

ENVIRONMENTAL MANAGEMENT SYSTEM

An Environmental Management System (EMS) is established to monitor activities of the university that have a bearing on the Environment. The Environmental performance of the university is reviewed for continual improvement. The university is conducting environmental audit every year of the activities it is undertaking.

1. Environmental aspects of the institution activities

Various activities in the campus would lead to waste and waste water generation with varied degree of impacts. A representative table lists various activities, type of impacts and anticipated remedial actions expected (Table 1).

Table1: Environmental aspects, impacts and actions of the university

Sl. No.	Activity	Environmental aspects	Environmental impact	Remedial actions
1	Water Consumption	Waste water generation	Water & Land Pollution	Waste water treatment
2	Healthcare	Hazardous waste generation	Water & Land Pollution; Health Hazard	Scientific Disposal
3	Consumption of Food & Beverages	Waste Water Generation	Water & Land Pollution	Waste Water Treatment
		Solid Waste Generation	Water & Land Pollution	Scientific disposal
4	Operation of Diesel Generators	Flue Gas emission	Air Pollution	Chimney of standard specification
		Noise	Noise Pollution	Acoustic enclosure
5	Use of batteries	Hazardous waste – Lead	Water & Land Pollution	Buyback arrangement with the suppliers
		Plastic waste	Water & Land Pollution	Scientific Disposal
6	Usage of electronic items	Hazardous waste generation	Water & Land Pollution	Scientific Disposal

2. Water management

Water is used for health care, drinking, laundry, kitchen, cleaning, gardening, bathing, toilets and restrooms. The University has a network of distribution lines for collection, storage and distribution of fresh water to all users in the campus.

In the university campus water is used for drinking, sanitation, kitchen, laundry, housekeeping, gardening, and healthcare related activities. The university has a water collection, storage and

distribution network for the supply of fresh water within the campus. The campus population includes students & staff (8000), patients (850 in-patient) and patient attenders (750) and floating population among others (800).

An efficient water management system ensures all users receive water of desired quality with uninterrupted supply and no wastage in the transit.

2.2 Domestic water management

University campus uses 3 different sources for the fresh water (Bore well, Open well and outside sources). There are 11 bore wells in the campus (main) which are the main sources of water. Two open wells are used for pumping the water through shallow aquifers. Tankers collect water from outside sources during lean periods. Water, drawn from various sources, is stored at different locations in the collection tanks of different capacities. There are 4 collection tanks at different locations for storage and further treatment. Potable water is treated against total suspended solids, colour, odour, hardness, disinfection, TDS and other parameters. There are 4 Water Treatment Plants, one each in the hospital, campus hostel, central kitchen and Gardenia hostels with a treatment capacity of 15m³/hr. Each. The treated water is then collected in storage tanks and pumped to various user locations such as Hospital, Hostel, Laundry, Boiler and Central Kitchen through a network of pipelines. Water is supplied from water sumps designated to each user location as per the demand. For non-potable applications, water is filtered through sand filter and carbon filter to remove total suspended solids, colour and odour. For critical applications in hospital and potable water requirements, water is purified through Reverse Osmosis (RO) plants.



Fig 1: Water treatment plant and Aquaguard

2.3 Waste water management

The usage of fresh water results in generation of waste water. The different types of waste water like black water, brown water, bio medical effluent etc. is being generated from different sources. The waste water generated will be treated by the different technologies in the treatment plants. Water consumption at various places may generate different quantum of wastewater. The treatment and reuse of wastewater is carried out as per the applicable discharge norms. There are 5 Sewage Treatment Plants (STP) and 2 Effluent Treatment Plants (ETP) which are being operated. The three STP's of 380 KLD, 200 KLD and 300 KLD capacity is provided to treat wastewater from the Medical hospital, Dental College, Medical College, Nursing College, Physiotherapy College, Hospital canteen, Ayurveda College, Homoeopathic College, Pharmacy College, Naturopathy College and Administration block. An ETP of 10 KLD for liquid biomedical waste treatment (LBMW) and the wastewater from kitchen and laundry is treated in ETP of 300 KLD with primary and secondary treatment.



Fig 2: Sewage treatment plants (STP)



Fig 3: Effluent treatment plants (ETP)

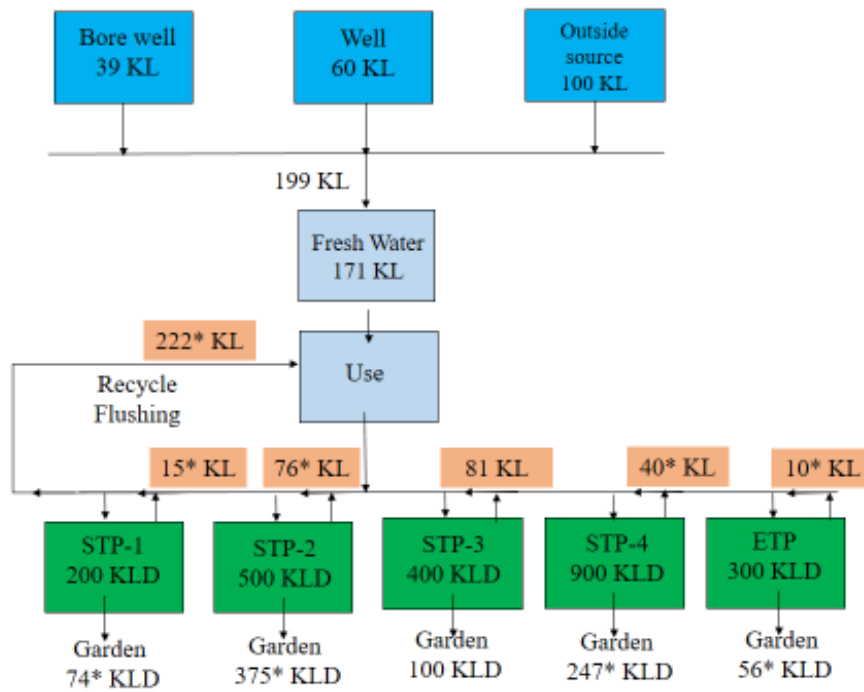


Fig 4: Water balance chart

2.4 Water Conservation

- Flow meters are installed to monitor and control water consumption.
- Rainwater harvesting pond is maintained with a capacity of more than 5 crore litres.
- Roof rainwater is harvested and channeled to bore wells.
- Aerators are used in taps to conserve water.
- Sensor taps and foam taps also help to conserve water.
- Sprinklers are used in garden for irrigation.



Fig 5. Water conservation measures

3. Waste management

Waste disposal are the activities and actions required to manage waste from its inception to its final disposal. This includes the collection, transport, treatment and disposal of waste, together with monitoring and regulation of the waste management process.

The waste from all around the campus is separated daily as wet and dry waste in different bags which are disposed separately. Dry waste includes paper, cardboard, glass tin cans etc. on the other hand; wet waste refers to organic waste such as vegetable peels, left-over food etc.

Yenepoya (Deemed to be University) recycles the biological reusable waste are processed as organic manure for the plants available in the university campus and the other solid waste generated in the campus is taken to the community bin of Yenepoya (Deemed to be University) municipality for recycling and disposal.

Table 2: Waste management at Yenepoya (Deemed to be University)

Type of Waste	Activates	Description	Disposal method
Wet Waste	1) Consumer products – Biodegradable waste generation 2) Gardening & Horticulture waste	Waste that can be decomposed like Food waste. Waste generated due to pruning, dry leaves etc	Composting and Vermi composting
Dry Waste	1) Consumer products – Non-Biodegradable waste generation	Waste like plastic, office waste etc	Saleable waste sold to recyclers (Scrap metal, paper etc) Non salable waste disposed to municipal solid waste agency
Bio-Medical Waste	1) Hospital activities and Medical college activities	Biomedical waste of different categories like used PPE's, contaminated cotton, expired medicines	Disposed through authorized biomedical handling agency (Ramky Industries)
Hazardous Waste	1) DG Operations & transformer	Used Lube Oil, tube lights, filters	Sold to authorized oil recycler (Supreeth industries)
E-waste	1) Discarded electronic items and instruments	IT, Diagnosis related electronic equipment	Sold to authorized e-waste recycler
Used batteries	1) Lead acid batteries at the end of their useful life		Sent to authorized recycler under buyback arrangement with battery supplier

3.1 Biomedical waste management (BMW):

Biomedical waste management: Any waste which is generated during the diagnosis, treatment of human beings or animals or in research activities are referred as biomedical waste. The hospital waste comprises both solid and liquid wastes. The liquid waste is treated in CETP and solid wastes are disposed through authorized vendor.

Biomedical waste generated from the hospital is infectious in nature. Therefore, the infectious waste is segregated and handled separately. The house keeping staff is well trained to work in the hospital to handle waste. The biomedical wastes are handled as per the guidelines of new Biomedical Waste (Management & Handling) Rules 2016. The rules lay out the procedures & methodology for segregation, collection, treatment & disposal.

The display boards are kept in the hospital to create awareness on the appropriate disposal of biomedical waste in the hospital. The biomedical waste generated from the hospital is segregated separately and collected in a colour coded bins and sent for disposal.



Fig 6. Display board and colour coded bins to collect bio medical waste in hospital

The waste is collected at different locations in coloured PVC bins with non-chlorinated colour bags provided for each type of waste. The waste generated at source is segregated, filled in bags with the representative colour bags, tied to avoid spillages and sent to final disposal site. At the site, waste in different bags is inspected for conformance to the norms by a competent person. Details are noted in the register. The BMW packed in separate color coded bags is stored in common collection site to be disposed daily through the authorized vendor. At the site, waste in different bags is inspected for conformance to the norms by a competent person. Details are recorded accordingly.

3.2 Wet waste management

The campus has a vermicomposting plant started in 2014. Vermicomposting is done by mixing vegetable peels and horticultural waste with earth worm. Garden waste along with vegetable waste from central kitchen is subjected to vermicomposting. The vermicomposting unit is operated throughout the year as the raw material is available for composting. The compost, rich in nutrients, is used in campus gardens and by the horticulture department in the nursery. There are six vermicompost units in the campus with a capacity of 400kg each. The total amount of vermicompost produced in a year is 3500 to 4000 kg.



Vermicompost Unit



Loading of raw materials



Chopping machine



Chopped garden waste



Vegetable waste



Paper waste



Earthworms



Compost

Fig 7. Vermicomposting process

Wet waste like food waste and horticultural waste are transported to our own composting unit established since 2021. Biodegradable waste transported to disposal unit shredded through shredder. Pulverized waste is kept in a pit with adding microbes for composting. The process takes around 30 days after which the waste is removed and dried in drying yard. Dried compost undergoes another round of shredding and the resultant will be packed as manure and used.



Fig 8. Composting units and compost

Solid waste is collected at different locations in solid PVC bins provided for both biodegradable and non-biodegradable wastes. The domestic waste collected is packed in black bags and taken to a common storage area for disposal. The waste is collected by authorized vendors.



Fig 9. Bins to collect domestic waste in the campus

4. Energy Management

As the activities of the university increase, energy needs also grow substantially. The university uses electrical energy from Mangalore Electricity Supply Company Limited (MESCOM) as well as the energy generated by diesel generators within the campus. A part of the power requirement (20%) is met by the use of solar energy. Energy audit is done regularly and emphasis is given on energy conservation. The energy demand comes from the operations of colleges, hospital, hostel, canteen, laundry, street lightings, energy storage (UPS), internet usage, security systems etc.

The University is connected to a power grid from Mangalore Electricity Supply Company Limited (MESCOM). Diesel generators are installed as alternate or standby power source. Diesel generators are operated when the MESCOM power supply fails and is essential to maintain continuous power supply for the hospital and other critical facilities, including research laboratories. Bharat stage III (BSIII) compliant high speed diesel is used as fuel for the generators. The diesel is blended with 5% ethanol.



Fig 10. Power station, Diesel Generators and Solar panels

Chimneys with suitable heights are provided as per the statutory requirements. Commercial LPG cylinders are utilized for cooking purpose in the central kitchen. The university has two boilers of 1 ton and 1.5-ton capacity. The quantity of steam generated is 20,000 kg per day. The generated steam is utilized for cooking and laundry use. Briquettes (made up of agro-waste) have good calorific value and are used for generation of steam in the Central Kitchen.



Fig 11. Boiler and Chimney

The authority keeps on replacing the old filament bulbs, CFL bulbs and tube lights by low energy consuming LED bulbs and LED tubes and bulky high-power consuming fans by energy efficient fans in order to keep the electricity consumption of the college as low as possible. The university has installed solar panels on the roof for the generation of electricity. The energy from this solar installation is helping offset the institute's day time peak electricity demand from the grid. The University with the installation of 500 KW solar rooftop plant in collaboration with M/s Green Energy Pvt. Ltd. was able to offset 54% of its energy usage from the state grid thus moving towards a more reliable and greener option and reducing its carbon footprint.

5. Transport system

The University uses a fleet of buses for transportation of the students & staff from the around locations of Mangalore. The campus is dedicated to provide its dependents and staff all the comfort and convenience to help them to achieve their targets. The transport department operates all transit services to and within the university campus. However various components such as parking, transit and fleet operations function as per the travel strategy of the university.

The university provides transportation facility for the campus community through a network of routes to reach the university. The transport services work hard to make travel both efficient and effective while ensuring safety of passengers. The university owns 26 small vehicles, 37 buses, 6 tankers and 7 ambulances which provide service for travel within the campus, field visits, patient care and other services. The department is developing sustainable strategy to reduce greenhouse gas emissions and strive towards sustainable transport.



Fig 12: Buses, light motor vehicles and e-vehicles

6. Sustainable practices in IT department

IT department can contribute substantially to reduce environmental impact. In collaboration with CES, the department strives to reduce pollution load. Such actions not only reduce environmental impact but also beneficial by cost reduction, time management, fasten communication etc. The daily practices have an attributed carbon footprint, while excess carbon dioxide negatively impacts the natural environment. By becoming greener the carbon foot print may be reduced.

E-Governance

- E-Governance is managed in the university at administration, services and support areas. It reduces the paper trail and also makes information tracking online with the click of a button.
- Management of human resources and communications are online including the leave application and approvals. Salary processing, as well as salary-slip decimation, happens online. Staff attendance is captured using biometric devices.
- University hospital operations are computerized and as a part of this, all patient medical records are managed in digital form. Patient care including IP/OP and ordering of lab and radiology tests and reporting, are processed and delivered digitally. Pharmacy prescriptions ordered online.
- All student data is managed online including the examination and result generation processes. Students attendance captured through biometric devices and summary of attendances sent to parents using SMS and email services. Student course work is delivered to students using the learning management system.
- An online issue tracking and reporting mechanism implemented which takes care of issues raised to IT, Maintenance and biomedical sections of the university. All inventory of stock is managed on centralized software through which indenting for items and purchase is handled. Inventory, stock and asset control is managed through the software system.

IT Services section has successfully implemented the following initiatives:

- 1) Implementation of Electronic Medical Records
 - 2) Sustainable Print Service
 - 3) Computer system sleep management
 - 4) Remote Access
 - 5) Online learning/E-Learning
 - 6) Procurement
 - 7) PACS
- 1) Implementation of Electronic Medical Records
The use of an electronic medical records system offers these clinical advantages:

- No bulky paper records to store.
 - Easier access to clinical data.
 - The ability to establish and maintain effective clinical workflows.
 - Fewer medical errors, improved patient safety and stronger support for clinical decision-making.
 - Enhancing privacy and security of patient data.
 - Securely **sharing electronic information** with patients and other clinicians.
 - Ability to gather and analyse patient data that enables outreach to discreet populations.
 - The opportunity to interact seamlessly with affiliated hospitals, clinics, labs and pharmacies.
- 2) The Sustainable Print Service (SPS) has been implemented in various departments where the confidentiality of the document is confined to a designated group of employees. Shared printing services are used wherever possible.
 - 3) Most of the University PCs will go in to sleep mode after a defined period of inactivity based on the type of work assigned to them, reducing their energy usage.
 - 4) All computer systems in the campus are remotely accessible using VNC software and computer sleep policies are in place during operational hours. Wake on LAN allows our staff to switch on any PC in our network remotely, for remote working or troubleshooting wherever and whenever they want. Remote connection to University computer services and applications allow flexible access without the need to travel or keep PCs powered on.
 - 5) The ILIAS based online learning portal, offers opportunities to reduce the amount of printed material by viewing materials online. All the course content which used to be distributed using the paper has been replaced with online content. Assignments can be produced, submitted, marked and feedback given without the need to be printed out. Results and notices are put up online instead of paper based notices. These initiatives have also reduced paper consumption. University email accounts can be accessed using mail.yenepoya.edu.in and the full Outlook client can be configured for staff working from home. A shared file to access a shared content in the university network wherever required.VPN (virtual private network) allows user's access to University restricted services and applications that are not otherwise available.
 - 6) Procurement: Requests are sent On-line to the Purchase department for procurement of various items from by all departments, thus reducing the use of paper.
 - 7) Implementation of PACS (picture archiving and communication systems):
A picture archiving and communication system (PACS) is a computerised means of replacing the roles of conventional radiological film: images are acquired, stored,

transmitted, and displayed digitally. When such a system is installed throughout the hospital, a filmless clinical environment is maintained.

- Once an image has been acquired onto PACS it cannot be lost, stolen, or misfiled.
- The numerous PACS terminals throughout the hospital allow simultaneous multi-location viewing of the same image, if desired, whereas conventional film can only physically exist in one place at any one time.
- PACS does allow some direct economic savings from the lack of expenditure on film, film packets, film processing chemicals.

Guidelines to staff and students on energy conservation

The staff and students are advised to adopt environment friendly methods in their activities they are:

- **Save energy**
Turn off PC and monitor when not in use. Use VNC to switch on PC to work remotely when needed. Access almost everything on a University PC or an alternative computer at home or hostel using VPN as per need basis.
- **Reduce printing**
Using email/e-learning platform, to share electronic copies of employee manuals, safety documents and other shared material. Use a laptop or iPad in meetings. Use large screen display, to show the document in a meeting environment rather than print. Recycle old documents or reuse them for faxes, scrap paper or drafts.
- **Be energy efficient**
Save energy by supplying laptops instead of desktop PCs, they are more energy efficient. The use of video conferencing facilities and Skype reduces the need of travel. Online learning via ILIAS/Yengage can replace the need for face to face sessions reducing the need to travel.
- **Dispose the e-waste through an e-waste management company.**
IT department disposes all e-waste generated in the university using authorised e-waste collectors as per the regulations of the Pollution Control Board. All e-waste are collected and stored in a secure location and based on the quantity accumulated disposals are performed periodically.
- **Buy the right product**
IT section provides guidance to make sure the faculty and students make the right purchasing decisions; provide Green Information, as well as equipment specification details on core equipment. An over-spec PC is not only more expensive to buy, it also costs much more on the run. LED monitors are more energy efficient than LCD monitors and cost less to use. Laptops are inherently more energy efficient.

7. Sustainable practices in Central Kitchen and Laundry

Central kitchen

The procurement and preparation of food – either in residential halls or as part of the campus commercial activities – can have significant impacts in terms of energy, water and waste generation. The university has a Central Kitchen which introduces sustainability into dining and catering services in several ways. Majority of items are bought from local producers which reduce ‘food miles’. Menu is planned based on what is naturally available in the season to reduce the energy needed to produce, transport, and store food. Quality: Quantity ratio is balanced in order to reduce overall waste. One month advanced menu is prepared and software maintains the availability of the food items required for the menu. Large 250 litres bulk cooking containers made of imported Japanese steel is used which retains freshness and nutrients of the vegetables. Where ever possible automation has been the key to facilitate bulk cooking, eg. Idiappam making, automated rice and dal washer, large scale cooking vessels for rice etc.

Laundry Line

The university has its own laundry process units with a capacity of 7000kg/day. It also provides all types of premium laundry services in and around the city of Mangalore to meet the customized demands of individual clients. The laundry team works with the latest technology and skilful practices for maximum efficiency, giving the end user the ultimate satisfaction. The laundry line caters to individual households, apartments, hospitals, educational institutions, hotels, student hostels and every kind of establishment that needs laundry services. The unit stands for superior quality service, pick up and drop facility, at affordable rates.

Use of hot water for cooking and laundry

Water of 3000L is stored after heating for 3 hours. This helps to reduce the water boiling time which will reduce gas consumption. Cooking is done in bulk 3 times a day to meet the requirement for 20,000 people every day. Rice Boiling is with steamer which saves 50% of the cooking gas. Also, steam is used in dryers and for steam press machines in laundry. Steam is produced for cooking and laundry by using briquettes made out of coffee husk, saw dust etc. Due to its low moisture content and high density, briquettes have the higher practical thermal value and much lower ash content. Thus, use of fuel briquettes leads to green and pollution free environment.

Waste management

Waste water from laundry and kitchen is collected and sent for recycling in effluent treatment plant and sewage treatment plant. The recycled water is used for irrigation or for toilet flush. Used oil is sent for sale. Coconut husk is used as fuel for burning thereby reducing gas consumption. Cardboard, tin, gunny bags are sent to recycle. Faulty refrigerators are either exchanged or sent to scrap.