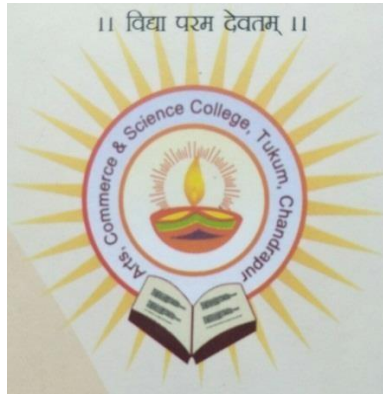


# **ARTS, COMMERCE & SCIENCE COLLEGE, Tukum, Chandrapur**



## **GREEN AUDIT REPORT**

**2019-2020**

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## Preface

Nature provides free services to all. In recent years, environmental problems have increased by human activities and development of science and technology and planet earth is facing tremendous pressure from increases in population. The planet is becoming warmer by most discussed phenomena, The “Global warming”. Quality of water, air, noise and soil is deteriorating beyond recovery. In order to know more about environmental degradation, there is need to identify them and implement mitigation measures for environmental protection.

Sustainable development is becoming popular in the world for saving the earth. Utilising resources in judiciously can save the earth's precious resources. Measurement of environmental components is the most effective step to conserve and protect natural resources.

Environmental auditing had begun in the early 1970s with provision of civil lawsuits for non compliance with environmental regulations. Green auditing involves on site visit, collection of samples, performing analyses, and report results to competent authorities. Industry, the corporate world is initiating auditing for saving natural resources. Academic institutions also can contribute to the preservation and conservation of resources within their premises.

In the present write up “Green Audit” report, outline existing scenario of campus. A brief content of this report would help everyone to think about preserving resources, show willingness to learn their importance, adopt steps to minimize resource use and set an example for others to follow the path of green practices to achieve the goal of sustainable development.

We express our deep sense of gratitude to the Chairman of the of Dnyandeep Shikshan Prasarak Mandal, Dr. N. H. Khatri and management body of DSPM and Dr. S. B. Mohitkar, Principal of the college for their support in preparation of the report.

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## **1. Introduction**

Auditing is an evaluating system of college in terms of internal controls for achieving goals. Planning, on-site work, audit report preparation, and follow-up are the most essential stages of the auditing process. College, in addition to imparting education is committed to environmental protection by reducing environmental impacts such as reducing waste, water and energy consumption. The basic motive is to inspect ongoing processes in college whose exercises can be harmful to the health of students, all workforce and environment. Our intention is to achieve environmental sustainability by implementation of better environmental sound practices.

**1.1** Planning of preparation of Green Audit involves comprehensive steps of observation and verification by on-site visit. Planning process started with a discussion among committee members, the objectives were framed, the methodology followed by sampling and final report preparation ended with a number of initiatives to be undertaken for environmental sustainability.

## **2. Objectives**

Objectives are significant to enhance our vision which further converts in the measurement of environmental components for achieving goals. Earth's natural resources are important to support life, but its overexploitation can lead to disturbance of the natural balance. In present time, conventional auditing supported by Green Auditing may assist the college to manage environmental resources by effective environmental mitigation measures. The following objectives are systematic attempt to reach at a target which could guide us for safe and clean environment for all.

1. To observe land use for various purposes.
2. To record and document tree species and faunal diversity in the college premises.
3. To prepare an air quality observation report.
4. To analyse water samples for aesthetic parameters.
5. To record noise level in the college premises and outside area.
6. To study soil quality of the college campus.
8. To prepare report on E-waste disposal and management.

9. To study solid waste management practices in college campus.

10. To study electrical power consumption in college.

### 3. Land use observation

The total area of Arts, Commerce & science, College is 10100 sq. meters out of which the built up area is 1908.397 sq. meters and open space & plantation area is 4691.6 and 563 sq.meters. Based on finding, it can be concluded that college campus covered with vegetation is adequate to curb pollutants from the air.

### 4. Tree species diversity in the college premises

Most of the trees are planted keeping in mind to reduce carbon dioxide from the atmosphere. Trees of the college campus are effective to stabilise soil, it provides habitat for diurnal as well as nocturnal animals, gives shelter to invertebrates. Trees of college campus protect students from different colleges from heat waves in summer during the university examination. Aesthetic quality is maintained by planting ornamental trees. The plantation programme had been implemented since inception of the college. The following tree species are observed during on- site visit.

**Table1.List of Tree species in the college premises**

Sl. No.	Vernacular Name	Botanical Name	Family Name	Number
1.	Teak (Sagwan)	<i>Tectona grandis</i>	<i>Verbenaceae</i>	03
2.	Karanj	<i>Pongamia pinnata</i>	Fabaceae	06
3.	Shisam	<i>Dalbergia sissoo</i>	Fabaceae	02
4.	Gulmohar	<i>Caesalpinia species</i>	Caesalpinioideae	01
5.	Gulmohar	<i>Peltophorum pterocarpum</i>	Caesalpinioideae	01
6.	Neem	<i>Azadirachta indica</i>	Meliaceae	05
7.	Jamun	<i>Syzygium cumini</i>	Myrtaceae	01
8.	Nilgiri	<i>Eucalyptus spceies</i>	Myrtaceae	02
9.	Ashoka	<i>Saraca indica</i>	Caesalpinioideae	04
10.	Ghanti	Cascabela thevetia	Apocynaceae	01
11.	Cotton Silk	<i>Ceiba pentandra</i>	Malvaceae	03
12.	Sitaphal	<i>Annona squamosa</i>	Annonaceae	01
13.	Vidya	<i>Thuja species</i>	Cupressaceae	02
14.	Fire craker plant	<i>Hemelia patens</i>	Rubiaceae	01
15.	Jungle Flame	<i>Ixora coccinea</i>	Rubiaceae	01

16.	Pygmy date Palm	<i>Phoenix roebelenii</i>	Areaceae	06
17.	Dracaena	<i>Dracaena fragrans</i>	Asparagaceae	01
18.	Colcasiaesculanta	<i>Xanthosoma sagittifolium</i>	Araceae	02
19.	Shatavari (Musli)	<i>Asparagus racemosus</i>	Asparagaceae	01
20.	Ornamental	<i>Tradescantia pallida</i>	Commelinaceae	01
21.	Ornamental	<i>Rhoeo discolor</i>	Commelinaceae	01
22.	Cactus	<i>Euphorbia trigona</i>	Euphorbiaceae	01
23.	Bougainvillea	<i>Bougainvillea</i>	Nyctaginaceae	02



**Figure 1: A green view of college campus**

## 5. Estimation of biomass

Biomass means the total number of living organisms in a certain area. Estimation of the biomass of a tree is important to assess the ecological status of a campus. The Standing Biomass and its measurements are an important tool to assess the amount of energy stored in the vegetation. The carbon sequestered by the trees would be captured and stored, thus removing carbon dioxide from the atmosphere. Teachers and student work together to estimate the biomass of the tree in a campus

## 5. Faunal diversity in the college premises

The faunal diversity consists of both invertebrates and vertebrates. Invertebrates have occupied every ecological niche. Vertebrates depend on invertebrates for food. It is very essential to record their existence for balance of nature. Presence of vertebrates and invertebrates were simply noted by sighting. The faunal diversity sighted and observed at different time interval is depicted in Table 2.

**Table 2: Faunal diversity of college campus**

Sr.No.	Fauna	Scientific Names
1.	Spiders	Artema Atlanta; Hersilia savignyi; leucauge decorate; Nephila pilipes.
2.	Butterflies	Hasora chromus; Hasora taminatus; Hasora vitta; Badamia exclamationis; Burara jaina; Hasora badra; Suastus gremius.
3.	Insects	Onitis, Phalops, Chironitis, Gymnopleurus Parvus,
4.	Mammals	Bat(Chiroptera Spp.), Squirrel (Funambulus)
5.	Birds	Acridotheres tristis (Common myna); Pycnonotus cafer (Redvented Bulbul), Dicrurus Macrocerus (Black Drongo), Sparrow (Passeridae Spp.) House Crow(Corvus Splendens)
6.	Amphibia	Tree Frog (Polypedates Maculatus), Indian Toad (Duttaphrynus Melanostictus)
7.	Reptile	Wall Lizard(Hemidactylus Frenatus), Calotes Versicolor

## 6. Air quality in college campus

The climate of Chandrapur has a hot and dry. December is the coldest month, with a minimum average temperature of December is 9 °C and a maximum average temperature remain around 23.2 °C. The mean maximum temperature of the month May is 43 °C. June and September are



the months of monsoon. Chandrapur's average annual rainfall is 1249.4 mm. (India Meteorological Department, May 2013).

Coal based Thermal Power Station is located in Chandrapur district in the state of Maharashtra. Air quality study was limited upto collection of near deposited dust particles by the Dust Fall Jar method. The average findings of dust particles are presented in Table 3.

**Table 3: Air borne particle analysis**

Location	Insoluble particles g/m <sup>2</sup> /month	Soluble particles g/m <sup>2</sup> /month	Total particles g/m <sup>2</sup> /month
January2017-December2018			
College top terrace	0.41	0.22	0.63

Dust collected over a period of time shows slightly higher concentration because of nearness of college to Thermal power plant, but green vegetation of college is effective to reduce dust pollution.

## **7. Water management and quality assessment report**

Water quality of working place is paramount as it is related to human health and livelihoods of people. Supplying clean and reliable water supplies is a prime necessity. The source of drinking water supply is majorly ground water and privately owned R.O. (reverse osmosis) supplier. The ground water is treated by R. O. unit on the ground floor and first floor prior being used by students and staff. Water after use is directed towards the area which goes to the plantation, so water is utilized. Rainwater harvesting unit installed at front side is working with maximum percolation of rain water. Water used in laboratories comes out as waste water is diluted prior to disposal in sewer line where it mixes with sewage. Ground Water required for drinking and laboratory purpose is analysed for physical and chemical parameters. Department of the College makes use of Air conditioners, water as distilled water brought from the city which is free, so burden of production of distilled water by conventional distillation is minimized with a saving of capital plus electricity. The water analysis report is depicted in Table.4

**Table.4: Physical and Chemical analysis of water sample**

Parameter	Physical and Chemical analysis of water sample				
	Ground Water	R.O.Unit1	R.O.Unit 2	R.O. Water supplied by private owner	A/Cs condensed water
Colour	Colourless	Colourless	Colourless	Colourless	Colourless
pH	7.3	7.1	7.2	7.1	6.9
Conductance μS/cm	630	90	110	70	05
Total Hardness mg/l	350	12	10	15	NIL
Chloride mg/l	75	BDL	BDL	BDL	NIL
Fluoride mg/l	0.8	BDL	BDL	BDL	NIL
Sulphate mg/l	110	BDL	BDL	BDL	NIL
Phosphate mg/l	10	BDL	BDL	BDL	NIL

**BDL-Below detectable limit**

It is observed that ground water drawn from bore well is having a higher amount of salts which may affect the taste, but such water is treated via R. O. plant and used for drinking purposes.



**Figure 2: Analysis of water samples**



**Figure 3: Analysis of water samples**

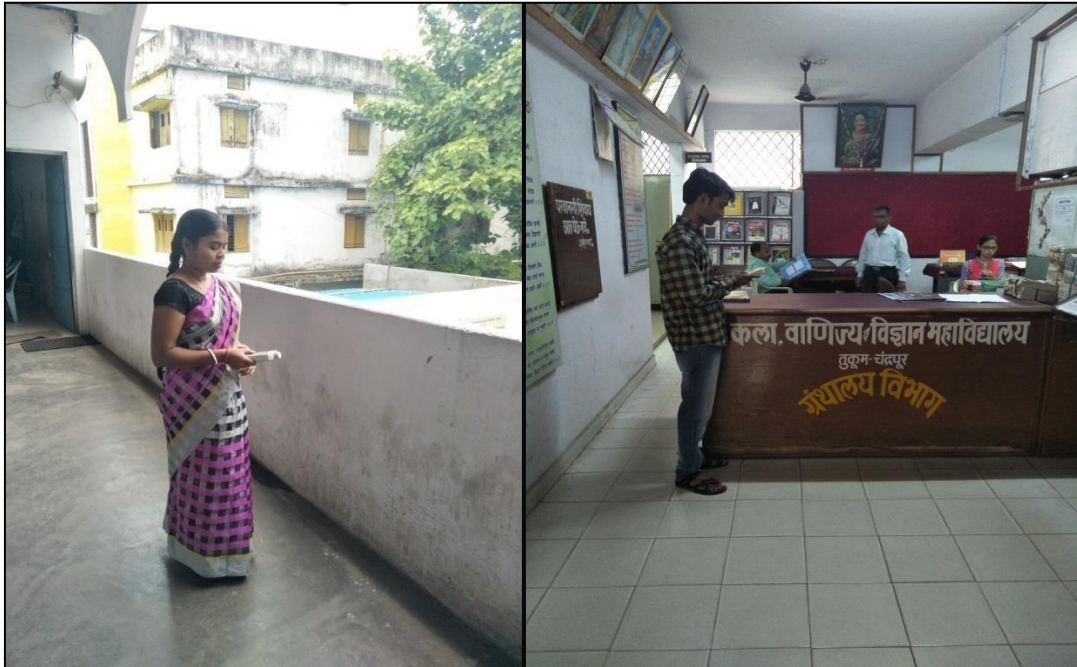
## 8. Noise quality assessment report

Noise Quality Measurement is the most important part of the noise control program. It imparts information about potential noise generating places in workplace, students and staff likely to be affected. Noise measurement during busy hours gives valuable numbers which may be useful for planning, avoiding, controlling noise at the workplace. Following noise measurements made at different locations is useful to consider noise if there is a noise problem in the workplace.

**Table 5: Noise level measurement**

Location	Noise Level (Decibel-dB)
First floor	25
Open passage- First floor	31
Ground floor	35
Library	15
Open Ground	35
College Office	37
Outside entry gate	64

It is observed that noise level outside entry gate is higher than rest of locations, as the entry gate is situated adjacent to Durgapur road.



**Figure 4: Noise level measurement (1<sup>st</sup> floor) Figure 5: Noise level measurement in library**

## 9. Soil quality assessment report

The purpose of Soil quality assessment is to protect and improve soil in campus, increase its fertility for plant growth. The basic thing about soil is content of organic matter in it which is important in maintaining soil quality. Litter fall in plantation area is altogether sufficient to maintain soil organic matter. Soil samples collected from campus area show the following results.

**Table 6: Soil Quality Parameters and concentration**

Soil Quality Parameters	Concentration
January2017-December2018	
pH	7.9
Chloride mg/l	220
Organic matter %	0.7115

## 10. E-waste disposal and management

The use of electronic equipments is growing faster due to advancement in technology. The quantity of E-waste generation is increasing as people buy advance electronic equipments while dumping old one. E-waste carries health risks as it contents toxic materials such as cadmium, chromium, PCBs. E-waste generation is minimum in college campus. E-waste generated in college is simply handed over to scrap collector as proper e-waste collection facility is not available in the city.

## 11. Solid waste management

Solid waste is heterogeneous material and hence need to be disposed off systematically with due care of the environment. Solid waste generated in college comes from administrative office and the campus. Solid waste generated in college is segregated and put into collection bins marked as green and blue. Chandrapur Municipal Corporation has made arrangement to collect solid waste

frequently. Litter from plants are collected for decomposing in a pit (5x3.5x1.75) made for this purpose. Ventilation arrangement of laboratories is effective to reduce gaseous waste.

## **12. Electrical power consumption**

Electrical power consumption is related with the standard of living of the people, the growth of cities, industries and transport sectors. Use of electricity is essential to carry out routine work. The college is committed to reduce consumption of electricity by replacing old fluorescent lamps with LED bulbs and tube lights. Students and staff are aware to minimize electric consumption by switching off electrical appliances when not in use.

### Estimation of biomass

Biomass means the total number of living organisms in a certain area. Estimation of the biomass of a tree is important to assess the ecological status of a campus. The Standing Biomass and its measurements are an important tool to assess the amount of energy stored in the vegetation. The carbon sequestered by the trees would be captured and stored, thus removing carbon dioxide from the atmosphere. Teachers and student work together to estimate the biomass of the tree in a campus