

Criterion 7 – Institutional Values and Best Practices

7.1.3 Quality Audits on Environment and Energy Regularly Undertaken By the Institution

Index

Sr. No.	Content	Page No.
1	Green and Environment Audit Report	1 to 34
2	Green Campus photography	35 to 40

GREEN AND ENVIRONMENTAL AUDIT REPORT 2020

Prepared for
Shankarrao Jagtap Arts and Commerce College, Wagholi

Prepared by
Adya Environmental services, Baramati

Submitted on ^{20th} August 2022

INDEX

Audit

1. Solid Waste Audit
2. Water Audit
3. Noise Audit
4. Biodiversity Audit

Environmental Quality Assessment

5. Water Quality
6. Soil Quality

Carbon accounting

7. Carbon Sequestration
8. Carbon Emissions by campus

If self-inquiry is a natural and necessary outgrowth of a quality education, it could also be stated that institutional self-inquiry is a natural and necessary outgrowth of a quality educational institution. Concern about global environmental degradation and resource depletion is a logical consequence of the scholarly research, teaching, and learning that takes place on campuses every day. Because universities & colleges are by nature inquisitive institutions, it is only natural for the colleges to examine itself. The current Green audit represents our effort to build environmental sustainability on the campus. Green Auditing is one contribution that attempts to prevent the destruction of the world in which we live. Stresses that it is everyone's responsibility - that of both individuals and the organizations in which they operate.

Green auditing is a systematic, documented, periodic and objective process in assessing an organization's activities and services in relation to:

- Assessing compliance with relevant statutory and internal requirements.

- Facilitating management control of environmental practices

- Promoting good environmental management

- Maintaining credibility with the public

- Raising staff awareness & enforcing commitment to departmental environmental policy

- Exploring improvement opportunities

The audit was conducted by **Adya Environmental services**, with a team of **SJCW** faculty and students & gathered all the necessary information about baseline environment of the college. That covered soil quality, water quality assessment of the campus. Noise pollution levels of the campus falls within the permissible limits given by CPCB. Water quality of the campus follows the parameters of potable water given by IS 10500:2012. As a responsible institution it understands the importance of its Carbon footprint & developed a plan to reduce greenhouse gas emissions and other waste in all its activities. College has also planned to promote campus and local biodiversity through detailed action plan and awareness

programmes. Along with future action plans College has already undertaken several steps like **Green Audit** 'No vehicle day', 'Paper reuse' to move towards becoming environmentally sensitive & a more sustainable campus.

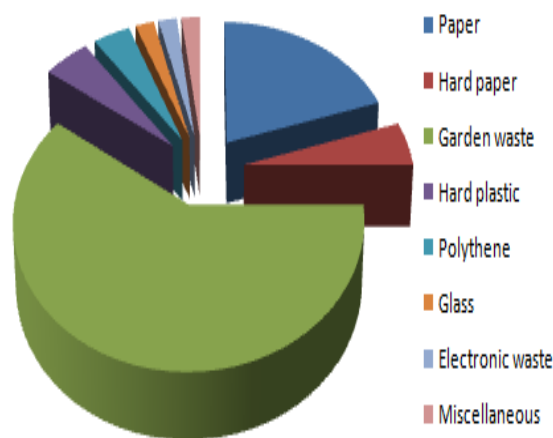
INTRODUCTION

Urbanization and industrialization have resulted in increasing amounts of municipal, industrial and health care waste in the country. Central pollution control board (CPCB) has estimated current quantum of solid waste generation in India to the tune of 48 million tons per annum. Each year everyone in India throws away more than 0.4 tons of waste. Management of such high quantum of waste puts enormous pressure on solid waste management system. Throwing thing away is waste of natural resources and energy which have been used to make the product. Waste has to put somewhere. Most of it is sent to landfill sites or incinerated (burnt), using up land and releasing greenhouse gasses. On an average in India 12% of waste is recycled/composted, 79% is sent to landfill site and 9% is incinerated (burnt)

SOLID WASTE GENERATION

VISUAL ANALYSIS OF MONTHLY SOLID WASTE GENERATION (year 2019)

Garden waste is the main contributor of campus solid waste by volume. Every week near about 1700 gm of Garden waste is removed from college campus. Variation in Garden waste quantity is also found due to the seasonal variation. Paper waste also contributes a lot to solid waste volume.



Visual analysis of College waste SJCW

As an educational institute, college’s paper and hard paper waste like cardboard, paper covering, printing paper is recognizable. It accounts for 25% by volume. SJCW converts some

quantity of its garden waste to manure by vermicomposting. Food waste is not included in visual analysis of solid waste for college building.

As an educational institute, college's paper and hard paper waste like cardboard, paper covering, printing paper is also high. It accounts for 25% by volume. SJCW converts some quantity of its garden waste to manure by vermicomposting. Food waste is not included in visual analysis of solid waste for college building.

SOLID WASTE ACCOUNTING BY WEIGHT

TABLE 1 WEEKLY WASTE OF OFFICES, CLASSROOMS & LIBRARY IN GM APX

Place	Paper	Hard paper	Polythene	Hard Plastic	Glass	Chalks	E-waste
Library	18	25	1	10	2	NEG	3
Main office	45	30	1	10	1	NEG	3
Classrooms	22	9	1	40	4	40	NEG
Total	85	64	3	60	7	40	6

TABLE 2 WEEKLY NON BUILDING AREA SOLID WASTE GENERATION IN GM APX

Place	Paper	Hard paper	Polythene	Hard Plastic	Glass	Chalks	Garden waste	E-waste
Solid Waste of non built-up area up area	90	35	1	10	2	NEG	850 (depends on the season)	8

TOTAL WEEKLY WASTE GENERATION OF CAMPUS

Here we can see that Garden waste is the main contributor of campus solid waste by weight. Paper comes after that. Hard Paper is the third and main contributors. If we differentiate between degradable & non biodegradable waste biodegradable waste shows a very large figure

compare to Non – degradable waste (glass, electronic, waste, and plastic, sanitary pads).

Sanitary pads contain both biodegradable and non-biodegradable part in it, but the waste is included in non-biodegradable waste.

	Waste Type (Volume wise)	Percent age
1	Paper	20 %
2	Hard paper	5 %
3	Garden waste	60 %
4	Hard plastic	5 %
5	Polythene	4 %
6	Glass	2 %
7	Electronic waste	2%
8	Miscellaneous	2%

	Waste (Weight wise)	Weight (gm)
1	Paper	175
2	Hard paper	99
3	Polythene	4
4	Hard Plastic	70
5	E – Waste	14
6	Glass	9
7	Chalks	40
8	Garden waste	850
9	Miscellaneous	150
10	Sanitary pads	50

SJCW campus produces near about 1.4 kg of waste per week. Garden waste is the main contributor of college waste i.e 850gm.

College has already started taking steps towards waste reduction, reuse and recycling to make its campus more eco-friendly. This detailed solid waste audit will provide necessary inputs for waste and management reduction.

CONTRIBUTORS OF CAMPUS

SOLID WASTE

PAPER AND HARD PAPER:

College produces Approx 274gm of paper and hard paper waste goes to dustbin every week. Out of that paper share is near about 175 gm while hard paper is about 99gm.

Around the world we use more than 1 million tons of paper every day and 93% of paper comes from trees alone which we can call as virgin paper. Paper also accounts for half of municipal solid waste. The pulp and paper industry is the third largest consumer of energy and uses more water to produce a ton of product than any other industry and is one of the world's major greenhouse gas emitters.

Producing one ton of paper requires 2-3 times its weight in trees. Making paper from recycled content rather than virgin fiber creates 74 percent less air pollution and 35 percent less water pollution.

Anything we can do to save paper will help reduce the amount of trash going into landfills, and it will also reduce energy use and pollution associated with manufacturing, transporting, and recycling new paper products. Perhaps most importantly, when we save paper, we reduce the need to cut down trees to make new paper.

College has started following action plan to minimize paper waste:

- Follow the golden rule. "Think before you print".
- Use both sides of the paper for printing.
- Check your draft 2-3 times on screen before you actually hit the print button.
- Use what technology has provided you, send emails, scan documents and send electronically rather than scanning copies and sending.
- Use the print range feature, print current page etc to print only what you need.
- Don't throw away misprints instead use them as drafts or print on the other side.
- Change / Minimize on every document you print. It can save a lot of paper by simply changing the margin settings.

CHALK WASTE

Chalk waste is an important contributor of College's Solid waste. Chalk dust is also an allergic irritant for many students and teachers. Chalk is mostly made up of limestone or gypsum. It can be reused or recycled.



Suggestion – Recycling of chalk

We can use chalk dust, small chalk stubs to create new, bigger, pieces of chalk. We can do so by crushing the small pieces of chalk into powder & then mixing the resulting powder with a bit of water, so that it gets the consistency of a modeling paste. Then, we can use to modeling it into chalk bars. After you finish shaping it, put it somewhere to dry and harden, so that you can use it just like you use regular chalk when it's dry.

Chalk waste

GLASS, PLASTIC AND HARD PLASTIC

On an average 154g of hard plastic and plastic is weekly disposed of by campus. On an average 9 gm of glass goes to waste. There should be a separate storage bin for these waste types. Separate storage bins should be provided for three categories of waste (at one place). And it should be given to waste recycler after possible reuse of waste.

ORGANIC WASTE

Organic waste of this college mainly includes garden waste. Graden maintenance is done once in two months. And this waste also goes to composting unit.

USE AND THROW TYPE PENS

Nowadays many people use 'use and throw' type pens. Nobody goes to refill the pen with ink. This adds more plastic to our dustbin. Same picture can be found at this College campus. 98% of students of SJCW use 'use and throw' type pens. This adds near about 1 kg hard plastic to solid waste per year.



College is thinking of creating awareness among students to stop the use of such pens. College will make guidelines about good alternatives i.e the use of Ink-pens. This awareness is needed to be done at every


faculty level of college. This can be done by arranging workshops on ‘waste minimization’ and personal observation of students by staff of the college

ELECTRONIC WASTE

College gives its E-waste to a vendor company –

SANITARY PADS:

Menstrual Hygiene Management (MHM) is an integral part of the Swachh Bharat Mission Guidelines (SBM-G). The MHM Guideline (Dec 2015) is issued by the Ministry of Drinking Water and Sanitation to support all adolescent girls and women. It outlines what needs to be done by state governments, district administrations, engineers and technical experts in line departments; and school head teachers and teachers.

<p>Unsafe</p>  <p>Safe</p>	<i>Common practices</i>
	Throw them unwrapped into fields, rooftops, etc.
	Wrap them in paper/ plastic bag and throwing them outside
	Drying, wrap in paper/plastic bag and throw in dustbins (mostly non-rural)
	Bury them for de-composting
	Throw them in latrine / toilets
	Burn it (rural areas and peri-urban areas)
	Use small scale incinerators (community or school level)
	Municipal waste management / burning in health clinics (more urban)

As the usage of sanitary napkins is increasing, the amount of sanitary waste generated every day is also increasing. It is equally important to address the issue of efficient disposal of this infectious waste. Currently as we see, a major part of this waste is dumped into landfills leading to tremendous land pollution. Sanitary napkins are flushed down the toilet under the name of convenience. All the drains ultimately meet the rivers in the city and thus water pollution increases.

Weekly sanitary pad waste generation of college is near about 50gm. So if we see the chart of UNSAFE to SAFE practices i.e burning and use of small incinerators is comparatively safe option. College has a option to use one of two option to minimize environmental pollution. If

college selects the burning option then it should be done at a distant place and under complete observation (till complete burning of the sanitary waste) Green Audit

Future steps by SJCW towards waste minimization:

RECOMMENDATIONS

SJCW should improve its Waste Management Plan on the basis of '4R' solution (Refuse, Reuse, Recycle, Recover) to achieve its goal of Carbon neutral campus.

2. WATER AUDIT

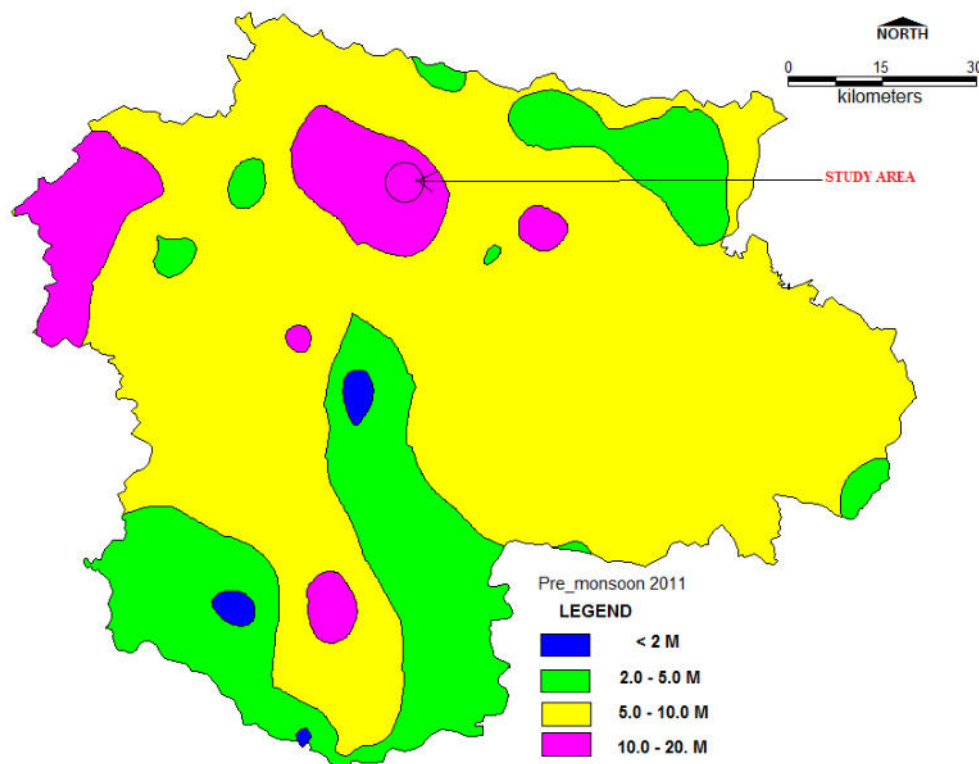
INTRODUCTION

A water audit is a systematic review of a site that identifies the quantities and characteristics of all the water uses. The site may vary from a public water utility, facility (institutional or commercial properties like malls, office, schools etc.) or a household. The overall objective of conducting a water audit is to identify opportunities to make system or building water use more efficient.

Current Water Status of the region:

Almost entire district is underlying by Deccan trap basalt. Also the isolated and small parts adjoining the hilly areas have low ground water development potential. Such areas occur in almost entire Mahabaleshwar taluka and part of Madha, Patan , Wai and Man taluka. The major part of the district is occupied by areas with medium ground water development potential.

Depth to water level in Satara district during may 2011 ranges from 0.09 m bgl (Shendri) to 16.2 (Mahabaleshwar) Depth to water level during premonsoon (May 2011) has been 9 depicted in the following figure. The perusal figure 3 indicate that most prominent range of water level is 5-10 m bgl which is seen almost entire district.



Depth to water level in Satara district in 2011

The overall stage of ground water development in the district is 69.5% hence it is necessary to adopt water conservation and artificial recharge techniques to increase sustenance of this precious resource.

Drought areas has been observed in major parts of the district in the entire eastern, north eastern and south eastern parts comprising almost entire Khandala, Phantana, Khatav, Mhaswad talukas and parts of Koregaon and Karad talukas. Deeper water levels of more than 10 m bgl are also seen in northern part around Mahabaleshwar, Khandala and Wai and in south eastern part of the district in the parts of Man and Khatav talukas. These are the areas where the ground water scarcity is quite common when the rainfall is deficient. The stage of ground water development in 5 talukas (Karad, Khatav, Koregaon, Phantana and Wai) has already crossed 70%. Most of these talukas fall in rain shadow zone of Western Ghats, where rainfall is low. Hence special attention is required in above mentioned areas and immediate steps like ground water augmentation by artificial recharge practice and water conservation should be adopted before further ground water development is planned in these areas.

WATER SUPPLY OF SJCW CAMPUS

The primary source of water for SJCW is a private dugwell. The College building receives all of its water supply from groundwater. The current dugwell which supplies to SJCW's daily water requirement of drinking and non potable uses is more than ten years old. It is located near the proposed near the college and was installed in 2001.

The pipeline from the dugwell is connected to a underground storage tank of capacity 500 litres. It has to be filled at least two times in a day.

From this storage tank, water is supplied for non potable use.

WATER USAGE

SJCW building has three floors. To conduct a building water audit water consumption data for all the users were required to be monitored and recorded. Toilet water use including flushing and face/hand washing along with drinking was clubbed under personal water use. In order to collect primary data and to ensure accuracy, a brief questionnaire format was prepared and survey conducted for students.

Water users	Number
Students	302
Staff and daily average visitors	25
Total	327

Total water users of the SJCW campus

The total personal water use was calculated from flow rates, questionnaire and total water users (occupancy of the building).

WATER CONSUMPTION CALCULATION

Total daily water Intake of water,
= 1000 liters

I. POTABLE WATER CONSUMPTION (DAILY)

College uses filtered borewell water use for potable water use

CALCULATION ON THE BASIS OF QUESTIONNAIRES AND FLOW RATES

i. Daily potable water consumption by staff and students: $1 \times 327 = 327$ liters/day

Total water use of drinking water is =327 liters/day

2. NON POTABLE WATER CONSUMPTION FROM NAKSHATRA WELL (DAILY)

College uses borewell water for non potable water use

CALCULATION ON THE BASIS OF QUESTIONNAIRES AND FLOW RATES

i. Water used for flushing by students 327×2 liters = 654 liters/day

ii. Water use for mopping of Main office area = Water per washing of wiper \times

Number of washing = 100 liter \times 1 = 100 liters/day,

iii. Water use for mopping = 100 litre

iv. Water used for hand and face washing = Average time the tap left open \times Number of times the hand and face washed) \times Average flow rate of taps per second
 $= 10$ seconds \times 1 times \times 0.12 = 1.2 liters per capita

So, Total non potable water use by students and staff for hand and face washing
 $= 1.2$ liters \times 327 = 392 liters.

So, the total water use for flushing and washing = 327 + 654 + 100 + 392 = 1146 liters/day

* The daily water requirement for Science lab is not included here.

OVERALL WATER CONSUMPTION

Therefore based on the above recordings, monitoring and calculation, the total potable water consumption for SJCW College is 327 lit/day and non potable water consumption is 1146 liters/day. Overall water consumption is $327 + 1146 = 2941$ liters per day. If gardening is excluded, then the per capita use for non potable water is around 4.75 liters day.

	Heads	Water use (in liters)
1	Average daily water supply, to the overhead tanks from the underground tank	1000
2	Total calculated water consumption from the water audit	1146
3	Difference between water consumption from overhead tanks and actual water use for various purposes	146

Total water supply and use at SJCW College

(please note that drinking water is filled differently on time to time)

DATA COMPARISON AND ANALYSIS

There is a wide variation in the average amount of water that is filled to the overhead tanks every day for various purposes and the average water consumption calculation. The average water supply (quantity) was based on quantity taken to overhead the tanks, flow rates and monitoring. The amount of non potable water based on questionnaire, flow rate and water users is 1146 liters per day while the daily water need to overhead all the tanks is 1000. The calculated water amount is 1.14 times greater than the amount of water which is used pumped in the tanks.

THIS DIFFERENCE COULD BE ATTRIBUTED TO THE FOLLOWING FACTS

- The staff and students present per day in the college were assumed to be 100 % present. In real this percentage varies.

- The observations from questionnaire for personal water use were a representative observations and not a complete study.
- Along with this staff and students living in nearby areas, they don't use the college washrooms. Some of them bring drinking water from home.

WASTE WATER GENERATION BY SJCW

Every building generates waste water amounting to almost 80% of total water consumed. The major source of SJCW waste water includes grey water from wash basins, lab basins, and black water from toilets. Out of that Black water of SJCW toilets goes to soak pits. So SJCW don't discharge any Black water in Grampanchyayat sewer lines

ESTIMATION OF WASTE WATER GENERATED BY SJCW

Waste water generated = 80% of water used

So, waste water generated by SJCW based on water audit

= 80% of 1146 liters per day = **916.8 liters/day**

Waste water generated by SJCW based on pumped quantity

= 80% of 1000 liter per day = **800 liters/day**

Out of that Black water of SJCW toilets goes **to soak pits**. So SJCW don't discharge any Black water in Grampanchyayat sewer lines

3. NOISE AUDIT

Actual noise monitoring is carried out with the help of sound level meter on various locations shown in figure . We have taken the samples within the free field. The comprehensive study was done inside the campus to calculate the noise level at various important locations such as class room areas, playground, parking area, library location and the data is interpreted for solutions.

Noise level readings (dB) was taken using noise meter.

The readings were taken in certain period of interval and specific timings such as mornings, evenings, afternoon.

DISCUSSIONS

Out of 30 average noise recordings at SITE I near college entrance, 10 noise level recordings exceed SJCW's noise standard. The laid down noise monitoring standard for Silence zone is 50 dB (A) for a day time. The highest noise levels near entrance were seen in the morning. This site is close to school. So it shows the impact of School activities in Morning.

Site II is in the centre of the C shaped campus building. Only 7 observations exceed the noise standard. Almost all noise level observations fall within standards.

SITE III location is backside of the college building i.e classroom area. All noise level observations fall within standards.

At some places we can find that the noise levels exceed the standard of CPCB for silence zone i.e. 50 db. This may be due to road rush. But we have taken the samples in free field where there are no reflected sound waves. So this satisfies that the high Noise level (above 50 db) decreases towards classroom areas.

COMMENTS

- Silence is an important factor in education. SJCW campus is an ideal place for education. It is suggested to plant trees in layers towards roadward side to minimize the impact of road rush.
- As per CPCB guidelines silence zone is referred as areas up to 100 meters around such

4. BIODIVERSITY AUDIT

premises as hospitals, educational institutions and courts. The campus is at a distance of from crowdie and noisy area of e village .

A TREE CENSUS AND INVENTORY

The present Tree census and inventory study was done to quantify, to create an inventory and to understand phyto-ecological structure of SJCW's Senior college.

Location

Latitude 17°90'94'N

Longitude: 74°08'76''E

OBJECTIVES

..... Senior college SJCW

1. To make an inventory of tree individuals and tree species in the campus.
2. To undertake phyto-ecological analysis with the help of
 - a. Species composition
 - b. Abundance, Relative abundance, density

SAMPLING

Since the purpose of the study was to create a detailed inventory of Tree individuals and species, the "Census" was used as a sampling technique. The campus was surveyed and each tree was counted.

Within each plot all individual trees were identified, measured, and recorded. The diameters at breast height of the species were measured using a measuring tape. Trees were grouped into the following diameter classes: medium-sized trees (16–29.9cm), and large trees (>29.9cm).

These species were further grouped into classes according to their height - treelets (small trees) (<10m), under storey (10–20m), canopy (20–30m), and emergent (>30m)

RESULTS

SPECIES COMPOSITION OF TREES

Table of species composition (see Tree inventory table) shows the different tree species found in the study area. A total of 19 species were recorded belonging to 12 families and 19 genera. Annexure of tree inventory shows the different plant species, their families found in the SJCW college campus. A total of 64 tree individuals (height above 3 meters) species were recorded in the study site.

Dominant families recorded in the study area according to descending order (based on number of species type in each family) are Fabaceae (7) Annonaceae (2) and in remaining other families only one species is recorded (see Tree inventory Table).



Photograph showing Ashoka (*Polyalthia longifolia*) plantation

ABUNDANCE

From the 12 families recorded in the study sites, the Fabaceae had the highest number of species (7) which belongs to 7 genera followed by the Annonaceae with 2 species and 2 genera. A total of 19 genera were recorded in the study site. *Polyalthia longifolia* (Annonaceae) having 10 individuals were the most abundant Tree species. This was followed by the species *Tamarandus indica* (Fabaceae), *Casurina equisetifolia* (casuarinaceae), *Duranta erecta* (Verbanaceae), *Delonix regia* (fabaceae) *Mangifera indica* (Anacardiaceae) *Cocus nucifera* having 9, 7, 6, 5, 5 and 4 species respectively. There were 19 species recorded in this site having only one individual. Out of which 11 species were native.

CONCLUSION

The Fabaceae was observed to be the most prevalent families. This may be due their plantation.. Annonaceae has the highest number of individuals.

The all native species makes up 53.84 % of total tree number. This percentage of native trees is good as per ecological parameters. But when we go towards deeper ecology, term 'native species' is refined as region or area specific native species. So to achieve sustainability and biodiversity conservation goals, we have to consider area specific native species and not country specific native species.

1. Fabaceae is the most dominant families of the campus.
2. It does not includes Trees of a rare, vulnerable or endangered species
3. This site does not contain emergent layer of vegetation.
4. It's good to see that 53.84% tree species are native to India.
5. Large population of single species i.e. plantation is one of the reasons for low value of evenness (low species variety).



Discussion about Biodiversity of the campus

BIRD DIVERSITY

In nature birds occur in a variety of habitats – from deserts to the tropical rain forests; the short dry to the tall wet grasslands and on the alpine meadows in the high altitudes; from sea level to above 4000 meters above sea level; on rocks, cliffs in caves and mud banks; along fresh water estuaries, seas and shores. They also occur on man modified lands such as agricultural fields, airfields, along roadsides and hedgerows and gardens, among human habitations and dwellings.

SJCW College comes under habitat of man modified lands. 9 bird species were recorded from the campus

C DAY AND TIME OF BIRD CENSUS

Date 10th August 2022, Time of the observations – 7.30 am to 10.30am

Family	Common Name	<i>Scientific Name</i>
Pycnonotidae	Red vented Bulbul	<i>Pycnonotus cafer</i>
Zosteropidae	White Eye	<i>Zosterops palpebrosus</i>
Columbidae	Blue Rock Pigeon	<i>Columba livia</i>
Muscicapidae	Indian Robin	<i>Copsychus fulicatus</i>
Nectarinidae	Purple Sunbird	<i>Cinnyris asiaticus</i>
Dicruridae	House Crow	<i>Corvus splendens</i>
	Common Myna	<i>Acridotheres tristis</i>
Apodidae	House Swift	<i>Apus nipalensis</i>
Passeridae	House Sparrow	<i>Passer domesticus</i>

BUTTERFLY DIVERSITY

India hosts 1501 species of butterflies (Gaonkar 1996), of which peninsular India hosts 350 and the Western Ghats, 331. The literature on biogeographic distribution and habitat preference indicates that the Satara district may harbor about 153 species. Remaining species are mostly forest dwellers and may not be found in the urban area. Koregaon falls in the relatively species poor drier region of the Maharashtra. There is no specific literature available on Butterflies of Koregaon taluka.

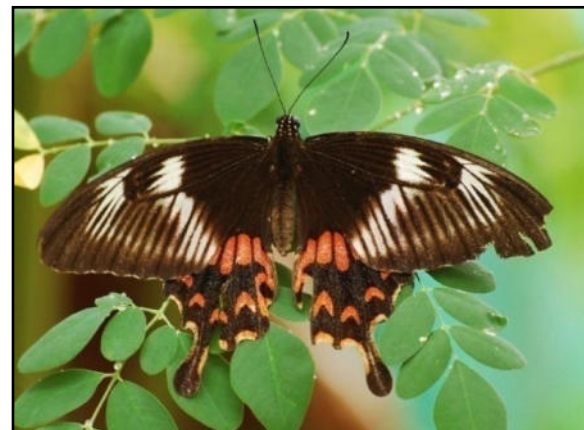
OBSERVATIONS

Common Name	Scientific name	Family
Common Crow	<i>Euploea core</i>	Nymphalidae
Common Tiger	<i>Danaus genutia</i>	Nymphalidae
Common Mormon	<i>Papilio polytes</i>	Papilionidae
Common grass yellow	<i>Eurema hecabe</i>	Pieridae

Butterflies reported at SJCW college campus



(Eurema hecabe)



Common grass yellow

Common Mormon (Papilio polytes)



Common Crow (Euploea core)



Common Tiger (Danaus genutia)

BUTERFLIES OF THE CAMPUS

COMMENTS

1. SJCW has attractive good and landscape.
2. The dense tree cover of campus acts as filter to air pollution. Campus trees do acoustic buffering of outside noise and acts as noise barriers. Pure environment and silence zone are prime necessities of any educational institute.
3. Along with maintenance of greenery more focus should be given for mixed plantation. Plantings should include a diverse array of species, genera, and families, of different herbs shrubs and trees. This will provide protected habitat for different faunal species of nearby

area.

4. The 53.84 % tree cover of the campus belongs to native tree species. This 44.61 % of native trees is good as per ecological parameters. But when we go towards deeper ecology, term 'native species' is refined as region or area specific native species. So to achieve sustainability and biodiversity conservation goals, we have to consider area specific native species and not country specific native species.
5. We can replace some ornamental shrubs or herbs with native (native to Koregaon) and useful one (i.e edible, medicinal species). Some areas should be reserved for plantations which attracts local butterfly species. Vines and bushes with long leave attract birds.
6. An integrated landscape approach can help to reconcile the sometimes-competing objectives of development and environmental sustainability.

Environmental Quality : 5. Soil Quality

Introduction

Knowledge of chemical and physical properties of soils has been assessed to understand the capacity of campus soil to support existing green cover. The concept of soil quality includes assessment of soil properties of campus as they relate to ability of soil to function effectively as a component of a Plant health at SJCW campus. In present study soil quality was assessed to know the capacity of a soil to produce biomass. As front campus is physically locked due to fencing of cement wall, so movement from **outside – campus – outside** is significantly restricted.

Status of soil in Maharashtra

The state of Maharashtra represents a mixed landscape with hill ranges, thick forest cover and coastline. The soils of Maharashtra are residual, derived from the underlying basalts. The land in the river basins of Godavari, Bhima, Krishna and Tapi has a deep layer of fertile black basalt soil rich in humus. The rest of the semi-dry plateau has a medium layer black regur soil which is clayey with high moisture retention capacity, rich in iron but poor in nitrogen and organic matter. The peaks of Sahayadri Mountains, the districts of Ratnagiri and the western regions of Kolhapur and Satara are composed of laterite soil. The Konkan coast has sandy loam soil. A variety of red soil and sandy soil is found in the Vidarbha region. Maharashtra's soils are highly deficient in nutrients when compared with the soils of other Indian states. They are lacking in Nitrogen (N), Phosphorous (P) and Potassium (K) and mainly because farmers in rain-fed areas use very little fertilizers. Further, excessive use of water for irrigation also leads to increasing salinity of soils.

Soil characteristics

In order to assess the soil quality SJCW educational campus, a collective soil samples were taken from different sites. Soil samples between 0-20 cm depths were collected. Collected soil samples are analyzed by using water soluble extract of soil samples.

Physical characteristics

Physical characteristics of soil are delineated through specific parameters, viz, particle size distribution in terms of percentage of sand, slit, clay is presented in table. It is observed that texture of original landscape of SJCW educational complex Sandy Clay Loam.

The bulk density of soil sample in the campus area found to be 1.4 gm/cm^3 , which is good for plant growth. It is generally desirable to have soil with a low BD ($<1.5 \text{ g/cm}^3$) (Hunt and Gilkes, 1992) for optimum movement of air and water through the soil.

Soil porosity is a measure of air filled pore spaces and gives information about movement of gases, inherent moisture, and development of root system and strength of soil. Variation in soil porosity is presented in table. The porosity of soil sample is 45%, which shows moderate water holding capacity.

Sample	%sand	% silt	%clay	Texture	% OM ¹	CEC ²	BD	Porosity ³	pH
4	55	20	25	Sandy clay loam	4	44	1.4	45	7.7

Table Physico-chemical analysis of soil samples collected from Campus

Chemical characteristics

pH is an important parameter indicative of the alkaline or acidic nature of the soil. It greatly affects the microbial population as well as the solubility of metal ions and regulates nutrient availability. The pH of original soil of the campus is 7.7 and so is conducive for the growth of plants.

Cation exchange capacity (CEC) determines the storage capacity of nutrients as supplied to plant in exchangeable forms. CEC of the campus soil is 44 meq/100 in the study area is given in table. Very high level of CEC i.e. more than 40 meq/100 normally found in very heavy soils with a high clay content or soils with a high organic matter level. Nutrients can be bound very tightly to the soil particles and availability can be restricted.

Fertility status of the soil

Organic matter present in the soil influences its physical and chemical properties. It commonly accounts for as much as one third or more of the cation exchange capacity of the surface soils and is responsible for soil aggregates. Organic matter of the campus soil is 4%, which is good for landscaping and gardening.

Recommendations and conclusions

- Soil at different location of the campus is varying in texture and having mixture of native and exotic soil. So soil sample is selected from original landscape area of the campus. It shows that campus terrain has good fertility status and can be used for landscaping and gardening.
- Though the campus soil has enough quantity of Organic matter for Plant growth, improved quantity will help for better Plant growth

Drinking water supply in SJCW College campus

The Primary source of SJCW potable and Non-potable water is dugewell water. The College receives its water from dugwell located near the campus. The college treats this well water before using it as potable water. College has water filter to filter dugwell water.

Water sampling and analysis

One drinking water samples were collected from campus premises to assess water quality.

Source	Sample No.
After filtration	D1

Table Water samples of SJCW campus

Physical parameters such as pH, E.C., TDS, Do were determined.

Sample No.	pH	Total hardness	TDS	DO
D1	7	60	150	5

Table Physical parameters

This table shows the results of physical parameters viz. pH, TH, TDS and DO are in the limits of drinking water parameters

Conclusion and Recommendations

The drinking water (after filtration) quality i.e physical water quality parameters of the SJCW campus are found to be within the specifications for drinking water standards.

It is recommended to college that it should check inorganic parameters viz. Calcium, Sodium, Chlorides and Sulphates. The regular water quality analysis is needed to check the portability of drinking water.

Introduction

Increasing levels of carbon dioxide in the atmosphere are of growing concern globally and locally, and urban forests have a role to play in the battle against climate change. Urban forests can reduce atmospheric carbon directly and indirectly. As long as trees are growing, they remove CO₂ from the air in a process called carbon sequestration, transforming CO₂ into carbon and making use of it to build living matter - leaves, stems, trunk, roots, etc. The Biomass carbon sequestration potential was measured for SJCW campus.

Tree canopy of the campus

The canopy of the campus is characterized by mixed species i.e. evergreen as well as deciduous.

A total of 18 species were recorded belonging to 15 families and 18 genera. Annexure of tree inventory shows the different plant species, their families found in the SJCW college campus. A total of 87 tree individuals (height above 3 meters) species were recorded in the study site. Out of 87 tree individuals only 3 were deciduous trees while rests all were deciduous.

Dominant families recorded in the study area according to descending order (based on number of species type in each family) are Bignoniaceae (3) Aracaceae (3) and in remaining other families only one species is recorded (see Tree inventory Table).

Height and Girth distribution of trees

Assessment of height apart from being one of the most important parameters for calculation in carbon inventory projects along with DBH was considered as a reliable parameter to find out the maturity of a natural or man-made forest for terrestrial sequestration projects.

Out of the 87 species identified in the study site all 87 species were treelets, <10m tall. No medium sized trees(10m-20m), canopy species (20-30m) found in the campus. Emergent species (>30m) were not found in the SJCW campus.

Total biomass assessment: The assessment of above ground and belowground biomass of SJCW campus was carried out within campus

Biomass carbon = (aboveground biomass carbon + belowground biomass carbon)

Conclusion: Total carbon locked in the year of 2021 was 0.08 ton.

7.VEHICULAR EMISSIONS

The emissions inventory is the foundation upon which the regulatory strategy can be formulated. There are many emission sources that contribute to the urban air pollution such as point sources, non-point or area sources, motor vehicles, non-road mobile and natural. Magnitude of contribution from each of the sources depends upon the individual emission rates and the activity level.

The on-road motor vehicle emission inventory can be summarized as the product of an emission rate (e.g., gram/km) and an associated vehicle activity (e.g., km/day).

Survey was conducted to count the vehicles used by SJCW 'ians . Survey was done for one week at 11am 2019.

On an average number of 60 bicycles were counted per day. Around 35 two wheelers are used daily by SJCW students and staff. While 3 four wheelers daily come to the campus.

Amid corona virus outbreak college was shutdown in March 2020 and remains closed for one year. So there was almost zero Vehiclular emissions for one year from March 2020. Following observations were taken in 2019 and are taken for reference to set sustainability goals for college.

Pollutants	Emissions Factor	Number of Vehicle/ day	Emissions (gm/km)	Average Travel (km)	Total Emissions per day
CO	1.4	12	16.8	10	168
HC	0.7	12	8.4	10	84
NOx	0.3	12	3.6	10	36
PM	0.05	12	0.6	10	6
CO2	33.83	12	405.96	10	4059.6

Total emissions by two wheelers

If we consider CO₂ emissions only, we can see that 4059.6 gm/day of CO₂ is emitted by two wheelers of SJCW campus. So the CO₂ emitted by two wheelers per year is **0.97 tones/year**

Pollutants	Emissions Factor	Number of Vehicle day	Emissions (gm/km)	Average Travel (km)	Total Emissions per day
CO	4.3	3	12.9	10	129
HC	2.05	3	6.15	10	61.5
NO _x	0.11	3	0.33	10	3.3
PM	0.08	3	0.24	10	2.4
CO ₂	72.50	3	217.5	10	2175

Table Total emissions by Four wheelers

Emission factors by four wheelers are higher than two wheelers. So the emissions per vehicles are also high as compared to two wheelers. If we consider CO₂ emissions only, we can see that 2175 gm of CO₂ is emitted by two wheelers of SJCW campus. So the CO₂ emitted by two wheelers per year is,

$$= 0.5 \text{ tones/year}$$

Total Emissions by SJCW vehicles per year = 2W + 4W = 0.97 + 0.56 = 1.47 tones/year

From above figure it can be analyzed that though the number of 4W are less as compared to 2W, they do notable contribution in total CO₂ emissions of the campus.

CARBON DIOXIDE EMISSIONS AND ITS ASSIMILATION BY CAMPUS TREES

In green audit college has also assessed carbon sequestration by campus trees..

If we quantify CO₂ flux of 2020 to carbon dioxide,

$$0.08 \text{ tones of Carbon} = 72.57 \text{ kg of carbon}$$

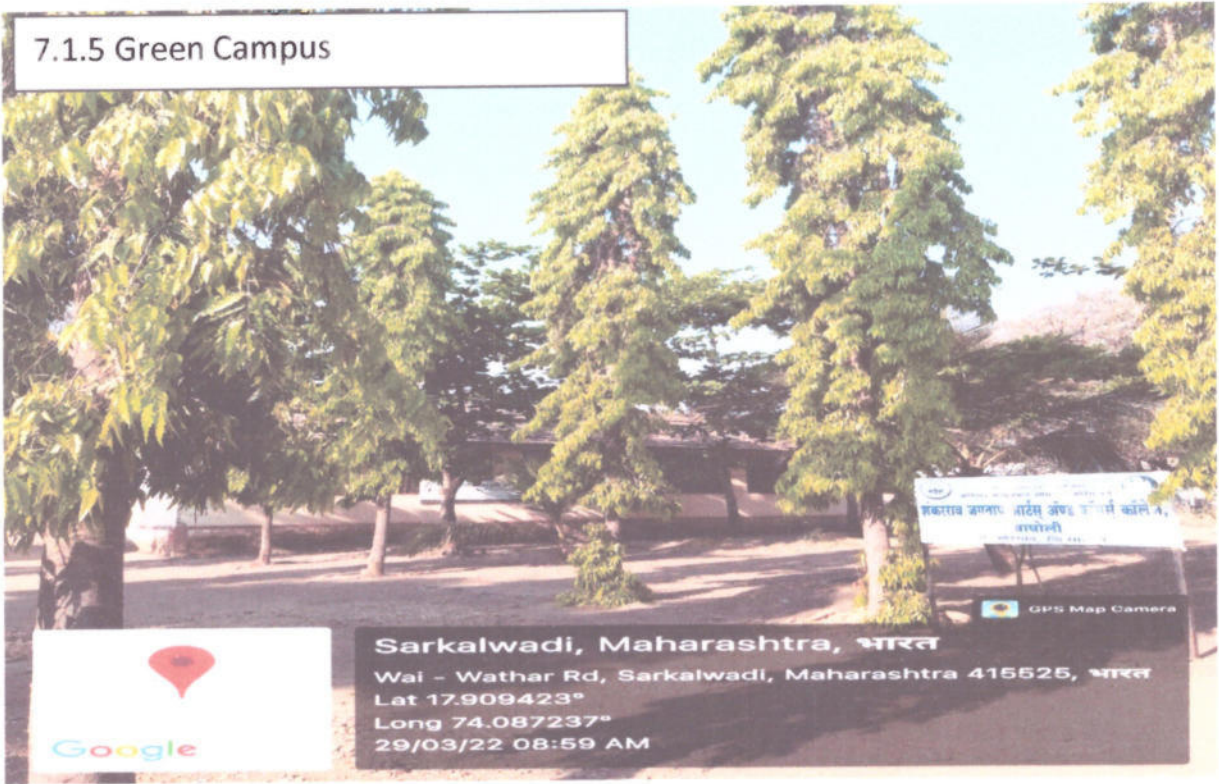
To determine the amount of CO₂ that the trees removed from the atmosphere, we have to multiply the carbon value by 3.67. This value is the mass conversion factor for carbon to carbon

dioxide.

$72.57 \text{ kg of carbon} * 3.67 = 266.33 \text{ kg of CO}_2 = 0.367 \text{ tonnes CO}_2 \text{ per year}$ So it can be concluded that campus trees has capacity to assimilate 0.26 tonnes of CO₂ per year.

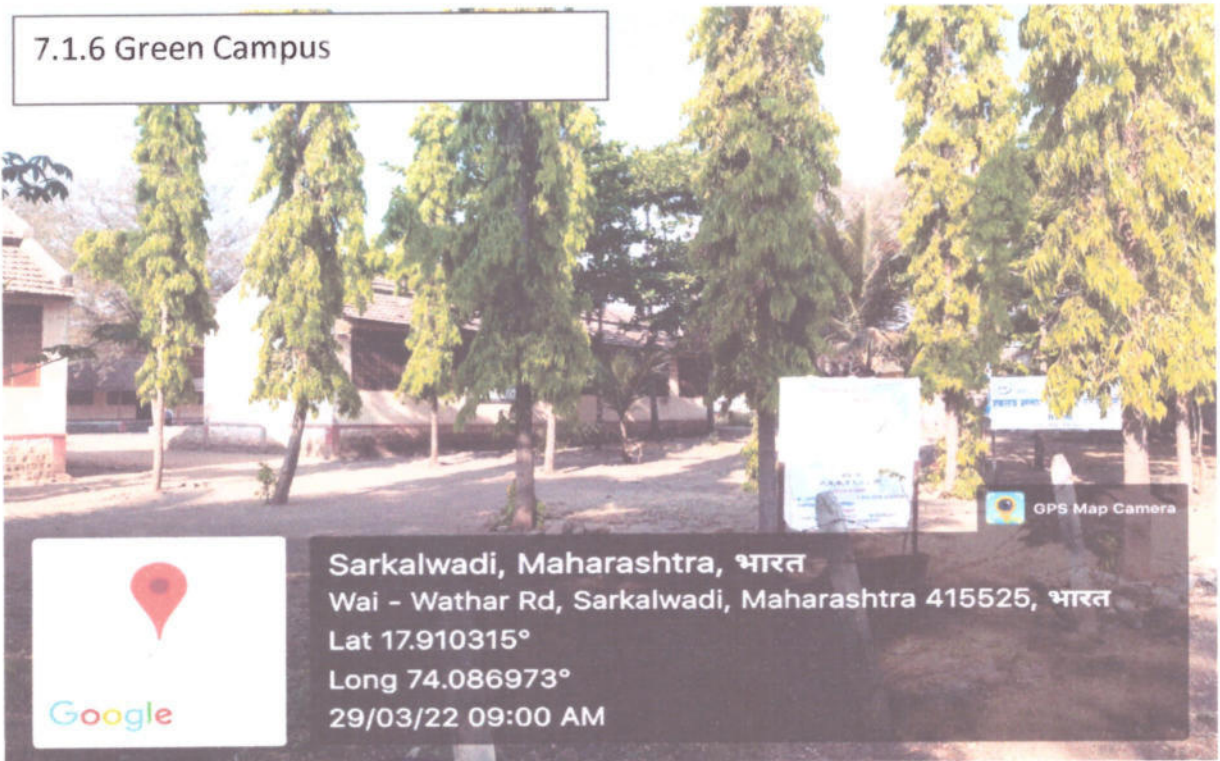
While the vehicular emissions study showed that total emissions of SJCW vehicles (2021) is 1.47 tones/year. This value is 5.6 times greater than Carbon dioxide assimilation capacity of campus trees.

7.1.5 Green Campus



Sarkalwadi, Maharashtra, भारत
Wai - Wathar Rd, Sarkalwadi, Maharashtra 415525, भारत
Lat 17.909423°
Long 74.087237°
29/03/22 08:59 AM

7.1.6 Green Campus

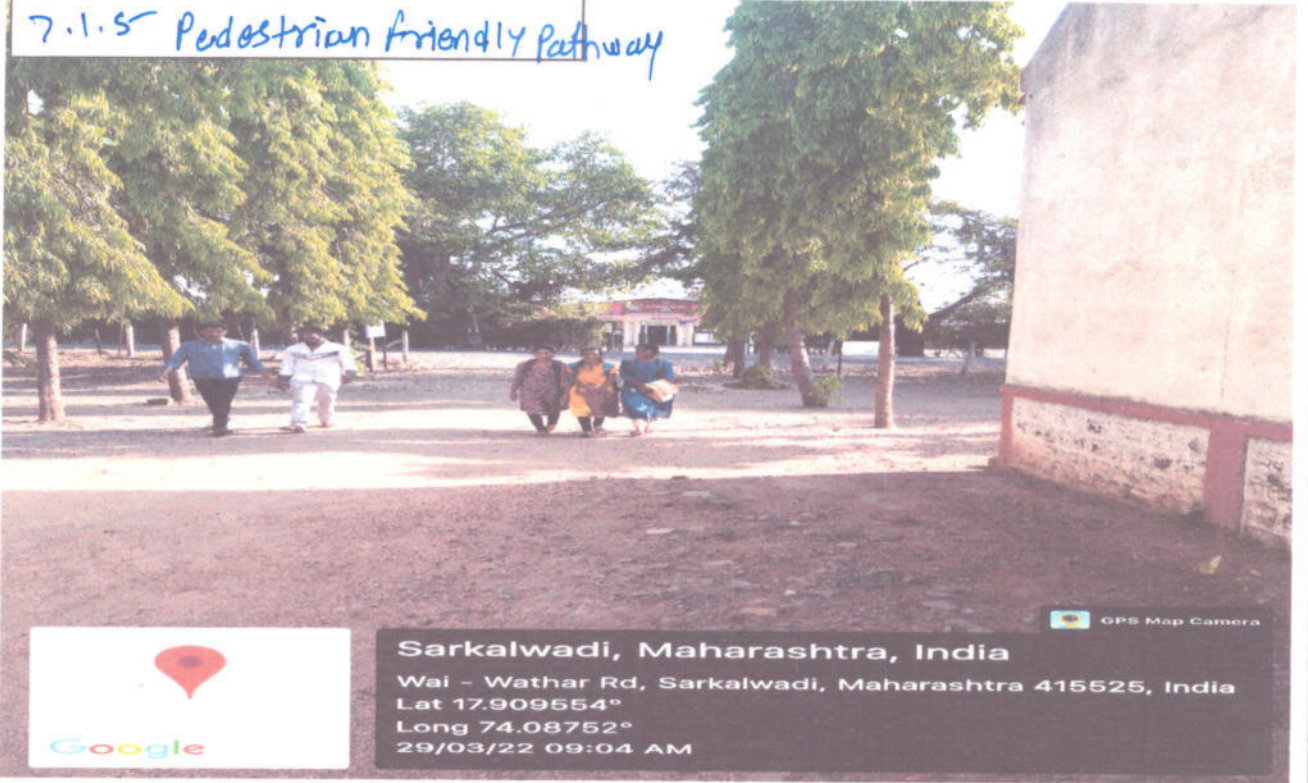


Sarkalwadi, Maharashtra, भारत
Wai - Wathar Rd, Sarkalwadi, Maharashtra 415525, भारत
Lat 17.910315°
Long 74.086973°
29/03/22 09:00 AM




PRINCIPAL
SHANKARRAO JAGTAP ARTS & COMMERCE COLLEGE, WAGHOLI
Tal-Koregaon, Dist-Satara.

7.1.5 Pedestrian friendly pathway



Sarkalwadi, Maharashtra, India

Wai - Wathar Rd, Sarkalwadi, Maharashtra 415525, India
Lat 17.909554°
Long 74.08752°
29/03/22 09:04 AM

GPS Map Camera

7.1.5 Pedestrian friendly pathway



Sarkalwadi, Maharashtra, India

Wai - Wathar Rd, Sarkalwadi, Maharashtra 415525, India
Lat 17.909667°
Long 74.087563°
29/03/22 09:04 AM

GPS Map Camera



शंकरराव जगताप आर्ट्स अँड कॉमर्स कॉलेज, वाघोली

ता. कोरेगाव, जि. सातारा पिन नं. ४१५ ५२५ फोन नं. (०२३७९) २५९७७५.

7/01/2021

महाविद्यालयातील सर्व अधिव्याख्यातांना व शिक्षकेतर कर्मचाऱ्यांना कळविण्यात येते की,

विषय: ~~द्वि हरित वाप्य घोषणासाठी मुक्त येव्यादीवत~~
~~बासनाच्या वसुधरा समिथानाअंतर्गत हरितवाप्य~~
~~घोषणासाठी सर्व कर्मचाऱ्यांनी दिनांक ०९/०१/२०२१ रोजी~~
~~ठीक ९-३० मि होल क्र. १ मध्ये मुक्त रावे. N.S.S~~
~~विक्षागतगीत ही वाप्य घेतली जाणार याची सर्वांनी~~
~~दयावी.~~



10/1/2021 (mes. chavan m. p.)
 Programme office of
 N.S.S

PRINCIPAL
 SHANKARRAO JAGTAP ARTS &
 COMMERCE COLLEGE, WAGHOLI

क्र.सं.	शिक्षक	सही	अ.क्र.	शिक्षकेतर कर्मचारि	सही
१	श्री. साळुंखे एस. आर.		१	कु. रसाळ एम.बी.	
२	श्री. पठाण आर. एम.		२	श्री. कदम आर. वाय.	
३	श्री. वैराट व्ही. एन.		३	श्री. राजे डी. एन.	
४	श्री. रगडे पी. आर.		४	श्री. नावडकर एस्.आर.	
५	कु. आंदे एल.डी.		५	श्री. कोरडे आर. एच.	
६	श्री. कारंडे आर. व्ही.		६	श्री. साठे यु. एम.	
७	कु. चव्हाण एम. आर		७	श्री. काटकर एस्.एस्.	
८	कु. डॉ. पटेल एस.ए.				
९	श्री. जाधव पी. एच.				
१०	श्री. कुंभार पी.सी.				
११	डॉ. पाटील व्ही. एन.				
१२	श्री. सावंत जे.सी.				
१३	Lokhande P.V.				
१४	Mr Ghadge v.				
१५					
१६					
१७					
१८					

7.1.5 - Plastic free college campus



PRINCIPAL
SHANKARRAO JAGTAP ARTS &
COMMERCE COLLEGE, WAGHOLI
Tal-Koregaon Dist-Satara


हरितशपथ

मी भारताचा सुजाण नागरिक या नात्याने शपथ घेतो की, स्वच्छ, सुंदर, सुजलाम्, सुफलाम् भारत घडविण्यास मी नेहमी कटिबद्ध राहीन. विविध प्रकारची वृक्ष लागवड, वृक्ष संवर्धन करून पर्यावरण समतोल राखण्याचा प्रयत्न करेन. हरित भारताचे स्वप्न पूर्ण करेन.

धूरमुक्त भारत होण्यासाठी विविध संकल्पना समोर आणीन व त्याचा वापर करेन. घर, गाव, परिसर स्वच्छ ठेवण्यासाठी स्वतः कृती करून जनजागृती करेन. भविष्याची गरज लक्षात घेऊन पाण्याचा काटकसरीने, कमीत कमी वापर करून पाण्याच्या बचतीचा धडा सर्वासमोर ठेवीन. जमिनीचा स्तर उंचाविण्यासाठी प्लास्टिकचा वापर करणार नाही. त्यासाठीच्या उपाययोजनांमध्ये हिरीरीने भाग घेईन. पृथ्वीच्या रक्षणासाठी व उज्वल भविष्यासाठी या सर्व गोष्टी अंगिकारण्यासाठी मी कटिबद्ध असेन.

‘जयहिंद जयभारत’




PRINCIPAL
SHANKARRAO JAGTAP ARTS &
COMMERCE COLLEGE, WAGHOLI
Tal-Koregaon, Dist-Satara

दिनांक : ०८ . ०१ . २०२१

सूचना

महाविद्यालयातील सर्व विद्यार्थ्यांना कळविण्यात येते की , शासनाच्या 'माझी वसुंधरा' या अभियाना अंतर्गत दिनांक ०९ . ०१ . २०२१ रोजी ठिक ८ . ३० वा . हरितशपथ घेण्यासाठी हॉल क्र . १ मध्ये जमा व्हावे .



A handwritten signature in black ink, appearing to be "S. S. S.", written over a horizontal line.

PRINCIPAL
SHANKARRAO JAGTAP ARTS &
COMMERCE COLLEGE, WAGHOLI
Tal-Koregaon, Dist-Solapur