24**
A. F. G	**6**	40	240	4	960	**6.72**
C C TV	**6**	6	36	24	864	**6.048**

D-Link router	**2**	6	12	8	96	**0.672**
Home Theater	**1**	90	90	1	90	**0.63**
LCD Projector	**5**	300	1500	2	3000	**21**
Zerox Machine	**2**	800	1600	1	1600	**11.2**
Invertor	**1**	400	400	2	800	**5.6**
Charging Points	**121**	2.5	302.5	2	605	**4.235**
Bore well motor	**1**	800	800	1	800	**5.6**
Back Up	**1**	390	390	2	780	**5.46**
	Total Energy usage per week in KwH					**1360.8595**



Graphical representation of Total Energy usage KwH/week

Solar System for Electricity:

Solar power is pollution free and causes no greenhouse gases to be emitted after installation. Reduced dependence on foreign oil and fossil fuels. Renewable clean power that is available every day of the year, even cloudy days produce some power.

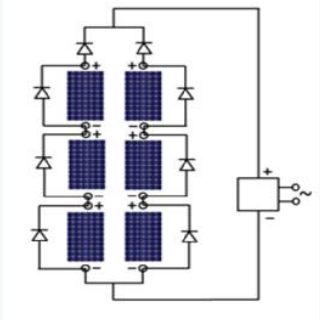
Theory and construction

Photovoltaic modules use light energy (photons) from the Sun to generate electricity through the photovoltaic effect. Most modules use wafer-based crystalline silicon cells or thin-film cells. The structural (load carrying) member of a module can be either the top layer or the back layer. Cells must be protected from mechanical damage and moisture. Most modules are rigid, but semi-flexible ones based on thin-film cells are also available. The cells are usually connected electrically in series, one to another to the desired voltage, and then in parallel to increase current. The power (in watts) of the module is the mathematical product of the voltage (in volts) and the current (in amperes) of the module. The manufacturing specifications on solar panels are obtained under standard condition, which is not the real operating condition the solar panels are exposed to on the installation site.

A PV junction box is attached to the back of the solar panel and functions as its output interface. External connections for most photovoltaic modules use MC4 connectors to facilitate easy weatherproof connections to the rest of the system. A USB power interface can also be used.

Solar panels also use metal frames consisting of racking components, brackets, reflector shapes, and troughs to better support the panel structure.

Module interconnection



A connection example, a blocking diode is placed in series with each module string, whereas bypass diodes are placed in parallel with modules.

Module electrical connections are made with conducting wires that take the current off the modules and are sized according to the current rating and fault conditions.

Panels are typically connected in series of one or more panels to form strings to achieve a desired output voltage, and strings can be connected in parallel to provide the desired current capability (amperes) of the PV system.

Blocking and bypass diodes may be incorporated within the module or used externally, to deal with partial array shading, to maximize output. For series connections, bypass diodes are placed in parallel with modules to allow current to bypass shaded modules which would be high resistance. For paralleled connections, a blocking diode may be placed in series with each module's string to prevent shaded strings' internal impedance from short circuiting other strings.

Concentrator

Some special solar PV modules include concentrators in which light is focused by lenses or mirrors onto smaller cells. This enables the use of cells with a high cost per unit area (such as gallium arsenide) in a cost-effective way.

Inverters

In general with solar panels, if not enough current is taken from PVs, then power isn't maximised. If too much current is taken then the voltage collapses. The optimum current draw depends on the amount of sunlight striking the panel. Solar panel capacity is specified by the MPP (maximum power point) value of solar panels in full sunlight.

Solar inverters convert the DC power to AC power by performing the process of maximum power point tracking (MPPT): solar inverter samples the output Power (I-V curve) from the solar cell and applies the proper resistance (load) to solar cells to obtain maximum power.

MPP (Maximum power point) of the solar panel consists of MPP voltage (V mpp) and MPP current (I mpp): it is a capacity of the solar panel and the higher value can make higher MPP.

Solar panels are wired to inverters in parallel or series (a 'string'). In string connections the voltages of the modules add, but the current is determined by the lowest performing panel. This is known as the "Christmas light effect". In parallel connections the voltages must be the same to work, but currents

add. Arrays are connected up to meet the voltage requirements of the inverters and to not greatly exceed the current limits.

Micro-inverters work independently to enable each panel to contribute its maximum possible output for a given amount of sunlight, but can be more expensive.

Efficiency

Each module is rated by its DC output power under standard test conditions (STC) and hence the on field output power might vary. Power typically ranges from 100 to 365 Watts (W). The efficiency of a module determines the area of a module given the same rated output – an 8% efficient 230 W module will have twice the area of a 16% efficient 230 W module. Some commercially available solar modules exceed 24% efficiency. Currently, the best achieved sunlight conversion rate (solar module efficiency) is around 21.5% in new commercial products typically lower than the efficiencies of their cells in isolation. The most efficient mass-produced solar modules [disputed – discuss] have power density values of up to 175 W/m2 (16.22 W/ft2).

Scientists from Spectro lab, a subsidiary of Boeing, have reported development of multi-junction solar cells with an efficiency of more than 40%, a new world record for solar photovoltaic cells. The Spectro lab scientists also predict that concentrator solar cells could achieve efficiencies of more than 45% or even 50% in the future, with theoretical efficiencies being about 58% in cells with more than three junctions.

Capacity factor of solar panels is limited primarily by geographic latitude and varies significantly depending on cloud cover, dust, day length and other factors.

Technology

Most solar modules are currently produced from crystalline silicon (c-Si) solar cells made of multicrystalline and monocrystalline silicon. In 2013, crystalline silicon accounted for more than 90 percent of worldwide PV production, while the rest of the overall market is made up of thin-film technologies using cadmium telluride, CIGS and amorphous silicon.

Emerging, third generation solar technologies use advanced thin-film cells. They produce a relatively high-efficiency conversion for a lower cost compared with other solar technologies. Also, high-cost, high-efficiency, and close-packed rectangular multi-junction (MJ) cells are usually used in solar

panels on spacecraft, as they offer the highest ratio of generated power per kilogram lifted into space. MJ-cells are compound semiconductors and made of gallium arsenide (GaAs) and other semiconductor materials. Another emerging PV technology using MJ-cells is concentrator photovoltaics (CPV).

Thin film

In rigid thin-film modules, the cell and the module are manufactured on the same production line. The cell is created on a glass substrate or superstrate, and the electrical connections are created in situ, a so-called "monolithic integration." The substrate or superstrate is laminated with an encapsulant to a front or back sheet, usually another sheet of glass. The main cell technologies in this category are CdTe, or a-Si, or a-Si+uc-Si tandem, or CIGS (or variant). Amorphous silicon has a sunlight conversion rate of 6–12%.[citation needed]

Flexible thin film cells and modules are created on the same production line by depositing the photoactive layer and other necessary layers on a flexible substrate. If the substrate is an insulator (e.g. polyester or polyimide film) then monolithic integration can be used. If it is a conductor then another technique for electrical connection must be used. The cells are assembled into modules by laminating them to a transparent colourless fluoro polymer on the front side (typically ETFE or FEP) and a polymer suitable for bonding to the final substrate on the other side.

The solar is installed on institution building with capacity of 500 kw, and right now only used for single building using only 300 to 350 units per day. Whatever available balance will be reversed to MSEB.

Solar Panel

d. Solid waste audit:

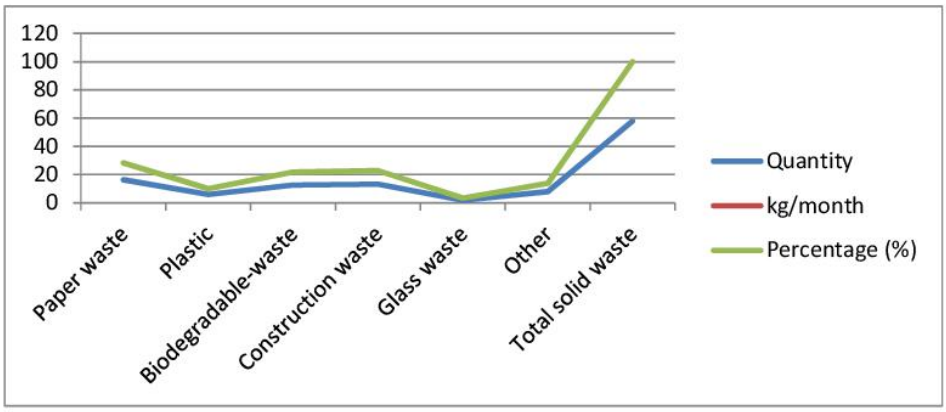
Solid waste management is becoming a major public health and environmental concern world over. Improper solid waste disposal leads to substantial negative environmental impacts e.g., pollution of air, soil, water and generation of greenhouse gases from landfills. Many insect borne diseases are spread through garbage. Therefore, it is necessary to manage the solid waste appropriately to reduce the load on waste management system. The intention of this inventory is to find out the quantity, volume, type and current management practice of solid waste generation in Institution, Kolhapur.

This survey related to solid waste generation would be helpful for making the college more environments friendly.

- **Generation of solid waste in Institution, Kolhapur:**

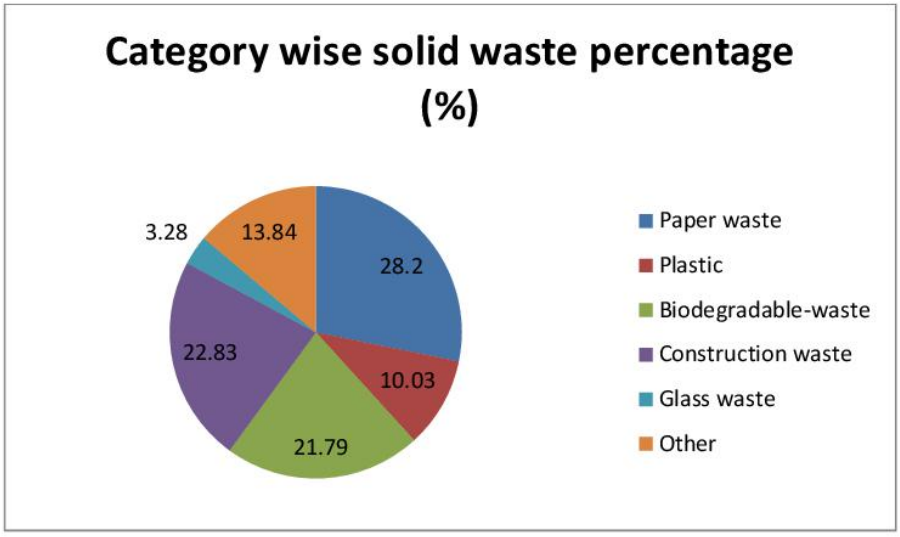
Category wise solid waste generation at Institution, Kolhapur (kg/month)

Category of waste	Paper waste	Plastic	Biodegradable-waste	Construction waste	Glass waste	Other	Total solid waste
Quantity kg/month	16.3	5.8	12.6	13.2	1.9	8.0	57.8
Percentage (%)	28.20	10.03	21.79	22.83	3.28	13.84	100



Category wise solid waste generation at Institution, Kolhapur

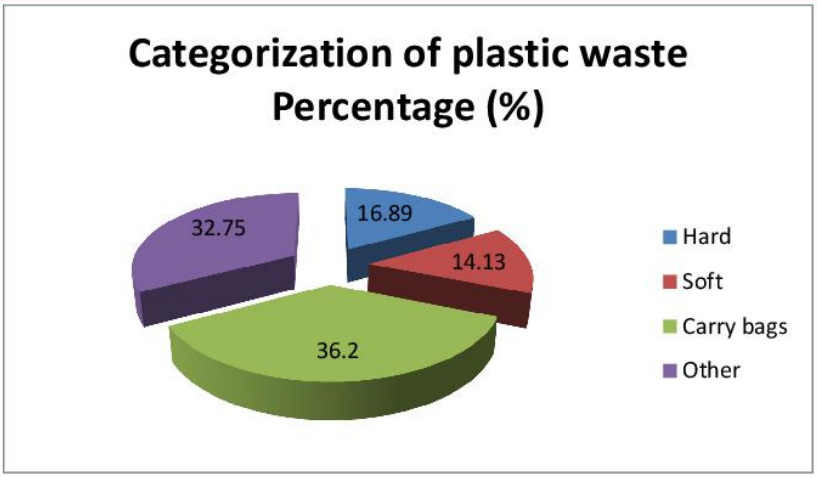
The average amount of solid waste generated per month in Institution, Kolhapur was 57.8 kg/month. On the basis of observations the highest quantity of solid waste generated is paper waste which is about 16.3 kg/month and construction waste is about 12.6 kg/month respectively. The examination department generated paper waste in large quantity in the college. The glass waste is produced in minimum quantity i.e. 1.9 kg/month. Besides, the above mentioned wastes, plastic waste is generated in the form of plastic wrappers of food items, old broken chairs, old broken water tank, etc.



- **Plastic waste generation and its distribution in college campus**

	Plastic kg/ month				Total
Category	Hard	Soft	Carry bags	Other	
Quantity	0.98	0.82	2.1	1.90	5.8
Percentage	16.89	14.13	36.20	32.75	100

Categorization of plastic waste at Institution, Kolhapur(kg / month):



The graph shows that the hard plastic and carry bag waste is generated in higher amount which is 36.2% and 32.75% respectively. The soft plastic and other plastic waste also generated in the college is 14.13% and 16.89% respectively

e.Hazardous waste audit:

Institution, Kolhapur is one of the well-known educational institutes having number of student strength. This college caters the facility for Medical faculty's students in their campus. Many department having chemicals hazardous waste but they provided their chemical and water treatment plant at the back side. If there is other waste is produces will hand over to the particular authority.

f. E-waste:

Generation of e-waste is found on every educational institute. It is observed that the E-waste generated at Institution, Kolhapur is of Schedule II category. Computers, Printers, Laptops, Scanners, Internet Routers and Xerox machines are used for administrative work. . The wire required for the connectivity also gets included in the e waste. The college has its own computer laboratory of 50 computers. The library uses some electronic scanners which after its use can become e-waste. Presently, the college is dispatching the e waste to Shivraj College of Arts, Commerce & D. S. Kadam Science College, Gadhinglaj, Kolhapur main office where the waste is collected centrally and it is given to authorised e- waste collector.

Key Observations:

- The average waste generated in the college is. 5.8Kg/month
- Highest quantity of solid waste is of paper waste16.3Kg/month
- Biodegradable waste is 12.6 Kg/month.
- Plastic waste is about 2.8% to the total solid waste on the college campus.
- Some of the classrooms were found without solid waste baskets.
- There is need of some improvements into the collection of solid waste.
- Solid waste is to be segregated at the source.

g. Ambient air quality status:

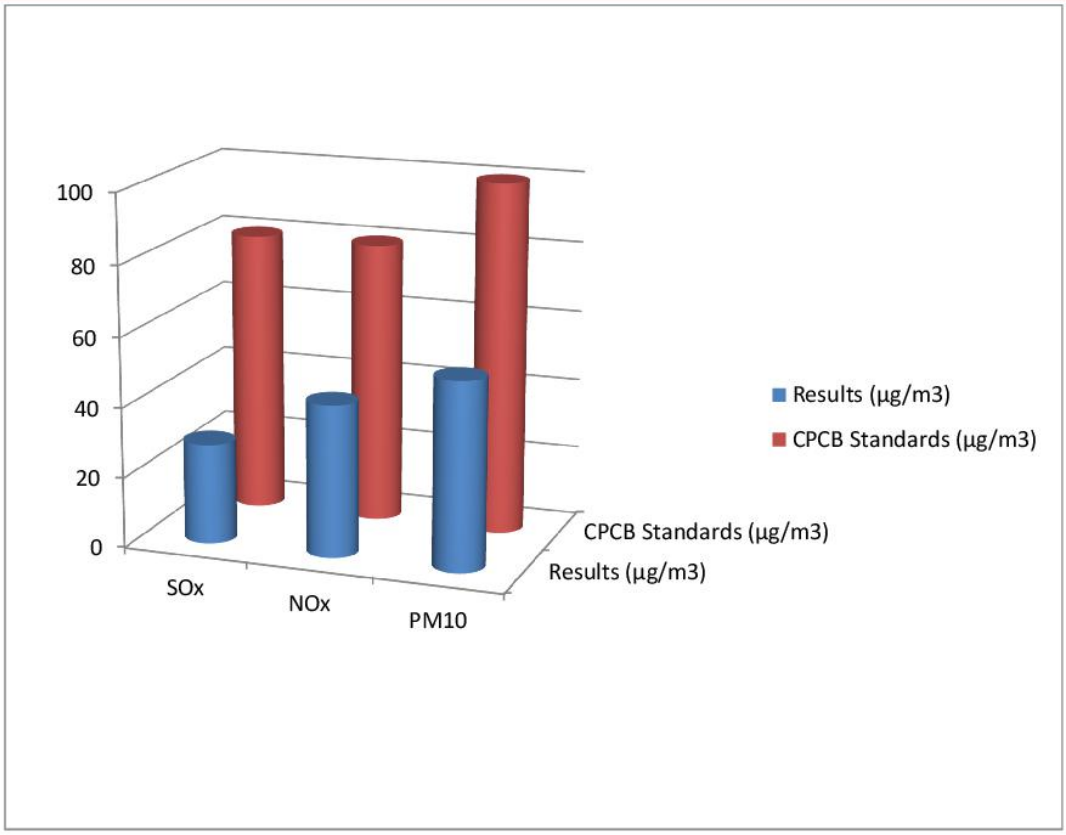
Ambient air sampling is important part of environmental monitoring. Particulate matter and trace gases sampling were carried out on the college campus. The sampling was carried out using calibrated Handy Dust Sampler APM 821 with flow rate 1 lit/min equipped with glass fibre filter paper (size 25 mm). The sampling period was 2 hrs.

Sulphur dioxide (SO_2) and Oxides of Nitrogen (NOx) in the air were estimated with West and Gaeke method and Jacob and Hochheiser modified method respectively. Particulate matter (PM_{10}) was measured gravimetrically. The samples were collected and analyzed in the approved laboratory. The details of air quality status in the college are given as bellow:

Ambient air quality status of Institution, Kolhapur

Sr. No.	Parameters	Results (µg/m^3)	CPCB Standards (µg/m^3)
1	SOx	28.57	80
2	NOx	43.33	80
3	PM_{10}	53.61	100

It was observed that all the air quality parameters analyzed were within the Ambient Air Quality Standards of Central Pollution Control Board, India. The air quality is good in the college campus as well as surrounding.



Ambient air quality status of Institution, Kolhapur.

h. Ambient noise monitoring status:–

Ambient noise monitoring was carried out in different areas of college campus like at college campus entry, college gate, corridor, floor and ladies hostel. The sampling was carried out using calibrated Sound Level Meter (AZ 8921) by logarithmic scale in Decibels (dB). The noise readings were collected in the college campus and calculated. The details of noise status in college campus are given as below:

Ambient Noise levels in Institution, Kolhapur.

Sr. No.	Site Name	Results dB (A) Leq	Standards(Day Time) dB (A) Leq
1	College Campus Entry	66.21	50
2	College Gate	62.04	50

3	Corridor	60.82	50
4	Floor	56.27	50
5	Hostel	48.54	50
6	Canteen	58.39	50
7	Library	36.17	50

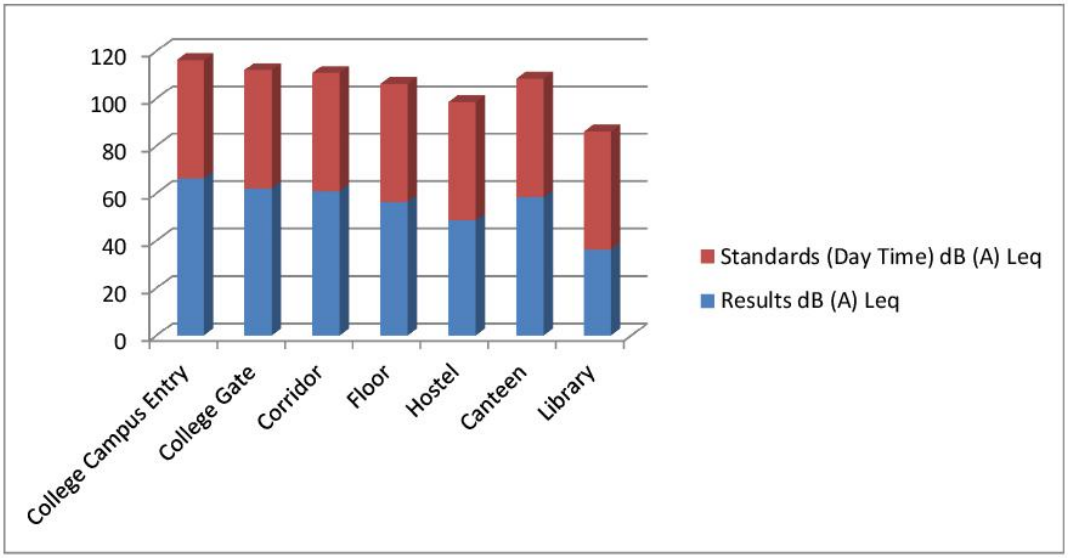
Note: - 1. All parameters expressed in dB (A) Leq.

2. Monitoring is carried during day time.

3. Day time is from 6.00 a.m. to 10.00 p.m.

It is observed from the table that the Ambient Noise levels overall in college is on higher side except ladies hostel as compared to the standards of Central Pollution Control Board for the day time.

Since the college is located adjacent of main roads and therefore, the major source of noise is automobile noise, rolling noise. The human communication and transportation are causing high level sound. It is advisable to increase the Environmentcover in the surrounding to avoid noise.



Ambient Noise levels in Institution, Kolhapur.

- **Parking and traffic management:**

Traffic generated from this project will confluent on 15 m wide road to college.

Parking statement:

Total parking area	2425.74 m2
Area per car	25 m2 for 4 wheeler 4 m2 for 2 wheeler

(Width of all internal roads (m) : Width of dive ways is 9 m to 12 m wide)

- **Bird's diversity:**

The diversity among birds is striking. ... Birds live in a variety of different habitats. Birds that live in different habitats will encounter different foods and different predators. Birds can be carnivores (feeding on other animals), herbivores (feeding on plants), or generalists (feeding on a variety of foods).

Sparrow, crow, bulbuls, Eagle, Pigeon, Cuckoo, Hornbill, Bat, Butterfly, etc these species are seen regularly around the campus.

i. Details of Tree census in College campus:

The beginning of the 21st century brought growing concern about global warming, climate change, food security, poverty, and population growth. CO_2 is a principle component causing global warming. Atmospheric carbon dioxide levels have increased to 40% from preindustrial levels to more than 390 parts per million CO_2. On this background it is a need of time to cover the educational campuses with Environment cover interrelated with climate change.

The current is a present status of tree cover, vegetation and carbon storage assessment of area under Shivraj College of Arts, Commerce & D. S. Kadam Science College, Gadhinglaj, Kolhapur Campus. In an era of global warming and climate change; carbon emission, carbon sequestration, mitigation, adaptation are the keywords in academia. Carbon sequestration is a phenomenon of converting atmospheric carbon i.e. CO_2 in to other pools of carbon such as vegetation, soil, ocean etc. in various forms to mitigate global warming. It is one of the important clauses of Kyoto Protocol. Current tree census methodology has been adopted from the guidelines set by Indian Institute of Remote Sensing, Dheharadoon, Govt. of India.

- **Total biomass :**

Biomass, in ecology, is the mass of living biological organisms in a given area or ecosystem at a given time. Biomass can refer to *species biomass*, which is the mass of one or more species, or to *community biomass*, which is the mass of all species in the community. It can include microorganisms, plants or animals. The mass can be expressed as the average mass per unit area, or as the total mass in the community. 0.378 tons of total biomass of woody vegetation have been recorded in The Shivraj College Kolhapur campus during the current tree census.

- **Carbon stock:**

Forests and trees act as natural carbon stores, but this carbon is released when the trees are felled and the area deforested. The amount of carbon stored within an area of land varies according to the type of vegetation cover. 0.1891 tons of total carbon stocks are present on the campus.

- **Carbon Sequestration:**

Carbon sequestration describes long-term storage of carbon dioxide or other forms of carbon to either mitigate or defer global warming and avoid dangerous climate change. It has been proposed as a way to slow the atmospheric and marine accumulation of greenhouse gases, which are released by burning fossil fuels. Vegetation carbon pool having the potential of 560 Pg (Pg: Petagram= billion ton) of carbon storage globally. In the current study the focus is given on the assessment of existing carbon stock stored The Shivraj College Kolhapur campus in the form of woody vegetation by enumerating every tree species. Overall 0.694 tons of CO_2has captured and stored by the woody plants present in the college campus. A single tree consumes 0.0218 tons of CO_2 approximately annually consequently, as the campus possess 69 mature woody plants 1.5042 tons of CO_2 is consumed yearly by all woody vegetation on the college campus.

- **Oxygen released :**

Woody vegetation on The Shivraj College Kolhapur campus has released 1.85 tons of oxygen in their lifetime till date. Released oxygen is directly proportional to CO_2 sequestrate in the ratio of 32/12. Thus, it is supposed to release of oxygen annually. It is assumed that a single tree supports oxygen demand of two people for their life.

- **Total number of trees enumerated on Shivraj College of Arts, Commerce & D. S. Kadam Science College, Gadhinglaj, Kolhapur campus:**

All the collected data was tabulated and analysed with the help of MS- Excel spreadsheets and objected findings were extracted by using various factors given by Inter governmental Panel on Climate Change (IPCC).

- **Total number of trees enumerated Shivraj College of Arts, Commerce & D. S. Kadam Science College, Gadhinglaj, Kolhapur campus:** Total 241 numbers of trees with more than 10 cm girth and height more than 4 ft have been enumerated. Girth and height of every tree has been measured.
- Total **401** numbers of plants.
- Total number of trees species **241**.
- Total numbers types of shrubs species **160**.

Tree Species chart with Names

Sr. No.	Name of Plant	Family	Vernacular name	Habit of plant	Height of plant (feet)
1)	***Acalypha wilkesiana* Müll. Arg. 1**	**Euphorbiaceae**	**खाजोटी**	**Shrub**	**07**
2)	*Acalypha wilkesiana* Müll. Arg. 2	Euphorbiaceae	खाजोटी	Shrub	06
3)	***Adansonia digitata* L. 1**	**Malvaceae**	**गोरख चिंच**	**Tree**	**10**
4)	***Agave americana* L.1**	**Asparagaceae**	**घायपात**	**Shrub**	**12.50**
5)	***Albizia lebbeck* (L.) Benth. 1**	**Fabaceae**	**शिरीष**	**Tree**	**85**
6)	*Albizia lebbeck* (L.) Benth. 2	Fabaceae	शिरीष	Tree	15
7)	*Albizia lebbeck* (L.) Benth. 3	Fabaceae	शिरीष	Tree	07
8)	*Albizia lebbeck* (L.) Benth. 4	Fabaceae	शिरीष	Tree	88
9)	*Albizia lebbeck* (L.) Benth. 5	Fabaceae	शिरीष	Tree	68
10)	*Albizia lebbeck* (L.) Benth. 6	Fabaceae	शिरीष	Tree	85
11)	*Albizia lebbeck* (L.) Benth. 7	Fabaceae	शिरीष	Tree	79
12)	*Albizia lebbeck* (L.) Benth. 8	Fabaceae	शिरीष	Tree	76
13)	*Albizia lebbeck* (L.) Benth. 9	Fabaceae	शिरीष	Tree	86
14)	*Albizia lebbeck* (L.) Benth. 10	Fabaceae	शिरीष	Tree	77
15)	*Albizia lebbeck* (L.) Benth. 11	Fabaceae	शिरीष	Tree	80
16)	*Albizia lebbeck* (L.) Benth. 12	Fabaceae	शिरीष	Tree	75
17)	*Albizia lebbeck* (L.) Benth. 13	Fabaceae	शिरीष	Tree	40
18)	*Albizia lebbeck* (L.) Benth. 14	Fabaceae	शिरीष	Tree	68
19)	*Albizia lebbeck* (L.) Benth. 15	Fabaceae	शिरीष	Tree	78
20)	*Albizia lebbeck* (L.) Benth. 16	Fabaceae	शिरीष	Tree	75
21)	*Albizia lebbeck* (L.) Benth. 17	Fabaceae	शिरीष	Tree	73
22)	*Albizia lebbeck* (L.) Benth. 18	Fabaceae	शिरीष	Tree	65
23)	***Alstonia macrophylla* Wall. ex G.Don 1**	**Apocynaceae**	**मोठी सातवीन**	**Tree**	**30**
24)	***Araucaria columnaris* (G. Forst.) Hook. 1**	**Araucariaceae**	**x-mas tree**	**Tree**	**25**
25)	*Araucaria columnaris* (G. Forst.) Hook. 2	Araucariaceae	x-mas tree	Tree	32
26)	***Artocarpus heterophyllus* Lam. 1**	**Moraceae**	**फणस**	**Tree**	**38**
27)	*Artocarpus heterophyllus* Lam. 2	Moraceae	फणस	Tree	53
28)	*Artocarpus heterophyllus* Lam. 3	Moraceae	फणस	Tree	12
29)	***Azadirachta indica* A. Juss. 1**	**Meliaceae**	**कडुलिंब**	**Tree**	**08**
30)	*Azadirachta indica* A. Juss. 2	Meliaceae	कडुलिंब	Tree	11

31)	*Azadirachta indica* A. Juss. 3	Meliaceae	कडुलिंब	Tree	06
32)	*Azadirachta indica* A. Juss. 4	Meliaceae	कडुलिंब	Tree	50
33)	*Azadirachta indica* A. Juss. 5	Meliaceae	कडुलिंब	Tree	36
34)	*Azadirachta indica* A. Juss. 6	Meliaceae	कडुलिंब	Tree	15
35)	***Bambusa vulgaris* Schrad.1 (58 plants)**	**Poaceae**	**Painted Bamboo**		**40**
36)	***Bauhinia purpurea* L 1**	**Fabaceae**	**कांचन**	**Tree**	**25**
37)	***Bauhinia racemosa* Lam.1**	**Fabaceae**	**आपटा, सोन**	**Tree**	**09.50**
38)	***Bauhinia variegate* L. 1**	**Fabaceae**	**कांचन**	**Tree**	**16**
39)	*Bauhinia variegate* L. 2	Fabaceae	कांचन	Tree	15
40)	*Bauhinia variegate* L. 3	Fabaceae	कांचन	Tree	12
41)	***Bismarckia nobilis* Hildebr. & H. Wendl. 1**	**Aracaceae**	**Bismarkia palm**	**Tree**	**13**
42)	*Bismarckia nobilis* Hildebr. & H. Wendl. 2	Aracaceae	Bismarkia palm	Tree	06. 20
43)	***Butea monosperma* (Lam.) Taub. 1**	**Fabaceae**	**पळस**	**Tree**	**07.50**
44)	***Caesalpinia pulcherrima* (L.) Sw. 1**	**Fabaceae**	**शंकासूर**	**Tree**	**06**
45)	*Caesalpinia pulcherrima* (L.) Sw. 2	Fabaceae	शंकासूर	Tree	06.50
46)	*Caesalpinia pulcherrima* (L.) Sw. 3	Fabaceae	शंकासूर	Tree	05
47)	*Caesalpinia pulcherrima* (L.) Sw. 4	Fabaceae	शंकासूर	Tree	09
48)	*Caesalpinia pulcherrima* (L.) Sw. 5	Fabaceae	शंकासूर	Tree	06
49)	*Caesalpinia pulcherrima* (L.) Sw. 6	Fabaceae	शंकासूर	Tree	10
50)	*Caesalpinia pulcherrima* (L.) Sw. 7	Fabaceae	शंकासूर	Tree	12
51)	***Callistemon citrinus* (Curtis) Skeels 1**	**Myrtaceae**	**Bottle brush**	**Tree**	**35**
52)	***Calophyllum inophyllum* L. 1**	**Calophyllaceae**	**उंडी**	**Tree**	**06**
53)	*Calophyllum inophyllum* L. 2	Calophyllaceae	उंडी	Tree	06.50
54)	*Calophyllum inophyllum* L. 3	Calophyllaceae	उंडी	Tree	05.50
55)	***Careya arborea* Roxb. 1**	**Lecythidaceae**	**कुंभी**	**Tree**	**08**
56)	*Careya arborea* Roxb. 2	Lecythidaceae	कुंभी	Tree	06.50
57)	***Caryota urens* L. 1**	**Aracaceae**	**भेरली माड**	**Tree**	**25**
58)	***Cascabela thevetia* (L.) Lippold 1**	**Apocynaceae**	**पिवळा कण्हेरी**	**Shrub**	**07**
59)	***Cassia fistula* L. 1**	**Fabaceae**	**बहावा**	**Tree**	**35**
60)	*Cassia fistula* L. 2	Fabaceae	बहावा	Tree	17
61)	***Casuarina equisetifolia* L. 1**	**Casuarinaceae**	**सुरू**	**Tree**	**70**
62)	***Ceiba pentandra* (L.) Gaertn. 1**	**Malvaceae**	**सफेत सावर**	**Tree**	**25**
63)	*Ceiba pentandra* (L.) Gaertn. 2	Malvaceae	सफेत सावर		22

64)	*Ceiba pentandra* (L.) Gaertn. 3	Malvaceae	सफेत सावर		35
65)	***Cinnamomum tamala* (Buch.-Ham.) T.Nees & Eberm.1**	**Lauraceae**	**तमाल पत्र**	**Tree**	**08.50**
66)	**1 *Citrus aurantiifolia* (Christm.) Swingle. 1**	**Rutaceae**	**लिंबू**	**Shrub**	**08**
67)	***Cocos nucifera* L. 1**	**Aracaceae**	**नारळ**	**Tree**	**32**
68)	*Cocos nucifera* L. 2	Aracaceae	नारळ	Tree	30
69)	*Cocos nucifera* L. 3	Aracaceae	नारळ	Tree	34
70)	*Cocos nucifera* L. 4	Aracaceae	नारळ	Tree	32
71)	*Cocos nucifera* L. 5	Aracaceae	नारळ	Tree	28
72)	*Cocos nucifera* L. 6	Aracaceae	नारळ	Tree	32
73)	*Cocos nucifera* L.7	Aracaceae	नारळ	Tree	38
74)	*Cocos nucifera* L. 8	Aracaceae	नारळ	Tree	50
75)	*Cocos nucifera* L.9	Aracaceae	नारळ	Tree	38
76)	*Cocos nucifera* L.10	Aracaceae	नारळ	Tree	15
77)	*Cocos nucifera* L.11	Aracaceae	नारळ	Tree	35
78)	*Cocos nucifera* L.12	Aracaceae	नारळ	Tree	30
79)	*Cocos nucifera* L.13	Aracaceae	नारळ	Tree	25
80)	***Couroupita guianensis* Aubl. 1**	**Lecythidaceae**	**कैलासपती**	**Tree**	**13**
81)	***Cupressus macrocarpa* Hartw. ex Gordon. 1**	**Cupressaceae**	**Cupressus**	**Shrub**	**04.50**
82)	***Cycas revoluta* Thunb.1**	**Cycadaceae**	**साबूदाणा पाम**	**Shrub**	**08**
83)	***Dalbergia latifolia* Roxb. 1**	**Fabaceae**	**शिसवी**	**Tree**	**09**
84)	*Dalbergia latifolia* Roxb.2	Fabaceae	शिसवी	Tree	18
85)	***Delonix regia* (Hook.) Raf. 1**	**Fabaceae**	**गुलमोहर**	**Tree**	**16**
86)	*Delonix regia* (Hook.) Raf. 2	Fabaceae	गुलमोहर	Tree	17
87)	*Delonix regia* (Hook.) Raf. 3	Fabaceae	गुलमोहर	Tree	17
88)	*Delonix regia* (Hook.) Raf. 4	Fabaceae	गुलमोहर	Tree	22
89)	*Delonix regia* (Hook.) Raf. 5	Fabaceae	गुलमोहर	Tree	20
90)	*Delonix regia* (Hook.) Raf. 6	Fabaceae	गुलमोहर	Tree	70
91)	***Diospyros malabarica* (Desr.) Kostel. 1**	**Ebnaceae**	**टेंभुर्णी**	**Tree**	**07.50**
92)	***Dracaena fragrans* (L.) Ker Gawl. 1**	**Asparagaceae**	**Dracaena**	**Shrub**	**08.50**
93)	*Dracaena fragrans* (L.) Ker Gawl. 2	Asparagaceae	Dracaena	Shrub	09.70
94)	*Dracaena fragrans* (L.) Ker Gawl.3	Asparagaceae	Dracaena	Shrub	08
95)	***Dypsis decaryi* (Jum.) Beentje & J.Dransf. 1**	**Aracaceae**	**Triangle palm**	**Tree**	**07**
96)	***Dypsis lutescens* (H.Wendl.) Beentje & J.Drans f. 1**	**Aracaceae**	**Golden cane palm**	**Shrub**	**13**

97)	*Dypsis lutescens* (H.Wendl.) Beentje & J.Drans f. 2	Aracaceae	Golden cane palm	Shrub	10
98)	*Dypsis lutescens* (H.Wendl.) Beentje & J.Drans f. 3	Aracaceae	Golden cane palm	Shrub	12
99)	***Erythrina suberosa* Roxb. 1**	**Fabaceae**	**पांगारा**	**Tree**	**09**
100)	***Eucalyptus globulus* Labill. 1**	**Myrtaceae**	**निलगिरी**	**Tree**	**80**
101)	*Eucalyptus globulus* Labill. 2	Myrtaceae	निलगिरी	Tree	90
102)	*Eucalyptus globulus* Labill. 3	Myrtaceae	निलगिरी	Tree	80
103)	*Eucalyptus globulus* Labill. 4	Myrtaceae	निलगिरी	Tree	85
104)	*Eucalyptus globulus* Labill. 5	Myrtaceae	निलगिरी	Tree	95
105)	*Eucalyptus globulus* Labill. 6	Myrtaceae	निलगिरी	Tree	82
106)	*Eucalyptus globulus* Labill. 7	Myrtaceae	निलगिरी	Tree	90
107)	*Eucalyptus globulus* Labill. 8	Myrtaceae	निलगिरी	Tree	60
108)	*Eucalyptus globulus* Labill. 9	Myrtaceae	निलगिरी	Tree	60
109)	***Euphorbia tirucalli* L. 1**	**Euphorbiaceae**	**शेर-कांडवेल**	**Shrub**	**09**
110)	**Ficus benghalensis L. 1**	**Moraceae**	**वड**	**Tree**	**07**
111)	***Ficus benjamina* L. 1**	**Moraceae**	**नांदरूख**	**Shrub**	**15**
112)	*Ficus benjamina* L. 2	Moraceae	नांदरूख	Shrub	15
113)	*Ficus benjamina* L. 3	Moraceae	नांदरूख	Shrub	16
114)	*Ficus benjamina* L. 4	Moraceae	नांदरूख	Shrub	18
115)	*Ficus benjamina* L. 5	Moraceae	नांदरूख	Shrub	09
116)	*Ficus benjamina* L. 6	Moraceae	नांदरूख	Shrub	06
117)	*Ficus benjamina* L. 7	Moraceae	नांदरूख	Shrub	07
118)	*Ficus benjamina* L. 8	Moraceae	नांदरूख	Shrub	15
119)	*Ficus benjamina* L. 9	Moraceae	नांदरूख	Shrub	07
120)	*Ficus benjamina* L. 10	Moraceae	नांदरूख	Shrub	07
121)	*Ficus benjamina* L. 11	Moraceae	नांदरूख	Shrub	07
122)	*Ficus benjamina* L. 12	Moraceae	नांदरूख	Shrub	05.50
123)	*Ficus benjamina* L. 13	Moraceae	नांदरूख	Shrub	05.50
124)	*Ficus benjamina* L. 14	Moraceae	नांदरूख	Shrub	07
125)	*Ficus benjamina* L. 15	Moraceae	नांदरूख	Shrub	06
126)	*Ficus benjamina* L. 16	Moraceae	नांदरूख	Shrub	17
127)	*Ficus benjamina* L. 17	Moraceae	नांदरूख	Shrub	07
128)	*Ficus benjamina* L. 18	Moraceae	नांदरूख	Shrub	17
129)	*Ficus benjamina* L. 19	Moraceae	नांदरूख	Shrub	14
130)	*Ficus benjamina* L. 20	Moraceae	नांदरूख	Shrub	09
131)	*Ficus benjamina* L. 21	Moraceae	नांदरूख	Shrub	14
132)	*Ficus benjamina* L. 22	Moraceae	नांदरूख	Shrub	14

133)	*Ficus benjamina* L. 23	Moraceae	नांदरूख	Shrub	13
134)	*Ficus benjamina* L. 24	Moraceae	नांदरूख	Shrub	05
135)	*Ficus benjamina* L. 25	Moraceae	नांदरूख	Shrub	12
136)	*Ficus benjamina* L. 26	Moraceae	नांदरूख	Shrub	13
137)	*Ficus benjamina* L. 27	Moraceae	नांदरूख	Shrub	15
138)	*Ficus benjamina* L. 28	Moraceae	नांदरूख	Shrub	20
139)	*Ficus benjamina* L. 29	Moraceae	नांदरूख	Shrub	20
140)	*Ficus benjamina* L. 30	Moraceae	नांदरूख	Shrub	19
141)	*Ficus benjamina* L. 31	Moraceae	नांदरूख	Shrub	15
142)	*Ficus benjamina* L. 32	Moraceae	नांदरूख	Shrub	12
143)	*Ficus benjamina* L. 33	Moraceae	नांदरूख	Shrub	17
144)	*Ficus benjamina* L. 34	Moraceae	नांदरूख	Shrub	17
145)	*Ficus benjamina* L. 35	Moraceae	नांदरूख	Shrub	06
146)	*Ficus benjamina* L. 36	Moraceae	नांदरूख	Shrub	14
147)	*Ficus benjamina* L. 37	Moraceae	नांदरूख	Shrub	18
148)	*Ficus benjamina* L. 38	Moraceae	नांदरूख	Shrub	13
149)	*Ficus benjamina* L. 39	Moraceae	नांदरूख	Shrub	14
150)	*Ficus benjamina* L. 40	Moraceae	नांदरूख	Shrub	20
151)	*Ficus benjamina* L. 41	Moraceae	नांदरूख	Shrub	11
152)	*Ficus benjamina* L. 42	Moraceae	नांदरूख	Shrub	12
153)	*Ficus benjamina* L. 43	Moraceae	नांदरूख	Shrub	13
154)	*Ficus benjamina* L. 44	Moraceae	नांदरूख	Shrub	15
155)	*Ficus benjamina* L. 45	Moraceae	नांदरूख	Shrub	06.60
156)	*Ficus benjamina* L. 46	Moraceae	नांदरूख	Shrub	12
157)	*Ficus benjamina* L. 47	Moraceae	नांदरूख	Shrub	09
158)	*Ficus benjamina* L. 48	Moraceae	नांदरूख	Shrub	13
159)	*Ficus benjamina* L. 49	Moraceae	नांदरूख	Shrub	15
160)	*Ficus benjamina* L. 50	Moraceae	नांदरूख	Shrub	04
161)	*Ficus benjamina* L. 51	Moraceae	नांदरूख	Shrub	06
162)	*Ficus benjamina* L. 52	Moraceae	नांदरूख	Shrub	06.50
163)	*Ficus benjamina* L. 53	Moraceae	नांदरूख	Shrub	09
164)	***Ficus elastica* Roxb. ex Hornem. 1**	**Moraceae**	**रबर वड**	**Tree**	**60**
165)	***Ficus recemosa* L. 1**	**Moraceae**	**उंबर**	**Tree**	**12**
166)	*Ficus recemosa* L. 2	Moraceae	उंबर	Tree	50
167)	*Ficus recemosa* L. 3	Moraceae	उंबर	Tree	10
168)	*Ficus recemosa* L. 4	Moraceae	उंबर	Tree	40
169)	*Ficus recemosa* L. 5	Moraceae	उंबर	Tree	70

170)	*Ficus recemosa* L. 6	Moraceae	उंबर	Tree	08
171)	***Gossypium arboreum* L. 1**	**Malvaceae**	**कापशी**	**Shrub**	**13**
172)	***Grevillea robusta* A.Cunn. ex R.Br. 1**	**Proteaceae**	**Silver Oak**	**Tree**	**96**
173)	*Grevillea robusta* A.Cunn. ex R.Br. 2	Proteaceae	Silver Oak	Tree	65
174)	*Grevillea robusta* A.Cunn. ex R.Br. 3	Proteaceae	Silver Oak	Tree	75
175)	*Grevillea robusta* A.Cunn. ex R.Br. 4	Proteaceae	Silver Oak	Tree	80
176)	***Hibiscus rosa-sinensis* L. 1**	**Malvaceae**	**जास्वंद**	**Shrub**	**06**
177)	*Hibiscus rosa-sinensis* L. 2	Malvaceae	जास्वंद	Shrub	08
178)	*Hibiscus rosa-sinensis* L. 3	Malvaceae	जास्वंद	Shrub	04.50
179)	*Hibiscus rosa-sinensis* L. 4	Malvaceae	जास्वंद	Shrub	07.50
180)	*Hibiscus rosa-sinensis* L. 5	Malvaceae	जास्वंद	Shrub	08
181)	*Hibiscus rosa-sinensis* L. 6	Malvaceae	जास्वंद	Shrub	07
182)	*Hibiscus rosa-sinensis* L. 7	Malvaceae	जास्वंद	Shrub	06
183)	*Hibiscus rosa-sinensis* L. 8	Malvaceae	जास्वंद	Shrub	07.50
184)	*Hibiscus rosa-sinensis* L. 9	Malvaceae	जास्वंद	Shrub	04
185)	*Hibiscus rosa-sinensis* L. 10	Malvaceae	जास्वंद	Shrub	09
186)	*Hibiscus rosa-sinensis* L. 11	Malvaceae	जास्वंद	Shrub	04
187)	*Hibiscus rosa-sinensis* L. 12	Malvaceae	जास्वंद	Shrub	10
188)	*Hibiscus rosa-sinensis* L. 13	Malvaceae	जास्वंद	Shrub	08
189)	*Hibiscus rosa-sinensis* L. 14	Malvaceae	जास्वंद	Shrub	6.50
190)	*Hibiscus rosa-sinensis* L. 15	Malvaceae	जास्वंद	Shrub	08
191)	*Hibiscus rosa-sinensis* L. 16	Malvaceae	जास्वंद	Shrub	08
192)	*Hibiscus rosa-sinensis* L. 17	Malvaceae	जास्वंद	Shrub	09
193)	*Hibiscus rosa-sinensis* L. 18	Malvaceae	जास्वंद	Shrub	07.50
194)	***Ixora coccinea* L. 1**	**Rubiaceae**	**Ixora**	**Shrub**	**06**
195)	*Ixora coccinea* L. 2	Rubiaceae	Ixora	Shrub	05
196)	*Ixora coccinea* L. 3	Rubiaceae	Ixora	Shrub	06
197)	*Ixora coccinea* L. 4	Rubiaceae	Ixora	Shrub	05.50
198)	*Ixora coccinea* L. 5	Rubiaceae	Ixora	Shrub	05.50
199)	*Ixora coccinea* L. 6	Rubiaceae	Ixora	Shrub	06
200)	*Ixora coccinea* L. 7	Rubiaceae	Ixora	Shrub	04.50
201)	*Ixora coccinea* L. 8	Rubiaceae	Ixora	Shrub	04.50
202)	*Ixora coccinea* L. 9	Rubiaceae	Ixora	Shrub	08
203)	*Ixora coccinea* L. 10	Rubiaceae	Ixora	Shrub	05.50
204)	*Ixora coccinea* L. 11	Rubiaceae	Ixora	Shrub	04
205)	*Ixora coccinea* L. 12	Rubiaceae	Ixora	Shrub	05
206)	*Ixora coccinea* L. 13	Rubiaceae	Ixora	Shrub	05
207)	*Ixora coccinea* L. 14	Rubiaceae	Ixora	Shrub	08
208)	*Ixora coccinea* L. 15	Rubiaceae	Ixora	Shrub	05
209)	*Ixora coccinea* L. 16	Rubiaceae	Ixora	Shrub	05.50
210)	*Ixora coccinea* L.17	Rubiaceae	Ixora	Shrub	06

211)	***Jacaranda mimosifolia.* D.Don1**	**Bignoniaceae**	**निळा मोहर**	**Tree**	**25**
212)	***Jatropha podagrica* Hook. 1**	**Euphorbiaceae**	-	**Shrub**	**08.50**
213)	***Juniperus communis* Pall. 1**	**Cupressaceae**	**Juniperus**	**Tree**	**13**
214)	*Juniperus communis* Pall. 2	Cupressaceae	Juniperus	Tree	13
215)	*Juniperus communis* Pall. 3	Cupressaceae	Juniperus	Tree	13
216)	*Juniperus communis* Pall. 4	Cupressaceae	Juniperus	Tree	13
217)	***Justicia adhatoda* L.1**	**Acanthaceae**	**अडुळसा**	**Shrub**	**05**
218)	*Justicia adhatoda* L.2	Acanthaceae	अडुळसा	Shrub	04
219)	***Lagerstroemia speciosa* (L.) Pers. 1**	**Lythraceae**	**ताम्हण**	**Tree**	**16**
220)	*Lagerstroemia speciosa* (L.) Pers. 2	Lythraceae	ताम्हण	Tree	10
221)	*Lagerstroemia speciosa* (L.) Pers. 3	Lythraceae	ताम्हण	Tree	18
222)	*Lagerstroemia speciosa* (L.) Pers. 4	Lythraceae	ताम्हण	Tree	24
223)	*Lagerstroemia speciosa* (L.) Pers. 5	Lythraceae	ताम्हण	Tree	22
224)	***Livistona rotundifolia* (Lam.) Mart. 1**	**Aracaceae**	**Table palm**	**Tree**	**24**
225)	***Magnolia champaca* (L.) Baill. ex Pierre 1**	**Magnoliaceae**	**सोन चाफा**	**Tree**	**08**
226)	2 *Magnolia champaca* (L.) Baill. ex Pierre 2	Magnoliaceae	सोन चाफा	Tree	05.50
227)	*Magnolia champaca* (L.) Baill. ex Pierre 3	Magnoliaceae	सोन चाफा	Tree	04
228)	*Magnolia champaca* (L.) Baill. ex Pierre 4	Magnoliaceae	सोन चाफा	Tree	09
229)	***Mangifera indica* L.1**	**Anacardiaceae**	**अंबा**	**Tree**	**25**
230)	*Mangifera indica* L.2	Anacardiaceae	अंबा	Tree	11
231)	*Mangifera indica* L.3	Anacardiaceae	अंबा	Tree	24
232)	*Mangifera indica* L.4	Anacardiaceae	अंबा	Tree	42
233)	*Mangifera indica* L.5	Anacardiaceae	अंबा	Tree	08
234)	*Mangifera indica* L. 6	Anacardiaceae	अंबा	Tree	04
235)	*Mangifera indica* L. 7	Anacardiaceae	अंबा	Tree	28
236)	***Markhamia lutea* (Benth.) K.Schum. 1**	**Bignoniaceae**	-	**Tree**	**10.50**
237)	***Millingtonia hortensis* L. fil. 1**	**Bignoniaceae**	**आकाश चमेली**	**Tree**	**05**
238)	***Mimusops elengi* L. 1**	**Sapotaceae**	**बकूळ**	**Tree**	**05.50**
239)	*Mimusops elengi* L. 2	Sapotaceae	बकूळ	Tree	09
240)	*Mimusops elengi* L. 3	Sapotaceae	बकूळ	Tree	05
241)	*Mimusops elengi* L. 4	Sapotaceae	बकूळ	Tree	09
242)	***Morinda citrifolia* L 1**	**Rubiaceae**	**बारतोंडी**	**Tree**	**04.50**
243)	*Morinda citrifolia* L. 2	Rubiaceae	बारतोंडी	Tree	10
244)	***Moringa oleifera* Lam. 1**	**Moringaceae**	**शेवगा**	**Tree**	**11**
245)	*Moringa oleifera* Lam. 2	Moringaceae	शेवगा	Tree	30

246)	***Muntingia calabura* L. 1**	**Muntangiaceae**	**पांचारा, Bird cherry**	**Tree**	**30**
247)	***Nerium oleander* L. 1**	**Apocynaceae**	**कनेर**	**Shrub**	**13**
248)	*Nerium oleander* L. 2	Apocynaceae	कनेर	Shrub	11
249)	*Nerium oleander* L. 3	Apocynaceae	कनेर	Shrub	10
250)	*Nerium oleander* L. 4	Apocynaceae	कनेर	Shrub	07.50
251)	*Nerium oleander* L. 5	Apocynaceae	कनेर	Shrub	12
252)	***Oroxylum indicum* (L.) Kurz 1**	**Bignoniaceae**	**टेटु**	**Tree**	**08**
253)	***Phyllanthus acidus* (L.) Skeels 1**	**Phyllanthaceae**	***राय आवळा***	**Tree**	**15**
254)	*Phyllanthus acidus* (L.) Skeels 2	Phyllanthaceae	***राय आवळा***	Tree	12
255)	***Phyllanthus emblica* L. 1**	**Phyllanthaceae**	**आंवळा**	**Tree**	**12**
256)	*Phyllanthus emblica* L. 2	Phyllanthaceae	आंवळा	Tree	30
257)	***Pimenta dioica* (L.) Merr.1**	**Myrtaceae**	**All spice**	**Tree**	**15**
258)	***Pinus roxburghii* Sarg. 1**	**Pinaceae**	**सरल देवदार**	**Tree**	**72**
259)	***Pithecellobium dulce* (Roxb.) Benth. 1**	**Mimosaceae**	**विलायती चिंच**	**Tree**	**18**
260)	*Pithecellobium dulce* (Roxb.) Benth. 2	Mimosaceae	विलायती चिंच	Tree	19
261)	***Plumeria pudica* Jacq.1**	**Apocynaceae**	**बारमाही चाफा**	**Shrub**	**08**
262)	*Plumeria pudica* Jacq.2	Apocynaceae	बारमाही चाफा	Shrub	08
263)	*Plumeria pudica* Jacq.3	Apocynaceae	बारमाही चाफा	Shrub	09
264)	*Plumeria pudica* Jacq.4	Apocynaceae	बारमाही चाफा	Shrub	15
265)	*Plumeria pudica* Jacq.5	Apocynaceae	बारमाही चाफा	Shrub	09
266)	*Plumeria pudica* Jacq.6	Apocynaceae	बारमाही चाफा	Shrub	05
267)	*Plumeria pudica* Jacq.7	Apocynaceae	बारमाही चाफा	Shrub	06
268)	***Plumeria rubra* L. 1**	**Apocynaceae**	**चाफ़ा**	**Tree**	**05**
269)	***Polyalthia longifolia* (Sonn.) Thwaites 1**	**Annonaceae**	**उलटा अशोक**	**Tree**	**30**
270)	3 *Polyalthia longifolia* (Sonn.) Thwaites 2	Annonaceae	उलटा अशोक	Tree	45
271)	*Polyalthia longifolia* (Sonn.) Thwaites 3	Annonaceae	उलटा अशोक	Tree	33
272)	*Polyalthia longifolia* (Sonn.) Thwaites 4	Annonaceae	उलटा अशोक	Tree	32
273)	*Polyalthia longifolia* (Sonn.) Thwaites 5	Annonaceae	उलटा अशोक	Tree	30
274)	*Polyalthia longifolia* (Sonn.) Thwaites 6	Annonaceae	उलटा अशोक	Tree	29
275)	*Polyalthia longifolia* (Sonn.) Thwaites 7	Annonaceae	उलटा अशोक	Tree	28
276)	*Polyalthia longifolia* (Sonn.) Thwaites 8	Annonaceae	उलटा अशोक	Tree	29
277)	*Polyalthia longifolia* (Sonn.) Thwaites 9	Annonaceae	उलटा अशोक	Tree	27
278)	*Polyalthia longifolia* (Sonn.) Thwaites 10	Annonaceae	उलटा अशोक	Tree	20
279)	*Polyalthia longifolia* (Sonn.) Thwaites 11	Annonaceae	उलटा अशोक	Tree	25
280)	*Polyalthia longifolia* (Sonn.) Thwaites 12	Annonaceae	उलटा अशोक	Tree	25

281)	*Polyalthia longifolia* (Sonn.) Thwaites 13	Annonaceae	उलटा अशोक	Tree	55
282)	*Polyalthia longifolia* (Sonn.) Thwaites 14	Annonaceae	उलटा अशोक	Tree	25
283)	*Polyalthia longifolia* (Sonn.) Thwaites 15	Annonaceae	उलटा अशोक	Tree	23
284)	*Polyalthia longifolia* (Sonn.) Thwaites 16	Annonaceae	उलटा अशोक	Tree	29
285)	*Polyalthia longifolia* (Sonn.) Thwaites 17	Annonaceae	उलटा अशोक	Tree	28
286)	*Polyalthia longifolia* (Sonn.) Thwaites 18	Annonaceae	उलटा अशोक	Tree	26
287)	*Polyalthia longifolia* (Sonn.) Thwaites 19	Annonaceae	उलटा अशोक	Tree	33
288)	*Polyalthia longifolia* (Sonn.) Thwaites 20	Annonaceae	उलटा अशोक	Tree	30
289)	*Polyalthia longifolia* (Sonn.) Thwaites 21	Annonaceae	उलटा अशोक	Tree	50
290)	*Polyalthia longifolia* (Sonn.) Thwaites 22	Annonaceae	उलटा अशोक	Tree	40
291)	*Polyalthia longifolia* (Sonn.) Thwaites 23	Annonaceae	उलटा अशोक	Tree	38
292)	*Polyalthia longifolia* (Sonn.) Thwaites 24	Annonaceae	उलटा अशोक	Tree	25
293)	*Polyalthia longifolia* (Sonn.) Thwaites 25	Annonaceae	उलटा अशोक	Tree	22
294)	*Polyalthia longifolia* (Sonn.) Thwaites 26	Annonaceae	उलटा अशोक	Tree	62
295)	*Polyalthia longifolia* (Sonn.) Thwaites 27	Annonaceae	उलटा अशोक	Tree	60
296)	*Polyalthia longifolia* (Sonn.) Thwaites 28	Annonaceae	उलटा अशोक	Tree	44
297)	*Polyalthia longifolia* (Sonn.) Thwaites 29	Annonaceae	उलटा अशोक	Tree	32
298)	*Polyalthia longifolia* (Sonn.) Thwaites 30	Annonaceae	उलटा अशोक	Tree	31
299)	***Pongamia pinnata* (L.) Pierre 1**	**Fabaceae**	**करंज**	**Tree**	**09**
300)	***Psidium guajava* L. 1**	**Myrtaceae**	**पेरू**	**Tree**	**06**
301)	*Psidium guajava* L. 2	Myrtaceae	पेरू	Tree	07
302)	*Psidium guajava* L. 3	Myrtaceae	पेरू	Tree	07
303)	*Psidium guajava* L. 4	Myrtaceae	पेरू	Tree	14
304)	*Psidium guajava* L. 5	Myrtaceae	पेरू	Tree	07.50
305)	*Psidium guajava* L. 6	Myrtaceae	पेरू	Tree	14
306)	***Pterospermum acerifolium* (L.) Willd. 1**	**Malvaceae**	**मुचकुन्द**	**Tree**	**20**
307)	***Rosa indica* L. 1**	**Rosaceae**	**गुलाब**	**Shrub**	**06.50**
308)	*Rosa indica* L. 2	Rosaceae	गुलाब	Shrub	05
309)	***Roystonea regia* (Kunth) O.F.Cook 1**	**Aracaceae**	**Royal palm**	**Tree**	**38**
310)	*Roystonea regia* (Kunth) O.F.Cook 2	Aracaceae	Royal palm	Tree	15
311)	*Roystonea regia* (Kunth) O.F.Cook 3	Aracaceae	Royal palm	Tree	15
312)	*Roystonea regia* (Kunth) O.F.Cook 4	Aracaceae	Royal palm	Tree	25
313)	*Roystonea regia* (Kunth) O.F.Cook 5	Aracaceae	Royal palm	Tree	30
314)	*Roystonea regia* (Kunth) O.F.Cook 6	Aracaceae	Royal palm	Tree	30
315)	*Roystonea regia* (Kunth) O.F.Cook 7	Aracaceae	Royal palm	Tree	32
316)	*Roystonea regia* (Kunth) O.F.Cook 8	Aracaceae	Royal palm	Tree	38
317)	*Roystonea regia* (Kunth) O.F.Cook 9	Aracaceae	Royal palm	Tree	25
318)	*Roystonea regia* (Kunth) O.F.Cook 10	Aracaceae	Royal palm	Tree	33
319)	*Roystonea regia* (Kunth) O.F.Cook 11	Aracaceae	Royal palm	Tree	38

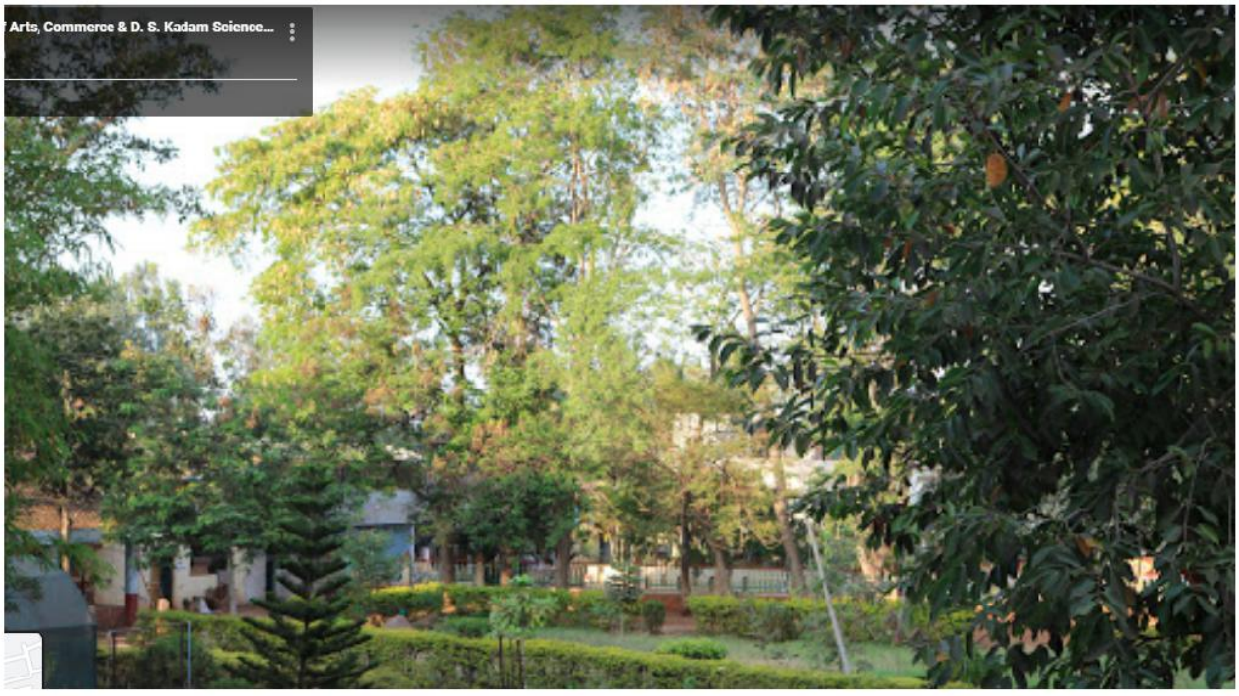
320)	*Roystonea regia* (Kunth) O.F.Cook 12	Aracaceae	Royal palm	Tree	35
321)	*Roystonea regia* (Kunth) O.F.Cook 13	Aracaceae	Royal palm	Tree	37
322)	*Roystonea regia* (Kunth) O.F.Cook 14	Aracaceae	Royal palm	Tree	34
323)	*Roystonea regia* (Kunth) O.F.Cook 15	Aracaceae	Royal palm	Tree	30
324)	*Roystonea regia* (Kunth) O.F.Cook 16	Aracaceae	Royal palm	Tree	28
325)	*Roystonea regia* (Kunth) O.F.Cook 17	Aracaceae	Royal palm	Tree	28
326)	*Roystonea regia* (Kunth) O.F.Cook 18	Aracaceae	Royal palm	Tree	28
327)	*Roystonea regia* (Kunth) O.F.Cook 19	Aracaceae	Royal palm	Tree	38
328)	*Roystonea regia* (Kunth) O.F.Cook 20	Aracaceae	Royal palm	Tree	12.50
329)	*Roystonea regia* (Kunth) O.F.Cook 21	Aracaceae	Royal palm	Tree	32
330)	*Roystonea regia* (Kunth) O.F.Cook 22	Aracaceae	Royal palm	Tree	31
331)	*Roystonea regia* (Kunth) O.F.Cook 23	Aracaceae	Royal palm	Tree	32.05
332)	*Roystonea regia* (Kunth) O.F.Cook 24	Aracaceae	Royal palm	Tree	31.07
333)	*Roystonea regia* (Kunth) O.F.Cook 25	Aracaceae	Royal palm	Tree	10
334)	*Roystonea regia* (Kunth) O.F.Cook 26	Aracaceae	Royal palm	Tree	08
335)	***Santalum album L.* 1**	**Santalaceae**	**चंदन**	**Tree**	**12**
336)	*Santalum album L.* 2	Santalaceae	चंदन	Tree	20
337)	*Santalum album L.* 3	Santalaceae	चंदन	Tree	21
338)	***Sapindus trifoliatus* L. 1**	**Sapindaceae**	**रिठा**	**Tree**	**14**
339)	***Senna siamea* (Lam.)H.S.Irwin & Barneby 1**	**Fabaceae**	**काशिद**	**Tree**	**18**
340)	*Senna siamea* (Lam.)H.S.Irwin & Barneby 2	Fabaceae	काशिद	Tree	25
341)	*Senna siamea* (Lam.)H.S.Irwin & Barneby 3	Fabaceae	काशिद	Tree	18
342)	*Senna siamea* (Lam.)H.S.Irwin & Barneby 4	Fabaceae	काशिद	Tree	30
343)	*Senna siamea* (Lam.)H.S.Irwin & Barneby 5	Fabaceae	काशिद	Tree	14
344)	*Senna siamea* (Lam.)H.S.Irwin & Barneby 6	Fabaceae	काशिद	Tree	25
345)	*Senna siamea* (Lam.)H.S.Irwin & Barneby 7	Fabaceae	काशिद	Tree	28
346)	*Senna siamea* (Lam.)H.S.Irwin & Barneby 8	Fabaceae	काशिद	Tree	30
347)	*Senna siamea* (Lam.)H.S.Irwin & Barneby9	Fabaceae	काशिद	Tree	75
348)	***Sesbania sesban* (L.) Merr 1**	**Fabaceae**	**शेवरी**	**Shrub**	**15**
349)	*Sesbania sesban* (L.) Merr 2	Fabaceae	शेवरी	Shrub	15
350)	4 *Sesbania sesban* (L.) Merr. 3	Fabaceae	शेवरी	Shrub	08
351)	*Sesbania sesban* (L.) Merr. 4	Fabaceae	शेवरी	Shrub	10.50
352)	***Spathodea campanulata* P.Beauv. 1**	**Bignoniaceae**	**पिचकारी**	**Tree**	**25**
353)	*Spathodea campanulata* P.Beauv. 2	Bignoniaceae	पिचकारी	Tree	22

354)	*Spathodea campanulata* P.Beauv. 3	Bignoniaceae	पिचकारी	Tree	04.50
355)	*Spathodea campanulata* P.Beauv. 4	Bignoniaceae	पिचकारी	Tree	05
356)	***Syzygium cumini* (L.) Skeels. 1**	**Myrtaceae**	**जांभुळ**	**Tree**	**62**
357)	*Syzygium cumini* (L.) Skeels. 2	Myrtaceae	जांभुळ	Tree	33
358)	***Tabebuia rosea* (Bertol.) Bertero ex A.DC. 1**	**Bignoniaceae**	**बसंत रानी**	**Tree**	**12**
359)	***Tamarindus indica* L. 1**	**Fabaceae**	**चिंच**	**Tree**	**07**
360)	*Tamarindus indica* L. 2	Fabaceae	***चिंच***	Tree	12
361)	***Tectona grandis* L.f. 1**	**Lamiaceae**	**सागवान**	**Tree**	**25**
362)	***Terminalia catappa* L. 1**	**Combreataceae**	**जंगली बादाम**	**Tree**	**06.50**
363)	*Terminalia catappa* L. 2	Combreataceae	जंगली बादाम	Tree	20
364)	***Thuja occidentalis* L. 1**	**Cupressaceae**	**मोरपंखी**	**Shrub**	**06**
365)	*Thuja occidentalis* L. 2	Cupressaceae	मोरपंखी	Shrub	04.06
366)	*Thuja occidentalis* L. 3	Cupressaceae	मोरपंखी	Shrub	05.50
367)	*Thuja occidentalis* L. 4	Cupressaceae	मोरपंखी	Shrub	09
368)	*Thuja occidentalis* L. 5	Cupressaceae	मोरपंखी	Shrub	06
369)	*Thuja occidentalis* L. 6	Cupressaceae	मोरपंखी	Shrub	06
370)	*Thuja occidentalis* L. 7	Cupressaceae	मोरपंखी	Shrub	05.50
371)	*Thuja occidentalis* L. 8	Cupressaceae	मोरपंखी	Shrub	05.50
372)	*Thuja occidentalis* L. 9	Cupressaceae	मोरपंखी	Shrub	06
373)	*Thuja occidentalis* L. 10	Cupressaceae	मोरपंखी	Shrub	05
374)	*Thuja occidentalis* L. 11	Cupressaceae	मोरपंखी	Shrub	04
375)	*Thuja occidentalis* L. 12	Cupressaceae	मोरपंखी	Shrub	06
376)	*Thuja occidentalis* L. 13	Cupressaceae	मोरपंखी	Shrub	05.50
377)	*Thuja occidentalis* L. 14	Cupressaceae	मोरपंखी	Shrub	05
378)	*Thuja occidentalis* L. 15	Cupressaceae	मोरपंखी	Shrub	06
379)	*Thuja occidentalis* L. 16	Cupressaceae	मोरपंखी	Shrub	06
380)	*Thuja occidentalis* L. 17	Cupressaceae	मोरपंखी	Shrub	05
381)	*Thuja occidentalis* L. 18	Cupressaceae	मोरपंखी	Shrub	05
382)	*Thuja occidentalis* L. 19	Cupressaceae	मोरपंखी	Shrub	05
383)	*Thuja occidentalis* L. 20	Cupressaceae	मोरपंखी	Shrub	07
384)	*Thuja occidentalis* L. 21	Cupressaceae	मोरपंखी	Shrub	06.50
385)	*Thuja occidentalis* L. 22	Cupressaceae	मोरपंखी	Shrub	05
386)	*Thuja occidentalis* L. 23	Cupressaceae	मोरपंखी	Shrub	05.50
387)	*Thuja occidentalis* L. 24	Cupressaceae	मोरपंखी	Shrub	06.50
388)	*Thuja occidentalis* L. 25	Cupressaceae	मोरपंखी	Shrub	06
389)	*Thuja occidentalis* L. 26	Cupressaceae	मोरपंखी	Shrub	06.50

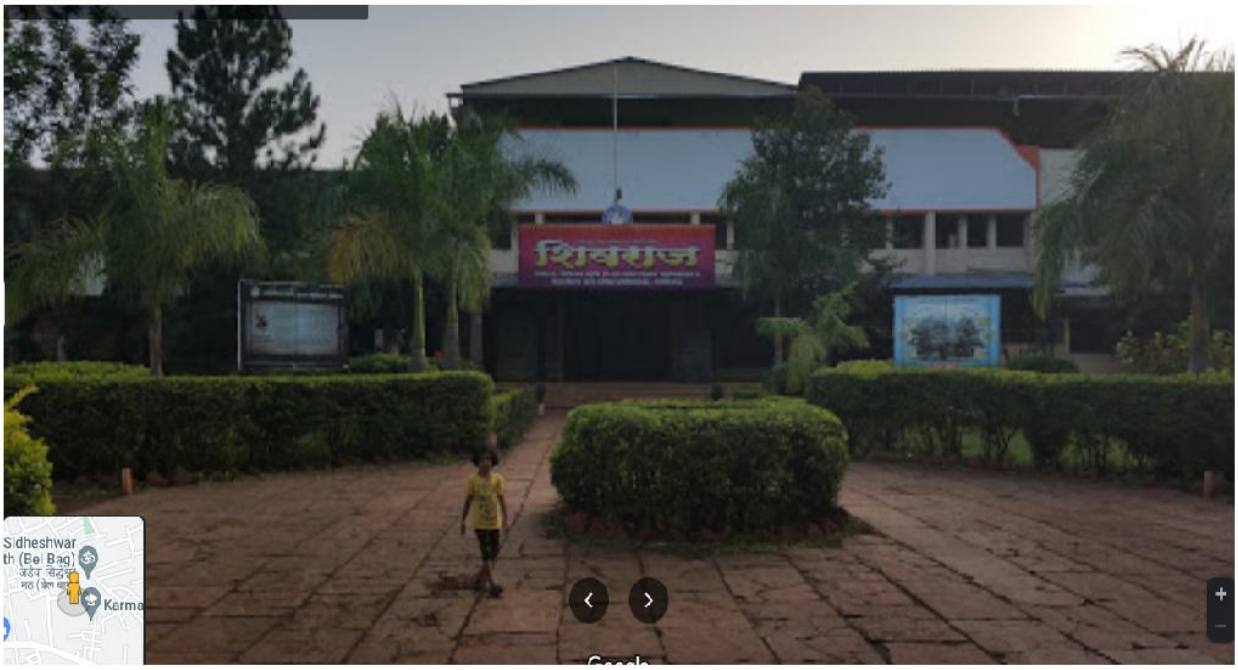
390)	*Thuja occidentalis* L. 27	Cupressaceae	मोरपंखी	Shrub	06.60
391)	*Thuja occidentalis* L. 28	Cupressaceae	मोरपंखी	Shrub	07
392)	*Thuja occidentalis* L. 29	Cupressaceae	मोरपंखी	Shrub	06
393)	*Thuja occidentalis* L. 30	Cupressaceae	मोरपंखी	Shrub	04.50
394)	*Thuja occidentalis* L. 31	Cupressaceae	मोरपंखी	Shrub	05.50
395)	*Thuja occidentalis* L. 32	Cupressaceae	मोरपंखी	Shrub	6.60
396)	*Thuja occidentalis* L. 33	Cupressaceae	मोरपंखी	Shrub	05.50
397)	*Thuja occidentalis* L. 34	Cupressaceae	मोरपंखी	Shrub	06
398)	*Thuja occidentalis* L. 35	Cupressaceae	मोरपंखी	Shrub	05
399)	*Thuja occidentalis* L. 36	Cupressaceae	मोरपंखी	Shrub	06
400)	**Trinax asava Lodd. ex Schult. & Schult.f 1**	**Aracaceae**	**तीनधारी पाम**	**Tree**	**04**
401)	***Wallichia caryotoides* Roxb. 1**	**Aracaceae**	-	**Tree**	**10**
402)	***Wodyetia bifurcata* A.K.Irvine. 1**	**Arcaceae**	**Foxtail pam**	**Tree**	**10**

Patch No.	***Duranta erexta* L. Patch in Feet**	**Patch in Meter**
1.	117	35.60
2.	114	34.70
3.	69	21
4.	67	20.40
5.	141	42.43
6.	102	31
7.	102	31
8.	25	
9.	35	10.60
10.	93	28.35
11.	73.10	22.50
12.	15	
13.	74	22.60
14.	64.7	19.70
15.	73	22.30
16.	08	

Gardening Photo Gallery

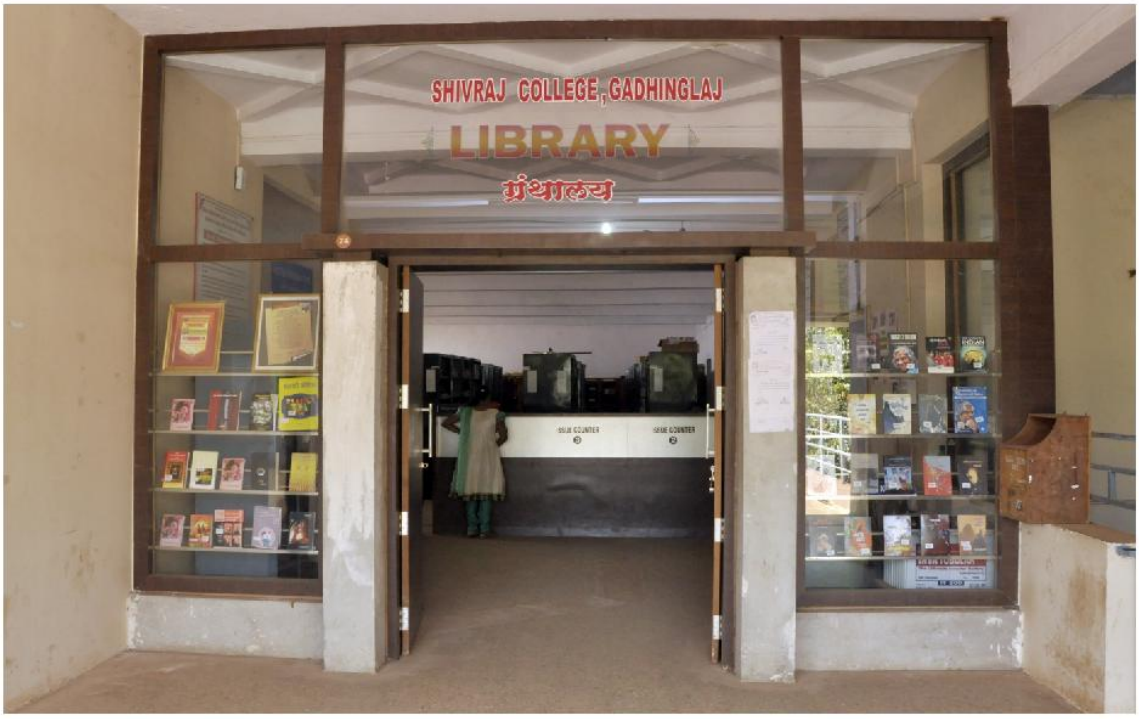



mmerce & D. S. Kadam Science...



College Main Building

Class Rooms

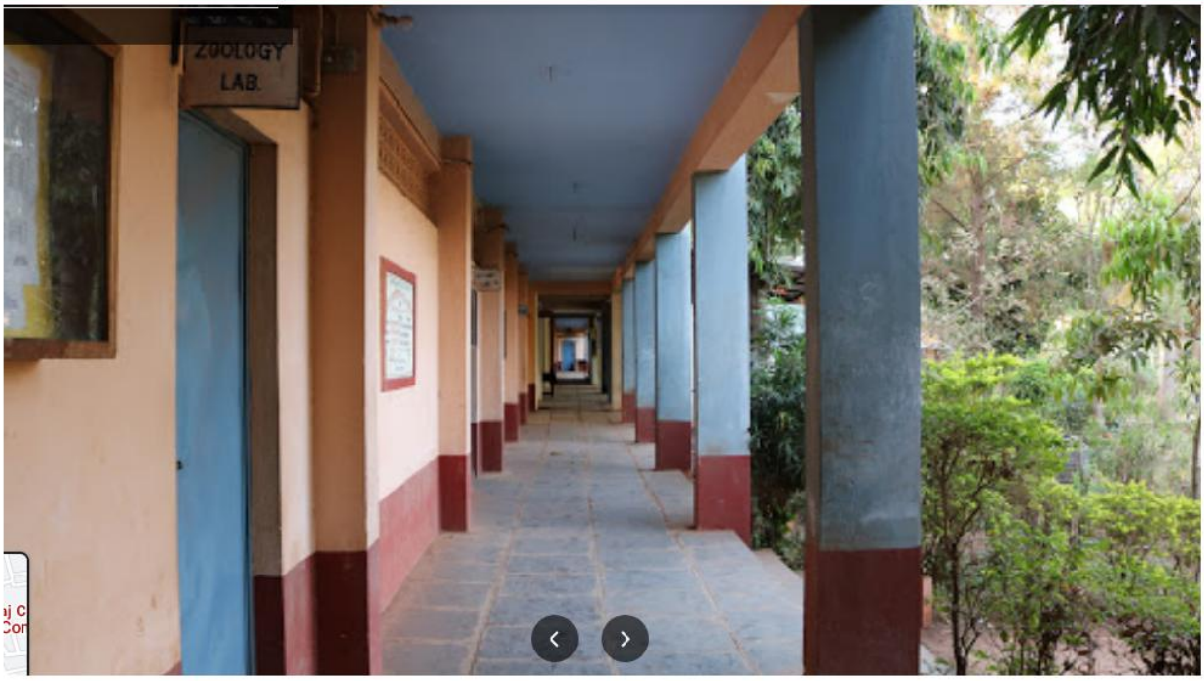


Library

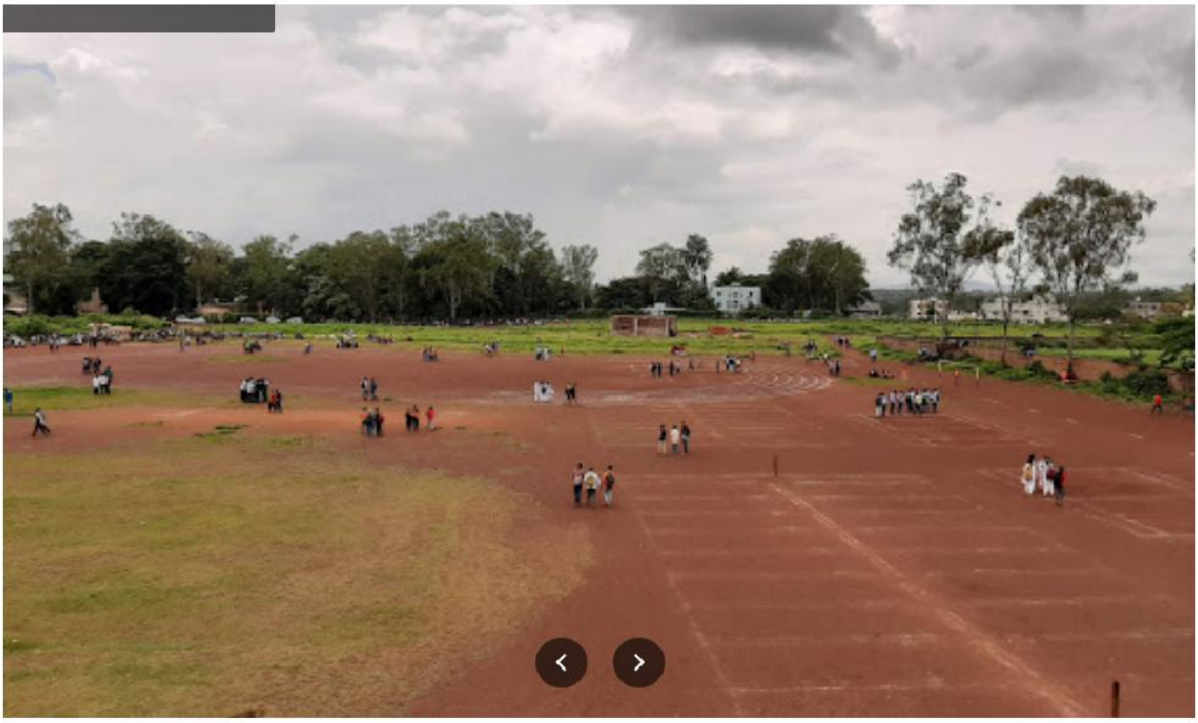
Boys Study room

Girls Study room

Computer Lab



Zoology lab



Play Ground

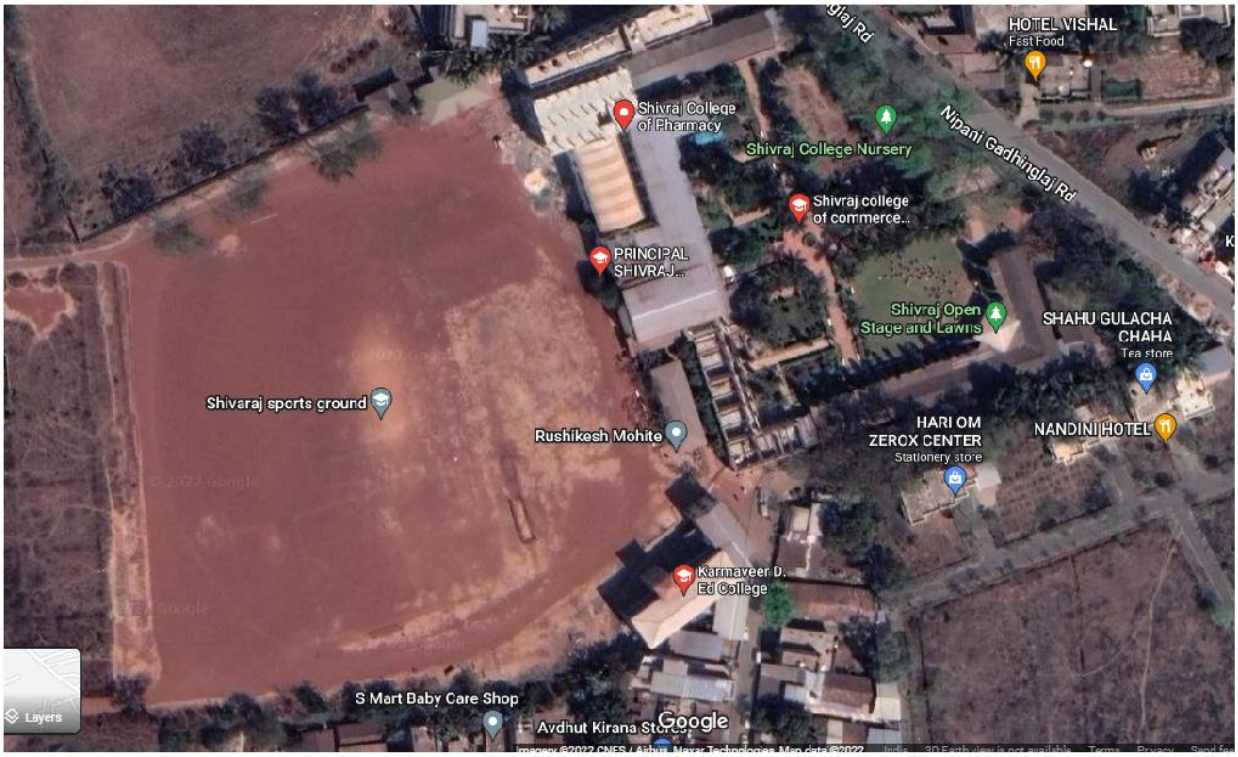
Gymnasium


GPS Map Camera
Gadhinglaj, Maharashtra, India
68GV+X96, Gadhinglaj Mahagaon Umbarwadi Rd, Gadhinglaj, Maharashtra 416502, India
Lat 16.22744°
Long 74.343534°
11/05/22 12:17 PM
Gadhinglaj - Gargoti Rd
Google

Sanstha Office

Drinking water facility

Parking



Sattalite View

CONCLUSION AND MANAGEMENT PLAN

The SSP Nature Solutions Environment consultant Pvt. Ltd., Kolhapur has conducted an Environment Audit of Shivraj College of Arts, Commerce & D. S. Kadam Science College, Gadhinglaj, Kolhapur in the academic year 2018-19. Environment auditing is the process of identifying and determining whether institution practices are eco-friendly and sustainable. The main objective of college to carry out Environment audit is to check Environment practices followed by college and to conduct a well formulated audit to understand where we stand on a scale of environmental soundness.

Conclusions:

From the Environment audit conducted by college following are some of the conclusions which can be taken for improvement of the college campus to become environment friendly college campus.

1. College takes efforts to dispose majority waste by using proper methods.
2. Confidential paper waste is disposed properly.
3. Glass waste is to be disposed properly.
4. Electricity consumption is more at some departments.
5. Use of CFL lamps in the college is minimum. Its use should be encouraged and now converted to LED lights.
6. Toilets and bathrooms are consuming more water and lights.
7. Roof top rain water harvesting should be planned which is useful for filling up of tanks on campus or filling of ground water level.
8. E-waste segregation, handling and disposal are properly done.
9. Practice of waste segregation to be initiated.
10. Air quality on the campus is good.
11. Conduct more seminars and group discussions on environmental education and awareness.

Recommendations:

Following are some of the key recommendation for improving campus environment.

1. College should develop its own Environmental Policy by using guidelines given in Environment Audit document.
2. The data related to all measured environmental parameters should be monitored and recorded regularly and information be made available to administration.
3. The college should develop internal procedures to ensure its compliances with environmental legislation and responsibility be fixed to carry out it in practice.
4. Wherever possible the waste i.e. biodegradable and non-biodegradable should be reused or recycled.
5. All street lighting should be changed to LED lights and solar systems to save electricity.
6. Install Rain water harvesting for every building.
7. Drip irrigation for gardens and vegetable cultivation can be initiated.
8. Gave few access to students for lightning and charging switches.
9. College having huge space, should develop own solar system for total campus.
10. Construct proper composting plant by using tree leaves to produce organic fertilizer.
11. Increase number of local tree species which purifies air. (Kadulimb, Vad, Pimple).

ENVIRONMENT MANAGEMENT PLAN:

By understanding the dynamics of present situation of resource utilization and current practices of waste disposal we have prepared an Environment Management Plan (EMP) for the Shivraj College of Arts, Commerce & D. S. Kadam Science College, Gadhinglaj, KolhapurDist. Kolhapur. This plan not only will provide the strengths, weaknesses and remedies for the Environment and clean campus but also give priority of the sector where the college has to give more efforts to improve its environment.

Sector	Strengths	Suggestions
Solid Waste		
Paper	1. Pulping of major portion of papers i.e. answer sheets, bills and other administrative papers. 2. Use of one sided papers in many departments and main building	• Towards paperless office: More use of e-mails, e-money transfer and advance IT technology for communication
Plastic	Reuse of plastic at some departments	• Segregation of waste at the source and sending plastic waste for recycling • Ban on Plastic carry bags in College premises
Biodegradable waste	Solid waste generated	• Segregation of solid waste help in composting process
Energy		
Electricity	Use untraditional source of energy	• Employment of more solar panels and other renewable energy sources. • Electrification of street lights by solar power. • Use of solar pumps for water tanks. • General awareness about electricity saving.
Fuel	Use of public Transport system is comparatively more by staff and students.	• 'Cycle on rent' service for student • General awareness about efficient use of fuel.
Water		
Water utilization	College has potential of Rain water harvesting.	• Installation of automatic water pumps to avoid overflowing losses • Proper and timely maintenance of plumbing at all departments • Installation of rain water harvesting assembly.

Hazardous Waste		
E-waste	• E waste is sent to E waste collection center at Kolhapur.	• There must be segregation of e-waste from regular waste and also among the e-waste. • E-waste in all forms not only computers, should be collected properly
Air and Noise		
Air and Noise	Air quality is still in good condition	The plantation can be increased by vertical gardening.
Tree Census		
Tree Vegetation	There is requirement of Tree Plantation	Avoid monoculture, variety of species should be planted in campus area and surrounding of ground.