GREEN AUDIT REPORT

2022-2023

FOR

Mahila Mahavidyalaya, Karad.

Mangalwar Peth , Karad. 415110,

By:-

Nature & Care
Scientific Solution
Environmental Consultant & Services

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Green Audit Team

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- **Dr. Shri. Hanmant Y. Karande, Member**
- **Smt. Sayali More, Member**

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CERTIFICATE

Date:- 30/09/2023

Environmental (Green) Audit

This is to certify that ***Mahila Mahavidyalaya, Karad,*** has satisfactorily conducted the Environmental (Green) Audit in accordance with the required norms for the academic year2022-2023.

The audit shall assist them to develop measures to save the environment and its individual units.

For Nature & Care

Authorize Signatory

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Executive Summary

Eco campus is a concept implemented in many educational institutions, all over the world to make them sustainable because of their mass resource utilization and waste discharge in to the environment. Waste minimization plans for the educational institute are now mandatory to maintain the cleanliness of the campus. To find out the environmental performance of the educational institutions and to analyze the possible solutions for converting the educational campus as eco-campus the conduction of Green Auditing of institution is essential. The green auditing of ***Mahila Mahavidyalaya, Karad***, enables to assess the life style, action and its impact on the environment. This is the first attempt to conduct green auditing of this college campus. This audit was mainly focused on greening indicators like consumption of energy in terms of electricity and fossil fuel, quality of soil and water, vegetation, waste management practices and carbon foot print of the campus etc. Initially a questionnaire survey was conducted to know about the existing resources of the campus and resource consumption pattern of the students and staffs in the college. In order to assess the quality of water and soil, water and soil samples were collected from different locations of the college campus and analyzed for its parameters. Collected data was grouped, tabulated and analyzed. Finally a report pertaining environmental management plan with strength, weakness and suggestion on the environmental issue of campus are documented.

INTRODUCTION

About college

Mahila Mahavidyalaya is founded on August 7, 1986 to cater to the needs of higher education of women of Karad town and nearby rural areas by Shikshan Mandal, Karad, a well known educational society of Western Maharashtra. The society has given more attention to quality excellence rather than multipoint expression. It has provided possible good infrastructure, human resources and more than this, leadership with vision. It was felt in the latter half of the 1980 that a good women's college is needed on the city side of Krishna bridge, a separating divide between the city on one side and Vidyanagar, a higher education campus that had come up on the northern side of the bridge. The commuting from the city and surrounding rural area across the river was becoming hazardous to the students in general and girl students in particular. Karad being one of the educationally alive taluka had a large population willing to educate their girl wards in higher education. But unfriendly social environment led them to crave for such a facility for girls' academic and social security, assuring quality on the city side of the river Krishna. Thus Shikshan Mandal Karad was called on once again to answer the call of girls' education in the city.

The women do differ in their psychological makeup and their learning priorities. So the co-educational environment often a misnomer or disguised masculine programme frustrates the academic aspirations of girls by the harsh hold, so Shikshan Mandal answered the call and established this college. It doggedly weathered down the financial tribulations of non-grant institution with heroic work of its intelligent teaching team and inquisitive students. The work succeed at the god pace and the college progressed and earned permanent affiliation within eight years in 1994 and UGC listing has followed it in 1998. The college is accredited by NAAC with 'B' grade in 2004 and re-accredited with 'B' grade in the year 2012 respectively. At the end of academic year 2016-17, college classrooms are equipped with 'Interactive Digital Boards' as well as Wi-Fi Internet connectivity.


महिला महाविद्यालय कराड

Vision and Objectives of College:-

Mahila Mahavidyalaya is committed to the cause of self development and empowerment of girl students through access to modern, scientific and value based higher education to groom into responsible citizens.

The college has highly qualified teaching faculty, Many of them have proved their excellence in teaching, research and publication.

Objectives :-

1) To provide higher education in arts and commerce faculty.

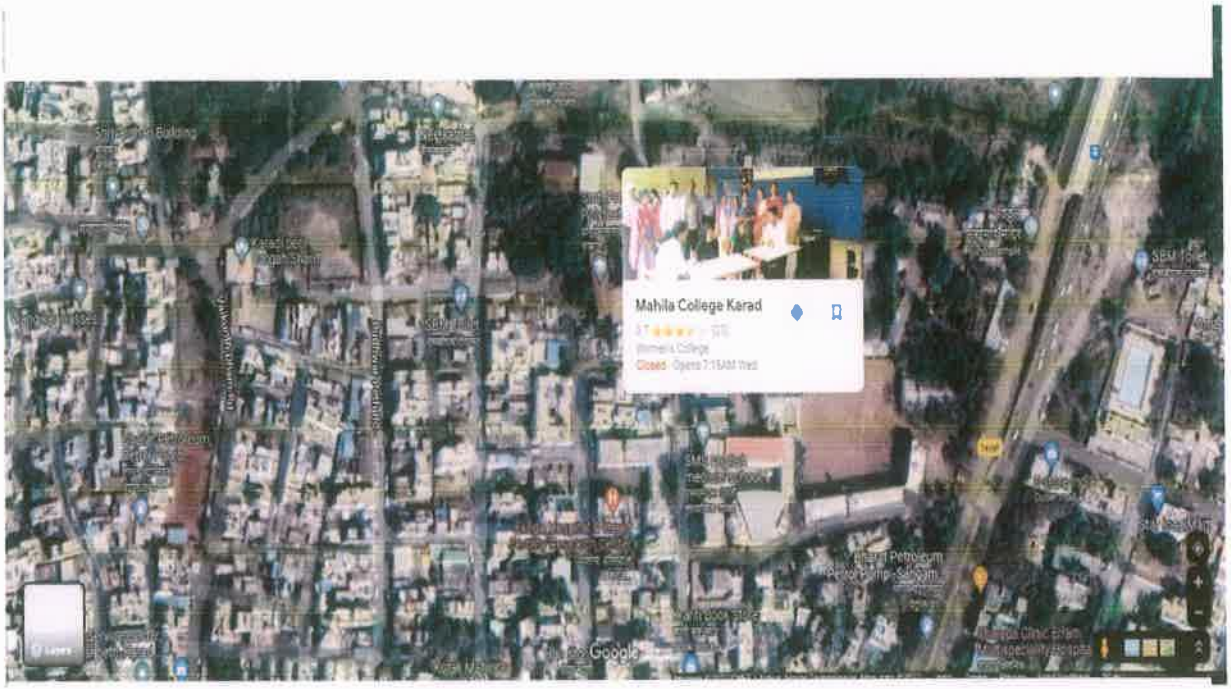
2) To provide opportunities for all-round development of the students and excellence in higher education through co- curricular and extracurricular activities.

3) To inculcate positive self concept, awareness about women's Issues and rights.

4) To enhance purposeful education with human values and social responsibility.

5)To organize short term courses aiming at striking a fair balance between them.

6) To encourage students in extra-curricular and co-curricular activities.



Location

Mahila Mahavidyalaya ,Karad

Mangalwar Peth , Karad 415110,
Tal - Karad, Dist - Satara,
Maharashtra.
Ph – 02164(220849)

Courses offered by the College

Sr. No	Programme Level	Name of the Programme/ Course	Duration	Entry Qualification	Medium of Instruction
A					
1	**B.A.**	Part-I	3 Years	H.S.C	English
		Part-II			
		Part-III			
2	**B.Com**	Part-I	3 Years	H.S.C	English
		Part-II			
		Part-III			
B					
	M. A.	---	2 Year	Graduation	English
C					
	B.Sc.	Part-I	3 Years	H.S.C	English
		Part-II			
D	**B.Com. IT**				
		Part-I	3 Years	H.S.C	English
		Part-II			

The student and faculty strength of the college is listed below:

No of students	804
No of teachers	44
No of Non-teaching staffs	09

The College has adequate infrastructure

1. 16 Classrooms
2. One Seminar Hall
3. Twelve Laboratories- (Food Science, Textile Science & Clothing (Home Science), Geography-UG, PG, Two Computer labs and Geography M. Phil & Ph. D Research lab, Physics, Chemistry, Botany, Zoology, Microbiology, Electronics.
4. 10 Classrooms have been equipped with **Interactive Boards** and Wi-Fi facility
5. Six Classrooms with LCD will be converted into Smart Classrooms in near future
6. Computer labs equipped with 65 computers, internet and printer facility
7. Office –computerized and equipped with 8 mbps internet connection and MIS
8. Reprographic facility- 2 Xerox machines
9. Staff Room
10. Recreation hall for students
11. Water cooler with clean drinking water
12. Aqua guard water purifier
13. Playground shared with sister concern
14. Open air stage
15. Sanitary napkin vending machine and incinerator:- 2

16. Sick/health Care Room with bed, Stretcher, wheelchair, First-aid Box

17. Ramps and railings

18. Well equipped, fully computerized library

19. Canteen

20. Students' Co-operative Consumer Stores

21. Well -equipped Gym

22. Yoga Hall

23. Study room with internet and computer facility

24. Centre for Skill Development

25. Beauty Parlour set-up

26. Fire extinguishers

27. Ladies Hostel

28. Two-wheeler and Four wheeler parking

29. Vermi-composting unit

30. Surveillance system (CCTV cameras) :- 16

OBJECTIVES OF GREEN AUDIT

The main aim objectives of this green audit is to assess the environmental quality and themanagement strategies being implemented in Mahila Mahavidyalaya, Karad,The specific objectives are:

1. To assess the quality of the water and soil in the Mahila Mahavidyalaya, Karad, campus
2. To monitor the energy consumption pattern of the college
3. To quantify the liquid and solid waste generation and management plans in the campus.
4. To assess the carbon foot print of the college
5. To assess whether the measures implemented by Mahila Mahavidyalaya, Karad, have helped to reducethe Carbon Footprint.
6. To impart environment management plans to the college
7. Providing a database for corrective actions and future plans.
8. To assess whether extracurricular activities of the Institution support the collection, recovery, reuse and recycling of solid wastes.
9. To identify the gap areas and suggest recommendations to improve the Green Campusstatus of the Mahila Mahavidyalaya, Karad.

TARGET AREAS OF GREEN AUDITING

Green audit forms part of a resource management process. Although they are individual events, the real value of green audit is the fact that they are carried out, at defined intervals, and their results can illustrate improvement or change over time. Eco-campus concept mainly focuses on the efficient use of energy and water; minimize waste generation or pollution and also economic efficiency.

All these indicators are assessed in the process of "Green Auditing of this educational institute". Eco-campus focuses on the reduction of contribution to emissions, procure a cost effective and secure supply of energy, encourage and enhance energy use conservation, promotes personal action, reduce the institute's energy and water consumption, reduce wastes to landfill, and integrate environmental considerations into all contracts and services considered to have significant environmental impacts. Target areas included in this green auditing are water, energy, waste, green campus and carbon footprint.

Auditing for Water Management

Water is a natural resource; all living organisms depend on water. While freely available in many natural environments, in human settlements potable (drinkable) water is less readily available. Groundwater depletion and water contamination are taking place at an alarming rate. Hence it is essential to examine the quality and usage of water in the college. Water auditing is conducted for the evaluation of facilities of raw water intake and determining the facilities for water treatment and reuse. The concerned auditor investigates the relevant method that can be adopted and implemented to balance the demand and supply of water.

Auditing for Energy Management

Energy conservation is an important aspect of campus sustainability which is also linked with carbon foot print of the campus. Energy auditing deals with the conservation and methodsto reduce its consumption related to environmental degradation. It is therefore essential that any environmentally responsible institution examine its energy use practices.

Auditing for Waste Management

Human activities create waste, and it is the way these wastes are handled, stored, collected and disposed of, which can pose risks to the environment and to public health. Pollution from waste is aesthetically unpleasing and results in large amounts of litter in our communities which can cause health problems. Solid waste can be divided into three categories: bio-degradable, non-biodegradable and hazardous waste. Bio-degradable wastes includes food wastes, canteen waste, wastes from toilets etc. Non-biodegradable wastes include what is usually thrown away in homes and schools such as plastic, tins and glass bottles etc. Hazardous waste is waste that is likely to be a threat to health or the environment like cleaning chemicals, acids and petrol. Unscientific management of these wastes such as dumping in pits or burning them may cause harmful discharge of contaminants into soil and water supplies, and produce greenhouse gases contributing to global climate change respectively. Special attention should be given to the handling and management of hazardous waste generated in the college. Bio-degradable waste can be effectively utilized for energy generation purposes through anaerobic digestion or can be converted to fertilizer by composting technology. Non-biodegradable waste can be utilized through recycling and reuse. Thus the minimization of solid waste is essential to a sustainable college. The auditor diagnoses the prevailing waste disposal policies and suggests the best way to combat the problems.

Auditing for Green Campus Management

Trees play an important ecological role within the urban environment, as well as support improved public health and provide aesthetic benefits to cities. In one year, a single mature tree will absorb up to 48 pounds of carbon dioxide from the atmosphere, and release it as oxygen. The amount of oxygen released by the trees of the campus is good for the people in the campus. So while you are busy studying and working on earning those good grades, all the trees in campus are also working hard to make the air cleaner for you.

Auditing for Carbon Footprint

Burning of fossil fuels (such as petrol) has an impact on the environment through the emission of greenhouse gases into the atmosphere. The most common greenhouse gases are carbon dioxide, water vapour, methane, nitrous oxide and ozone. Of all the greenhouse gases, carbon dioxide is the most prominent greenhouse gas, comprising 402 ppm of the Earth's atmosphere. The release of carbon dioxide gas into the Earth's atmosphere through human

activities is commonly known as carbon emissions. Vehicular emission is the main source of carbon emission in the campus, hence to assess the method of transportation that is practiced inthe college is important.

METHODOLOGY ADOPTED

The methodology adopted to conduct the Green Audit of the Institution had the following components

Onsite Visit

Four day field visit was conducted by the Green Audit Team . The key focus of the visit was on assessing the status of the green cover of the Institution, their waste management practices and energy conservation strategies etc. The sample collection (water, soil) was carried out during the visits. The water samples from two open wells and two tap water sources were taken and soil samples from three different places of the campus was collected. The sample collection, preservation, and analysis were done in the scientific manner as prescribed by the standard procedures.

Focus Group Discussion

The Focus Group discussions were held with the nature club, bird club, Environ Friends Club members, staff members and the management focusing various aspects of Green Audit. The discussion was focused on identifying the attitudes and awareness towards environmental issues at the institutional and local level.

Energy, waste management and Carbon foot print analysis Survey

With the help of teachers and students, the audit team has assessed the energy consumption pattern and waste generation, disposal and treatment facilities of the college. The monitoring was conducted with a detailed questionnaire survey method.

AUDIT STAGE

Green auditing in **Mahila Mahavidyalaya, Karad,** began with the assessment of the status of the green cover of the Institution followed by waste management practices and energy conservation strategies etc. The team monitored different facilities at the college, determined different types of appliances and utilities (lights, taps, toilets, fridges, etc.) as well as measuring the usage per item (Watts indicated on the appliance or measuring water from a tap) and identifying the relevant consumption patterns (such as how often an appliance is used) and their impacts. The staff and learners were interviewed to get details of usage, frequency or general characteristics of certain appliances.

Data collection was done in the sectors such as Energy, Waste, Greening, Carbon footprint and Water use. College records and documents were verified several times to clarify the data received through survey and discussions. The environment samples including water, soil were from various location of the campus were collected and analyzed at Nature & Care Scientific Solution, Satara.

Water Quality assessment

Water samples from four different locations were collected and analyzed for its quality parameters. The samples includes two well water which are the main water source of the college campus and two tap water samples which is used for canteen and drinking water cum cooler systems. The samples were collected, preserved and transported to school of Environmental Sciences and analyzed for various physio-chemical parameters. The major parameters analyzed include dissolved oxygen, acidity, alkalinity, chloride, hardness, pH, conductivity, total dissolved solids and salinity. The results are presented in the Table 1 The results are comparable with the values of drinking water standards prescribed by different agencies.

Table 1. Results of water quality

Sr. No	Parameters	Result	Unit	Permissible Limits
1	Total Dissolved Solids	48.6	mg/l	<500
2	Total Suspended Solids	5.3	mg/l	NA
3	Total Hardness (as CaCO3)	4.8	mg/l	<200
4	Chloride (as Cl-)	1.9	mg/l	<250
5	Phosphate as PO4	0.0	mg/l	NA
6	Nitrate Nitrogen (as N03-N)	0.0	mg/l	NA
7	Ecoli	Absent	/100ml	Absent

Water Management

The source of water used in the College is Nagarpalika Karad.

An average of 2000 L of water is used by the College per month.

Table 2.

SL NO	PARAMETERS	Response	Remarks
1	Source of water	Nagarpalika Karad	
2	No of Wells	-	
3	No of motors used	-	
4	Horse power – Motor	-	
5	Depth of well –Total	-	
6	Water level	-	
7	Number of water tanks	3	
8	Capacity of tank	14000 L	

9	Quantity of water pumped every day	500 L	
10	Any water wastage/why?	-	
11	Water usage for gardening	300L/day	
12	Waste water sources	-	
13	Use of waste water	Nil	
14	Fate of wastewater from labs	-	
15	Any wastewater treatment for lab water	-	
16	Whether any green chemistry method practiced in labs	-	
17	Rain water harvest available?	Yes	
18	No of units and amount of water harvested	-	
19	Any leaky taps	Nil	
20	Amount of water lost per day	Nil	
21	Any water management plan used?	Water management audit conducted	
22	Any water saving techniques followed?	Nil	
23	Are there any signs reminding peoples to turn off the water?	Yes	

Soil Quality assessment

Soil samples were collected from four locations of the campus and analysed for the basic parameters. The results are tabulated and presented in the table 3.

Table 3

Parameter	Location 1	Location 2
pH	7.1	7.4
Total Kjeldahl Nitrogen (mg/kg)	2.9	3.3
Total organic carbon (%)	1.6	1.1
Phosphate (mg/kg)	0.1	0.2

Energy Audit Report

Table 4 shows the energy consumption pattern of the college for a month. The college has consumed an average of 9515.15 kW/hr electricity in a month and the one year electricity bill amount was 1,97,090/-.

Waste management

Approximate quantity of waste generated per day (in kg)

Office				
Approx	Biodegradable	Non - biodegradable	Hazardous	Others
<1Kg	0	0	0	0
2-10Kg	6 KG	1 KG	0	0
>10Kg	0	0	0	0

Laboratories				
Approx	Biodegradable	Non - biodegradable	Hazardous	Others
<1Kg	0	0	0	0
2-10Kg	0	0	0	0
>10Kg	0	0	0	0

Canteen/kitchen				
Approx	Biodegradable	Non - biodegradable	Hazardous	Others
<1Kg	0	0	0	0
2-10Kg	0	0	0	0
>10Kg	0	0	0	0

How the waste generated in the college is managed?

A)Composting/ Vermicomposting	Yes/ No	Remark
B)Recycling	Yes	By Municipality
C)Reusing	No	No
D)Other ways	No	No

Waste generated in the college?

E-waste		
Hazardous waste		NO
Solid waste		NO
Dry leaves		YES
Canteen waste		YES
Liquid waste		NO
Glass		NO
Unused equipment		YES
Napkins		NO
Others (specify)		NO

Do you use recycled paper in college ?	YES
Any waste management methods used ?	NO

Waste management

Waste management is important for an ecofriendly campus. In a college different types of wastes are generated, its collection and management are very challenging. The following data provide the details of the waste generated and the disposal method adopted by the college.

Table 5. Different types of waste generated in the college and their disposal

Types of waste	Particulars	Disposal method
E-Waste	Computers, electrical and electronic parts	Direct selling
Plastic waste	Pen, Refill, Plastic water bottles and other plastic containers, wrappers etc	Direct selling
Solid wastes	Damaged furniture, paper waste, paper plates, food wastes	Reuse after maintenance energy conversion
Chemical wastes	Laboratory waste	Neutralise with water
Waste water	Washing, urinals, bathrooms	Soak pits
Glass waste	Broken glass wares from the labs	Direct selling
Sanitary Napkin	-	Napkin Incinerators

Waste management Practices adopted by the college

For the last few years, college is following zero organic waste protocol throughout the campus. The food waste generated by the students and staffs are taken by them to their own home, so that, minimum waste is generated inside the campus. In addition, the organic waste generated in the canteen is used as feed for biogas plant and the biogas is used as fuel in college canteen. Vegetable waste and other leaf litters were used to fed in the vermi-compost pit and the resulting vermin-cast is used as manure in the garden. The chemicals from the laboratories are disposed in a sealed tank along with water, so that the chemicals undergo neutralization with the water.

Green Campus

Total number of plant species identified **20**

Total number of plants in the campus **207**

Table 6. List of plants in the campus

Sl No	Common/local name	Scientific Name	No of trees
1	कोरफड	Aloe	4
2	कडीपत्ता	Murraya Koenigii	22
3	आंबा	Mangifera	4
4	जाई	Oleaceae	1
5	गुलाब	rose	25
6	जास्वंद	hibiseus	05
7	सदाफुली	Cathatanthus Roseus	02
8	लिंबू	Citrus Limon	03
9	लिली	Lilim	17
10	चाफा	Frangipan	03
11	मोरपंखी	Thuga Plant	13
12	अशोक	Saraca asoca	10
13	सुबाभूळ	Leucaena leucocephala	14
14	लिंबू	Citrus limon	02
15	बदाम	almonds	02
16	Battle Tree	Battle Tree	14
17	टनटनी वनस्पती	Compositae	29
18	तुळस	holy basil	07
19	Other		30
Total			**207**

Routine Green Practices

Every year college celebrates World Environment Day, World Water Day and Ozone Day in the campus. The main focus of these programmes was to provide awareness to the students about the importance of the environment, its conservation and sustainable use of environmental resources. The programmes are conducted through seminars, poster presentation, quiz competition debates etc.

Carbon Foot Print Analysis

1. Total number of vehicles used by the stakeholders of the college : 29
2. Number of cycles used 25
3. No: of two wheelers used 26

   Average distance travelled : 10 km

   Average quantity of fuel used : ½ Ltr
4. No: of cars used 1

   Average distance travelled : = 20 kmAverage

   quantity of fuel used : 1 Ltr
5. No: of persons using public transportation : 400
6. No: of persons using college conveyance : ----
7. No: of generators used per day : -
8. Amount of fuel used : -
9. No: of LPG cylinders used in canteen/ Labs : -
10. Use of any other fossil fuels in the college : -
11. Any suggestion to reduce the use of fuel :-----

Green Audit Report

2022-2023

No.	Description	Details
1	Name Of College:	Mahila Mahavidyalaya, Karad
2	Name Of Sanstha:	Shikshan Mandal, Karad
3	Types of Streams	B.A, B.Com, B.Sc.,B.Com IT & M.A
4	Strength of Students	804
5	Strength of Staff	44
6	Total Water Consumption per Day	2000 ltr
7	Water Balance:-	
	1) Septic Tank	3
	2) Chemistry Department	NA
8	ETP / STP Provided	Yes
9	No. of Toilets provided	6
10	No. of Latrine provided	33
11	Toilet Cleaning Frequency:	3 Times in a day
12	Water Tank Cleaning Frequency:	Every 6 Month
13	No. of Solar Units provided	1
14	Total No. of LED bulb provided	220
15	Solid Waste management Facility	Collection : Karad Municipality
16	BioGas provided or not	No
17	Types of Composting	Vermi Composting
18	Drinking Water Parameters	
	1) TDS	48.6 mg/l
	2) Hardness	4.8 mg/l
19	Ambient Air Quality	
	1) TSS	
	2) TPM	
20	Ambient Noise Quality	Low
21	Total No. of plants around the college	207
22	Total No. of Species around the college	

SUGGESTIONS AND RECOMMENDATIONS

Water Management

The water sources are safe in terms of contamination. The students are taking back the food waste as per the zero waste management strategy of the college. It helped in reducing the consumption of water for washing.

The Storage Tank can be recharged with rainwater from rooftops of new building. The area of the rooftop is 10500.00m^2. Approximately 32560 m^3 of water can be harvested from the roof area of new building.

Rainwater for laboratory purposes – Construction of a 5000L rainwater harvesting tank can satisfy the need of laboratory , especially in distillation units where water lost as coolant. The rain water from harvesting tank can be used as source water as well as coolant for the distillation unit. The rain water can also be used as source for drinking water. The coolant water can be recycled through a separate plumbing system .

The capacity of distillation unit in the college is 1 L / hour. The amount of water used as coolant for 1L of distilled water is 60L. Annually, the unit require approximately 1500L of water as coolant and this much water can be saved with the construction of the harvesting tank.

The ***Nature & Care*** can arrange awareness programmes for water conservation. There should be a proper monitoring of water consumption pattern in the campus. ***Nature & Care*** can also conduct water quality monitoring during specific intervals.

The canteen waste can also be subjected to aerobic composting by setting-up of few composting yards in the campus. This will provide a chance for the students to learn by seeing and operating such compost yards by themselves. Also a good practice of managing their own waste (from lunch box) instead of carrying them back home they can be trained in operating the compost yard ,by using their lunch time waste to produce good organic manure.

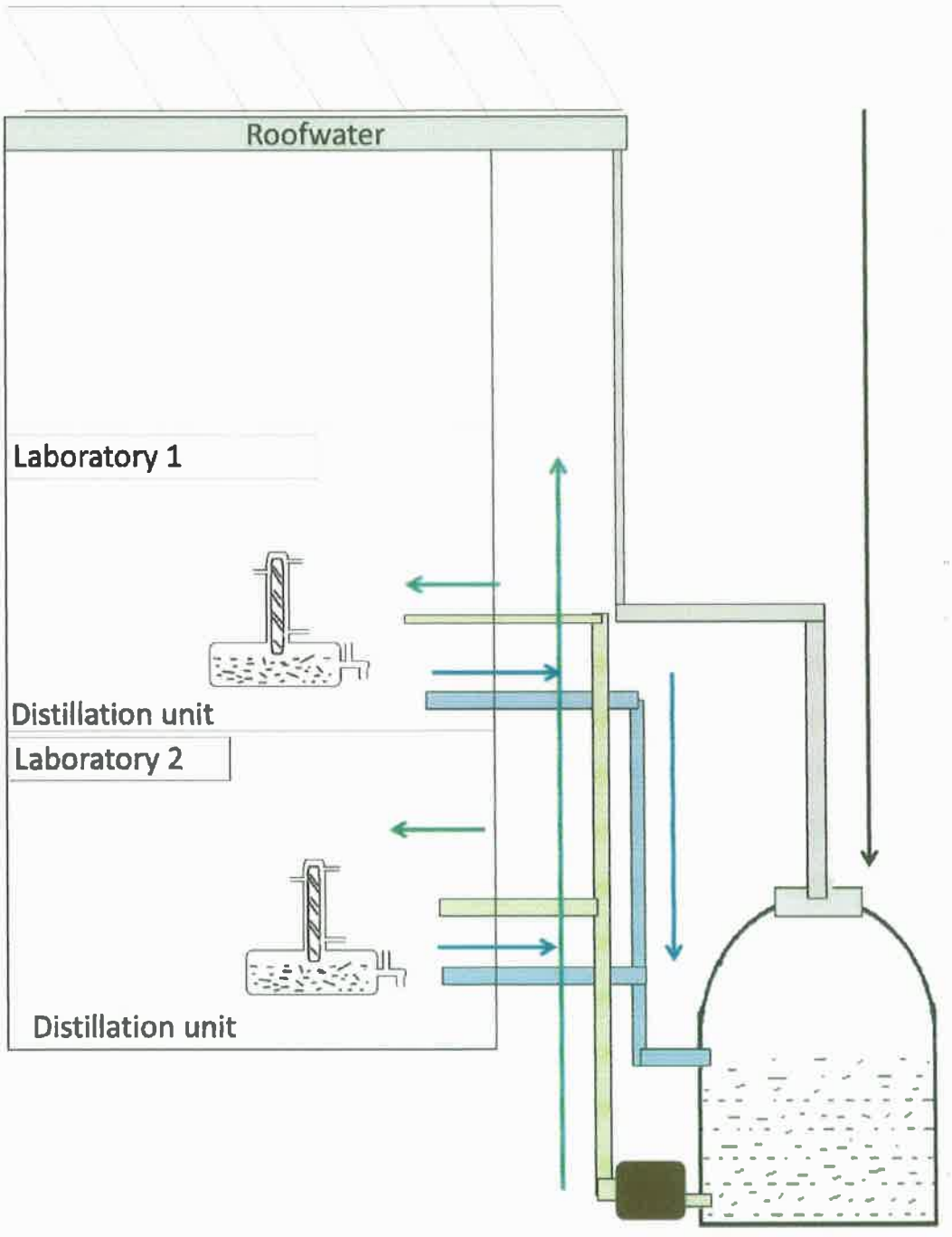


Fig. 3 Schematic diagram of water harvesting and its utilisation

Energy management

The energy audit recommend to avoid the use of more energy consuming electrical appliances and to replace with more environment friendly and energy efficient appliances (for example five stars rated Air conditioner) in the college. The potential of renewable energy sources have to be explored. As the college has a very large roof area for installing solar panels so that it can be effectively used for generating power. The college has started steps in installing the solar panels for office.

It is recommended to install the following solar powered appliances in the campus;

Solar powered water heater and cooker in the college canteen

Solar powered street lights and LED display board

Green Campus

In order to increase the carbon credit and greenery of the campus, it is recommended to plant more indigenous and evergreen / fruit trees inside the campus.

Waste Management

Try to avoid the use of plastic in the campus, and to encourage the use of biodegradable materials as alternatives. Try to achieve the goal of plastic free campus.

Leaf litter from the campus can be effectively used for aerobic/ vermi composting, so that the composted material can also be used as good manure.

Recycle the paper waste instead of incinerate or burning