



VIT[®]

Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

SDG-12 Annual Report 2019-20

12 RESPONSIBLE CONSUMPTION AND PRODUCTION



Ensure sustainable consumption and production patterns



Vellore Institute of Technology

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Report of VIT-Vellore Campus

Ensure sustainable consumption and production

Use of the natural environment and resources in a way that continues will yield destructive impacts on the earth. Humans have unlimited needs, but the resources are limited and it can't satisfy the human needs for a long time to come. To ensure sustainable production and consumption, VIT inculcate the following measures

VIT School of Agricultural Innovations and Advanced Learning (VAIAL) (<https://vit.ac.in/school/course/vaial/ug>) offers an under graduate programme B.Sc. Agriculture and offers following courses

- Soil and Water Conservation Engineering
- Crop Production Technology – I (Kharif Crops)
- Crop Production Technology – II (Rabi Crops)
- Farming System & Sustainable Agriculture
- Production Technology for Fruit and Plantation Crops
- Production Technology for Vegetables and Spices
- Rainfed Agriculture & Watershed Management
- Environmental Studies & Disaster Management
- Farm Management Production and Resource Economics

The following compulsory course has been offered to all the students to inculcate the important of natural sources and their sustainable utilization

1. Environmental Sciences – to all engineering students
2. Environmental Studies - to all non-engineering students

Use of Renewable energy

Management of Solar power

To obtain energy from renewable sources, the university has installed 2MWp of solar PV, that can supply electricity to 5 hostels and other office buildings. A 500-litre solar water heater built on the academic campus satisfies the university's pre-heated water needs. Solar water heaters are installed in the majority of hostel buildings. In addition, University utilizes 90,00,000 units from wind power.

To reduce the power consumption and for effective utilization of electricity all the conventional lamps are replaced with LED lamps. LED desktop monitors and LED TVs are fixed in new buildings. Centralised chiller plant has been installed for cooling which consumes only 40% electricity than the conventional AC.



Value added food production

The centre for sustainable rural development & research studies–VIT (CSR&RS) (<https://vit.ac.in/about/community-outreach>) participated in Gram Sabha in five adopted-village panchayats, where they addressed sustainable development initiatives with the villagers and promoted cleanliness and the prohibition on single-use plastics. With the goal of promoting, developing, and commercialising technologies, the CSR&RS and the National Research Development Corporation (NRDC) of the Government of India received approval to conduct EDP training programmes for rural areas of Vellore under the administrative control of the Ministry of Science and Technology's Department of Scientific and Industrial Research.

Through this EDP training program, we have succeeded in training the rural public, in processing and adding values to the food products like jackfruit, mini millets and honey for enhancing their sustainability.

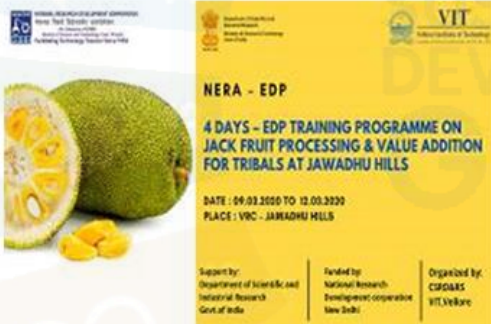
Honey Value addition EDP training

Date: 29.11.2019 to 02.12.2019 / Venue: VIT –VRC, Jawadhu Hills



Jack Fruit Value Addition EDP Training Programme

Date: 09.03.2020 to 12.03.2020 / Venue: VIT –VRC, Jawadhu Hills



Waste disposal

Hazardous material

The Strong acids and bases used in the laboratories are neutralised before being disposed of at a water treatment facility. Along with the acids the 0.01N Cr (IV) from the laboratories is converted to Cr (III) and released into the water treatment plant along with the acids. Although Silica gel is commonly used in TLC columns, it is non-toxic and chemically inactive, so it is recycled. Overall, laboratories that use chemicals and solvents take the necessary precautions when utilising and disposing of hazardous compounds. All radioactive-element- using equipment is meticulously salvaged in accordance with the instructions in the relevant user manuals. Even in the studies/research carried out in the institution the radioactive materials are not used overtly.

Non-Hazardous medical waste

Extended care centers and ambulatory health care services are the most common sources of undesirable non-hazardous medical waste. Individuals involved in the handling and disposal of this type of waste are properly protected by good personal hygiene and meticulous sanitation practices. "Ken Bio Connections Pvt. Ltd." disposes of biological waste with care at VIT. VIT employs a waste management plan that is both sustainable and healthy, with the objective of making the campus green and eco-friendly.

Physical E-Waste

E-waste is collected from source sites on a regular basis and sent to an e-waste storage facility. On campus, about 2-tonnes of e-waste are generated each year. Laptops, desktops, servers, projectors, biometric devices, condemned electronic equipment, printers, scanners, and cartridges are among the most common types of electronic trash. The approved vendor presently collecting e-waste from us is M/s Veltech Systems, Chennai.

Disposable Items

Different coloured bins gather organic and green garbage, recyclable general waste, and sanitary waste. Composting is done with segregated food waste, vegetable peels, and other kitchen trash gathered from campus canteens and food outlets. Garden trash and dry leaves are composted in the same way. Waste that can be recycled is collected and sold to merchants for the purpose of recycling. On alternate days, sanitary trash is sent to a certified agency for incineration. Our objective of reducing the quantity of garbage entering the waste stream is supported by the institute's waste management and recycling strategy.

Minimization of plastic and paper use

The University has taken the required efforts to involve staff and students in discussions regarding excessive energy, water, and paper usage. A variety of paper-saving strategies have been proposed to reduce paper use. Digital submissions were used for all assignments. The usage of single use plastic is prohibited on the University's campus. The University is attempting to make glass water bottles available on all of its campuses in an effort to minimise the use of plastic water bottles.

Food waste management

The University is attempting to eliminate food waste. To keep trash out of landfills, food merchants must reduce food waste and segregate garbage for composting. Since its inception in 2015, this programme has saved 300 tonnes of food waste from being disposed of in landfills. Faculty members and students are also striving to divert garbage from landfills by utilising on-campus composting facilities.

Management of waste water treatment facility

A total of 5412 KLD of water is required during operation. The project generates about 3379 KLD of wastewater, which is processed in eight sewage treatment facilities with a total handling capacity of 3920 KLD. This is then recycled and utilised to flush toilets or irrigate the campus's plants and lawns. The sludge that has accumulated in the STPs is collected and composted four times a month. The compost is utilised in the gardens as manure. As an outcome, all liquid waste generated on campus is treated and used appropriately.



Notable Publications on responsible consumption and production

- Hierarchical porous carbon derived from tea waste for energy storage applications: Waste to worth. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85092466084&doi=10.1016%2fj.diamond.2020.108100&partnerID=40&md5=21f5bdd3bdcf0a8270633c2332cf468a>
- A feasibility study on optimization of combined advanced oxidation processes for municipal solid waste leachate treatment <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85087663449&doi=10.1016%2fj.psep.2020.06.040&partnerID=40&md5=121261048f2d354c9a97388e46cb4b65>
- An integrated green management model to improve environmental performance of textile industry towards sustainability <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85086900470&doi=10.1016%2fj.jclepro.2020.122656&partnerID=40&md5=13cca538028b8905e5a1b321bac151f7>
- Biodegradable and non-biodegradable fraction of municipal solid waste for multifaceted applications through a closed loop integrated refinery platform: Paving a path towards circular economy. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85084311871&doi=10.1016%2fj.scitotenv.2020.138049&partnerID=40&md5=093bca23a8987114df9062e15be400a9>
- Treatment of dairy industry wastewater by combined aerated electrocoagulation and phytoremediation process. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85082651278&doi=10.1016%2fj.chemosphere.2020.126652&partnerID=40&md5=9daeb6b5b756d0c5d9f4090043ce3fc1>
- Waste to wealth: A solution to textile dyes related pollution. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85081957157&doi=10.1088%2f2053-1591%2fab6c22&partnerID=40&md5=1186e06394ef19749d70da41b6c02140>
- Bio oil production from Agro waste residue: Thermochemical conversion to improve oil quality. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85074700960&doi=10.1088%2f1755-1315%2f312%2f1%2f012031&partnerID=40&md5=4ca9876772a4360522b6047a27b9c179>
- Phytocapping: an alternate cover option for municipal solid waste landfills. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85038403904&doi=10.1080%2f09593330.2017.1414314&partnerID=40&md5=14933dc9c4da18b8a1d6b52b9dcb8328>



Report of VIT-Chennai Campus

PREAMBLE

Responsible consumption and production is all about improving the standard of living by providing access to basic facilities, decent job, sustainable infrastructure, energy efficiency, usage of resource in any form, etc. Our Mother Earth has finite resources whereas Global Consumption pattern reveals that the growth is exponential with people around the world exerting pressure on the Earth for leading luxury life which is far above their basic needs. On the other hand, there are billions still living in extreme poverty without proper food, cloth and shelter. Sustainable living can be achieved only through sustainable practices such as reducing food waste, energy conservation and practice simple sustainable habits such as using Earth's resources judiciously and preserve it for future generations.

SUSTAINABLE PRACTICES

VIT Chennai's focus is to develop a Sustainable Green Campus. The Green initiatives promote sustainability within the institute as well as in the locality. The energy conservation facilities, water conservation and water recycling facility contribute to the development and maintenance of the campus as a green and eco-friendly campus.

Water Conservation and Recycling

Appropriate rainwater harvesting methods are practiced on the campus to save water. An artificial lake is constructed in the campus to collect the water from storm water drains. The overflow from the lake is connected to the other ponds on the campus so that the entire rainwater is harvested and conserved. The roof top water during the rain is collected in the underground storage tanks and is used as stored water for firefighting purposes. Also, landscaping of the campus was with few depressions and small mounts and by cultivating grass / small trees and plants over the ground to reduce the run-off and ultimately re-charge the ground water. Also sensor based water taps are installed in the campus for water conservation. All the wastewater generated on the campus is collected and conveyed to a modern wastewater treatment plant and treated to a satisfactory level to recycle the water for gardening/landscaping and flushing of toilets. This helps in conserving water to a great extent and helps in recharging the groundwater, which is the main source of water supply on the campus. Also, the nutrient and water value of recycled water is of great help in maintaining the campus green. The

recycled water is sprinkled for irrigation to make the supply of water optimal and thereby avoid water logging on the campus.



An artificial lake for Rainwater harvesting and Recycled Water used for Lawns

Energy Conservation and Efficiency

Solar Power plant is installed on the campus for conserving energy. All pathway lights are powered by Solar Energy. LED bulbs are used predominantly on the campus for energy efficiency and savings. Fans, LED Monitors, centralised chiller plants and VFD based lifts and pumps also help in energy savings.

Apart from solar plants biodiesel, clean biomass and wind power (Wheeling) are also used as renewable energy source for power generation. More than 25% of the energy consumed by the University is drawn from renewable energy which makes the campus a sustainable one.

Green Campus Award

Green programmes are initiated by several clubs including NSS, NCC, Biosphere Club, Energy and Environment Club, etc., which involves over 400 students and 7 faculty members. The programmes are conducted on campus and nearby village adopted by VIT Chennai and Government Schools around the campus.

VIT Chennai was awarded the prestigious **IGBC Gold rated Green Campus Award**. Indian Green Building Council had presented the award during 4th Green Building Congress held at Mumbai on the theme “**Sustainable Built Environment for All**”.

Ban on Usage of Plastics in campus

VIT Chennai has banned the usage of disposable plastics / paper cups and plates inside the campus. Reusable Stainless steel plates and cups are used in cafeteria, food court and hostel mess. Treated water is available in all blocks for refilling rather than using disposable water bottles.

Go Digital

As part of “Go Digital” policy, usage of paper is reduced on the campus. Submission of assignments and lab records are completely Digital. This reduces the amount of paper handled by the students, faculty and staff inside the premises helping us to maintain a sustainable environment.

Solid Waste Management

VIT Chennai has excellent solid waste management system. Recyclable waste is sold and Trash is disposed. Food waste, garden and lawn waste are processed in bio-composting plant. The matured compost is used as manure for the garden and lawns, thus avoiding the use of chemical fertilizers.



Composting Machine



Bio-Composting Process



COURSES ORIENTED TOWARDS SUSTAINABILITY

University offers various programme specific courses on Sustainability. Apparel Logistics and Supply Chain, Energy Management in Apparel Industry, International Social Compliance, Recycling of Textile and Apparel products, Renewable Energy sources, Urban Planning and Sustainability , Energy efficient Buildings are some of the courses offered by the University that focuses on Sustainability.

RESEARCH PUBLICATIONS

Faculty, research scholars and students are actively involved in research oriented towards sustainable development. A few are listed below:

- Rishabh Kala, Dhruvanka Dutta, Vignesh Sasikumar, Umamaheswari S, Bhuvaneshwari R, "Cost of Living in Metropolitan Cities: Statistical Analysis using R Studio", International Journal of Innovative Technology and Exploring Engineering (IJITEE), 2019, ISSN: 2278-3075.
- Chiranjeevi Muppala and Velmathi Guruviah, "Machine vision detection of pests, diseases, and weeds: A review", Journal of Phytology, Vol.12, Issue 1, pp.2075-6240, April 2020.
- S. Ramesh, D. Vydeki, "Rice Disease Detection and Classification Using Deep Neural Network Algorithm", Springer Lecture Notes in Networks and Systems, Vol.no. 106, pp. 555-566, April 2020.
- Malathi D., Logesh R., Subramaniaswamy V., Vijayakumar V., Sangaiah A.K., "Hybrid Reasoning-based PrivacyAware Disease Prediction Support System", Springer-Computers and Electrical Engineering, ISSN: 0045-7906, 2019.
- Karthik R., Hariharan M., Sundar Anand, Priyanka Mathikshara , Annie Johnson, Menaka R., "Attention embedded residual CNN for disease detection in tomato leaves", Applied Soft Computing. 86(2020), pp. 1-11.
- M Edwin, M Saranya Nair, S Joseph sekhar. "Hybrid Energy based Chilling System for Food Preservation in Remote Areas", IntechOpen, ISSN/ISBN : 978-1-78985-591-3

OUTREACH ACTIVITIES

Nutrition Day was organized by NSS club on 12th September 2019 in association with Chettinad Health City, as part of “Poshan Abhiyaan” scheme initiated by Government of India to attain malnutrition free India by 2022. Mrs.Subhashini, Nutritionist stressed on the importance of nutrition and its impact in the longer run as well as the consequences of unhealthy diet habits.

Ozone Day was observed by NSS to spread knowledge among school children by conducting essay and drawing competition on the theme “Ozone layer depletion and Green house effects” to ensure healthy people and healthy planet.



Nutrition Day

Ozone Day

Energy and Environmental club members prepared digital posters and a short video on “Water Conservation” and “Environmental Protection” to create awareness among students.