SRI RAAJA RAAJAN COLLEGE OF ENGINEERING AND TECHNOLOGY
Approved by AICTE - New Delhi & Affiliated to Anna University, Chennai.
Amaravathipudur - Karaikudi

BEST PRACTICES – 2

Eco-friendly innovative practices and its impacts on environmental system

OBJECTIVES:

- Conserve energy and enhance the efficient use of renewable resources by converting waste into organic fertilizer, thereby promoting a pollution-free environment for society.
- Aim to eliminate the carbon footprint.
- Promote natural outdoor cooling to mitigate the effects of global warming.
- Implement water treatment using hydroponic methods.

The following eco-friendly practices have been carried out by the students in our campus to make the environment clean and green.

- Clay tube cooling,
- Natural air cooler,
- Eco-friendly hut-solar powered,
- Bird's nest,
- Vetiver grass technology
- Hydroponics water treatment

FACULTY COORDINATORS

1. **Dr. V. Sarathi, HOD / Agri**
2. **Dr. R. Dhanasekarapandian**

1. CLAY TUBE COOLING

CONTEXT:

Clay tube cooling is a low-energy, eco-friendly cooling system that utilizes clay tubes and water to lower air temperatures. This system operates on the principle of evaporative cooling, similar to how traditional earthen water pots cool their contents.

In light of the current energy crisis and the growing demand for a healthier environment, there is an urgent need for energy-saving cooling solutions. The principle of evaporative cooling, demonstrated in earthen pots (also known as matkas or clay pots), leverages the natural cooling properties of clay. The porous structure of clay facilitates evaporation, which results in water that is cooler than the surrounding air.

Clay tubes present a viable and economical alternative or supplement to conventional central heating and air conditioning systems. They require no compressors, chemicals, or burners—only blowers to circulate the air. In this system, water is connected to the cooler at the top, maintaining a cooled chamber. The transient performance results indicate a noticeable decrease in temperature within the building.

Students at SRRCET have developed this innovative Clay Tube Cooling system, which is made from terracotta—a low-cost, eco-friendly solution that recycles materials, mitigates climate damage, and produces no carbon emissions.

ACTIVITIES PERFORMED:

Mr. Madurai Selvam, an environmental expert and consultant, conducted a training session for our college students on the clay tube cooler and its impact on environmental protection and energy conservation. During the session, a clay pot filled with water was inserted into vetiver and placed inside a clay tube, which was then positioned in the path of a table fan.

The session proved to be very informative for the students, providing them with valuable knowledge about the clay pot and clay tube cooler, as well as its various applications. Mr. Selvam conducted five days of hands-on training, covering the construction of the clay tube cooler and its effects on the environment.

1. As water evaporates from the clay pot, it cools both the pot and the surrounding air.
2. The vetiver adds a pleasant fragrance and may further enhance the cooling effect.

3. The fan blows air over this setup, promoting evaporation and distributing the cooled, scented air throughout the room.

This method serves as an eco-friendly, low-tech alternative to air conditioning, particularly effective in dry climates where evaporation occurs more readily.

We have implemented the clay tube cooling arrangement in staff rooms and classrooms.

EVIDENCE OF SUCCESS:

This training session was immensely beneficial for students, and the clay tube cooling system has been successfully installed and maintained on our college premises, resulting in a positive impact on global warming. Through these practices, our campus has actively joined the fight against climate change.

PROJECT OUTCOME:

The earthen pot with the earthen tube system requires more space for installation; however, if properly designed, it can be a feasible and economical alternative to conventional air conditioning systems. There is no need for compressors or chemicals—only blowers are required to circulate the air. The earthen pot with the earthen tube represents a promising and effective technology for the climate control of buildings. Therefore, the clay pot with the clay tube cooling system, installed and maintained on our college premises, has contributed positively to the fight against global warming.

2. ECO-FRIENDLY SOLAR POWERED HUT

CONTEXT:

Eco-friendliness can be measured in various ways, including water conservation, waste reduction through reusing and recycling materials, pollution control to limit global warming, energy generation and conservation, and decreasing CO2 emissions. Solar power is an excellent energy source, providing a sustainable and cleaner alternative to fossil fuels. Today, solar energy powers almost everything, and making simple environmental choices is a crucial step towards a cleaner future. As the cleanest and most abundant renewable energy source worldwide, solar energy is increasingly recognized in India, which has significantly boosted its solar capacity. This initiative promotes environmental sustainability and hands-on green technology education in our nation, serving as an innovative energy source for a better future. Solar energy is constantly replenished and produces no emissions, unlike burning fossil fuels.

ACTIVITIES PERFORMED:

Mr. Madurai Selvam, an environmental expert and consultant, conducted a training session for our college students on building an eco-friendly hut and installing solar panels. Our college has constructed an Eco-Hut, allowing students to engage in stress-relieving activities at any time. It provides a relaxing ambiance for both students and teachers, complete with a green view and pleasant breeze. The session was highly beneficial, equipping students with knowledge about solar power and its applications. Mr. Selvam led five days of hands-on training focused on constructing the eco-hut, installing solar panels, and planting ornamental and air-purifying plants around the hut. The Eco-Hut, erected in front of the campus, offers a peaceful retreat for students and staff.

EVIDENCE OF SUCCESS:

In our college, the eco-friendly hut has been constructed using NASA-certified air purification plants infused with Blue Mind Therapy (neuroscience music). The benefits of eco-friendliness are both tangible and intangible, with the most noticeable advantages being the reduction in water and energy consumption. Electrical power for the Eco-Hut is provided by solar panels. Our students utilize this green space for relaxation, which enhances their thinking abilities and helps them study in a more relaxed environment.

PROJECT OUTCOME:

Our college has built the Eco-Hut, where students can engage in stress-relieving activities at any time. They have learned about renewable energy and how to harness it effectively, highlighting the importance of clean energy for both staff and students. By encouraging students to explore the potential of solar energy through these projects, we are paving the way for a new generation of environmentally conscious innovators and problem solvers. Thus, the Eco-Hut serves as a vital resource for promoting relaxation and well-being among our students.

3. BIRD CONSERVATION THROUGH ARTIFICIAL BIRD NESTS

THE CONTEXT:

Bird populations are currently declining due to pollution, deforestation, and hunting. To support bird conservation and increase their populations, we are creating artificial nests and placing them in various locations (such as trees) around our college campus, along with providing feeding stations with grains. Birds play a vital role in maintaining environmental health in several ways:

- **Pest Control:** Birds consume insects that can damage crops.
- **Seed Dispersal:** Birds help spread seeds through their droppings.
- **Pollination:** Birds pollinate around 5% of the plants that humans rely on for food and medicine.
- **Scavenging:** Birds like crows and vultures consume carcasses, which helps reduce the spread of diseases such as rabies and distemper.
- **Population Control:** Birds like hawks and owls help regulate rodent populations.

ACTIVITIES PERFORMED:

To attract birds and promote biodiversity, our institute has created artificial bird nests, accompanied by nature music. Mr. Madurai Selvam conducted a training session for our college students on the importance of artificial bird nests and how to construct them using bamboo. He provided simple, step-by-step instructions on creating these artificial nests with bamboo sticks.

Evidence of Success:

Through this initiative, the bird population on our campus has increased significantly due to the provision of artificial nests. Our students, with the support of staff, regularly monitor the birds and ensure they receive food. As a result, our campus is now vibrant with birdlife.

Project Outcome:

The creation of artificial bird nests has led to a notable increase in bird activity on campus. Our students are actively involved in monitoring this practice and providing food for the birds. Birds play a crucial role in the environment, and by conserving them through these artificial nests, we are helping to protect these small creatures for the betterment of humanity. Consequently, our college has successfully enhanced biodiversity within the campus environment through the implementation of this project.

4. VETIVER GRASS TECHNOLOGY

THE CONTEXT:

The Vetiver Grass (Vetiveria zizanioides) System (VGS) was initially developed to protect farmland from soil erosion and to conserve water. While this application remains crucial in agriculture, its ability to thrive in adverse soil and climatic conditions has positioned it as an exciting natural tool in the growing field of environmental protection.

ACTIVITIES PERFORMED:

Originally designed for soil and water conservation, the Vetiver System has expanded its role into environmental protection, particularly in wastewater treatment. Mr. Madurai Selvam conducted a training session for our college students on vetiver grass technology. The session provided valuable knowledge about vetiver and its applications. He conducted ten days of hands-on training focused on vetiver cultivation and its environmental impact. This training was immensely beneficial for the students.

Vetiver plants have been planted in front of the college to aid in carbon sequestration. As a result of these practices, our campus is now free from greenhouse gases, and wastewater is properly disposed of and reused for garden irrigation.

EVIDENCE OF SUCCESS:

Vetiver grass technology has significantly improved air purification and helps absorb CO2, acting as a natural method for carbon sequestration. To minimize environmental impact and promote sustainability, this project emphasizes the integration of environmentally friendly systems. Through this initiative, students gain hands-on experience with natural carbon sequestration using vetiver grass.

PROJECT OUTCOME

Vetiver grass effectively mitigates soil erosion, flooding, and landslides, and aids in rehabilitating degraded soils. Our lawn area features vetiver grass to trap carbon and create a pollution-free, greener environment. By encouraging students to explore the potential of vetiver through these projects, we are paving the way for a new generation of environmentally conscious innovators and problem solvers, thereby minimizing environmental impact and promoting sustainability through the integration of eco-friendly principles.

5. HYDROPONICS WATER TREATMENT

THE CONTEXT:

Water hyacinth (Eichhornia crassipes) is a free-floating perennial aquatic plant belonging to the monocot family Pontederiaceae. The rapid growth and spread of water hyacinth in nutrient-rich water bodies have become a global concern. Literature indicates that this hydrophyte thrives in various countries across all continents. Since the 1980s, water hyacinth has been recognized for its role in water pollution control, as its biomass is effective in adsorbing metals and organic compounds from water. Compared to other aquatic plants used for phytoremediation, such as water lettuce, water hyacinth excels in growth output and adsorption efficiency for certain pollutants. Hydroponic systems, particularly wastewater hydroponics, hold great potential for wastewater treatment, utilizing mineral nutrient solutions to grow plants without soil.

ACTIVITIES PERFORMED:

Mr. Madurai Selvam conducted a training session for our college students on hydroponics and the growth of water hyacinth. The session provided valuable insights into the environmental impact of water hyacinth. He conducted two days of hands-on training focused on the growth of water hyacinth and its effects on the environment. This training was immensely beneficial for the students. To make effective use of wastewater, our institution has undertaken a project with the help of our students. The floating hydroponic plant system represents an emerging rhizofiltration technology. When these plants come into contact with soil or water, they easily propagate and develop new adventitious root systems. Researchers have found that hydroponics using Eichhornia crassipes can be an innovative and cost-effective wastewater treatment method. At the end of the training session, our college was equipped with hydroponic practices for water treatment and purification.

EVIDENCE OF SUCCESS:

Our college students have implemented a hydroponics water treatment method for purifying water in our college pond. Using this system, wastewater from our college kitchen and bathing facilities is purified and reused for irrigation purposes.

PROJECT OUTCOME:

Water hyacinth effectively removes a range of pollutants from wastewater, including heavy metals, biochemical oxygen demand, nitrogen, and phosphorus. It can be utilized in wastewater treatment plants to optimize pollutant control. By fostering students' exploration of water hyacinth's potential through these projects, we are preparing a new generation of environmentally conscious innovators and problem solvers. Consequently, our college has been equipped with hydroponics practices for water treatment and purification.