



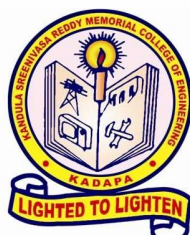
Green Audit Report

2021-2022



Prepared By
**Lee Shreyus
Foundation**





Green Audit Report

2021-2022

EXPERT COMMITTEE MEMBERS

Dr. A. Vamsi Krishna Reddy Asst. Prof(C),
Center for Environment - IST- JNTUH.

Dt.S.Jyothi - Assoc.Prof -Department of Chemistry
Kakatiya University, Warangal.

Dr. Abhilasha Maryada, Asst. Prof & Environmental Expert
Chaitanya Deemed to be University.

Ms. Gunde Padma - Senior Consultant & Environmental
Expert

Mr. A. Uma Shankar Kumar - Environmental Expert and
Director - LSF

INTERNAL COMMITTEE MEMBERS

Prof. V.SS Murthy Principal -KSRMCE

Dr.I Sreevani - HoD& Assoc.Prof - KSRMCE

Mr. P. Suresh Praveen Kumar - Asst. Prof - KSRMCE

Mr. M. V Ravi Kishore Reddy - Asst.Prof - KSRMCE

Preface

The issues connected with widely understood institutions are nowadays one of the most discussed problems in the social sciences. Especially the role of institutions in creation of economic performance and economic development in the context of sustainable development is crucial. The paper aims to explain shortly the importance of institutions in modern economies, the nature of sustainability problems and relationship between institutions and sustainable development.

The constitutive element of sustainable development is a long-term socio-economic development, conducive to the development of all societies and each individual who takes account of environmental protection. There isn't a consensus among economists in the case of one, common definition of development. However arbitrary it is accepted that development relates to the increasing real GDP per capita, improvement in health and nutrition, positive changes in quality of education systems and social security, more equal distribution of income and access to economic resources.

KSRM College of Engineering, Kadapa has been putting efforts for making the campus sustainable. Our special thanks to the management and faculty for supporting us in preparing audit reports of the campus.



About us....



Lee Shreyus Foundation is an organization working for the sustainable development focusing on the green nation building started in the year 2012 registered in the year 2014 and re- registered as a Section -8 Company, under the Ministry of Cooperate Affairs, Government of India with CIN: CIN: U85300TG2021NPL151122 with registered office at 834/a, Bhagath Singh Nagar Near Vasanth Nagar Kukatpally, Hyderabad.

We have worked with various government bodies such as Telangana State Biodiversity Board, Telangana State National Green Crops, EPTRI, JNTUH NSS Cell, KU NSS Cell, TSPCB etc.

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MINISTRY OF
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OVERVIEW

The integration of three dimensions: environmental, economic and social are commonly referred to the concept of sustainable development. But more and more often the fourth institutional dimension is considered. The conditions of long-term socio-economic growth and development are widely discussed on the basis of social sciences. In the search for sources of economic growth, the reasons of disproportion and divergence between countries in terms of their level of growth and income are considered. The researches look for answer, to the question, both in theory and empirics why do some countries get richer while the others do not. The most discussed issue is the role of institutions and institutional quality in the economic performance, in poverty limitation and in the socio-economic development.

Green audit can be a useful tool for a college to determine how and where they are using the most energy or water or resources; the college can then consider how to implement changes and make savings. It can also be used to determine the type and volume of waste, which can be used for a recycling project or to improve waste minimization plan. Green auditing and the implementation of mitigation measures is a win-win situation for all the college, the learners and the planet. It can also create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of Green impact on campus.

This audit was initiated with the motive of inspecting the work conducted within the organizations whose exercises can cause risk to the health of inhabitants and the environment. It exposes the authenticity of the proclamations made by multinational companies, armies and national Governments with the concern of health issues as the consequences of environmental pollution. It is the duty of organizations to carry out the





Green Audits of their ongoing processes for various reasons such as; to make sure whether they are performing in accordance with relevant rules and regulations, to improve the procedures and ability of materials, to analyse the potential duties and to determine a way which can lower the cost and add to the revenue. Through this audit, one gets a direction as how to improve the condition of environment and there are various factors that have determined the growth of carrying out the audit. Some of the incidents have cautioned the industries that setting corporate strategies for environmental security elements have no meaning until they are implemented.

Green audit is assigned to the Criteria 7 of NAAC Assessment and Accreditation Council which is a self-governing organization of India that declares the institutions as Grade A, Grade B or Grade C according to the scores assigned at the time of accreditation. The intention of organizing Green Audit is to upgrade the environment condition in and around the institutes, colleges, companies and other organizations. It is carried out with the aid of performing tasks for better environmental friendly institute.

Objectives

- To carry out audit to secure environment and cut down the threats posed to human health.
- To make sure that rules and regulations are taken care of
- To avoid the interruptions in environment that are more difficult to handle, and their corrections requires high cost.
- To suggest the best solutions for adding to sustainable development.

COLLEGE PROFILE

The college owes its existence to the keen interest of Late Kandula Obul Reddy to develop technical education in Rayalaseema region of Andhra Pradesh. With a view to translating his noble ideal of imparting technical education into reality, a Technical Training Institute at Vempalli, Kadapa District was started in 1979 under the aegis of Sri Kandula Obul Reddy charities. It is in the year 1980 that K.S.R.M. College of Engineering was established to perpetuate the memory of Late Sri. Srinivasa Reddy, youngest son of Late Sri Obul Reddy. Sri Srinivasa Reddy, a brilliant student of III-year Mechanical Engineering at Delhi College of Engineering, New Delhi, met with his untimely death in a scooter accident on 18th Oct, 1979.

The college was formally inaugurated on 14 November 1980 by Sri T. Anjaiah, the Chief Minister of Andhra Pradesh and it started functioning from the academic year 1980-81.



VISION

KSRMCE seeks to be recognized as one of the best engineering colleges in India in providing high standards of academics with most productive, creative learning environment by including research, innovation thoughts and producing graduates with human values & leadership qualities to serve nation.

MISSION

1. Provide high quality education in Engineering & Technology in order to bring out knowledgeable engineers.

2. To create environment a collaborative environment with stakeholders to take up need-based research and industry specific programs.

3. To organize co-curricular and extracurricular activities for character and personality development to produce highly competent and motivated engineers and professionals to serve and lead the society.





Development

The college had its modest beginnings in 1980 with an intake of 160 students with core branches Civil, Electrical & Electronics, Electronics & Communications and Mechanical Engineering. Keeping in view the latest trends, priorities and relevance in Engineering and Technology, the Board of Management decided to start Computer Science and Engineering in 1990 commemorating the decennial year of the college. With the concerted efforts of the Management and the Successive Principals, the departments have been strengthened year after year and the intake has steadily been increased to 1080 by the year 2014.

Furthering its sphere of activity, the college started post graduate programme in CAD/CAM (ME), Geo-technical Engineering (CE) in the year 2004, Power Systems (EEE) & Computer Science and Engineering (CSE) during 2010-11 and Digital Electronics and Communication Systems (ECE) in 2011-12 respectively. The branches have constantly been strengthened by increasing the intake from time to time. This reflects one aspect of the progress and development of the college.

Campus

The College campus is located 7 K.M. away from Kadapa town on Kadapa to Pulivendula Highway in a calm and salubrious area of 35 acres. The College is set in a serene environment with lush greenery and fresh air. Four multi-storeyed RCC structures measuring 26,700 sqm provide accommodation for the departments. The College has dedicated electric power feeder and 250 KVA substation. Other capital resources include transport vehicles and four hostels. Excellent Bus facilities exist from Kadapa to Hyderabad, Vijayawada, Nellore, Tirupati, Kurnool, Bangalore, Chittoor and Chennai.

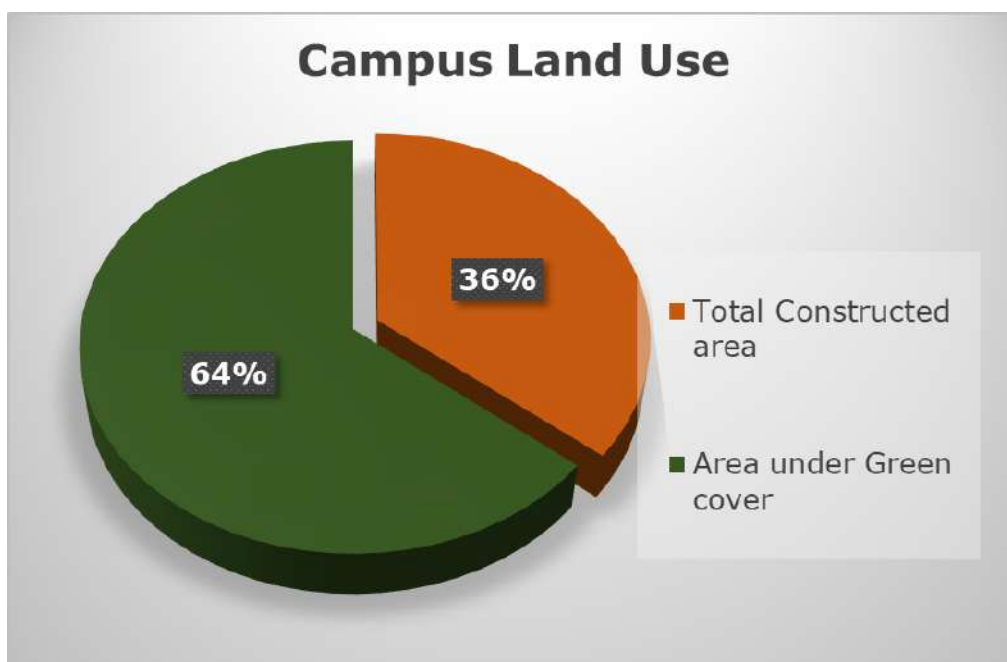


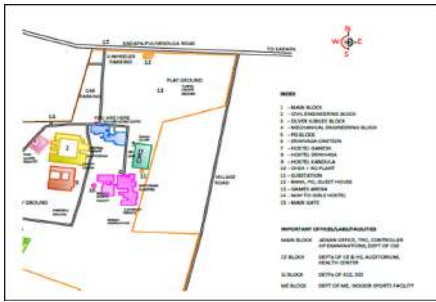
location of the campus

**YERRAMASUPALLI, C.K.
DINNE, KADAPA,
ANDHRA PRADESH
516003**



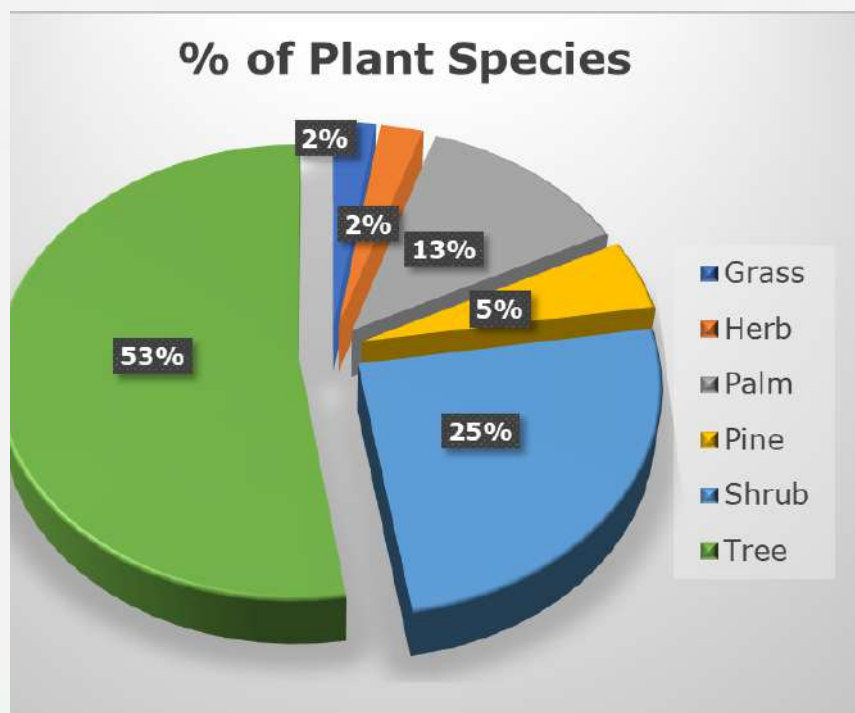
LAND USE





Floral biodiversity

Plant Type	No. of species	% of plant species
Grass	1	2.5
Herb	1	2.5
Palm	5	12.5
Pine	2	5
Shrub	10	25
Tree	21	52.5



HIGH NUMBER OF TREE SPECIES I.E., 52.5% AND THEN SHRUB SPECIES I.E., 25%.

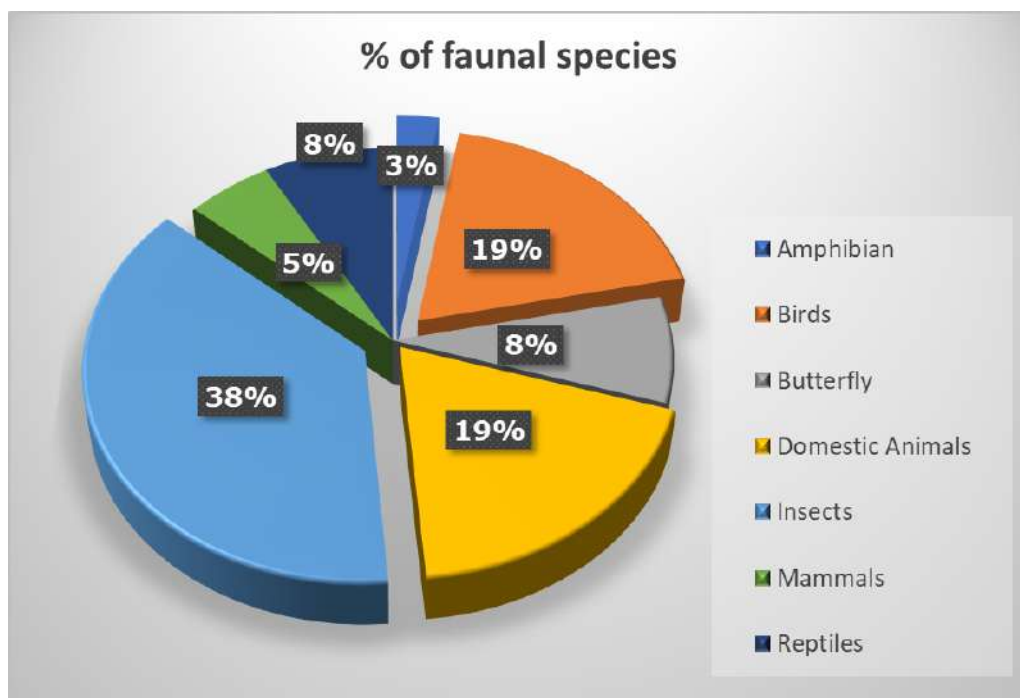
LIST OF FLORAL SPECIES

S.NO	Species Type	Common Name	Scientific Name
1	Tree	Conocarpus	conocarpus lancifolius
2	Tree	Fiji fan palm	Pritchardia pacifica
3	Tree	Neem tree	Azadirachta indica
4	Shrub	Chinese ixoro	Ixoro chinensis
5	Grass	South kalimantan bamboo	Gigantochloa luiceostriata
6	Pine	Norfolk island pine	Araucaria heterophylla
7	palm	Manila palm	adonia merrillii
8	Tree	Scared fig	Ficus religiosa
9	Tree	apricot	Prunus armeniaca
10	Shrub	Flames of the wood	Ixora coccinea
11	Palm	Fan palm	Licuala grandis
12	Tree	Lemon tree	Citrus limon
13	shrub	Deutzia	Deutzia gracilis
14	Shrub	Hibiscus	Hibiscus rosa-sinensis
15	Shrub	Jasmine	Gardenia jasminoides
16	Herb	Holy basil	Ocimum tenuiflorum
17	Shrub	Copper leaf	Acalypha wilkesiana
18	shrub	Garden croton	Codiaeum variegatum
19	Pine	Screw pine	Pandanus vitchii
20	Shrub	Green button wood	Conocarpus erectus
21	Palm	Sago palm	Cycas revolute

22	Tree	Rain tree	samanea saman merr
23	Tree	Golden rain tree	Koelreuteria paniculata
24	Tree	Teak	Tectona grandis
25	Tree	Mango	Mangifera indica
26	Tree	Kaju Badam	Anacardium occidentale
27	Tree	Bakul	mimusops elengi
28	Tree	Coconut	Cocos nucifera
29	Tree	Banyan tree	Ficus benghalensis
30	Tree	Jamun tree	Syzygium cumini
31	Tree	Guava	Psidium guajava
32	Tree	Ajar tree	Lagerstroemia speciosa
33	Palm	Japanese sogo palm	Cycas revoluta
34	Tree	Tamarind	Tamarindus indica
35	Tree	Flame tree	Delonix regia
36	Tree	Bael	Aegle marmelos
37	Shrub	Madar	Calotropis gigantea
38	Tree	sapota	Manilkara zapota
39	Palm	Tall palm(wine palm)	Butia capitata
40	Shrub	horn beam	Carpinus orientalis

FAUNAL BIODIVERSITY

Type of fauna	No. of species	% of faunal species
Amphibian	1	2.7
Birds	7	18.9
Butterfly	3	8.1
Domestic Animals	7	18.9
Insects	14	37.8
Mammals	2	5.4
Reptiles	3	8.1



38% of insects are found in the campus. Then the Domestic Animals and Birds are high in numbers i.e., 19 % each.

LIST OF FAUNAL SPECIES

SNo	Type	Local Name	Scientific Name
1.	Amphibian	Indian Toad	<i>Duttaphrynus melanostictus</i>
2.	Birds	Crow	Corvus
3.	Birds	Pigeon	Columba Livia Domestica
4.	Birds	Sparrow	Passerdia
5.	Birds	Parrot	Psittaciformes
6.	Birds	Palapitta (Roller bird)	Corvus
7.	Birds	Crane	Grudae
8.	Birds	Kokila (Cuckoo)	Cuculidae
9.	Butterfly	Grass Yellow Butterfly	<i>Eurema hecabe Linnaeus</i>
10.	Butterfly	Common Mormon	<i>Papilio polytes Linnaeus</i>
11.	Butterfly	Common Emigrant	<i>Catopsilia pomona Fabricius</i>
12.	Domestic Animal	Pilli	<i>Felis catus</i>
13.	Domestic Animal	Dog	<i>Canis lupus</i>
14.	Domestic Animal	Cat	<i>Felis catus</i>
15.	Domestic Animal	Goat	<i>Capra aegagrus hircus</i>
16.	Domestic Animal	Pig	<i>Sus Scrofa Domesticus</i>
17.	Domestic Animal	Rabbit	<i>Oryctolagus cuniculus</i>
18.	Domestic Animal	Squirrel	<i>Oryctolagus cuniculus</i>

19.	Insects	Mosquito	Culicidae
20.	Insects	Housefly	Musca domestica
21.	Insects	Centipede	<i>Theatops californiensis</i>
22.	Insects	Daddy Long Legs	<i>Pholcus phalangioides</i>
23.	Insects	Honey Bee	<i>Apis mellifera</i>
24.	Insects	Fire Ant	<i>Solenopsis invicta</i>
25.	Insects	Ant	Formicidae
26.	Insects	Miduthalu	<i>Caelifera</i> (Grass hopper)
27.	Insects	Thene teega	<i>Apis mellifera</i> (honey bee)
28.	Insects	Teelu	<i>Hottentotta tamulus</i>
29.	Insects	Dragonfly	<i>Sympetrum flaveolum</i>
30.	Insects	Grasshopper	<i>Caelifera</i>
31.	Insects	Butterfly	Rhopalocera
32.	Insects	Cockroach	Blattodea
33.	Mammal	Monkey	<i>Cercopithecidae</i>
34.	Mammal	Indian Bush Rat	<i>Golunda ellioti</i>
35.	Reptiles	Garden Lizard	<i>Calotes versicolor</i>
36.	Reptiles	Fan-throated Lizard	<i>Sitana ponticeriana</i>
37.	Reptiles	Indian cobra	<i>Naja naja</i>

RECOMMENDATIONS

- All the insect species need to be catalogued, seasonally and preserved to create a museum display for environmental education.
- Economically useful insect species need to be given special protection. e.g. honeybees.
- Need to develop college nursery and collect important native species.
- Need to develop Butterfly Park, Bee Park, etc.
- Garden needs to plant indigenous flowering plants which flower for whole year and readily available for insects and birds.
- Plantation of seed bearing and flowering plants.
- Patches of wild-flower habitats have to be fenced and protected from reclamation.
- Avoid the burning of leaf litter in the campus.
- Prevent the use of chemical fertilizers and pesticides.
- Restriction or marked use of vehicles in campus area.
- Invasive weeds need to be eliminated /controlled.
- Signboards could be displayed on plants in the campus area.
- Plantation of exotic species has to be avoided in the future plantation program.
- Chemical pesticides should not be used within the campus.
- Workshop on 'Biodiversity' could be conducted in coming period of time.



GLIMPSE OF THE PLANTATION



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ECO- ACTIVITIES





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Mr. M. Bhaskar Reddy, Assoc. Prof – KSRMCE
Dr. T. Kiran Kumar, Professor – KSRMCE
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About us....



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Preface

Educational institutions now a days 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. The activities pursued by colleges can also create a variety of adverse environmental impacts.

Environmental auditing is a process whereby an organization's environmental performance is tested against its environmental policies and objectives. Green audit is defined as an official examination of the effects a college has on the environment. As a part of such practice, internal environmental audit (Green Audit) is conducted to evaluate the actual scenario at the campus. 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. A clean and healthy environment aids effective learning and provides a conducive learning environment. There are various efforts around the world to address environmental education issues.

KSRM College of Engineering has taken up the environmental audit for understanding the available resources and implement the sustainable solutions.

Our special thanks to the College Management for giving us opportunity to conduct the environment audit of the campus. We thank the faculty of the college for providing the data for the audit process.

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1. Introduction

Environment with its five elements is protecting us from all odds of life. Hence, they are very critical and has been depleting / degrading due to pollution. Now it's our responsibility to protect our own resources and live sustainable life. In this whole efforts Institution plays important role. Environmental 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 and enforcing commitment to departmental environmental policy
- Exploring improvement opportunities
- Establishing the performance baseline for developing an Environmental Management System (EMS)

Conducting an environmental audit is no longer an option but a sound precaution and a proactive measure in today's heavily regulated environment. Indeed, evidence suggests that EA has a valuable role to play, encouraging systematic incorporation of environmental perspectives into many aspects of an organisation's overall operation, helping to trigger new awareness and new priorities in policies and practices.

1. Methodology

Methodology includes data collection from facilities such as physical inspection of the campus, observation and review of the documentation, interviewing key

persons and data analysis, gaps and recommendations. This study covers various aspects of environment as mentioned in the report.

Survey by questionnaire

The committee brainstormed and evolved a questionnaire. Questionnaire survey was conducted in the campus. The different questionnaire formats were restructured also with different combinations and modifications. The final sets of questionnaires were prepared based on solid waste, energy, fuel, water, hazardous wastes and e wastes. The framed questionnaires were distributed among students, scholars and staff of the University to fetch the information pertaining to the Environmental audit. The questionnaires contained the general information of the concerned section, including name of the section, total number of students and employees, number of buildings along with the area under build up. The maintaining of records for handling of solid and hazardous wastes holds much importance in green audit. It is quite possible that the loss of water and energy resources can occur due to improper maintenances and therefore their assessment holds importance as far as green audit is concerned.

Data evaluation

The information gathered during the surveys was compiled for the further analysis. It consists of the audit protocol, documentation supplied by the University administration, the auditor's own recordings, results of the sampling and monitoring photographs, records, plans, maps, audit findings and reviewing documentation against standards, policies and action plans and gathering support to the answers to the questions.

Analysis and reporting

The completed questionnaires were tabulated as per their modules in excel spreadsheets. This tabulated data was used for further analysis. Average and percentage values were determined to avoid complications.

2. College Profile

The college owes its existence to the keen interest of Late Kandula Obul Reddy to develop technical education in Rayalaseema region of Andhra Pradesh. With a view to translating his noble ideal of imparting technical education into reality, a Technical Training Institute at Vempalli, Kadapa District was started in 1979 under the aegis of Sri Kandula Obul Reddy charities. It is in the year 1980 that K.S.R.M. College of Engineering was established to perpetuate the memory of Late Sri. Srinivasa Reddy, youngest son of Late Sri Obul Reddy. Sri Srinivasa Reddy, a brilliant student of III-year Mechanical Engineering at Delhi College of Engineering, New Delhi, met with his untimely death in a scooter accident on 18th Oct, 1979.

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2.1 General Information

Location	Chinnamachupalli (V), Tadigotla	
Layout of the Site	Provided	
Total Area of the Campus	35.23 Acres	
Total Constructed Area	51080.41 sq.m	
Area under Green Cover	91490.34 sq.m	
No. of Buildings	08	
Source of Water (Municipal, Ground Water & Tanks)	Ground Water	
Source of Electricity (Supplier)	APSPDCL & Solar	
Does your campus have renewable energy sources	Yes	
Total No. of Students	2757	
Total No. of Students (Hostellers)	819	
Total No. of Students (Day scholars)	1938	
Total No. of Faculty	172	
Total No. of Teaching Faculty (In House)	Zero	
Total No. of Teaching Faculty (Staying Outside)	172	
Total No. of Non-Teaching Faculty (In House)	02	
Total No. of Non-Teaching Faculty (Staying Outside)	198	
Total No. of Administrative Staff	24	
Total No. of Cleaning Staff	29	
Total No. of Employees for Landscape Maintenance	09	
Total No. of Security Staff	22	
Total No. of People Visiting /Day	Min: 30	Max: 55

2.2 Campus Building Details

S.No	Name of the Building	Utility	Built Area (sq.m)
1	Main Block	Administration and Academics	5041.30
2	Civil Block	Academics	7212.60
3	Silver Jubilee Block	Academics	5934.90
4	Mechanical Block	Academics	4455.00
5	Hostel Ganesh	Accommodation for Students	1065.65
6	Hostel Srinivasa	Accommodation for Students	1536.18
7	Hostel Kandula	Accommodation for Students	1536.18
8	Srinivasa Canteen	Refreshments	502.00
9	PG Block	Administration and Academics	5934.90

Constructed Areas – Building wise Details

Building Utility / Name	Main Block
Total Built Up Area (sq.ft or sq.m)	15123.90
Area of the building (excluding parking, lawn, roads, etc)	5041.30
Number of Floors in the Building	03
Total No. of Rooms	46
No. of Faculty Rooms	07
No. of Classrooms	03
No. of Halls	05
No. of Labs	04
No. of Library Rooms	01
No. of Store Rooms	02
No. of Bathrooms	05

Building Utility / Name	PG Block
Total Built Up Area (sq.ft or sq.m)	17563.00
Area of the building (excluding parking, lawn, roads, etc)	5934.90
Number of Floors in the Building	03
Total No. of Rooms	53
No. of Faculty Rooms	06
No. of Classrooms	17
No. of Halls	01
No. of Labs	08
No. of Library Rooms	01
No. of Store Rooms	01
No. of Bathrooms	07

Building Utility / Name	Hostel Srinivasa
Total Built Up Area (sq.ft or sq.m)	3072.36
Area of the building (excluding parking, lawn, roads, etc)	1536.18
Number of Floors in the Building	02
Total No. of Rooms	82
No. of Faculty Rooms	01
No. of Classrooms	02
No. of Halls	02
No. of Labs	01
No. of Library Rooms	01
No. of Store Rooms	02
No. of Bathrooms	20
No. of Surveillance equipments	01

Building Utility / Name	Hostel Kandula
Total Built Up Area (sq.ft or sq.m)	3072.36
Area of the building (excluding parking, lawn, roads, etc)	1536.18
Number of Floors in the Building	02
Total No. of Rooms	82
No. of Faculty Rooms	01
No. of Classrooms	02
No. of Halls	02
No. of Labs	01
No. of Library Rooms	01
No. of Store Rooms	02
No. of Bathrooms	20
No. of Surveillance equipments	01

Building Utility / Name	Civil Block
Total Built Up Area (sq.ft or sq.m)	
Area of the building (excluding parking, lawn, roads, etc)	7212.60
Number of Floors in the Building	03
Total No. of Rooms	64
No. of Faculty Rooms	16
No. of Classrooms	27
No. of Halls	02
No. of Labs	11
No. of Library Rooms	01
No. of Store Rooms	02
No. of Bathrooms	05

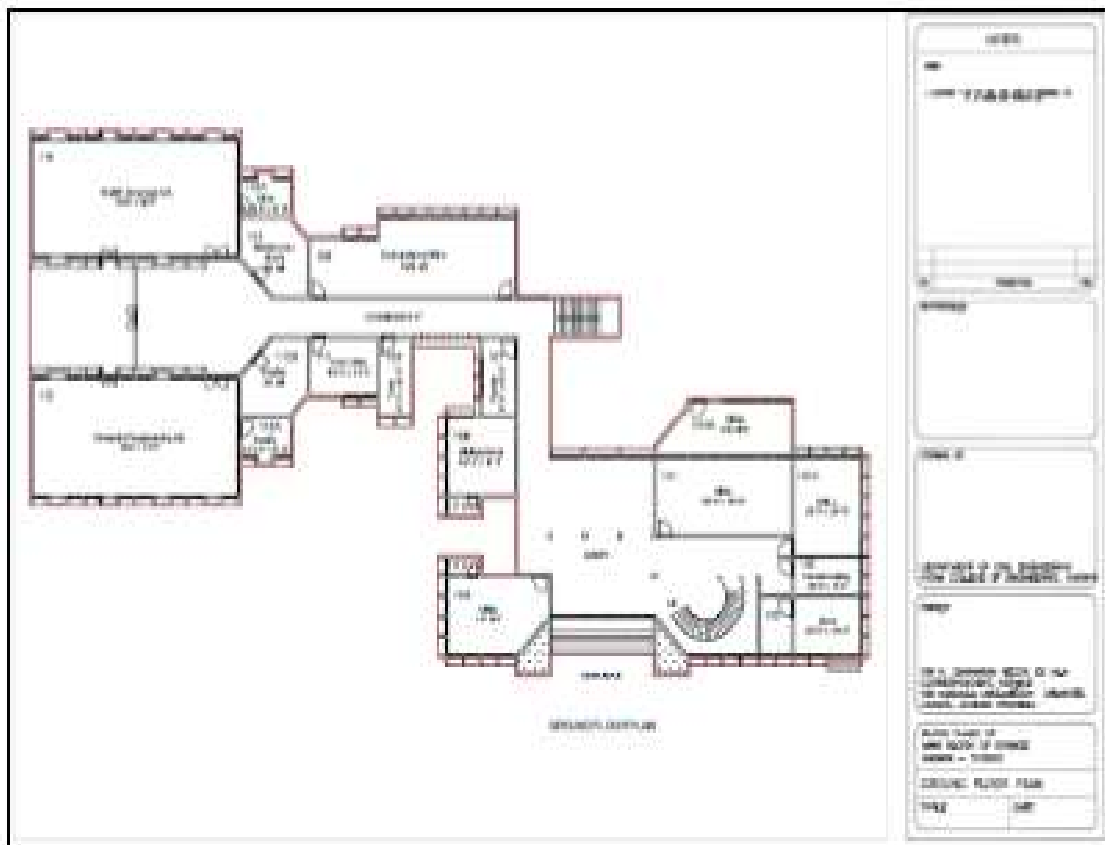
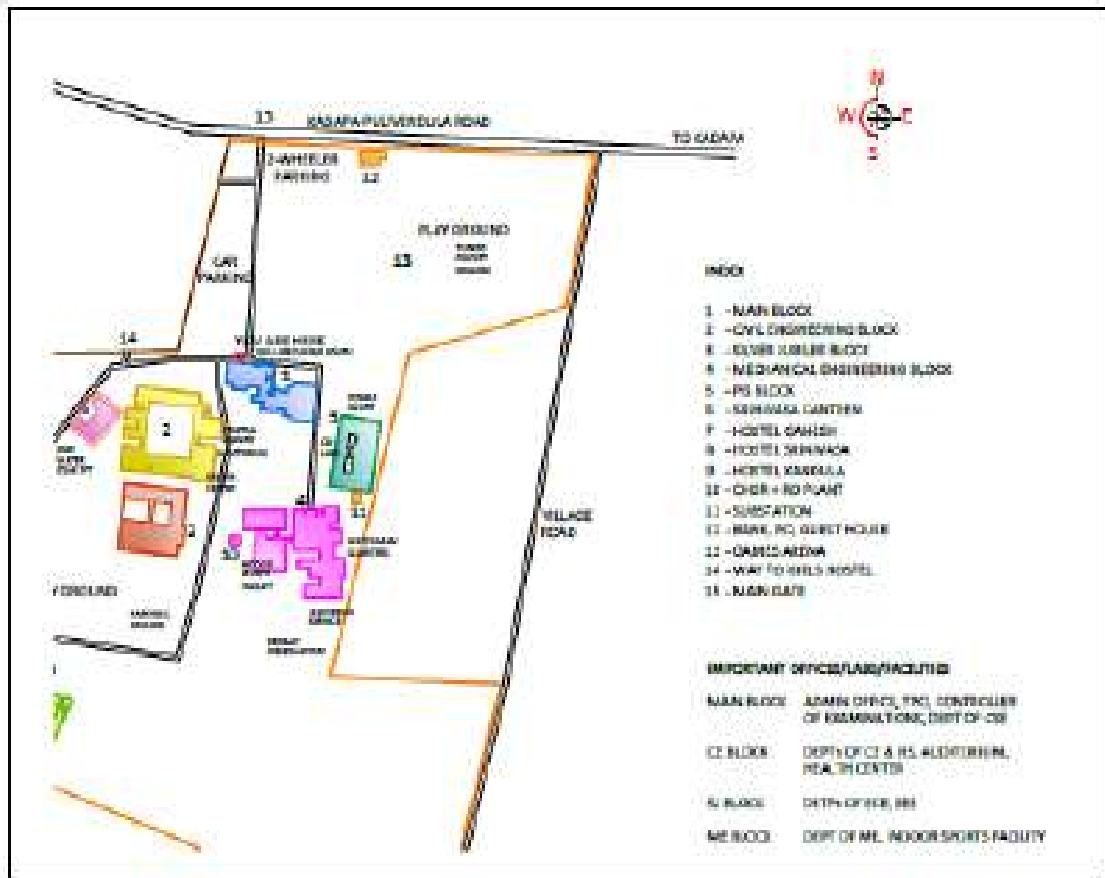
Building Utility / Name	Srinivasa Canteen
Total Built Up Area (sq.ft or sq.m)	502.00
Area of the building (excluding parking, lawn, roads, etc)	502.00
Number of Floors in the Building	00
Total No. of Rooms	05
No. of Faculty Rooms	00
No. of Classrooms	00
No. of Halls	01
No. of Labs	00
No. of Library Rooms	00
No. of Store Rooms	01
No. of Bathrooms	02

Building Utility / Name	Silver Jubilee Block
Total Built Up Area (sq.ft or sq.m)	17139.94
Area of the building (excluding parking, lawn, roads, etc)	5934.90
Number of Floors in the Building	03
Total No. of Rooms	46
No. of Faculty Rooms	11
No. of Classrooms	15
No. of Halls	01
No. of Labs	12
No. of Library Rooms	01
No. of Store Rooms	01
No. of Bathrooms	05

Building Utility / Name	Mechanical Block
Total Built Up Area (sq.ft or sq.m)	8910.00
Area of the building (excluding parking, lawn, roads, etc)	4455.00
Number of Floors in the Building	02
Total No. of Rooms	40
No. of Faculty Rooms	12
No. of Classrooms	09
No. of Halls	01
No. of Labs	13
No. of Library Rooms	01
No. of Store Rooms	01
No. of Bathrooms	04



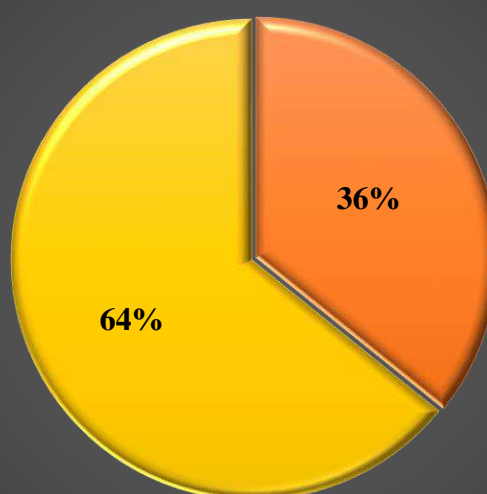
2.3 Maps



2.4 Floating Population

Total No. of Students	2757	
Total No. of Students (Hostellers)	819	
Total No. of Students (Day scholars)	1938	
Total No. of Faculty	172	
Total No. of Teaching Faculty (In House)	Zero	
Total No. of Teaching Faculty (Staying Outside)	172	
Total No. of Non-Teaching Faculty (In House)	02	
Total No. of Non-Teaching Faculty (Staying Outside)	198	
Total No. of Administrative Staff	24	
Total No. of Cleaning Staff	29	
Total No. of Employees for Landscape Maintenance	09	
Total No. of Security Staff	22	
Total No. of People Visiting /Day	Min: 30	Max: 55

Campus Land Use



■ Total Constructed Area
 ■ Area under Green Cover

3. Energy Audit

Energy Audit attempts to balance the total energy inputs with its use and serves to identify all the energy streams in the systems and quantifies energy usages according to its discrete function. It helps in energy cost optimization, pollution control, safety aspects and suggested the methods to improve the operating & maintenance practices of the system.

Energy today has become a key factor in deciding the product cost at micro level as well as in dictating the inflation and the debt burden at the macro level. Energy cost is significant factor in economic activity at par with factors of production like capital, land and labour. The imperatives of an energy shortage situation call for energy conservation measure, which essentially mean using less energy for the same level of activity.

An energy audit is an inspection survey and an analysis of energy flows for energy conservation in a building. It may include a process or system to reduce the amount of energy input into the system without negatively affecting the output. In commercial and industrial real estate, an energy audit is the first step in identifying opportunities to reduce energy expense and carbon footprint. Some of the greatest effects on energy use are user behavior, climate, and age of the home. An energy audit may therefore include an interview of the location owners to understand their patterns of use over time. The energy billing history from the local utility can be calibrated using heating degree day and cooling degree day data obtained from recent, local weather data in combination with the thermal energy model of the building. Advances in computer-based thermal modeling can take into account many variables affecting energy use.

Energy audit is often used to identify cost effective ways to improve the comfort and efficiency of buildings. In addition, location may qualify for energy efficiency grants from central government.

Objectives

- Establishing the performance baseline for developing an EMS
- Assessing compliance with relevant statutory and internal requirements
- Facilitating management control of environmental practices
- Promoting good environmental management
- Raising staff awareness and enforcing commitment to departmental environmental policy
- Exploring improvement opportunities

S.No	Item	Value
1	Connected Load (kW) or Contract Demand (kVA)	200
2	Peak Demand or Maximum Demand Indicated (MDI) (kW)	400
3	Installed capacity: DG/ GG Sets (kVA or kW)	320/250
4	Annual Electricity Consumption, purchased from Utilities (kWh)	200000
5	Annual Electricity Consumption, through Diesel Generating (DG)/Gas Generating (GG) Set (s) (kWh)	150000
6	Total Annual Electricity Consumption, Utilities + DG/GG Sets (kWh)	350000
7	Annual Electricity Cost, purchased from Utilities (Rs.)	1532000
8	Annual Electricity Cost generated through DG/GG Sets (Rs.)	1149000
19	Total Annual Electricity Cost, Utilities + DG/GG Sets (Rs.)	2681000
10	What is power factor (less than 1, 1 or above 1)	01
11	No. of fans	1066
12	Working hours (e.g. day working /24 hour working)	08
13	Working days/week (e.g. 5/6/7 days per week)	06
14	Installed capacity of Air Conditioning System	

a	Window/Split ACs (TR)	129
b	Total AC Load (TR)	200
15	Installed lighting load (kW)	71
16	Equipment Load (kW)*	200
17	Whether sub-metering of electricity consumption for Air Conditioning, Lighting, Plug Loads, etc. done: Yes/No	No
18	HSD (or any other fuel oil used, specify)/Gas Consumption in DG/GG Sets (liters/cu. meters) in the year	100lt
19	Fuel (e.g FO, LDO, LPG, NG) consumption for generating steam/water heating in the year (in appropriate units)	No
20	Have you implemented a Building Management System (BMS)? (Yes/No)	Yes
a	Make and year of installation of the BMS	2021
b	Number of sensors / VRVs in the BMS	04
21	Any other appliances - Coffee machines/Office machinery, etc.,	No
22	Renewable Energy Sources- Solar Equipment's	250kWp
a	Does your college have solar equipment	Yes
b	Capacity (KWH) of the solar equipment	250
c	No. of Solar water heaters	NO
d	Capacity of the heaters	NO
23	No. of street lights in the campus	50
a	Connected to electricity within the campus	50

3.1 Lighting Arrangements in the Campus

S.No	Type of Lighting	Wattage	No. of Fittings	No. of Hours in a Day	Total No. of Days (usage)	Total Wattage
1	Incandescent Bulbs (Halogen)	0	0	0	0	0
2	Filament Bulbs	0	0	0	0	0

3	Fluorescent Tube Lights (FTL)	30	2100	10	365	63
4	Compact Fluorescent Light (CFL)	0	0	0	0	0
5	LED	20	1631	6	365	32.62
6	Cold Cathode	0	0	0	0	0
7	Rope Light	0	0	0	0	0
8	Neon Light	0	0	0	0	0
9	Street Light	50	50	10	365	2.5

3.2 Equipments Used in the Campus

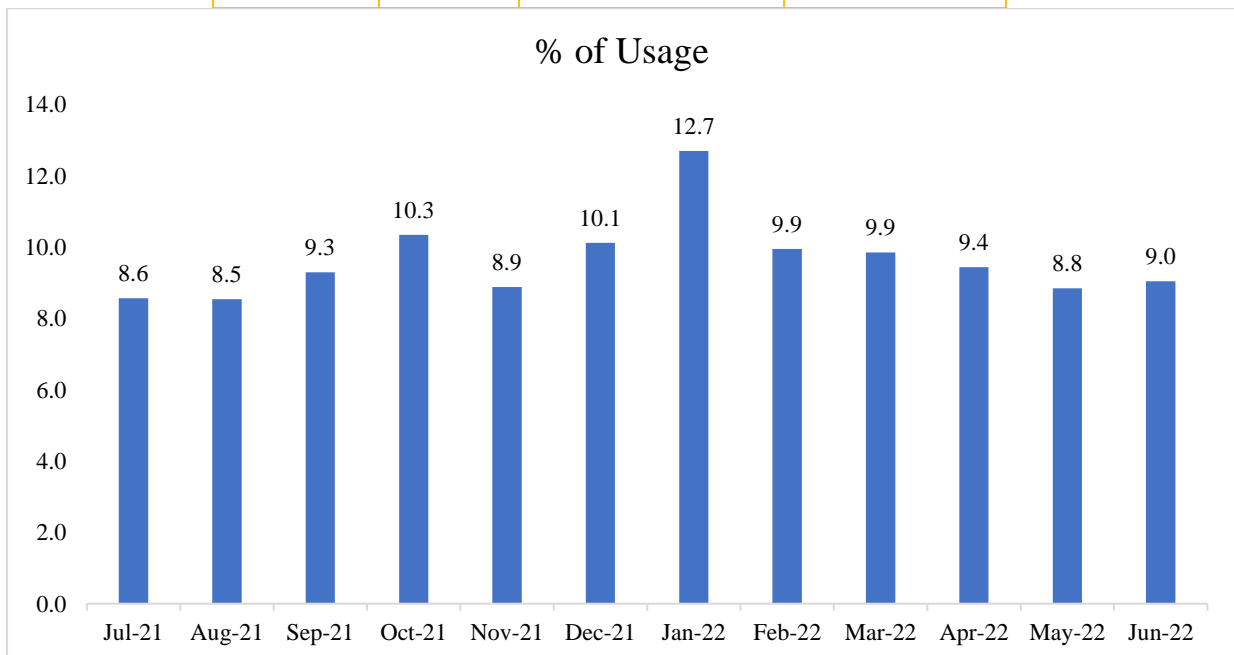
Equipment	Wattage	Nos	No. of Hours per Day	Total No. of Days (usage) in a Month
Refrigerators	1500	2	10	25
Desktop Computers	200	712	10	25
Laptops	200	38	10	25
Servers	200	2	24	30
Small Printers	120			25
Printers/Scanners/Xerox	250	14	5	25
Fax Machine	100	0		0
Projectors	60	30	4	25
Sound System	60	30	4	25
Televisions	100	2	10	30
Inverters	10000	20	18	30
Air Coolers	1500	1	5	25
Kettles	1500	1	2	25
Iron Boxes	1500	0	0	0
Grinders	3000	1	2	30
Water Filters	1500	1	10	30
Water Heaters	3000	0	0	0

Pumps and their Capacities

Type of pump	Horsepower	Number of units consumed to fill the overhead tank or sump fully	Number of hours operated per day to fill the tank with full capacity
Submersible	15	40	12
Submersible	7.5	12	10

3.3 Electricity Consumption

Month	Units	Amount Spent	% of Usage
Jul-21	14344	167433	8.6
Aug-21	17560	205671	8.5
Sep-21	20856	224275	9.3
Oct-21	17840	172370	10.3
Nov-21	18908	212853	8.9
Dec-21	17376	171631	10.1
Jan-22	14336	112902	12.7
Feb-22	21408	215202	9.9
Mar-22	33232	337318	9.9
Apr-22	37412	396288	9.4
May-22	41660	470968	8.8
Jun-22	37724	416900	9.0



3.4 Solar Power System

Month	Gen (kWh)	Total in Rs.
Jul-21	14590	111759.40
Aug-21	19834	151928.44
Sep-21	21145	161970.70
Oct-21	19495	149331.70
Nov-21	11120	85179.20
Dec-21	19558	149814.28
Jan-22	23958	183518.28
Feb-22	23226	177911.16
Mar-22	22987	176080.42
Apr-22	25227	193238.82
May-22	20453	156669.98
Jun-22	20988	160768.08

Energy Requirements met by Solar Power

Year	Energy Requirements met by Solar	Total Power Produced	%
2020 – 21	236984	260492	90.98
2021 – 22	258537	552571	46.79

3.5 Transport Mechanism

No. of vehicles regular to campus	360
No. of four wheelers (regular)	34
No. of two wheelers (regular)	480
No. of four wheelers (visitors)	7
No. of two wheelers (visitors)	18

No. of students using Public Transport	243
No. of faculty using Public Transport	21
No. of buses (regular)	12
Fuel Consumption per bus / day	150 lit.
Students with own vehicles	420
Faculty with own vehicles	60
Cycle usage (Nos)	5

3.6 Observations

- Total electricity consumption is 292656 Units. Solar power station capacity of 250 kWp. High solar power is produced in the months of February and March. 46% of electricity needs are met by solar power.
- Total wattage used for the equipment's is 24790.
- The power factor is 1.
- Moderate number of fluorescent tube lights are used in the campus.
- Two submersible pumps are used and 52 units are consumed to fill the overhead tank.
- High number of electricity units are consumed in March, April, May and June months. Similarly high electricity is consumed in the months of September and February months.
- 12 buses are used as public transport for the students in the campus and fuel consumed for the buses is 150 litres.
- Total 480 own vehicles are used by the faculty and students.

4. Water Audit

Water plays many important roles in the body including flushing waste from the body, regulating body temperature, transportation of nutrients and is necessary for digestion. No wonder it is considered "essential!" Plain water is the best choice for hydrating the body. It is essential that we utilize existing water resources in the most careful, efficient manner. Water audits provide a rational, scientific framework that categorizes all water use. It is a tool to overcome drought related problem, shortage, leakage and losses.

Water audit is a qualitative and quantitative analysis of water consumption to identify means of Reducing, Reusing and Recycling of water. Water consumption patterns are to be identified and problems are to be fixed like leaks & overflow, identify the points where water loss is observed, identify the solutions, assign the responsibility for implementation, prepare a monitoring schedule and assign a person for monitoring.

It is conducted for the evaluation of facilities of raw water intake and determining the activities for water treatment and reuse. The relevant method that can be adopted and implemented to balance the demand and supply of water. It is therefore essential that any environmentally responsible institution examine its water use practices.

1. Water audits provide decision making tools to utility managers, directors, and operators. i.e., knowing where water is being used in your system allows you to make informed decisions about investing resources such as time, labour and money.
2. Water audits allow managers to efficiently reduce water losses in the system.

3. Reducing water used at the source may even result in delaying or avoiding capital investments such as a new well, more treatment technology or additional water rights.
4. Water audits also identify which water uses are earning revenue for the utility and which water uses are not. Thus, System personnel can increase revenue by ensuring all appropriate uses are being accurately measured and billed. This leads to more financial capacity in the water system, reduced cost per customer and better management of the water resource.
5. Creating awareness among water users i.e., customers can see and understand that the utility is taking proactive steps to manage wasted water and save for the future.
6. It is an effective educational and public relations tool for the water system.

Source of water (Municipal Supply/ Groundwater (Borewells)/ Tankers (Private or Public)/ Rainwater/ Others	Ground Water
Total water consumption per day (litres)	471,690Lts
Per capita water consumption per day (litres)	135Lts
No. of bore wells	2
Water consumed through water tanks (litres)	471,690Lts
Water Storage	Overhead tank
Overhead tank	01
Capacity of the tank	60,000Lts
Number of times it is filled in a day	5
No. of Sumps	1
Capacity of sumps	
Purpose Eg: Drinking, Cleaning & Landscape	Landscape
Potable water consumption	15,000Lts
Drinking water used (litres per day) – Mineral water	15,000Lts
Purified water with in the campus – like RO treatment	Yes
In case of canteen facility in the building - Water used for cooking	200

4.1 Observations

- The campus water source is borewell only. There are Overhead tanks for each building along with bore well. For drinking water RO plant is set up.
- The water of the campus has 200 mg/l COD and 224 mg/l TDS.
- Capacity of overhead tanks is 60,000 litres and they are filled 5 times in a day.
- Total water consumption of the campus per day is 471690 litres and per capita water consumption per day of 135 litres.
- One sump is available in the campus and its water is used for landscape and cleaning purposes.
- Water consumed for cooking in the canteen is 200 litres per day.

5. Waste Audit

There should be systematic procedure to review operations and subsequently, waste generation. Performing this exercise will define the composition of your discards by examining how materials enter and exit your facility. All operations produce waste and there is nothing wrong by recognizing it. However today concern is over waste generation and increasing costs of collection and disposal are good reasons to find out how to reduce, increase recycling and try to cut costs. An audit alone will not reduce your waste. Rather, it is the starting point that will enable your work to make informed decisions on how to allocate resources for source reduction and recycling programs. This saves money, reduces waste and disposal costs and creates positive environment campus image in future. This also helps in devising the ways and methods of reducing wastes at the source.

Management has adopted standard operating procedures for safe disposal of hazardous chemicals collected in the chemistry laboratory and other allied departments. The chemicals like acids utilized for experiments are very negligible hazardous chemicals. So, the chemicals of through the normal waste in shrinks.

Solid Waste Management:

- The twin dustbins are placed for Wet and dry waste segregation and source.
- The Bio-degradable waste is composted in Rapid Composite Units.
- The Kitchen waste is used as raw materials in Bio-Gas Plant.
- The Non-Degradable waste for recycling.

Type	Nos
Twin Bins	02
Small bins	325
Medium Size Bins	10
Main (big) Bins	4

Liquid Waste Management

- Proper drainage system is arranged for all the buildings of the campus.
- The liquid waste is diverted to septic tank and from there honey suckers will collect the septic waste
- A proper RO plants are been established in the campus.

Biomedical waste management:

All the sanitary napkins are disposed by using a incinerator available in the campus

E-Waste Management:

The Institute has signed an MoU with Suraj Krishna Greeneries – Kadapa (ITC Franchises), Andhra Pradesh for E-waste recycling. All the e –waste is collected and stored in a safe place once in semester the e –waste is sent for recycling.

Waste recycling system:

All the waste is segregated as degradable or non – degradable, all Bio-degradable waste is composted in Rapid Composite Units and Kitchen waste is used as raw materials in Bio-Gas Plant. The Non-Degradable wastes such as glass, plastic e – waste etc are sent for recycling to Suraj Krishna Greeneries – Kadapa (ITC Franchises), Andhra Pradesh.

Hazardous chemicals and radioactive waste management:

All the Chemicals used in the laboratory are diluted and or not hazardous and while letting them in to the drainage also they are highly diluted. And college don't use any radioactive materials.

6. Recommendations

- Comprehensive Environmental Action Plan is to be formulated for the sustainable activities in the campus.
- Lighting arrangements should also include the LED lights in the campus.
- Rainwater harvesting structures are to be built with proper scientific method for all buildings for water conservation within the campus.
- Wastewater from laboratories and canteens are to be controlled and used for garden only after proper treatment.
- Repair leaking taps and pipes at regular intervals to conserve water.
- Specific Waste Management Plan should be developed and adopted to manage solid waste within the campus. Swachh Bharat Mission is also now giving scope for the involvement of the college and general public in large. Therefore, college can take part in their programmes.
- More number of twin bins are to be installed in the campus to encourage source segregation.
- Management has to make to campus plastic free zone. Usage of single use plastic is to be banned completely from the campus especially in the plastic bags, glasses, cups, thermocole cups/ plates.
- There should be a system for better management of hazardous waste management as per the new amendment of Solid Waste Management Rule 2020.
- The manure of compost can be used for plants avoid using pesticides.
- Bio toilets can be installed for better management of faecal sludge.
- Vehicle pooling can be promoted for both students and faculty. Initially this can be declared by the management or through student groups on particular days.

- There is a need to streamline the existing good practices that are already being implemented. This also gives increase the scope of environmental activities for students.
- Strick implementation of the plan also bring behavior change amongst the students' fraternity.
- Environment auditing is to be carried out every year to evaluate the outcomes of the environmental activities. This helps the college to implement activities like cost efficiency and conservation of the available natural resources.
- Students and faculty are to be trained on carbon footprint calculation and reduced carbon emissions.
- Students are to encourage to do innovative activities at this level so that they feel motivated and think on eco-friendly solutions.

7. Snapshots



