BEST PRACTICE

TITLE: GREEN INITIATIVES AND ECO-FRIENDLY CAMPUS

The context that required the initiation of the practice

The entire world is busy with development at the expense of the environment. There is a mad rat race for industrialization. Deforestation, industrialization, automobile pollution, and forest fires, worsen the global environment. We polluted our air, water, land, and food in the development process. Man's intervention in nature's process proved very fatal. Deforestation, conversion of forest land to agriculture, dams, and resorts led to a reduction in tree cover. The reduction in forest cover led to climate change. Man is exploiting nature for his greed. If exploitation of nature continues, there will be nothing left for the future generation. Sustainable development is the need of the hour.

The global focus is on increasing the green cover of the planet. The Ecological consciousness is increasing day by day in the world. The only panacea for the entire environmental degradation is taking up the sustainable green initiatives. The college Eco club and Department of Botany and Zoology are engaged in converting our campus into a eco friendly campus.

OBJECTIVES OF THE PRACTICE:

1. To increase the green cover in the college by plantation
2. Developing new Botanical gardens and increasing the bio-diversity of the college
3. To Create a carbon sequestration sink by planting more tree varieties
4. To Increase the green cover in the classrooms through Hydroponics
5. To produce *Azolla* Biofertilizer
6. To increase fertility and reduce soil pollution by using Organic fertilizers
7. To produce pesticide-free food by organic farming.
8. To segregate the solid waste and produce vermicompost from organic solid waste.
9. To construct Rain Water Harvesting Pits on the college premises to recharge the water table
10. To establish and maintain the seed museum in the Botany Lab

The Practice:

To convert the college into an eco-friendly campus, plantation programmes are planned and executed from time to time. The district Social forestry department supplies the required tree varieties for plantation. The tree varieties include the shade giving fruit bearing fast-growing varieties. We also purchase the plants from the local nursery. Mass plantation programmes are generally organized in the monsoon months for the survival of the plants. The students from different groups under the NCC, NSS, and Eco club will participate in the programme.

In the past five years, two new Botanical gardens are developed. One in front of the college premises and the other in the backyard. In the first Botanical garden we planted many

plant varieties like Duranta, Hibiscus, Ipomoea, Annona, Neem, Mango, Sapota, Terminalia, syzyzium, Bauhenia, Nagalinga, Cymbapogon Artocarpus, Citrus,etc., the garden is nourished by the water used in the Azolla culture which is rich in nitrogen content. Azolla pond, spirulina Pond and the Aquatic pond are located in this garden area. In the garden established in the backyard, several Palm varieties are planted. In this garden we practice organic farming. As a result of the establishment of these gardens, our Carbon sequestration has increased a lot.

Hydroponics is the innovative culture of plants in water without using the soil. Externally the plants are supplied with the required nutrients along with water. We started this initiative as an experiment mode and were successful in introducing three different units of Hydroponics. The three models developed are NFT(Nutrient film Technology), Dutch Bucket Model and deep water culture. Through NFT model shallow rooted plants like Amaranthus methis are produced. Tomato and capsicum are produced through Dutch bucket model. Deep water culture is used to produce the leafy vegetables like Spinach and Amaranthus. Electric conductivity(EC) and the Ph are the two important things that controls the growth of Hydroponic plants. The technique of culture of plants through hydroponics is yet to be mastered to produce different plant varieties.

The college has developed the Azolla pond in the second Botanical garden as a part of an eco-friendly practice. Azolla is a small free-floating pteridophyte plant that is used as the Biofertilizer. Its leaf contains cyanobacteria which convert the molecular nitrogen in the air to the utilizable form of the plant like ammonia. Both dried Azolla and water used for culturing it are used for nourishing our garden plants.

The Botany department of our college has taken the initiative to start Organic farming in the Palm Garden. The students of BZC group are involved in the organic farming. They are trained in land preparation, seed treatment, fertilizer and Biopesticide preparation. The department took the expertise of the local farmer of Venkatadripalem namely J.Venkateswarlu. In the process of practicing Organic Farming our students prepared the Organic fertilizers and Biopesticides required to grow different plant varieties. Some of them are Panchgavya, Dravajeevamrutham, Matti Dravanam. Agnastram etc., Under the supervision of local farmer and Botany staff our students produced Ribbed Guard, Bitter Guard, Beans, Water Melon, Lady's finger, tomato, and leafy vegetables through Organic farming practices.

Solid and Liquid Waste Management is a part of our eco-friendly campus. Solid waste collected in the classrooms and college premises is segregated in the separate cement pits constructed in the garden located at the entrance gate. Three pits are constructed to separate the Organic waste, Metals, and Plastics. The organic waste which constitutes the litter from the plants, kitchen waste, and other Biodegradable waste is diverted to vermicompost units. We have four large compartments to prepare the Vermicompost. That's how we convert waste to wealth in our college.

For water conservation, we constructed 4 Rain Water Harvesting Pits to recharge the groundwater. Waste water from our RO units is diverted to nourish our garden plants. Water

sensors are installed in the over head tanks to detect the overflow of water and thus reduces the wastage of water.

As a part of the conservation of nature, we maintain a seed museum with a collection of more than fifty seeds in our Botany laboratory. Each seed variety is QR coded. The seed collection ranges from fruit trees, vegetable, cereal, oilseeds, and medicinal plants.

Obstacles faced if any and strategies adopted to overcome them

Plantation: The only obstacle we faced is in the form of soil. The soil in our college is rocky red soil. It is difficult to grow the plants in the initial stage as the soil is very hard. Growth is possible on continuous watering and supplying fertilizer to the plants. Ph of the soil according to the soil test is 8.5. The macro and micro mineral deficiency is reported in the soil test. Ever since we started using the organic fertilizers to our garden plants, (especially the Drava jeevamrutham,) the plants started showing good signs of luxurious growth.

Botanical Gardens: During the past five years we established two new gardens. Low fertile soil with less organic content, micro mineral deficiency are the major obstacles we faced during the development of the garden. We overcome this problem by the usage of organic fertilizers.

Hydroponics

The obstacles we faced during the development of hydroponic units and cultivation of plants through hydroponics are as follows

Some leakages are traced out in the NFT model and they are rectified by fixing The leakages with glue. **Water clogging** is the main problem observed in the Dutch Bucket Model as we are using cocopeat, clay balls and gravel in equal composition, it led to Water clogging in some dutch buckets. Coming to the culturing plants through hydroponics initially we faced the problems in EC (electrical conductivity) and Ph maintenance. As each plant requires separate set of conditions like EC and Ph, though initially we failed through practice and sharing knowledge with experts we could overcome the problem.

Azolla Culture:

There are not many obstacles in culturing *Azolla* in the pond. The maintenance of pond is crucial thing in culturing *Azolla.* Periodically the water should is replaced along with the harvesting of *Azolla.*

Organic farming:

The obstacles we faced during the organic farming are as follows:

To start Organic farming in our garden, we require constant support from the expert organic farmers. J. Venkateswarlu, an expert farmer of Venkatadripalem village supported our organic farming practice. He extended his support through training our faculty and students in land preparation, Organic fertilizer and biopesticide preparation, seed treatment and sowing etc.

Uneven and low fertile land posed a problem to continue the organic farming. Maintenance of the Organic farming site during holidays and vacation is a serious problem. Some dedicated students from BZC group along with the office sub ordinates are kept incharge to look after the crops. Leaf spoilage is the common problem we came across different plants in Organic farming. For this Mattidravanam is effectively used to solve the problem

Water Conservation:

Locating the correct site for construction of Rain Water Harvesting Pits is the major task. The sites are located in such a manner that the maximum rain water is collected and stored in the water table.

Seed Museum: Storage of the seeds without spoilage for longer time in the glass bottles is the major task. It is done by mixing the neem powder with the seeds for longer storage.

IMPACT OF THE PRACTICE:

All our green initiatives paved a path for the eco friendly campus in our college. We not only increased the green cover significantly but also increased the biodiversity of the college campus. The Botanical Gardens we developed in the past five years not only increased the greenery but also attracted so many living creatures. The plants in the garden not only increased the beauty of the garden but also used for taxonomic study. A new ecosystem is formed by the Botanical gardens which supports the life for many other organisms present inside and out side the garden.

Through Hydroponics we produced leafy vegetables of good quality without diseases. With this we started developing greenery inside the classrooms too. Through Hydroponic practice we could instill the confidence in our students. The Students of our college can now use the disposed plastic bottles,buckets and tubs to grow leafy vegetables in their home itself. With limited resources they can start the hydroponic culture of plants.

Our *Azolla* pond and Aquatic pond, created a new aquatic ecosystem in the college which sustains life for many aquatic creatures. *Azolla* is our first biofertilizer produced in the college campus. The dried *Azolla* mass along with the water in which we culture *Azolla* are used to nourish our plants in the garden. From Azolla we moved on to creating the Biocompost and vermicompost in the campus. We achieved in converting the solid waste in to wealth. After this we started preparing cow based organic fertilizers like Drava jeevamrutham Panchagavya etc., With the preparation organic fertilizers, vermicompost and Azolla culture we attained self sufficiency in fertilizers.

We started producing, pesticide free Organic food through Natural farming. We produced ribbed guard, beans, lady's finger, tomato, chilies and water melon through organic farming. We conducted the workshops on Organic farming, Azolla culture and vermicompost preparation to the local farming community. All the green initiatives taken up by our college

are driving us towards the eco friendly campus. All this achievement is possible with the active participation of our students. We hope all these green initiatives will benefit our flora and fauna and boost up our student's Eco discipline.

Resources required:

1. **Plantation and Botanical Garden**: Plants and tree varieties

2. **Hydroponics**:

The resources required for preparing 3 hydroponics units are as follows

A. NFT Unit

1) PVC pipes 20 ft – 4, 10 inch

2) reservoir drum 50 l

3) 20 watts motar

4) T shape pipes for joints

5) Eraldite gum

6) Net Pots of 2.5 inch

7) A type wooden stand - 2

8) couplings Plastic - 32

9) clay balls

10) wire and Plug

B. Deep Water culture Unit

1) 10 Plastic tubs with 10 l capacity

2) Railway decolum pieces

3) 210 Net pots

C. Dutch Bucket Model unit

1) Plastic Buckets used to pack the curd – 10, 10 l capacity

2) 1 inch pipe 30 ft

3) Plastic Tube 0,5 inch 15 ft

4) Eraldite gum

5) clay balls -20 kg

6) coco peat – 20 kg

7) gravel- thin – 50 kg

8) Wooden sticks -8 (support for the 1 inch plastic pipe)

9) 50 l reservoir plastic drum

10) Two 40 watts submersible motors pumps

3. Azolla pond:

Pond, Shadenet, Azolla plant, Cow dung, Mud etc.,

4 Organic farming:

Seeds, Organic fertilizers, Biopesticides, fly traps etc.,

5. Seed Museum

Seeds, Small Glass Bottles and Neem Powder

6. Solid Waste Management- Vermicompost preperation

Three Separate Cement pits to segregate the different solid waste,

Four large compartments with protected shelter to prepare the vermicompost

Earthworms, Organic litter

7. Liquid Waste Management

RWHP- Small, medium and big sized motor chips, Sand and Mud

Waste water reusage- Plastic pipes to divert the waste water to plants

NOTE: For Photos please visit our Green initiatives tab given in our college website