Yashwantrao Chavan Warana Mahavidyalaya, Warananagar.

GREEN AUDIT REPORT

2014-15

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GREEN AUDIT REPORT

2014-15

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of
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Green Message:

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

(Vinayravgi V. Kore)
Chairman, Warana Vibhag Shikshan Mandal,
Warananagar.

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

Hon.G. D. Patil-
Secretary, Warana Vibhag shikshan Mandal, Warananagar.

Message

Sustainable development is widely used in these days by the policy makers, academia, governments in all areas including developmental projects and in many verticals. Sustainability is not only spoken in various levels but also practiced by industries, organizations and educational institutes to optimize their resource utilization and make them environmental friendly. As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more prevalent. Hence sustainability is the need of the hour for our country to provide our future generation a cleaner, safer environment. To achieve it there are many paths, one should be able to identify the best path related to their educational organization to achieve sustainability. Various models and tools are already developed by researchers working on this domain which helps them to identify the focus areas where the optimization is possible to improve the environmental performance of the educational institutes.

Education is one of the key solutions for this situation. Sustainability had become the key word of developing nation and it's evident in many issues, the growing economy is facing nowadays. Ecology is being associated with the growth of any industry, organization. A nation's growth starts from its educational institutions, where the ecology is thought as a prime factor of development associated with environment. Educational institutions nowadays are becoming more sensitive to environmental factors and more concepts are being introduced to make them eco-friendly. To preserve the environment within the campus, various viewpoints are applied by the several educational institutes to solve their environmental problems such as promotion of the energy savings, recycle of waste, water reduction, water harvesting etc. Educational institutions must play an active role in creating and modeling solution for such environmental problems. 'Green audit' is one such concept or principle introduced to make the educational institute environmentally sustainable. Our college has implemented eco-friendly practices to manage the available resources and has taken steps in environmental conservation and protection. As a part of such practice, internal environmental audit (Green Audit) is conducted to evaluate the actual scenario on the campus. Our expert of 'Green Audit Committee-2014-15' made a keen survey of YCWM Warananagar campus in which these experts identify and determine whether institutional practices are eco-friendly and sustainable.

I am very happy to forward this 'Green Audit Report 2014-15' of YCWM, Warananagar campus. I must congratulate Dr. Vilas.S.Patil, Co-ordinator ,Green Audit committee and his team for taking efforts for the completion of such brief report. I hope the report will be helpful to all concerned in the YCWM Warananagar campus and will motivate for Greening our educational institutions.

(G. D. Patil)
Secretary, Warana Vibhag shikshan Mandal,
Warananagar.

"Only when the last tree has been cut down,
Only when the last river has been poisoned,
Only when the last fish has been caught,
Only then will you find that money cannot be eaten."

-Lester Brown

Hon. Principal Dr.S.B. Shahapure

Y.C. W.C.Warananagar.

Foreword

The world in 21st century is facing many challenges related to environment. On one hand world is developing at alarming rate while on the other hand the destruction of natural resources is going on. That means world's present development path is not sustainable. Efforts to meet the needs of a growing population in an interconnected but unequal and human-dominated world are ignoring the Earth's essential life-support systems. Today, the human society is facing severe environmental problems like climate change, greenhouse effect, energy crisis, depletion of natural resources, biodiversity loss, pollution of air, water, soil, etc. The ever increasing population and changing life styles are increasing the severity of the environmental problems. The time has come to protect the natural environment through precise efforts.

At the same time sustainable development through higher education provides a pivotal role in nations building. Sustainable development remains barely a significant social, economic or environmental challenge for any country. Though teaching and learning must begin to reflect environmental issues, there is an emerging consensus that institutions must also model sustainable practices. Such education contributes strongly to sustainable development by training and expanding young minds in researching solutions to the environmental challenges. After graduation the students become leaders of tomorrow and get dispersed from the world of higher education into their specific career. In doing so, they take with them the green practices and approaches they were involved with at their institution.

Eco-campus or Ecological Campus has its meaning in itself. The meaning of eco-campus has been expressed in its targets and objectives. By all means, eco-campus means "environmental sustainability within the school / colleges". College is a center for generating education; Moreover, it is also a research center where the students and teachers are attempting to develop the best strategy for achieving their purposes. Due to this reason, the development of eco-campus has been pointed out and established recently. Eco-campus concept mainly focuses on the efficient uses of energy and water; minimize waste generation or pollution and also economic efficiency. All these indicators are

assessed in process of 'Green Auditing of educational institute'. Eco-campus focuses on the reduction of the educational institute contribution for emissions of green policy, procure a cost effective and secure supply of energy, encourages and enhance staff and student energy issues, also promotes personal action, reduce the institute energy and water consumption, reduce wastes to landfill and integrate environmental considerations into all contracts and services considered to have significant environmental impacts. While these various measures are promoted synthetically and systematically, an "Environmental Management System" is introduced, in order to realize certainly the "Ecocampus".

The Green audit 2014-15 of our college was carried out to find out areas of strengths and weaknesses in environmental management within the institution. Findings of the green audit report 2014 -15 showed that the institution could conserve paper, electricity and water easily, if better environmental awareness was created. Canopy of trees, number of garden and greenery in campus beautify the campus and automatically neutralize carbon footprint. College has already taken some steps like Plantation of local and endemic plant species, arranges special programmes by inviting the eminent personalities for environmental consciousness of staff as well as student, cleaning and beautification of YCWM campus by various activities through NSS and NCC units. Some activities pursued by colleges can create a variety of adverse environmental impacts.

The report made a number of recommendations, including the design of an Environmental Management Plan (EMP) for institutions which must be enforced after designing the Green Policy by college. Now College recognizes the need to function all year round in a manner which minimizes its harmful environmental impact by designing a Green policy. Implementation of Green policy provides chance to exploitation of opportunities for better performance in the future.

I know that sharing of this reports widely generate greater awareness with in campus community, hence I am very glad to make public this report.

I am also thankful to Dr. Vilas .S.Patil, Coordinator of Green Audit Committee and his team for taking sincere efforts and hard work for the completion of such case study report. I hope the report will be helpful to society, staff, student and all concerned in the YCWM, Warananagar campus and will motivate for Greening aspect through green practices.

Dr.S.B. Shahapure
Y.C. W.C.Warananagar

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

Dr.Vilas S Patil.
Co-ordinator, Green Audit Committee,
Assistant Proffessor,
Department of Physics,Y.C.W.M. Warananagar.

About Green Audit

Everything that happens in the world is the expression of flow of energy (Electrical) in one of its forms**.** In development process to cope with increasing energy demands, conservation and energy efficiency measures are two parallel paths.

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

India with the second largest population in the world is now one of the fastest growing economies with a rapid growth in GDP. In the past few decades the need for trained people is rapidly increasing in the industrial and other fields to support our countries technological growth. This has lead to the establishment of more and more technological and educational institutions in India. India has a large number of Universities, colleges, and other institutions and the number is growing rapidly in the past few decades. In Maharashtra itself there are more than 6000 educational institutions now operating to cater to the needs of students from various areas of study for more than 2 million students. It is well known that educational institutions consume resources like water, electricity; Forest products and generates wastes like many industries. Establishment and operating of educational institute are not covered by any of the environmental laws in India. As a result, the importance of making the educational institute operate with self consciousness in the utility of resources inside the campus is least understood. Eco campus is a concept implemented in many educational institutes across the globe to make them sustainable because of their mass consumption of resources and creation of waste. Waste minimization plans inside the educational institute for

solid and wastewater is now mandatory to maintain the cleanliness inside the campus. To find out the environmental performance of the educational institutions and to analyse the possible solutions for converting the educational campus as eco-campus the conduction of Green Auditing of institution is essential.

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

For green auditing of YCWM Warananagar campus college formed internal 'Green Audit committee 2014-15' and the responsibility of coordinator of this committee is given to me. This is the first attempt to conduct green audit of our college campus, there was no baseline data. Hence our committee followed rules, acts and formats set by Govt. of India, Ministry of Environment and Forest, New Delhi ,Central Pollution Control Board, New Delhi and proposed strategy on the Greening concept approved by the IIT Council. Focus was given on greening indicators like consumption of energy, electricity, fuel-natural gas, water as well as disposal of liquid waste, solid waste, hazardous waste and e-waste and air quality also. For preparation of questionnaires and in conducting 'Green Audit' guidelines and help is taken from Prof. (Dr.) P. D. Raut, Professor and Head Department of Environmental Science Shivaji University, Kolhapur and alumni of our college Dr. Prashant Banne who is exisistingly working as Director and Environment Consultant for SAITECH, Research and Development Organization. The questionnaire contains month, year, total number of students and employees, visitors of the department, average working days and office timings. The information related to consumption of resources like water, electricity and handling of solid and hazardous waste was collected in the formats from departments and common facility centers. Even though, the data collected is for one month and during the period of year is giving a total idea about the various environmental parameters. Collected data was grouped, tabulated in Excel sheets and analyzed. The graphs of the analyzed data were prepared for getting facts at glance. Final report pertaining environmental management plan with strength, weakness and suggestion on the environmental issue of YCWM Warananagar campus. Our team also proposed an structure of "Green Policy' for campus as one management plan.

During the Green auditing for survey, data collection, monitoring, verification and for preparation of the-'Green Audit Report-2013-14' our Hon. Chairman,Hon. Secretary, Hon. Principal

encouraged us with their full support. All Heads of the departments, Professors, Non-Teaching staff, officers in-charges of the common facility centers of the college also gave full co-operation. I am also thankful to co-coordinators, committee members for supporting me during Green auditing. I must also thank students of our college for circulating and submitting questionnaires in time. I hope the efforts made will be helpful for YCWM campus to take one step ahead for greening purpose.

Dr.Vilas S Patil.
Co-ordinator, Green Audit Committee
Assistant Proffessor,Department of Physics,
Y.C.W.M. Warananagar.

1. Look deep into nature, and then you will understand everything better. - **Albert Einstein**

2. Our task must be to free ourselves by widening our circle of compassion to embrace all living creatures and the whole of nature and its beauty. - **Albert Einstein**

"LET'S GO GREEN TOGETHER....."

Dr. Prashant A. Banne, M.Sc. Ph.D. (Environmental Science)

- CEO & Managing Director, SAITECH Research & Development Organisation
- External Faculty, PCRA, Under petroleum Ministry, Govt. of India
- EIA Coordinator, was accredited by NABET, Quality Council of India

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Expert Opinion

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

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

Green Audit can be defined as systematic identification, quantification, recording, reporting & analysis of components of environmental diversity. The term "Green" means eco-friendly or not damaging the environment. The green audit practically involves energy conservation, use of renewable sources, rain water harvesting, efforts of carbon neutrality, plantation, hazardous waste management & E-waste management.

This document presents a proposal for both the process and the content of an environmental assessment of Yashwantrao Chavhan Warana Mahavidyalaya /College (YCWM). The process involves the formation and deliberation of assessment teams, each consisting of a group of knowledgeable stakeholders within the campus community. This report serves to highlight YCWM's many accomplishments, and to make recommendations for improving the College's environmental sustainability.

The Environmental or Green audit report is prepared by Dr. Vilas Patil and his faculty associates at YCWM, Warananagar with support from Principal of YCWM & various stakeholders of Warana Shikshan Mandal, Warananagar. I would like to extend my special appreciation for the amazing work done by Dr. Vilas Patil on the Green Audit project. Seeing their diligence, self

SAITECH RESEARCH AND DEVELOPMENT ORGANISATION

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motivation and focus has been a source of motivation for the rest of the team, as we see a positive approach in the college.

Besides that, this assignment was done by Dr. Vilas Patil and his team, is not just about providing opportunities for student learning and growth, it was about an obligation to exercise leadership in promoting environmental sustainability, environmental awareness and commitment that leads to action, that leads to transformation and change. They have studied and presented their efforts in this report. This is not only for the institution itself, but just as importantly to be a role model institution for others to emulate and bring the environmental concerns and related mitigating measures to centre stage of Green campus life which extend locally, regionally and beyond.

The overall goals of this project are four-fold:

- To introduce students to the tools of investigation and the process of quantification of resource use and sustainability using the YCWM Campus as a study site
- To analyze various resource use patterns and levels of resource use on the Campus
- To establish a baseline to assess future sustainability work
- To identify and catalog existing efforts to make the College a more environmentally sustainable institution of higher learning.

To accomplish these four objectives, they have to analyze resource use and the campus environmental impact through a series of environmental or sustainability lenses. YCWM College needed to conduct an audit, in order to judge how they are using their resources and if they can use them more efficiently.

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

It is observed that –

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

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- Plantation inside the college premises is found well maintained.
- The college undertakes various activities through N.C.C., N.S.S. like beautification, water and power management.
- Baseline data generation for Air, water, energy (in all forms electricity, fuel) and waste.
- Data management and analysis of trends with respect to energy consumption, water consumption, waste water generation, solid waste generation (stream wise).
- Program on rain water harvesting has been taken up, the project is under progress.
- Establishing improvement objectives for reducing energy consumption, water consumption, and fuel consumption.
- Identification of improvement initiatives, prioritization and rollout of suitable projects
- Ensuring effective implementation of such projects to attain set environmental goals

Recommendations:

- A mechanism needs to be developed to identify the various environmental aspects & the impact arising from the activities of the institute. This will enable the college to map its various resources usage and waste streams, in accordance with the same control measures could be developed and implemented.
- College needs to develop a monitoring & measurement program for resources (water, electricity, LPG & fuel)
- Consumption efficiency by (a) evaluating current consumptions, (b) setting time based reduction targets (c) action plan to achieve the same with defined responsibilities (d) periodic review of effectiveness of actions implemented.
- Suitable communication by means of banner, posters, one point lesson can be displayed at vantage location to create awareness among all stakeholders.
- Student's community may be involved in small groups for different environmental improvement projects within the college as well outside the college boundary.
- The cleanliness of the common room for students and some of the classrooms found inadequate.
- Participation and involvement of the students can be improved by college event on pertinent days such as world environment day, earth day, World Water day etc.
- Waste Water reuse and recycle opportunities have not been explored.
- The college may take initiative for community plantation programme by involving students to offset the GHG emission.
- College needs to develop an emergency preparedness plan; Signage indication emergency evacuation layouts, routes and assembly area are not implemented.
- Stakeholder awareness on emergency preparedness needs to be improved.
- Infrastructure for firefighting needs to be reviewed.
- First aid room is not maintained in proper condition.

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Waste Generation & Management:

- E –waste and glass wastes generated from office, IT and Science labs are handled through authorized service provider.
- The Chemistry, Botany and Zoology laboratories are using a number of hazardous chemicals (e.g. – mercuric chloride, formaldehyde, butyl alcohol etc.). The Department needs to identify all the hazardous chemicals and necessary communication dos and don'ts to minimize environmental and health impact by the user from the MSDS.
- Presently solid waste disposal process is done in unorganized basis. The collection of waste is done from the campus on as and when required basis and the solid waste disposed through only by recognized technologies like vermicomposting, decomposition etc.
- The college has not yet taken any initiative for carbon accounting.
- Plantation program has been initiated inside the campus.
- Adequate awareness program amongst the students and other stakeholders (faculty, other staffs, service providers etc.) needs to be organized for proper solid waste disposal.
- The college may start proper communication with the local body for regular collection of solid waste from the campus. Various wastages like used tube lights, plastic bottles were observed on ground behind the common room.
- College needs to prepare & implement a waste handling & disposal procedure with clear identification for different type of wastes. Disposal area for different types of waste needs to be earmarked.
- The college does not have a waste collection system with proper segregation. The college may introduce waste collection bins with different colour code for biodegradable and non-biodegradable waste for source segregation with adequate signage.

Water Conservation:

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

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

Energy Conservation & Efforts on Carbon Neutrality:

- Assessment of electrical load calculation is not yet done by the college.
- The college may assess the equipment rating to have the baseline data for assessing energy consumption pattern.
- Maximum numbers of electrical fans are found of older generation & non energy efficient. The college may develop a phase out plan of the same by replacing with new energy efficient fans.
- High energy consuming Incandescent lights and fluorescent lights are found in use. The college may plan for long term phase out plan of the same with less energy consuming LED or CFL lights.
- Many classrooms are found unoccupied while fans & lights are operational. Automation or time control mechanism may be explored.
- The communication process for awareness in relation to energy conservation found inadequate.
- The college is having considerable area in the roof top, a cost benefit analysis may be done for installation of solar panel to reduce carbon footprint. College needs to explore the usage of renewable energy sources like solar panels for lighting & water heating, Electricity generation from Wind mills etc.
- The college may account the carbon foot print from per capita energy consumption and other means of GHG emission. Based on the baseline data the college may set target and program to reduce carbon foot print.

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

Thanks and Regards.

Yours Sincerely,

Dr. Prashant A. Banne
(CEO & Managing Director)

Our Expertise in:

- Environmental Clearance, EIA-EMP studies
- Environmental Monitoring and analysis
- Pollution Control Board Consultancy
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EXECUTIVE SUMMARY AND IDENTIFICATION OF ‘GREEN INDICATORS’:

The Green Audit Committee 2014-15 of our college Yashwantrao Chavan Warana Mahavidyahalaya , Warananagar has conducted a "Green Audit" in the academic year 2014-15. ‘Green audit’ is one of such potential tool which can be used effectively by any educational institution for resource usage identification and optimization. If green audit properly deployed with all indicators, it will increase the sustainability of the institutions and reduce their resource consumption, which will benefit the institutions and the nation in many ways. ‘Green auditing is the process of identifying and determining whether institutions practices are eco-friendly and sustainable’. The main objective to carry out green audit is to check green practices followed by the college and to conduct a well formulated audit report to understand where we stand on a scale of environmental soundness. (This is the first attempt to conduct green audit of our college campus, there was no baseline data). For Green Auditing questionnaires prepared based on the guidelines , rules, acts and formats set by Govt. of India, Ministry of Environment and Forest, New Delhi and Central Pollution Control Board, New Delhi. For preparation of questionnaires and in conducting ‘Green Audit’ guidelines and help is taken from Dr. Raut ,The HOD of Department of Environmental Science, Shivaji University, Kolhpaur and alumni of our college Dr. Prashant Banne who is exisistingly working asDirector, SAITECH, Research and Development OrganizationIn Kolhapur. Questionnaires were prepared for solid waste, energy, water, hazardous waste and e-waste. For audit purpose and suitability of analysis of data the study area i.e. our campus is grouped as Science Departments (includes Jr. and Sr. wing), Arts Departments (includes Arts Jr. wing ,HSVC wing and Language, Social sciences departments at Sr. wing), Commerce Department(includes Jr. and Sr. wing), Office(include Administrative Office, Principal chamber, meeting hall. Non-residential hall, store, strong room etc), Computer/ I/T. Lab. Gymkhana (includes gymnasium hall, gymkhana office, Shivneri ground, Medical officer room etc) , Exterior (includes Botanical Garden, Garden in front, in back of new building, Roads in Campus and area in near etc) and Common facility centers (includes Library and MPSC Staff quarters, Canteen, Boys hostel , Ladies hostel etc). The environmental audit was carried for solid waste, electricity and energy, water, hazardous waste, noise and air quality. The 'Green Audit' also give a 'Environmental Management Plan' and propose an ‘Green Policy’ to increase the green practices in campus.

1. Solid Waste: This indicator addresses waste production and disposal: paper waste, food waste, plastic, biodegradable waste, construction waste, glass waste, dust etc and recycling. Furthermore, solid waste often includes wasted material resources that could otherwise be channeled into better service through recycling, repair, and reuse. Solid waste generation and management is a burning issue. Unscientific handling of solid waste can create threats to everyone. The solid waste

audit focused on volume, type and current management practice of solid waste generated in YCM campus. The solid waste collected was paper waste, plastic, biodegradable waste, construction waste, glass waste and other miscellaneous waste. The total solid waste collected in the campus is 7816 kg/month. Paper waste is a major solid waste generated by all the departments. Single sided used papers reused for writing and printing in all departments. Important and confidential reports/ papers are sent for pulping and recycling after completion of their preservation period. Very less plastic waste is generated by some departments, office, garden etc but it is neither categorized at point source nor sent for recycling. Metal waste and wooden waste is stored and given to authorized Scrap agents (Siddhanath Paper Waste and Scrape Merchant, Kodoli, Dist-Kolhapur & Salunkhe raddi and scrap traders, Kodoli, Dist-Kolhapur) for further processing. Few glass bottles are reused in the laboratories. Small paper piece waste, classroom waste, biodegradable waste is not used for composting but burn on site. Food waste, dinning waste etc. of common canteen is thrown at site. Some paper dishes, plastic use throw dishes, packages of food are burned nearer the canteen. The food waste from main canteen and mess is not used or sent for vermin-composting plants.

2. 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 centers include electricity, liquid petroleum and LPG.

Major use of energy is in Science Department, office, canteen, hostel and laboratories for lighting, transportation, cooking and laboratory work. Energy consumption by major energy consuming Equipments in College laboratory is 2663.28 KW / Month, Energy consumption by less energy consuming Equipments in College is 4089.13 KW / Month and Energy consumption by Lightning Equipments in College is 4806.62 KW / Month . Thus total Electric energy consumption in college is 11559 KW / Month. No any department and common facility centers were using CFL lamps except department of chemistry and HSVC. All the departments with common facility centers are using a incandescent lamp where increasing consumption of electricity observed. The street lights in front of main gate of campus are HID type and other street lights in campus are of sodium vapour lamp also increasing major consumption of electricity for lighting purpose. In group of study area more electricity is consumed in administrative office, Computer laboratory, Science departments, library and MPSC center on the other hand, it consumed very less at arts and commerce departments. Due to lack of adequate ventilation and natural light at 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. In science laboratory at some places exhausts fans are used at proper locations but their use has to be monitored in summer duration. Also high consumption of electricity is observed at office in duration of admission and examination. Some water coolers (nearer to Chemistry lab and nearer to 15 B) are seen overflowing frequently, It wastes electricity as well as water. For this monitoring responsibility was given to peon in near labs. Major electricity is required for water fetching, irrigating purpose although sprinkler, drip irrigation is used for watering the gardens in campus. 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 teaching as well as non-teaching staff is in campus and nearer to campus for resident and mass number of students are come from nearby villages of Warananagar hence consumption in fuel is less. As our college is situated in rural area very less number of students are using vehicles, only 13.48 % of staff using four wheelers is less number. Study shows about 27.76 % students come to the college by walking, 10% student are using bicycle and, 48% are using state transportation vehicles and no any student make use of private transportation like Vadap. Staff members who lived out campus are using the vehicles in sharing for daily transportation. Also effect of bicycle bank scheme for female student was functioning in well manner and private transportation vehicles are restricted in YCM campus from gate. The college follows 'No Vehicle Day' on 13th December on occasion of death anniversary of Late. Tatyasaheb Kore was minimizes the fuel consumption for a day, which is a one of green practices followed by the college. Study tours, collection tours, visits, treks, save fort and clean forts abhiyan 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 but high consumption is observed at common facility center like canteen, mess and staff quarters. The LPG connection in name of the college and LPG is handled by departments of Physics, Chemistry, HSVC. For heating purpose at the time of practical, no leakages and off mode regulators are seen at time of verification. Number of two wheelers is 597 , it consumes 6958 liter/month and number of four wheelers is 48, it consumes 1838 liter/month, i.e. total consumption of fuel in YCM campus is 8796 Liters/Month.

3. A)Water and waste water audit: This indicator addresses water consumption, water sources, irrigation, storm water, appliances and fixtures. A water audit is an on-site survey and assessment to determine and improve efficiency water use. In survey water used at bathrooms, toilets, laboratory, kitchen, garden, shower and of as well as leakages and over flow of water from overhead tanks is also been evaluated.

The data collected from all the departments is examined and verified. For monitoring of water use number of times of filling of tanks per day, time for overflowing, rate of flow, water

wasted in liters per day due to overflowing is periodically is supervised by water management and water harvesting committee members. Data submitted by the departments it examined according to leakages, rate of flow of leakages, use for washing, use of water for cleaning etc by committee.

On an average the total use of water in the college is 17,20,180 Liters/Month and 2,06,42,147 Liter/Year.. Major loss of water is through overflow of tanks and it is observed about 5,56,108 Liters /Month and water loss due to leakages is 17,436 Liters/Month. The major use of water is in common staffroom , science building, canteen, Staff quarters, hostels, canteen and at exteriors.. There is also water filtration plant for filtration of water in the botanical garden which supplies filter water for drinking purpose. Roof top rain water harvesting is also been practiced in some extent by the department of Chemistry with storing rain water and using it as distilled water and distributing to other department for practical purpose. In the Chemistry laboratory the water harvesting system is in working order during rainy season. Roof water is collected in big syntax tank and used as distilled water. This is used by all laboratories throughout the year . Water harvesting is also practiced by digging two wells in campus at such geographical place where rain water and peculated water easily trapped in it. The collected drain water, rain water from roofs of building, rain water from paved area in the campus is send toward the wells. Although our campus has canopy of trees (grand total - 5021), huge botanical garden, garden and lawn in front of new building, garden in back of new building for this requirement of irrigating water is major and it is sufficiently filled by the wells but new design of water harvesting system and watering the garden is necessary. Gardens are watered by using drip/sprinkler irrigation system to save water. The sprinklers are used for irrigating gardens, different lawns in campus is one of the steps toward greening practices. Less number of leakages are observed while conduction of verification and site inspection of infrastructure still plumbing survey of water supply line is necessary to stop water supply after occupancy time and to use pressure valves / sensor valves to make control on overflow is necessary. Need of monitoring, controlling overflow is essential and periodically supervision drills should be arranged. In campus small scale / medium scale/ large scale reuse and recycle of water system is necessary.

4. Hazardous waste audit:

A. Chemical waste: This indicator addresses hazardous waste, laboratories, medical waste, art supplies, colors, dies and chemicals used in campus maintenance. Hazardous materials represent significant risks to human health and ecological integrity. They often persist in the environment leaving a legacy of land and water contamination for generations. Many accumulate in the tissues of organisms and become concentrated within food chains, leading to cancer, endocrine disruption, birth defects, and other tragedies. The minimization, safe handling, and ultimate elimination of these materials are essential to the long-term health of the planet. Only in the department of Chemistry,

Botany and Zoology the laboratories generate the chemical waste. Survey and data collection shows that chemical waste generated on the campus through Science laboratories is very less and majorly generated by the department of Chemistry. At time of site inspection it is observed that in the department of Chemistry hazardous chemicals are handled for practical purpose and these hazardous chemical wastes are drain out with basin water directly to the botanical garden and producing negative impact on environment. In some extent it produces an air, soil, water pollution. Hence for environmental sustainability the drainage of chemical laboratory should be collected in air tight cement chamber and frequently the chemical waste from chamber is sent for recycle or for scientifically destroy process. Although the laboratories of Zoology and Botany generating an less chemical waste and it is of category III, is also directly drained in lawn near the departments. It has to stored in cement chamber and it is frequently recycled or destroyed scientifically. In chemistry, Botany, Zoology different chemical bottles are labeled properly, tight with unbroken caps .The study as well as collected data reveals that solid hazardous waste 4.320 Kg and liquid hazardous waste 11.5 liters are generated, it drained with making 100 times dilution. Usually there is a practice in the laboratories to store these hazardous chemicals in the containers and cans for safe disposal. The stoppers of all the bottles are regularly checked. The exhaust fans are not provided in some laboratory to expel gaseous waste. In laboratory provide a separate dust bin for wet solid waste.

B) **W**ater **Environment:** Waste water sample form the Chemistry, Botany and Zoology was examined for Physico-Chemical parameters in order to assess the characteristics of the laboratory waste. From the analysis report of laboratory waste it is observed the Chemical Oxygen Demand (COD) is higher.COD of waste water sample is 840 mg/L hence waste water is not suitable for irrigating purpose. It can be decreased and make suitable for irrigating by adding coagulants like $Fecl_3$ and $Fe_{2(}So_4$) and then passing the sample through the filter made up of sands, charcoal, activated carbon.

B. E-waste: E-waste can be described as consumer and business electronic equipment that is near or at the end of its useful life. E-waste makes up about 5% of all municipal solid waste worldwide but is much more hazardous than other waste because electronic components contain cadmium, lead, mercury, and Polychlorinated biphenyls (PCBs) that can damage human health and the environment. E-waste generated in our college is of schedule III and is generated is very less in the in institute is handled, treated and disposed in scientific way.

In the year 2012-13 our college purchase committee sold an about 52 peripherals (CRT monitor, P III computers , CPUS, UPS, Multi media system etc.) which are not in use. Computers, Printers and other ICT equipments which cannot be used are sold to vendors who do the recycling. Now our institute has some e-waste like chips, bulbs, circuit boards, mother boards, computers,

batteries, relays, and switches with garbage.

The college is not using paperless office work administration due to which in campus there is carbon emission in printers, carbon copy of bills, filing of cartridge inside the office and several departments is observed. The non-working computer spare parts and other non-working electrical equipments are dumped in different department at several places. Buy back policy is not available. The cartridges of laser printers are not refilled outside the college campus. College has to conduct the awareness programmes regarding -E-waste Management with the help of Department of Physics and department of Electronics & Telecommunication of sister concerned TKIET, Warananagar. E-waste handled is 143.5 kg per year and by record this total E-waste treated and disposed. E-waste generated within college will be stored separately and disposed off through authorized vendors .

5. Air quality audit:

Air quality in the academic institute is very important for health of the students, faculty and staff of the institute. The air pollution sources in the college campus are wind storm, pollen grains, natural dust, vehicular emissions, generators, fires and laboratory fumes etc. All the pollutants are measured by the Dr. Prashsnt Banne and his technical team. Six locations are selected for the ambient air quality monitoring , selection of stations is based on the Meteorological conditions of the area.

The air pollutants monitored on regular basis are Sulphur dioxide (SO2), Oxides of Nitrogen as NO2, Suspended Particulate Matter (SPM) and Repairable Suspended Particulate Matter (RSPM) etc. The chief sources of air pollution in the study area are mainly due to existing sugar factory unit of Shree Tatyasaheb Kore Warana Sugar factory, Warananagar, vehicular activities and domestic firewood burning, fuel burning etc. The major pollutants released in the atmosphere will be PM_{10}, $PM_{2.5.}$ SO_2 NO_x and CO etc. All the air quality parameters are within standard limits of CPCB, New Delhi, suggesting ambient air quality at YCM campus. College has green campus of 27 acres, efforts have been made on to bring part of land under cultivation of medicinal plants as well as other productive plants through NSS , NCC students ,Seniors students , teaching and nonteaching staff in college. In campus total 5021 tree of 152 varieties are present in which 3087are trees, 1424 are shrubs, 473 are herbs and 37 are climbers.

We created a green zone in our campus. The college has planted different types of large number of trees in the campus, hence the greenery around the institute helps to neutralize whatever carbon and its byproducts generated.

6.0 Noise Environment

The noise levels measurements were carried out using precision noise level meter. The noise level survey was carried out at six locations, at outside as well inside the study area campus. The major source of noise identified in the study area has been predominantly the vehicular movement, and the transportation activities.

Environmental Management Plan:

Environmental Management Plan gives the strength, weaknesses and suggestions on the environmental issues of YCWM campus. It also suggests about which area is to be given priority. The green audit of college campus reveals that the administration should take care of glass waste, waste water, chemical waste and e-waste management on high priority as the ignorance to these will deteriorate the environment on the campus. The entire exercise of green audit concluded that the college administration is keen on all the environmental issues. College have lot to gain by following links to work towards making a green campus and more environmental friendly campus. Students, staff, faculty and administration working together will produce the best results raising awareness and helping to push the environmental friendly agenda in front of campus.