GREEN

AUDIT REPORT

For Matoshri Subhadrabai Patil Arts And Late Pandurangji Thakare Commerce College Manora, Dist. Washim. Maharashtra.

By,

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Acknowledgement

The Green Audit Assessment Team thanks the management of Matoshri Subhadrabai Patil, Arts, Science & Late Pandurangji Thakre Commerce College Manora for assigning this important work of Green Audit. We appreciate the cooperation to our Team for completion of study.

Our special thanks are due to:

- *Principal-Dr. N. S. Thakare*
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- *Team of colleagues and students as stated under Annexure-1*

For giving us necessary inputs to carry out this very vital exercise of Green Audit.

We are also thankful to other staff members who were actively involved while collecting the data and conducting field measurements.

DISCLAIMER

Green Audit Team has prepared this report for M.S.P. Arts, Science & K.P.T. Commerce College Manora based on input data submitted by the representatives of College complemented with the best judgment capacity of the expert team.

While all reasonable care has been taken in its preparation, details contained in this report have been complied in good faith based on information gathered.

It is further informed that the calculations are arrived following best estimates and no representation, warranty or undertaking, express or implied is made and no responsibility is accepted by Audit Team in this report for any direct or consequential loss arising from any use of the information, statements or forecasts in the report.

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Chapter 01- Scope of Work

Topics to be covered as part of the assessment are

Solar Passive Architecture

- How the buildings are constructed to utilize the solar energy efficiently. This includes use of day light as lighting source and avoidance of GHG intensive technology example AC as source of cooling due to solar heat gains.

Implementation of measures to reduce wastage of energy

- This includes effective and objective evidences to create awareness towards wastage of electric energy. Hoardings, placards, messages, posters etc planted at key locations in college, hostels and cafeterias. PCRA (Petroleum Conservation Research Association, Govt. of India) and BEE (Bureau of Energy Efficiency) posters are exhibited.
- It can also be extended to include papers presented by the students on avoidance of electricity at college or day life.
- Appointment of joint committees of teachers and students to save electricity.

Energy Efficient Procurement

- This includes evaluation of energy efficient procurement practices. This does not exactly mean that you need to buy the most efficient, but you need to buy the most efficient which is financially viable. Example AC with efficiency star ratings, Transformer etc.
- Replacement of lighting sources to CFL or LED.
- Replacement of Copper Ballast with Electronic Ballast.
- Centralized controls of lighting, auditorium etc to avoid any mis-use of electricity.
- Procurement of LED monitors to phase-out CRT Monitors.
- Shift to paperless regime wherever not required, example attendance muster replaced by biometrics, DG log book replaced by computerized log book, daily reports converted from paper to paperless formats, and all such examples.

- Installation of solar panels, Power Purchase Agreements with solar Power Plant owners to buy environmentally friendly energy Source etc.

- Documentary evidences as feasible to calculate the above impacts and finally into the value of value of avoidance of tCO2 emitted to atmosphere.

Rain water harvesting/ recharging

This includes Calculation of Catchment Area (Terrace and ground) and evaluating rough amount of water that is recharged into the water recharge pits.

Hazardous Waste Management and e- Waste Management

There are various wastes that are generated within the organization. The report will give the list of the procedures foe waste handling.

Duration of the Green Audit

The Green audit field observations data collection was carried from 27th Dec to 28th Dec 2018 for the session 2017-18. The submitted data was monitored by the college throughout the year and assessed by Assessment Team during the visit.

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Annexure-VII: *Water quality Report*

Annexure-VIII: *Ambient Air quality Monitoring Report*

Annexure-IX: *Solar panel installation*

Annexure-X: *Water Distribution data*

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Annexure-XII: *Water Management*

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Introduction of the Institute [1]

Matoshri Subhadrabai Patil Arts, Science & Late Pandurangji Thakre Commerce College Manora was established in 1986 by the board of directors with objectives of bringing about intellectual awakening and all round development of society through education. Matoshri Subhadrabai Patil Arts, Science & Late Pandurangji Thakre Commerce College Manora is now a leading institute in university having Arts, Commerce and Science disciplines.

The teaching staff is highly qualified, experienced and dedicated. The leadership quality and able guidance of Shri Arvind D Ingole imparts the college regularly. He was the president of zila parishad, Washim. The achievements of academic excellence and Nobel, impressive, and pompous infrastructure is gained by the constant efforts of multidimensional personalities of the board of directors.

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[1]Reference: www.mspkptmanora.ac.in

Objective of Green Audit

The Green Audit Team focused on Material[2] Issues pertaining to college which have the highest influence on the Green Attributes of the college. To evaluate steps taken by college management towards green campus below material issues are discussed chapter wise:

1- Organization Level Efforts
2- Creation of Awareness
3- Lighting
4- Cooling and Ventilation
5- Operation of Electronic Equipments
6- Water Management
7- Water Quality
8- Renewable Energy
9- Transportation
10- Purchasing Practices
11- Carbon Footprint, Ambient Air quality
12- Waste Management
13- Plantation Details

Checklist approach is adopted for transparent evaluation of the topics and increase readability for independent reader.

[2]Definition: as per Global Reporting Initiative: **GRI 101:** FOUNDATION2016

An organization is faced with a wide range of topics on which it can report. Relevant topics, which potentially merit inclusion in the report, are those that can reasonably be considered important for reflecting the organization's economics, environmental, and social impacts, or the economy, the environment, an/or society (positive or negative). A topic can be relevant-and so potentially material-based on only one of these dimensions.

1. Organizational Level Efforts

Is the college having campus green team?	**Yes,**
If yes, who are the Stakeholders?	Yes. It included stakeholders. The stakeholder Include ▪ Administration ▪ Teaching Faculty ▪ Students ▪ Faculty manger (from Account Department) ▪ Canteen manager ▪ Volunteers However, Green Campus Team is shared with the Audit Team. Refer Annexure III
Does it meet regularly?	The Team meets once in a semester. This was confirmed during site visit interviews and the review of the minutes of meeting
Can the Green Campus Team suggest new environmental initiatives to College Management?	Suggestions of improvement of environmental performance are always welcomed by Management. Installation of solar lighting, rain water harvestings, tree plantation at various locations around the college, health related camps, (gas safety) etc was also discussed as part of brain storming sessions within the meetings.
Have you established an environmental mission/ vision for	The Environmental mission/ vision is integrated part of the philosophy of Management of College. The

your campus	Principal of College is persistent and resolved to make the campus more eco-friendly in due course of time. Efforts various efforts are already initiated towards implementation sustainable initiatives, application of efficient technologies to save energy, plantation etc.
Is the college encouraging sustainable behaviour via: • **Education campaigns?** • **Posters,placards messages** • **Incentives?** • **Contests?** • **Awards?**	College conducts various activities to create awareness amongst the students and society on environment safety and protection. College has established "Eco-Club" and through PARIAVARAN DOOT all related activities and consistently facilitated by the college. On 15th August 16,17,18,19 tree plantations was carried out in the college premises with active participation of students, faculties and management. The plantation of around 350 trees was carried out at Hivra and Kondali which directly and indirectly supported the Forest Department, Government of Maharashtra. The college participated in the ▪
Is the college staff modeling sustainable behaviour for students, peers, and community?	❖ The Staff of the college utilize personal vehicle and public transport (State Transport) for commuting. ❖ Some are car pulling. ❖ Use of cycle is promoted and college parking is meant for the cycles in the premises. No fossil fuel based vehicles are allowed inside the campus. ❖ Every Saturday is a "NO VEHICLE DAY", a kind of initiation or step for environmental sustainability. ❖ Teachers are coming in college by sharing of

	their bikes and vehicles impart the conservation of fuels or petroleum/ resources. ❖ Please refer above assessments for additional detail.
Do students model sustainable behaviour for staff, peers, and community?	The students of college utilize the public transport for commuting. As stated above use of cycles is promoted. Students participate in activities conducted by college on environment and sustainable development. In addition please refer above assessment.
Is the college sharing learning internally via: • **Posters, placards, messages?** • **Assemblies?** • **Classroom presentations?** • **Training/professional development?** • **Posters/bulletin boards?** • **Newsletter?** • **Website?**	Data is shared via posters, placards and messages. Since, construction activity is going on, the awareness poster are removed and will be again installed once construction is over. The assessment team is appraised that the awareness poster include topics related to minimization of energy usage by avoiding wastage, improvements on energy efficiency, minimization of water wastages, proper disposal of wastes. Please refer Annexure….for details.
Does the college offer energy conservation lesion?	Energy and Environment conservation is part of the curriculum study for second year of B.Sc, B.Com and B.A.
Is the college sharing its learning externally via • **Paper presentations?** • **Newsletter?** • **Website?**	The students are encouraged to present projects on topic related to environmental aspects. The college is also making the Green Audit Report public so that learning's of college are shared.

Further Scope of Improvement: At organization level, the college needs to Establish long term improvement objectives to further reduce energy consumption water consumption and fuel consumption and reflect the same in form of dedicated Environmental Policy.
Conclusion: ❖ **Active involvement of Organization is observed.** ❖ **Adequate awareness amongst the students and other stakeholders (faculty, other staffs, service providers, etc.) is observed and reflected from their behaviour.** ❖ **Establishment of the dedicated Environmental Policy in line with material aspects to achieve long term improvement objectives and continual improvement need to be initiated.**

2. Creation of Awareness

Are the objectives of green audit clearly understood by the institute	**Yes , as per the internal audit report prepared by the department of zoology, the objectives are unambiguously stated below** ➢ **To spread awareness amongst the students and the surrounding community about the environmental impact due operations associated with their teaching institution.** ➢ **To sensitize them how to address the situation at the local and personal level by conducting programmes, camps and other means as feasible.** ➢ **To mitigate the gap between carbon**

	emission and offset. ➢ **To explore the possibilities to use renewable energy sources to avoid GHG emissions and also reduce power cost.** ➢ **To increase the green cover** ➢ **To vigorously and responsibly position the institute for active contribution in Clean India Mission undertaken by the Government.** ➢ **To identify ways and means to sustainably contribute and reduce gaps and become environment friendly.**
Are there posters/guidance displayed to remind students and staff of good practices?	Yes
Are the students aware of energy sources?	The major source of energy is electricity followed by the usage of petrol in the PG (Petrol generator) as back in case of failure of grid electricity. Students are also aware about the solar panel. Students are aware of sources of energy which are providing by college.
Is college tracking its electrical energy usage?	There is a meter which measures the electricity imported by the college. The readings of annual electricity consumption is included as part of this report under chapter 11.
Is college offering energy conservation lesions and programs?	▪ College has created awareness among the faculty and students to reduce energy wastage. ▪ The college has appropriately disabled the screen savers and programmed the computers for sleep mode operations. ▪ The usage policy of photocopiers, fax machine

	and other equipment users is "POWER ON" when in use and "POWER OFF" when not in use. There is no ideal idle power consumption. **Recommendation:** **The Assessment Team observed that CRT monitor is also utilized in the college. Since additional LCD, LED monitors are available, the CRT monitor should be replaced with existing LCD or LED monitors and CRT monitor should be utilized as back-up measure in case of failure of LCD monitors.**
Do students and staff know where their water comes from?	The main source of water is bore well water. Bore well water is utilized in the wash rooms and cleaning.
Is college encouraging responsible water use via ▪ **Posters, placards?** ▪ **Incentives?** ▪ **Contests** ▪ **Awards?**	Yes, by posters, placards etc
How is trash managed outside the campus?	The canteen waste is sent to Taluka disposal site.
Further Scope of Improvement: ❖ **The Assessment Team observed that CRT monitor is utilized in the college. Since additional LCD/LED monitors are available, the CRT monitors should be replaced with existing LCD/ LED monitors and CRT monitors should be utilized as back-up measure in case of failure of LCD/LED monitors.** ❖ **College may calculate the water footprint to compare its performance with national and international consumption standards and communicate with its stakeholders**.	

Conclusion:

- **Visible communication on environmental issues.**
- **Effective use of notice boards and signs.**
- **Additional measures in form of events can be organized by college.**

3. Lighting

How college is utilizing daylight?	**The college building is situated in an open space without any type of cover hence it is getting the full advantage of good airflow enabling good ventilation and sun light. Building imparts large windows and open space in all directions. During the day time, it is possible to carry out activities without air conditioners and air fans during operational days. Campus is fully eco-friendly.**
Is college utilizing any incandescent lights? Can they be replaced with compact fluorescents (energy saving bulbs)?	The college timing is from 7 am to 5 PM. Thus, recruitment of daytime lighting is limited. Energy efficient lighting system is followed the contemporary best practices will recommendations on lighting by Bureau of Energy Efficiency, Book-3, Chapter 8, table 8.1

Table 8.1 Luminous Performance Characteristics of Commonly Used Luminescent

Types of Lamp	Lumens/Watt		Colour Rendering Index	Typical Application
	Range	Avg.		
Incandescent	8-12	14	Excellent (100)	Homes, restaurants, general lighting, emergency lighting.
Fluorescent lamp	46-60	50	Good w.r.t Coating (67-77)	Offices, shops ,hospitals ,homes
Compact fluorescent lamps(CFL)	40-70	60	Very good (85)	Hotels ,shops ,homes, offices

High pressure mercury(HPMV)	44-57	50	Fair (45)	General lighting in factories,garges,car parking,flood lighting
LED lamps	30-50	40	Good (70)	Reading lights, desk lamp,nightlights,spotlight,security lights, signage lighting, etc.

Thus, LED"s are considered for installation as night lights, security street lights by college. The term reading light[3](https://www.collinsdictionary.com/dicionary/english/reading-light) normally refers to lamps or light which focus light which dedicated for readings, thus LEDs were not considered for class room lightings initially. Fluorescent lamps were utilized for class rooms (as the same are stated to be suitable for office illumination level requirements). LED lights started replacing the conventional tube light as a replacement measure after failure. LED lighting survey was also undertaken by the Audit Team. Please refer below assessments in details. During the onsite visit the Audit Team visited each department and physically counted the installed lights by their types (Fluorescent tube lamp, CFL and LED). It is confirmed that there is no incandescent light installed for lighting purpose. As per the published article: http://www.usailighting.com/stuff/contentmgr/files/1/9/2ffeb328de0f4878257999e7d46de4/misc/lighting comparison chart.pdf.

LED light has lumen/ watt in the range of 80-100 whereas CFL has lumen/ watt in the range of 70-90.

Recommendation:

As per the replacement policy the college should continue to install LED lights in the class rooms in place of conventional tube lights. The CFL lamps[4] should be replaced by the LED lamps.

Has the college evaluated	The lighting arrangements are well balanced with arrangements to

existing lighting for opportunities to reduce lighting in over lit areas?	switch ON and OFF lights independently. There are therefore practically no over lit areas.
Are the light switched duly labeled to make more obvious which switches relate to which appliances?	Switch arrangements are lucid. The fan switches are adjacent to fan speed regulators. Light switches are arranged in order of lighting.
Are the lights switched off to make use of daylight?(e.g. lights parallel to windows or in corridors)	There are minimum or practically negligible use of lights during day time as the building structure has possibility of daylight usage. The lux level in the classrooms was measured and found above 250.
Is the college utilizing natural lighting when possible?	Yes, natural lighting is first preference.
For the spaces like store rooms, toilets, kitchen areas, copying rooms, corridors etc is there scope for automatic lighting controls?	The policy of college is to switch off the lights and other electrical equipments when they are not in use. The appropriate usage of the resources and control on its avoidance is one of core responsibilities of the respective HoD. Since, the culture of useful gain is practiced over the years; there is a responsible and natural tendency amongst staff and to avoid wastage. Every Lab in-charge is responsible for the lab electrical utilities; every faculty including the HoD is responsible for switching off the un-necessary lightings and AC in his/ her cabin.
Can main lighting ever be switched off and dedicated lighting is used?	As such there are no dedicated lamps which can replace overhead lighting. However, redundant lighting can above desk can be operated and other overheads lights can be switched off.
Are the light fittings	Cleanliness is well maintained. In- house light fittings are cleaned

clean?	regularly. Some places the light lamps were found not cleaned.
Do windows and skylights need cleaning to allow in more natural light?	The window and skylight are clean. Cleaning is with utmost care and regular cleaning schedules were observed by the Audit Team during the course of Audit.
Has the college installed lighting occupancy sensors?	No, lights are negligibly operated during day time. The lights are operated manually.
Is there mechanism in place to immediately report inoperable occupancy light sensors?	NA as no light sensor is installed.
What is the % contribution of LED lighting?	We have evaluated the % LED installation at Passage and ground and all other floor. The value is determined and presented under Annexure

Further Scope of Improvement:

A dedicated stabilizer can be installed and the lighting load can be transferred. With the help of voltage regulation, further energy savings are possible from the fluorescent lamps. Please refer below table which provides impact of energy savings from voltage regulations (reference Bureau of Energy Efficiency, Book 3, Chapter 8).

Particular	10% lower Voltage	10% higher voltage
Fluorescent Lamp Light Output	**Decreases by 9 %**	**Increases by 8%**
Fluorescent Lamp power consumption	**Decreases by 15%**	**Increases by 8.1%**

Conclusion:

- **Feedback was taken with students and employees and no complains was identified within respect to the sufficiency of lighting measures.**
- **Negligible lighting load is observed during day time as college make good use of daylight.**
- **Replacement policy to further improve lighting efficiency (as stated above) is already implemented.**

[4]The CFL lamps have problem as they contain mercury. Mercury is very toxic to human health and the environment.

4. Cooling and Ventilation

How are the Air Conditioning Controls? For the local controls, how it is ensured that AC is working only ON when necessary. What is temperature setting of AC?	**The AC usage is very high as the temperature in Manora is comparatively higher (Max temperature can be 42 ^{0}C). Only 2 ACs were installed. The AC temperature is not set below 24^{0}C, Awareness is created and measures are implemented in line with the recommendations of Ministry of Power (http://www.cseinndia.org/a-step-in-the-right-direction-says-cse-of-power-ministry-s-move-to-fix-starting-temperature-of-room-air-conditioners-at-24oc-and-not-lower-to-save-energy-8814)**
What is the mechanism of reducing heat in –grace? Are the closing blinds or fitting reflective film to windows installed to reduce solar gain?	The building is designed to make best use of day light and avoid the heat in-grace. Blinds are available in office while auditorium is well equipped with green net sheet for reduce the heat.
Are all external doors and windows closed when air conditioning is on?	There is limited number of ACs in college. Based on interviews, it is confirmed that this practice is maintained.
Is there a scenario where air conditioning is wasted in unused spaces, such as cupboards, corridors?	There are no such instances observed. Arrangements are duly implemented to avoid losses.
Are Efficient and energy labeled AC's utilized for cooling purposes?	There are 2 AC which are off fine quality; it runs hardly for 3-4 hours during summer. **Below guidelines can be considered by college in future while selecting between the AC and evaporative cooling.** **Evaporative Cooling System** The Assessment team has undertaken document review and analysis of the data for the assessment of the air conditioning system. Based on the same it was found that there exist scope for the use of evaporative based cooling which is energy effective compared to the reversed Bryon cycle i.e. Vapour Compression Cycle. The basic reason for the same installed system has COP of 1.5kW/TR of refrigeration compared to evaporative cycle which draws 0.3-0.5 kW based on the size of installation.
Further Scope of Improvement:	
College must ensure that condenser of AC"s are not exposed to direct sunlight	

Conclusion:

- **PROCUREMENT[6] of 3 Star is not observed as one of energy conservation measure. The selection of AC follows the publically traceable selection methodology which is mix of feasibility and performance.**

5. Operation of Electronic Equipments

Are computers, printers, photocopiers and other equipment switched off at the end of the day?	**Yes**
Is there any mechanism by which the screens and other equipment be controlled during the day?	The college has appropriately disabled the screen savers and programmed the computers for sleep saver and programmed the computers for sleep mode operations. Please refer to Annexure
Are the screen savers disabled?	Yes please refer above assessment.
Are computers programmed to "power down "mode?	Computers are programmed for the sleep operation.
Is the user entrusted with the rights to modify standby settings? (e.g. TVs, LCD projectors, printers etc.)	No college has the administrative rights. Such changes cannot be initiated by users.
What is status of the photocopiers, fax machines and other equipment? Are they programmed on "Energy Saver" mode during the day?	The equipments like photocopiers, fax machines are shutdown when not in use, computers are turned to sleep mode when ever not in use.
Are the power management settings enabled on all the computers/monitors/all-in-one machines?	All machines are governed by the college. All are equipped by power management settings as already described above.

[6] http://www.bijlibachao.com/air-conditioners-selection-understand-tonnage-eer-cop-and-star-rating.html

Conclusion:
The Electrical Equipments are well operated. Redundant operations are avoided.

6. Water Management

Are any water leaks identified?	**The urinals are flushed periodically and manually. The urinals need to be equipped with push button taps. Please refer below recommendation.**
Are taps left running? **Are there any dripping taps?** **Do taps need maintenance?**	No such instance was observed.
Are push button taps utilized?	The toilet washrooms are not equipped with the push buttons. Please refer below recommendation.
Is water escaping from overflows either inside or outside buildings?	No such instance was identified during onsite audit. There is a trench constructed to direct water to soak pit behind the building for wash room.
Has the college installed low flow faucets, automatic faucets and/or faucet aerators?	**Recommendation for improvement:** **The college Management needs to consider dedicated flush at urinals (in place of periodic manual flushing), low-flow faucets, automatic faucets, and/or faucets aerators as the replacement for the existing conventional taps.**
Has the college installed low-flow shower heads at Hostel?	Hostel is not assessed under the scope.
Has the college collected rain water for onsite watering needs?	Yes, rain water from terrace is recharged into the pits. At the time of site visit team observed that building were well equipped with piping system for down water. As per interviews the construction activities resumed in month of October 2017. Thus while calculating the rain water ,data is consider for year 2017-18
Is the college collecting the condensation from A/C units for onsite watering needs?	Yes, ACs is operated and condensed water is collected and utilized for gardening as feasible. Please refer Annexure … for details
Has the college optimized its irrigation system for	As per the latest publication from “The Hindu” drip irrigation is one of the most important measures to achieve “more crop per

gardening to: • **Operate at night or early morning hours to minimize evaporation?** • **Water the minimum time and frequency necessary for the applicable vegetation?**	drop". Share of Agriculture consumption is approximately 83 per cent of India's water resources, thus approximately 17 per cent water resources are available for domestic and industrial use (http://www.thehindubusinessline.com/openion/time-to-focus-on-more-crop-per-drop/article9778971.ece) The Assessment Team noted that college is utilizing the RO/cooling machine reject water for watering nearby plants. For rest of gardening area of college, the evaporation losses from soil surface are reduced by watering plants in evening. It is noted that there is drip irrigation system implemented by college.
What is amount of rain water harvested?	No , but college amply recharging the water by which the water table increased .The rain fall for Manora region is approximately 766 mm (http://cgwb.gov.in/District Profile/Maharashtra/Washim.pdf, Table-3,page4
Are there any community based projects implemented by the college?	No. College students undertake street plays to sensitize local community against the hazards of open defecation. Compost manure (green manure) in small quantity utilized for college gardening, green manure pit is observed by team. Cleanliness drives under " Swatch Bharat" is undertaken by college NSS unit of college undertakes cleanliness drive, awareness regarding pollution, tree plantation etc. Blood donation camps are organized by college on regular basis. Department of zoology regularly organized the various eco-friendly drill and programs i.e. world sparrow day, wildlife week, tiger day etc.
Further Scope of Improvement: Long Term Measure: ➢ The college Management needs to consider the low-flow faucets, automatic faucets, and/or faucet aerators as the replacement for the existing conventional taps. ➢ College needs to install the metering arrangement to measure the water drawn from bore well. ➢ College can undertake determination of water foot print and calibrate its specific water consumption with the established National and International Norms.	
Conclusion: • The toilet washrooms are not equipped with the push buttons. • Practically efficient measures are implemented for gardening.	

7. Water Quality

Is the college campus maintained clean to minimize litter polluting water table?	The college premise is kept clean. Thus the chances of litter polluting water table are negligible. The Assessment Team has also observed that the effluent from the upper washroom is directly sent to pit. **Recommendation:** **Effluent must be treated with well equipped piping** for upper washroom of science building.
Is the college monitoring drinking regularly? If yes what is the frequency?	The Chemical Lab is undertaking water testing. In case of any deviant parameters are observed, the water will be tested in a third party laboratory. Water Quality Test are included as part of Annexure… to this Report. **Recommendation:** **College should appoint independent third party for drinking water testing at least once in a semester.**
Further Scope of Improvement: • Need to be maintaining the piping for effluent from upper washroom of science building just above the zoology lab. • College should appoint independent third party for drinking water testing at least once in semester.	
Conclusion: The students, staff members and guests have access to clean, safe and potable water with the RO system.	

8. Renewable Energy

Is college having solar, wind, or other forms of renewable energy?	**College has 5.5 kW solar panel.** **It generates the 468.21 kW per month and 5618.52 kW per year.**
Is the college purchasing renewable power from third party or renewal energy certificate for its electricity use?	Only Grid electricity is purchased. This is verified from the submitted bills.
Is the college offering	This already assessed under chapter 01 of this report.

renewable energy lesson/programs	
Further Scope of Improvement and Conclusion: College has web meter which facilitate the mutual understanding with the electricity department. More generation of energy which is up to use would be captured and utilize by the state electricity board.	

9. Transportation

Is the college encouraging transportation measures like bicycle, Bulk transport, walking?	▪ **Bicycles: The College always promotes pollution free transportation. Most of the students of our college are from the rural area. From the nearby area they preferring the bicycles or by walk. As per survey conducted by the college near about 50-60% students use the pedestrian road to come in the college. College observe Saturday as a "NO VEHICLE DAY" to reduce the amount of Carbon emission into the atmosphere.** **Faculties are found to be sharing their vehicles.**
Is the college providing eco-friendly or less GHG intensive transportation matching services? (Example carpools, college buses etc)	Some faculty members sometime are car pulling while most of them are coming by their two wheelers by sharing the vehicles.
What are the good practices pertaining to Transport?	The students utilize the state and private transport and cycle as a means of commutation. The use of cycle is encouraged. The college also observed no vehicle day every week on Saturday.
Conclusion: **The college management, its employees and the students observe good practices of transportation/ commutation.**	

10. Purchasing Practices

Describe the purchasing that confirms the better environmental performance?	**Lastly the college has purchased the ACs with 3-star labeling.** **A printer with duplex printing facility is installed at the computer lab and Library. There is culture of the two sided printing. Paper is not wasted.**
How does the college limit the purchase of single-serve bottles and containers?	The college has RO system; guests are served with water from RO system. Single serve bottles are not utilized unless requested by guest. Glasses are available to fetch the water to render the quench of thrust imparts the wastage of water by students.
Is the college having water fountains/stations to promote easy filling of reusable water bottles?	Yes, the water dispensers are connected to output of RO system. Clean and potable water is available to staff, student and guests.

Further Scope of Improvements:

The college should further emphasize on the purchase of:

- **no-to low-odor (VOC) markers**
- **no- to low-VOC paints? (via Facilities)**
- **paper/ paper products with maximum recycled content**
- **refillable pens/ pencils**
- **compostable bags for green manure collection**

Conclusion:

- **The GHG intensive technologies are well managed.**
- **Focus on the replacement of lighting as per above stated recommendation needs to be considered.**
- **Focus of the recommendation pertaining to the environmental preference of evaporative cooling over AC needs to be considered.**
- **One side papers are utilized by college to avoid use of fresh paper.**
- **Policy for the disposal of Archived paper Records needs to be formed by college.**

11. Carbon Footprint, Ambient Air quality

<table>
<tr><td>Has the college calculated its carbon footprint?</td><td>Yes, college has calculated the carbon foot print and ambient air quality i.e. 450 ppm & 456ppm (CO2) respectively as reports depicted by agency- Ashwamedh Engineers& Consultants, Survey No.102, Plot 26. Wadala Pathardi Road. Indira Nagar, Nasik-422009. Maharashtra, India.</td></tr>
<tr><td>How is college promoting zero emission transportation option?</td><td>Not applicable. There is no internal transport within the college. Vehicles are not allowed inside the campus. Faculty members are sharing the vehicles for commuting.</td></tr>
<tr><td>Are all the applicable emission sources calculated?</td><td>Ambient air quality depicts the carbon di oxide were 450ppm.
It was noted that there was no refrigerant charging during the applied verification period.</td></tr>
<tr><td></td><td>LPG CONSUMPTION IN CANTEEN 456 kg (24 cylinder per year) imparts tCO2 (1.66 ~ 2)
Paper consumption
<table>
<tr><td>Paper consumption as per college estimate</td><td>150 rim</td></tr>
<tr><td>Paper per rim</td><td>500 Standard assumption</td></tr>
<tr><td>Weight of each sheet in gm for 80 gsm paper</td><td>4.69 gm</td></tr>
<tr><td>Total weight for 150 rim in 1000 kg</td><td>0.35175</td></tr>
<tr><td>Emission with 10% uncertainty</td><td>0.3 tCO2</td></tr>
</table>
Very less amount of CO2 emission had been recorded; overall college is practicing good effort and control over carbon di oxide emission.</td></tr>
</table>

12. Waste Management

How the college reduces its paper waste via:

- **Encouraging digital reading, note taking, and activities?**
- **Setting printers and computers to default to duplex (double-sided) printing?**
- **Reducing margins and white space on documents that must be printed?**
- **Printing multiple pages per sheet?**
- **Minimizing paper correspondence with families?**
- **Opting out of unwanted mail?**

Is the college undertaking recycling collection for additional recyclable materials- like plastic bags, CFL (spiral) light bulbs, batteries, pouches, candy wrapper, and electronics?

- **The class room and labs are well ventilated and spacious. This minimizes suffocation to students by improving air changes and hence the air quality.**
- **The college has adopted the duplex printers, which enables the complete usage of the paper areas**
- **College has taken initiates towards plastic free campus. The students are encouraged to use waste bins which are placed in the college.**
- **The internal correspondences and various functionalities are taken care by the electronic means like emails, sms etc.**

Different types are generated within campus which include

- **Canteen Waste: Manora Nagar Panchayat handles the canteen the canteen waste. It is authorized government functionality for waste disposal.**
- **E. Waste: The E- waste generally includes the tube lights, CFL, LED are stored into the scrap room of college. Some IT components are kept as demo pieces in the electronic laboratory. The college also has policy to exchange old systems and extract residual value while buying the new technology.**
- **Plant waste: The plant waste is manures in green manure pit for compost obtained from waste leaves.**
- **Sewage waste: The liquid waste from lavatories and other sources are disposed in the soakage pit.**
- **Recycling of RO Waste Water: The waste water from RO is fluxed for gardening.**

Please refer Annexure ….and…

Further Scope of Improvement:
The college can introduce its own recycling system to process wet waste in a Compost

Machine to transfer it into nutrient rich compost for the botanical garden and for others plantations.
The disposal system for e-waste needs to be formalized and streamlined.
Considering the huge volume of paper usage college needs to work out feasible solution for recycling of waste papers.

13. Plantation by college

The college campus has garden and whole campus is full of green lush cover having more than 1500 and among them more than 100 plants imparts their medicinal values. The outer border of the campus is totally covered by the trees and shrubs which imparts the greenery all around the campus. The college has planted and maintained the line of trees around its boundary. Every year, plantation programme in the campus as well as outside the campus regularly facilitated along with students. In the current session, the institution planted more than 400 plants on the forest land &locality.

The details of existing plants in college:

Sr. No.	Name of trees, plants, herbs and shrubs	No. of trees, plants, herbs &shrubs
1	Neem	74
2	Chafa	63
3	Umber	2
4	Sagwan	125
5	Ashoka	20
6	Saru	27
7	Vidya shrubs	42
8	Mehndi Shrubs	205
9	Bel	1
10	Badam	1
11	Custard Apple	21
12	Bhingri	7
13	Bamboo	8
14	Kasot	15
14	Nilgiri	9
15	Palash	5
16	Bor	5
17	Sarpagandha	13
18	Sui babool	40
19	Rib	2
20	Parijaat	1

21	Acistea eckloni	23
22	Bougain villea	2
23	Citrus	1
24	Babool	3
25	Kadubadam	2
26	Hivar	2
27	Nerium	1
28	Baniyan	1
29	Herbs	4
30	Shrubs	76
31	Other trees	21
32	Potplants	50

Annexure

Annexure-I: List of interviewed College / Students

S.No.	Interviewee	Designation
1	Dr .N. S. Thakre	Principal
2	Dr. A. Y. Ali	IQAC Coordinator
3	Dr. Seema Keswani	HOD Zoology
4	Mr. G.B. Patil	Director Physical Education
5	Dr. M.N. Iqbal	HOD Botany
6	Ms. Pushpa Louta	Student (B.A)
7	Ms. Sheetal Chipde	Student (B.Sc)
8	Ms. Arti Patil	Student (B.Sc)
9	Ms. Vina Rathod	Student(B.Sc)
10	Mr. Shailesh Rathod	Student(B.Sc)
11	Mr.Aryan Ingole	Student(B.Sc)
12	Mr. Subham Gawande	Student(B.Sc)
13	Mr. Akash Rathod	Student(B.Sc.)

Annexure-II: Reference Documents/ Surveys

Sr. No.	Reference Documents / Survey pertaining to
1	Functionality of RO water plant
2	Utilization of RO reject water plant
3	Roof top area of college
4	Set up of rainwater recharging
5	Information regarding Canteen Compost Management
6	Information regarding Garden Waste Management
7	Information regarding Liquid Waste Management
8	Measures for maintaining Cleanliness in Campus
9	Measures for Garbage Collection and disposal
10	Plantation Measures
11	Use of construction waste management(for filling purpose)
12	Electricity bills for duration of April2017 to March 2018
13	Eco-Club composition
14	Declaration on operational controls of System department with respects to IT Management & other electronic equipments.
15	Roll of Staff, Students & Management to save electricity in Campus.
16	Lighting Survey undertaken by Green Audit Team
17	AC Survey undertaken by Green Audit Team
18	Water recharging survey by Green Audit Team
19	Water Waste management survey undertaken by the Green Audit Team

Annexure- III : Campus Committee

GREEN AUDIT COMMITTEE

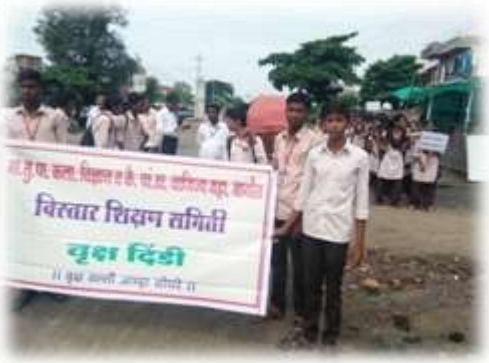
1- Dr. N.S.Thakre	Chairman
2- Mr. Arvind Ingole	Management Representative
3- Dr. A.Y. Ali	IQAC Coordinator
4- Dr. Seema Keswani	HOD Zoology
5- Dr. M.N Iqbal	HOD Botany
6- Mr. G.B. Patil	Director Physical Education
7- Dr. N.A. Thakre	Administrative Representative
8- Mr. Gajanan Khade	Canteen Manager
9- Ms. Pushpa Laute	Student Representative , B.A
10- Ms. Arti Patil	Student Representative, B.Sc. Maths
11- Ms. Vina Rathod	Student Representative. B.Sc, Bio.
12- Mr. Shailesh Rathod	Student Representative, B.Sc. Bio
13- Mr. Aryan Ingole	Student Representative, B.Sc, Bio.
14- Mr. Shubham Gawande	Student Representative, B.Sc, Maths

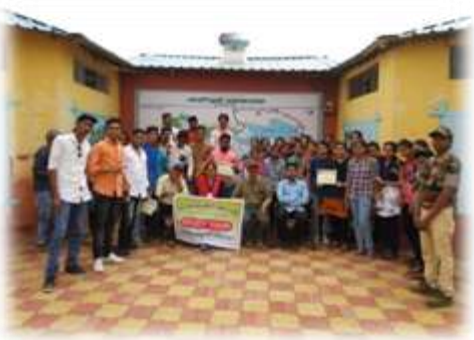
[2]Reference: www.mspkptmanora.ac.in

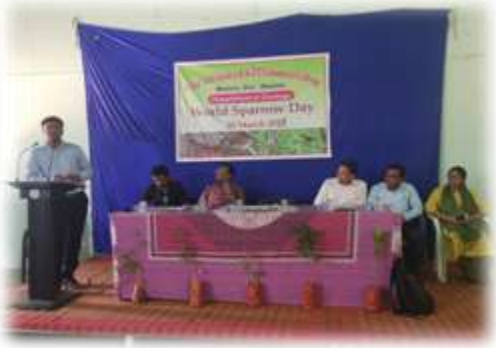
Annexure-IV: Awareness Program undertaken by College

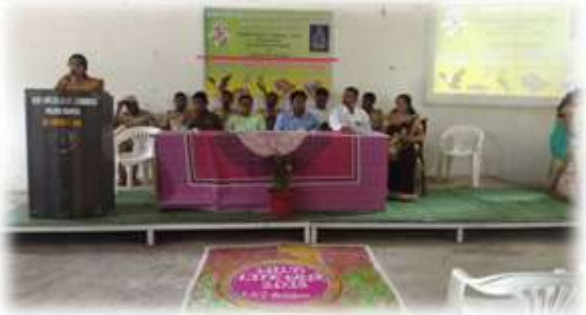
Session 2017-18

Tree plantation drive the NSS, staff and students









Various awarenes done by students & Jointly organized programs with district forest divisio

Annexure-V: Lighting Survey

List of Assumptions:

- During the survey specific hours for each classroom, washroom, office space was assessed and accordingly average daily hours were considered.
- The kW ratings of the installed lights is taken from the college data
- The calculation covers two approaches
    - Approach: Calculation of LED contribution based on the total lighting load energy consumption. **Note: The Lumen/Watt for28W tube light is up to 110; which is almost same as LED is: 110-120**[19]
    - The Green Audit Team acknowledges the criteria for introduction of LED lights as LED lights do not have disposal problems. Tube lights face problem of mercury contamination.
    - College have ample LED tube lights, on the other hand a bit of problem regarding some of the existing tube lights. The sudden disposal of tube lights on large scale and within their service life will be lead to huge amount of e-waste which has critical impact on environment. The college management is thus looking for the replacement policy and lighting (tube light , CFL) will be upgraded to eco- friendly LED after failure of existing lighting system

Lux Levels observed at working place- 178

Calculated Contribution of various lighting arrangements: Calculated for 228 working days

Light Sources	kWh (annual)	Light Sources	% Contribution
Tube Light	323.76	Tube Light	63.39%
LED	186.96	LED	36.60%
CFL	----------	----------	----------

19https://www.google.co.in./amp/s/www.bijlibachao.com/lights/comparing-led-lights-withfluorescent-lights.html%3fisamp=1

S. No	Room Name/no.	Tube light	Watts	Daily average hrs	W.hr	LED	Watts	Daily average hrs	W.hrs
1	Zoology Lab(R18)	1	40	1	40	1	20	1	20
2	Botany Lab(R16)	1	40	1	40	1	20	1	20
3	Chemistry Lab(R15)	-	-	-	-	3	20	1	60
4	Physics LabR(17)	1	40	1	40	1	20	1	20
5	Seminar Hall(R22)	-	-	-	-	-	-	-	-
6	Common Room	1	40	1	40	-	-	-	-
7	Music Dept.	-	-	-	-	1	20	1	20
8	Staff Room	-	-	-	-	1	20	1	20
9	Library	2	40	8	640	2	20	8	480
10	Auditorium	-	-	-	-	4	30	0.5	60
11	Office(R1)	-	-	-	-	2	20	8	160
12	Hostel	-	-	-	-	18	20	-	-
13	Principal(R2)	--	-	-	-	2	20	6	240
14	R3	-	-	-	-	1	20	0.5	20
15	R5	1	40	1	40	-	-	-	-
15	R7	-	-	-	-	1	20	1	20
16	R8	-	-	-	-	1	20	1	20
17	R9	1	40	1	40	1	20	1	20
18	R10	1	40	1	40	1	20	1	20
19	R11	2	40	1	80	-	-	-	-
20	R12	2	40	1	80	-	-	-	-
21	R13	-	-	-	-	1	20	1	20
22	R19	1	40	1	40	-	-	-	-
23	R20	1	40	1	40	-	-	-	-
24	R21	-	-	-	-	1	20	1	20
25	R23	1	40	1	40	-	-	-	-
26	R26 Physical	-	-	-	-	-	--	-	-
27	R29	1	40	0.5	20	-	-	-	-
28	R30	1	40	1	40	-	-	-	-
29	R31	-	-	--	-	-	-	-	-
30	R32	1	40	1	40	-	-	-	-
31	R33	1	40	1	40	-	-	-	-
32	R34	1	40	1	40	-	-	-	-

33	**35**	**1**	**40**	**1**	**40**	**-**	**-**	**-**	**-**
TOTAL W.hrs					1420			820	
TOTAL ANNUAL kWh					323.76			186.96	

Annexure-VI: Undertaking by the System Department regarding control of Electronic Equipments

To whom it may concern

The administrative Department confirms that

The administrative rights of computer settings are with the computer department of the college.

As part of sustainable and eco-friendly setting, the system department has initiated below settings in computer of all users.

1- We have disabled all the computer screen savers.
2- When the computers are idle for 5 minute, they are turned to sleep mode.
3- The computer setting cannot change as the administrative rights are with the computer department.
4- With regards to the usage policy of photo copier and other equipment users "POWER ON" when in use & "POWER OFF" when not in use.
5- The statement is issued in response to the query raised during Green Audit.

Vishal Bhatia

Principal
M. E. P. Arts, [illegible] & C. P. T. Comm. College, Mumbai Dist. Washim

Annexure-VII: Water Quality Reports

MAHARASHTRA POLLUTION CONTROL BOARD
REGIONAL LABORATORY, NAGPUR

Website: mpcb.gov.in
Phone: (0712)2557231
Email: ssonagpurlab@mpcb.gov.in

6th Floor, Udyog Bhavan,
Civil Lines, Nagpur-440 001
Date:- 30/12/2019

ENVIRONMENTAL SAMPLE ANALYSIS REPORT

SRO-K.T.P.S Collage Monora

Sample Completed On: 27/12/19
Sample Received On: 18/12/19

Sr. No	Parameters	
1	pH	7.15
2	Turbidity NTU	1.0
3	Conductivity ms/m, us/cm	275.0
4	Dissolved Oxygen (DO)	-
5	B.O.D 27° C for 3 day's	-
6	Chemical Oxygen Demand	-
7	Suspended Solids (SS)	-
8	Total Dissolved Solids (TDS)	-
9	Chloride	95.0
10	Sulphate (SO_4)	16.85
11	Oil & Grease	-
12	Phosphate (PO_4)	0.280
13	Hardness	290.0
14	Calcium	88.0
15	Magnesium	17.01
16	Total Alkalinity	216.0
17	Nitrates (NO_3)	3.20
18	Nitrates (NO_2)	-
19	Ammonical Nitrogen	0.597
20	T.K Nitrogen (TKN)	-
21	Total Coliform MPN / 100ml	-
22	Fecal Coliform MPN / 100ml	-
23	Sodium (Na)	-
24	Potassium (K)	-
25	Copper (Cu)	-
26	Iron (Fe)	-
27	Zinc (Zn)	-
28	Lead (Pb)	-
29	Nickel (Ni)	-
30	Cyanide (CN)	-
31	Bio- Assay Test (Toxicity)	-
32	Residual Chlorine	-
33	Detergents (ABS)	-

Note: All Results are in ppm except pH and Conductivity
1) NA Indicates Not Analysed.
2) ND Indicates Not Detectable.
3) BDL Below Detectable Level.

(Dr. V. R Thakur)
Senior Scientific Officer
I/C Regional Laboratory
MPCB, Nagpur.

Regional Laboratory MAHARASHTRA M.P.C. Board, Nagpur

Annexure –VIII: Ambient Air Quality Monitoring Report

Ashwamedh Engineers & Consultants
Survey No.102, Plot No.26, Wadala Pathardi Road,
Indira Nagar, Nashik-422009, Maharashtra, India
[illegible]
sales@ashwamedh.net Tel: +91-253-2392223

Ashwamedh
Engineers & Consultants
Laboratory Services Division

AMBIENT AIR QUALITY MONITORING REPORT

Sample / Report No.	AA/11/19/3220	Report Date	29/11/2019
Name and address of Customer	**M.S.P. Arts, Science and K.P.T. Commerce College** Village - Manora Dist. Washim Maharashtra		
Sample Collected by	Laboratory	Sample Description / Type	Ambient Air (Group: Atmospheric Pollution, Sub Group: Ambient Air Quality Monitoring)
Sampling Location	Inside College Campus (Garden)	Date - Sampling	23/11/2019
Sample Quantity / Packing	CO_2: 1 x 1 no. tedlar bag	Date - Receipt of Sample	25/11/2019
Sampling Procedure	As per method reference	Date - Start of Analysis	25/11/2019
Order Reference	Verbal Discussion	Date - Completion of Analysis	28/11/2019

Meteorological Data / Environmental Conditions

Average Wind Velocity - km/h	Wind Direction -	Relative Humidity (Max./Min.): -%	Temperature (Max./Min.): -°C	Duration of Survey - h

Parameter	Result	Unit	Method
CHEMICAL TESTING			
Carbon Dioxide (CO_2)	450	ppm	By IR

Ninad Soundankar
Technical Manager (Chemical)
AUTHORIZED SIGNATORY

Ashwamedh Engineers & Consultants

End of Report

Note:
1. The result listed refer only to the tested sample(s) and applicable parameter(s).
2. This report is not to be reproduced except in full, without written approval of the laboratory.
3. The above parameters are not included in our NABL Scope.

Ashwamedh Engineers & Consultants
Survey No.102, Plot No 26, Wadala Pathardi Road,
Indira Nagar, Nashik-422009, Maharashtra, India
[illegible]
sales@ashwamedh.net T/F: +91-253-2392225

Ashwamedh
Engineers & Consultants
Laboratory Services Division

AMBIENT AIR QUALITY MONITORING REPORT

Sample / Report No.	AA/11/19/3221	Report Date	29/11/2019
Name and address of Customer	**M.S.P. Arts, Science and K.P.T. Commerce College** Village - Manora Dist. Washim Maharashtra		
Sample Collected by	Laboratory	Sample Description / Type	Ambient Air (Group: Atmospheric Pollution, Sub Group: Ambient Air Quality Monitoring)
Sampling Location	Outside College Campus Near College Gate (2)	Date - Sampling	23/11/2019
Sample Quantity / Packing	CO_2: 1 x 1 no. tedlar bag	Dete - Receipt of Sample	25/11/2019
Sampling Procedure	As per method reference	Date - Start of Analysis	25/11/2019
Order Reference	Verbal Discussion	Date - Completion of Analysis	26/11/2019

Meteorological Data / Environmental Conditions

Average Wind Velocity - km/h	Wind Direction -	Relative Humidity (Max./Min.): -%	Temperature (Max./Min.): -°C	Duration of Survey - h

Parameter	Result	Unit	Method
CHEMICAL TESTING			
Carbon Dioxide (CO_2)	456	ppm	By IR

Ninad Soundankar
Technical Manager (Chemical)
AUTHORIZED SIGNATORY

Ashwamedh Engineers & Consultants

End of Report

Note:
1. The result listed refer only to the tested sample(s) and applicable parameter(s).
2. This report is not to be reproduced except in full, without written approval of the laboratory.
3. The above parameters are not included in our NABL Scope.

Annexure-IX: Solar Panel Installations

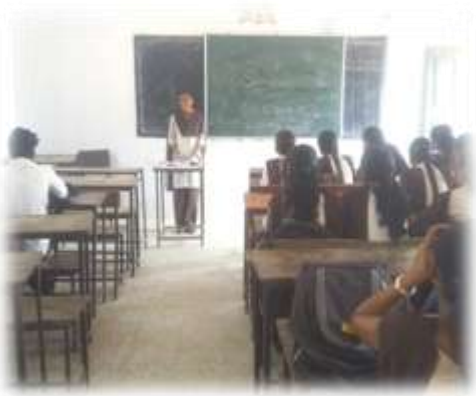
5.5 kW Solar Panel on hostel Roof of college

Annexure-X: Water Distribution Data

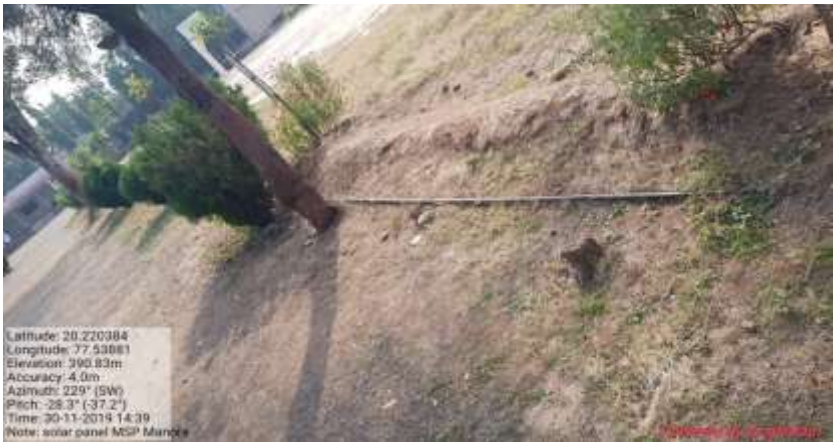
No metering arrangement is in place to measure water drawn from bore well. It is already recommended to install meters to monitor water withdrawal from bore wells.

Annexure-XI: Solar Passive Structure/ Drip Irrigation

Class Room is heighted and well equipped with large window along with adequate sun light.

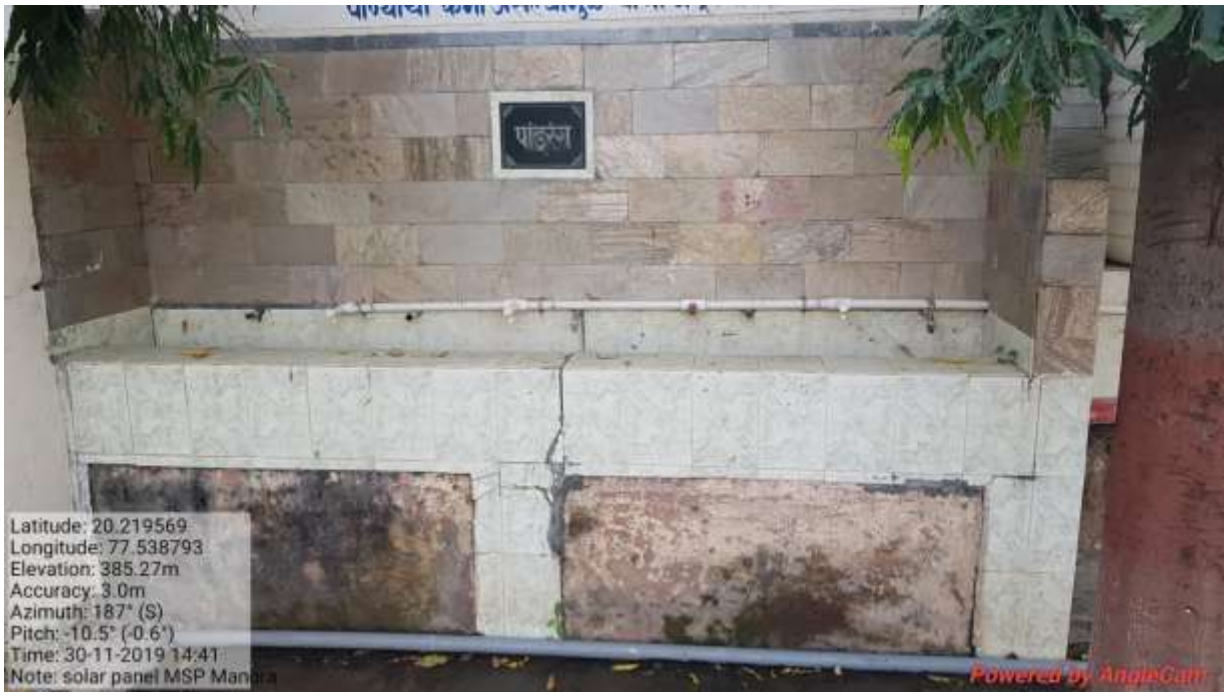


Adequate light in Classrooms, Hall without electrical lighting

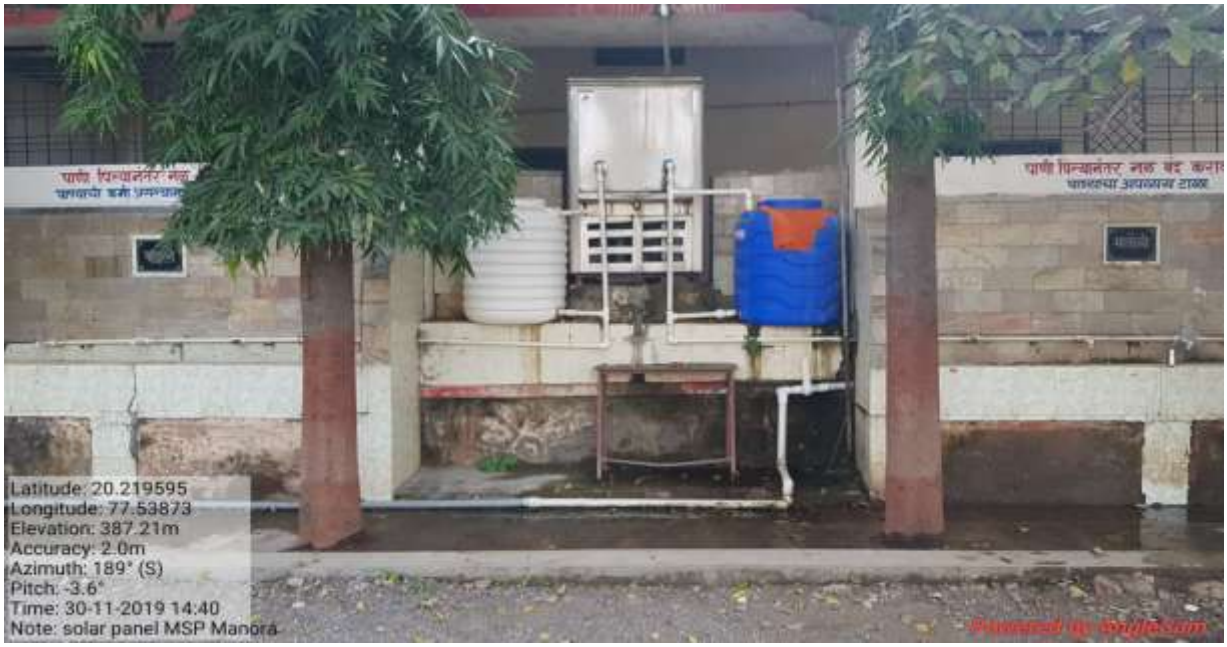


Use of drip irrigation for gardening

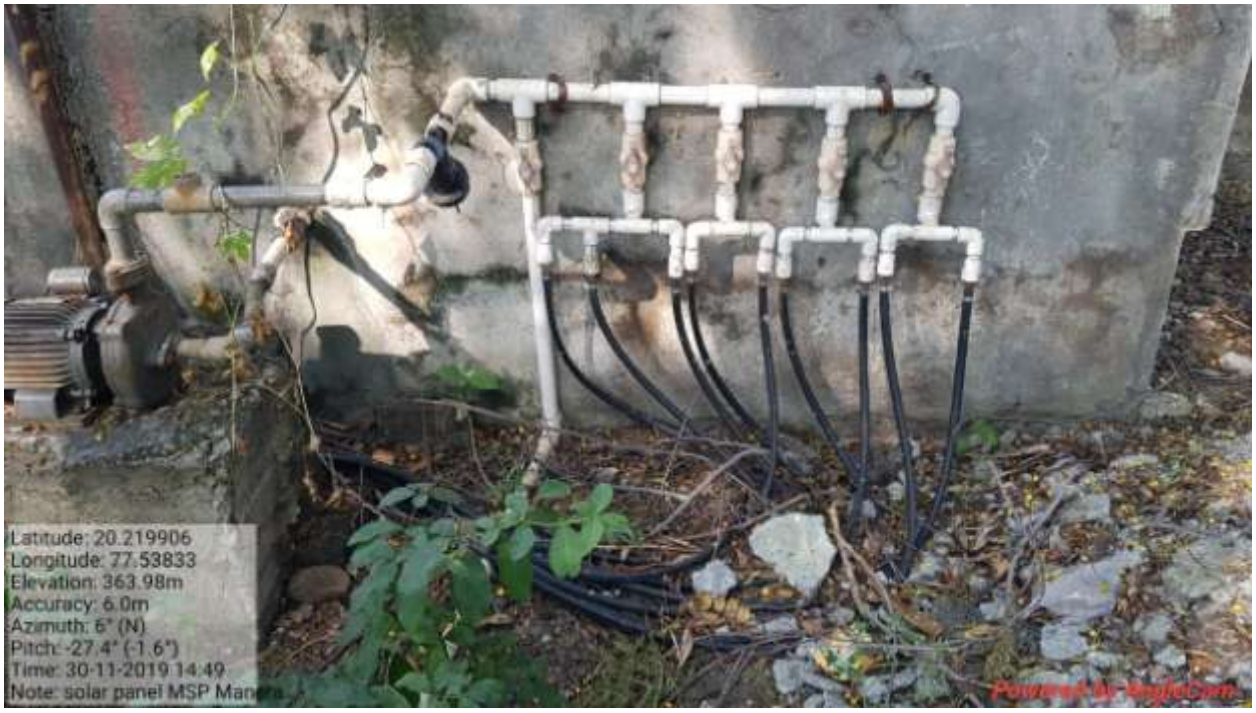
Annexure-XII: Water Management



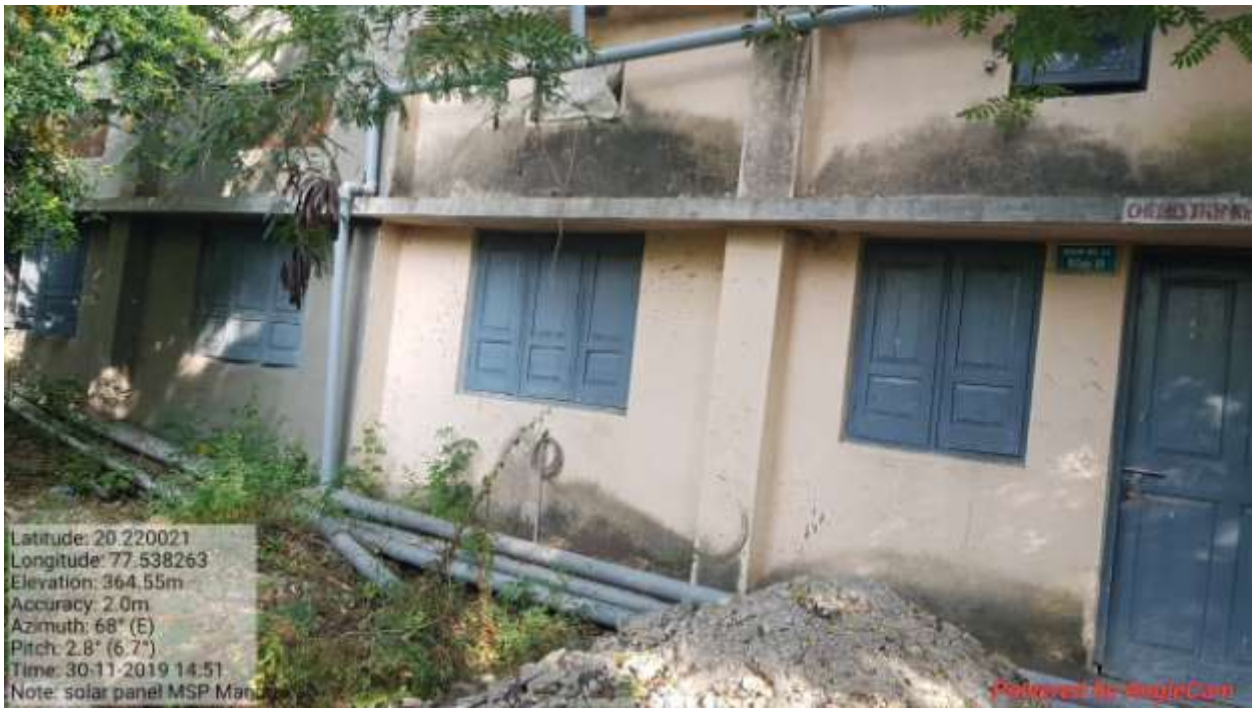
Taps to be replaced by Faucets



RO Waste water used for Tress & placard on wall to adequate use of tap or water



Drip irrigation system of college

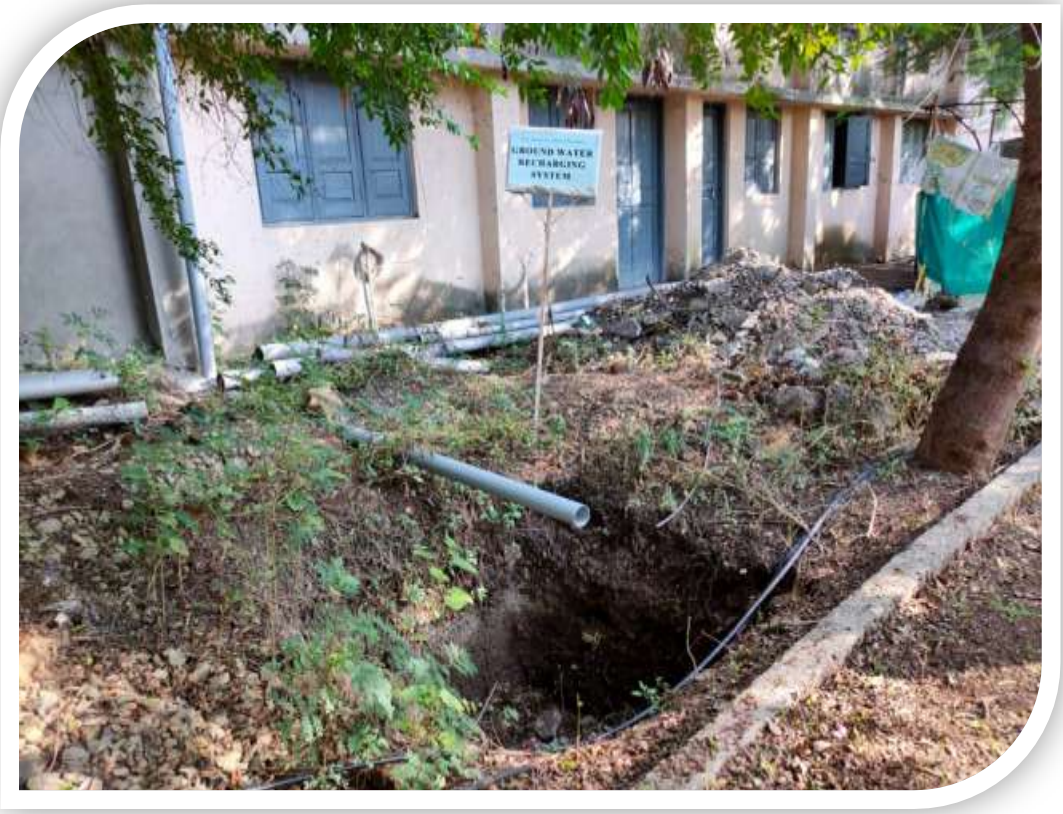


Rain water harvesting/ recharging pipelines

Annexure-XIII: Waste Management

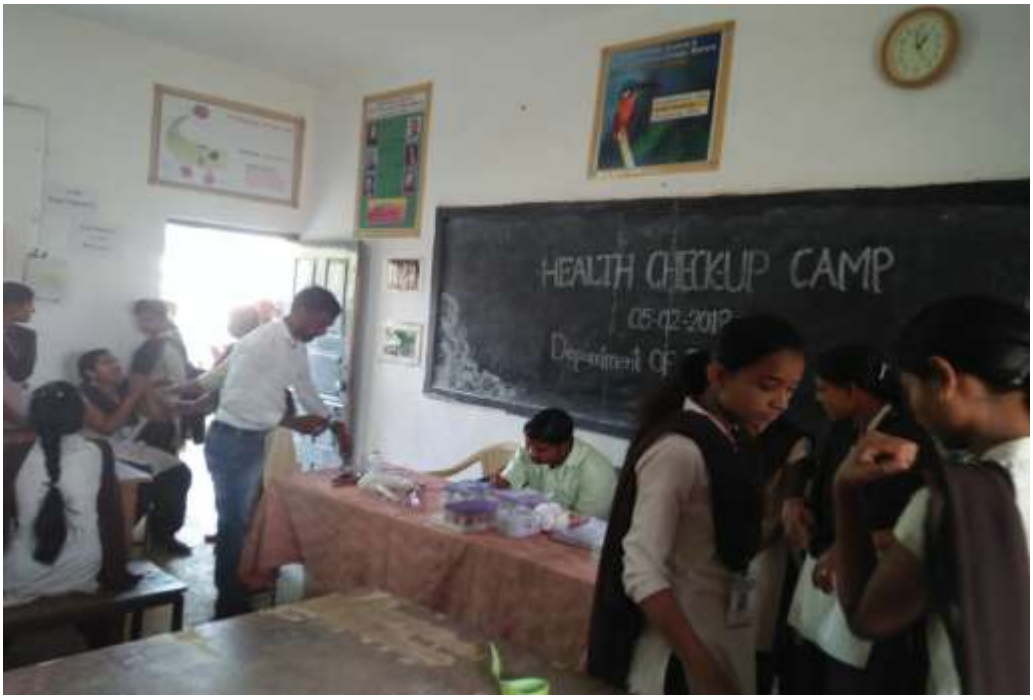
Liquid Waste of Laboratory

Green Waste of garden for manure

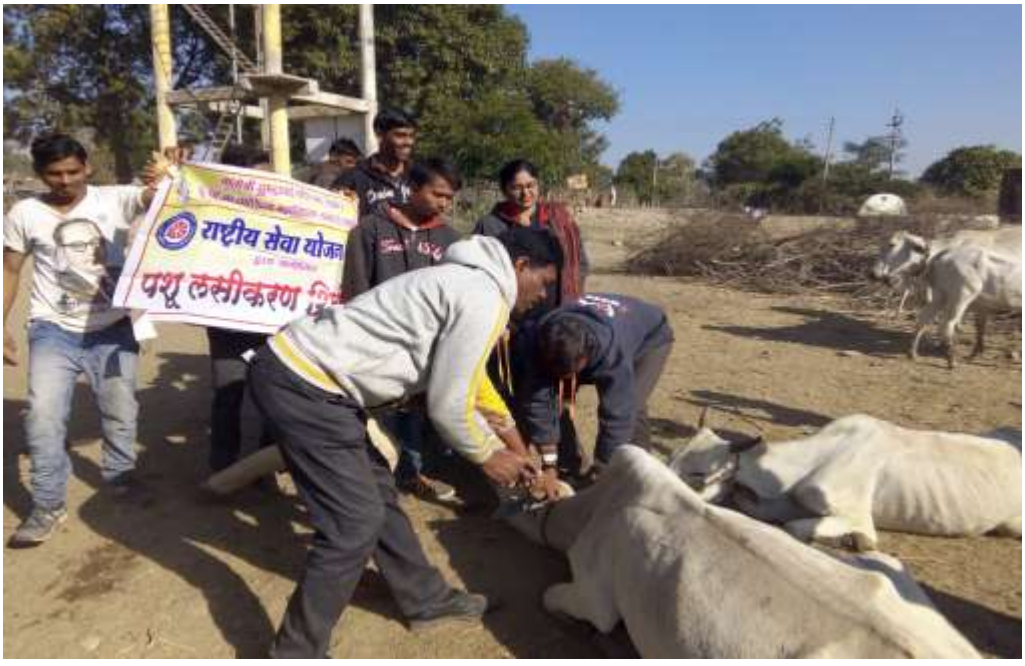


Rain Water Recharging pit

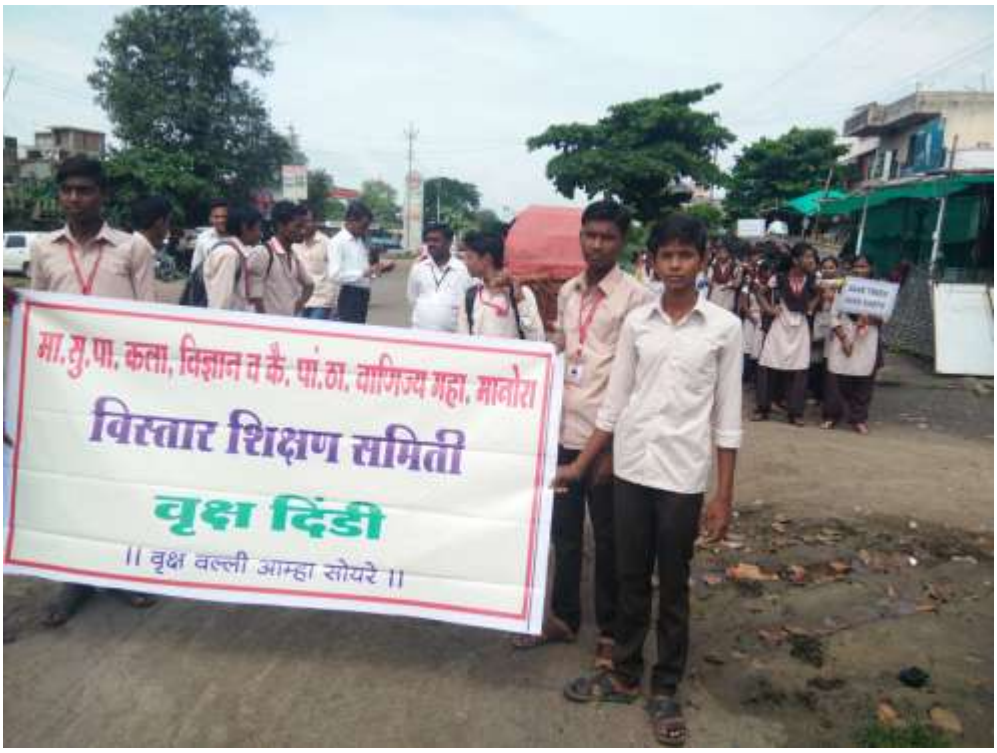
Annexure-XIV: Awareness/Posters



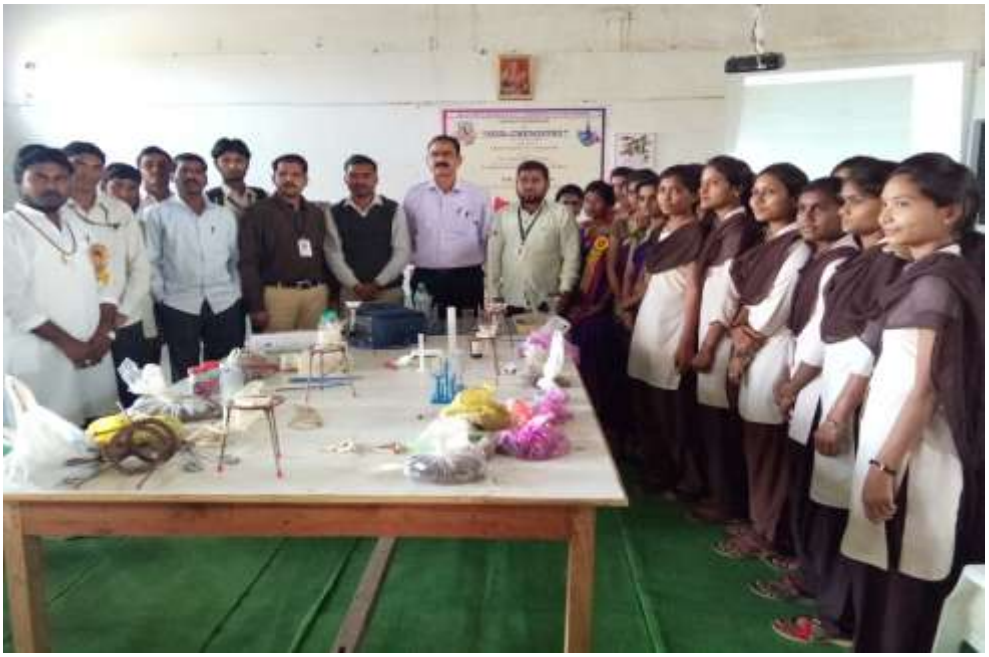
Health Checking Camp in College



Animal Vaccination Camp by NSS are done once on academic year 2017-18

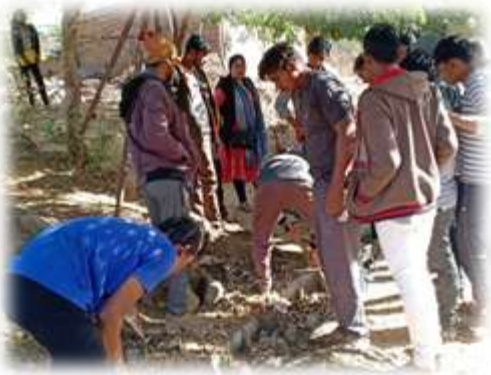


Tree plantation campaign by students



Soil Chemical analysis for better agricultural practices in college

Swacchata Abhiyan/ Cleanness Drive



Cycle distribution by college, a step for green practice and environmental sustainability

Annexure-XV: Snapshot of annual rainfall, Grid Emission Factor

Table 3: Annual Rainfall Data (2002-2011). (mm)

Taluka	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Taluka Avg.
Washim	2160	1235.7	1059.2	1167.2	1359.5	852	752.7	764.2	1162.3	734.7	1124.75
Risod	1377.4	683.9	547.9	773.6	1005.4	861	772	634	1012.5	634.8	830.25
Malegaon	1691	1017	684.2	906.8	1098.3	787	771	699	1153.9	613.3	940.15

Mangrulpir	1108	543	482.5	1001.3	1310.2	826.4	562.5	586.8	1101.9	791.5	831.41
Manora	1059.8	687.2	486.6	918.8	1209.5	724.2	518.4	435.1	1176.5	817.8	788.39
Karanja	915	743.5	546.2	1062.3	1312.3	949.6	561.1	688.2	835.4	766.9	858.05
District Avg.	1385.2	818.38	634.43	975.00	1187.53	830.03	656.28	634.55	1073.75	726.5	892.16

Weblink: http://cgwb.gov.in/District Profile/Maharashtra/ Washim.pdf

Coordinates:

Ar. Kiran P. Deshpande

(B. Arch, F.I.V)

Reg. No. CA/2001/28227

Shree Samarthya Conslt & Engg.Services

Jawahar Nagar/Akola.

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