REPORT

Academic Excursion to The Energy And Resources Institute (TERI)

Gururgram, Haryana (13th April, 2018) Under DBT Star College Scheme

Department of Botany had organised a one day academic excursion to The Energy And Resource Institute (TERI), Gual Pahari, Gurugram on 13th April, 2018. A total of 76 Students from B.Sc.(H) Botany and B.Sc. Life Sciences, 5 Teachers and 2 Non-teaching staff visited the place. Lush Green Campus of TERI is beautifully designed, green forested area with some cutting edge research activities and facilities as well as Self Sustainable Green RETREAT close to mother nature. This RETREAT training complex uses no power from the Grid and is a unique model of Solar Energy, Waste and Water resource - use efficiency producing no waste, with all the waste water and sewage being treated organically by the plants roots techniques specially chosen for the purpose, Heating and cooling with EAT tunnels technology ,tour to Herbal / Medicinal Garden and Vermi Composting unit. The visit gave an opportunity to the students to see all the state of the art technologies involved to provide sustainable environment and development, but most importantly, the students were exposed in an atmosphere where the air is clear, the sky is blue and there is lush greenery all around.

The students were taken around the Green Campus on a tour to show them the following technologies :-

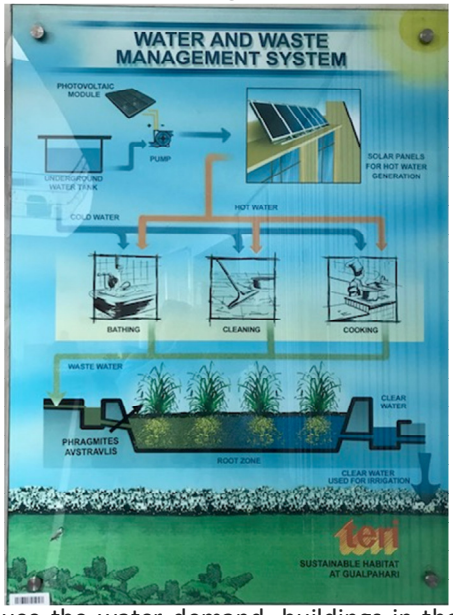
1. **Introduction and presentation on TERI :**

The planning and orientation of spaces and building blocks ensures glare-free daylight in all regularly occupied areas. All the liner blocks are oriented in East-West direction with shorter facades facing the sun. The form of the building self shades the glazing such that direct sunlight is blocked at critical times of the day. The exposed facades and walls on the east and west directions have limited glazing.

2. Solar Roof Top system:

Solar energy is harvested to generate power for RETREAT building.

3. Waste and Water Management:



To reduce the water demand, buildings in the campus have been provided with low flow fixtures such as dual flush toilets, low flow taps and sensor taps that would result in 25% savings in water use. Further, the waste-water generated from the building are treated through efficient biological process using a combination of microorganisms and bio-media filter. The treatment system requires low area and energy. The treated water meets the prescribed standards for landscape irrigation. Rainwater run-off from roof and the site would be used for recharge of aquifer. This would enhance the sustainable yield in areas where over-development has depleted the aquifer .

4. Natural Lights & Ventilation:

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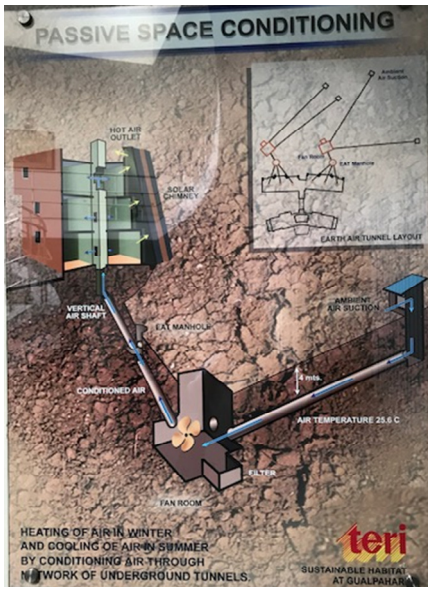
  The predominant wind direction is taken into account in designing the open space. The hot air from outside moves into the central court where it passes over the water body and fountain. The air thus gets humidified and becomes cooler. This makes the central atrium area always cooler than the surrounding exterior.

  5. Green Building Features:
  Insulation of external walls, Insulation on terrace done with China mosaic for efficient heat reflection, Double insulation synergy azur glass is used in external facade with aluminum glazing, Earth Air Tunnel, system for cooling- cooling the building, Solar water heating system, Waste water recycling with Root Zone technology

6. Earth air tunnel system :



Cooling System : The Retreat Building is equipped with passive space conditioning cooling – heating systems, integrated to take advantage of innovative technologies to achieve energy efficiency. It is used for free cooling / heating of the building for a major part of the year. This technology uses the heat sink property of earth to maintain comfortable temperatures inside the building. Supplementary systems have been used for extreme conditions (monsoon). In such a system energy savings of nearly 50% compared to conventional system can be achieved. At the Retreat, this system is used for providing comfort for the rooms in hostel block.

7. Energy Efficient Systems to light up the Green building Retreat:
The campus has an efficient artificial lighting system designed for minimizing the energy consumption without compromising the visual comfort in the building. The system takes advantage of day lighting wherever available. Efficient lamps with high lumen output fixed with mirror optics reflectors. All fixtures have energy saving with efficient designing the lighting loads. During the monsoon season, inbuilt gassifiers are used to generate energy for the whole building using easily available raw materials like rice husk, straws and wood chips etc.

8. Visit to Tissue Culture and Micropropagation Unit: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TERI, Micropropagation Unit provides millions of disease resistant elite crop plants to the farmers through micropropagation techniques. They have explained to the students about the benefits of micropropagation and how in a very minimum cost they are helping the farmers through their outreach program. Tissue culture facilities, poly-house and Green house facility were also visited.

9. Visit to Herbal / Medicinal Garden:

TERI also has a large collection of herbal and medicinal plants. They collect and provide these plants to the local people and spread awareness about these important plants. Students had a thorough explanation about these important plants like Ashwagandha (*Withania somnifera*), Mint (*Mentha* spp.), Tulsi (*Ocimun* spp.), Lemon grass (*Cymbopogon citrates*), Bramhi (*Bacopa* spp.), Stevia *Stevia rebaudiana*) etc.

10. Tour to Vermi Composting unit:

TERI has a vermin-composting unit in which earthworms especially red wigglers (*Eisenia* spp.) are used. They have the dry-composting system in which dry leaves are used to prepare the compost within three months time. The same compost is used for the plants inside the campus and to sell out to the locals also.

LIST OF STUDENTS VISTED TO TERI GRAM			
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28.	16HBT6712	BHUPENDRA KUMAR	
29.	16HBT6713	CHANDAN MANDAL	9582084487
30.	16HBT6715	HARDIK KATHURIA	
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37.	16HBT6737	RIYA PAKHRE	9643445964
38.	16HBT6739	RUSHMIKA RAWAT	9910068694
39.	16HBT6742	SANTOSH SAHOO	
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74.	16LFS7703	ABHAY	9911126194
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76.	16LFD7747	SAPNA	8266058609

Teachers Accompanied: Dr. Sujata Sinha, Dr. S.N. Tripathi, Dr. Rajkumari S. Devi, Dr. Varnika Bhatia, Dr. Sandeep Kumar

Non- Teaching Staff: Mr. Narendra Kumar, Mr. Rajkumar