

Terrarium: A unique entrepreneurial opportunity for migrant women in the COVID-19 pandemic

Terrarium making is an art as well as there is a science behind it. It is emerging as one of the lucrative business opportunities in metro cities of India, where people have to be confined indoors, and they crave for greenery. As a part of the curriculum taught under the aegis of the undergraduate course 'Ornamental Horticulture', an innovative teaching module was tried for instilling creativity in undergraduate students of PDUCHF, Dholi, Bihar. Terrarium making was taught in theory, demonstration, and practice. After that, students did an assignment of preparing their terrarium by following guidelines provided by the instructor. These terrariums were then displayed in *Kisan Mela* conducted by the RPCAU in 2021, and a brief survey of visitors/interested farmers was conducted by the students. Afterward, we found that many women from surrounding villages, who visited *kisan mela*, were more interested in the art; thus, this article on the method of making terrarium was compiled for the popularization of technology among women and youth for the entrepreneurial opportunity/startup.

A TERRARIUM is like an aquarium, with an ecosystem of its own, but instead of ornamental fish, it contains decorative/ornamental plants. It is a small aquarium-type cabin utilized for growing plants. In the era of urbanization and shrinking space, man's need to live in touch with nature has increased immensely. To fulfill the need for greenery in an innovative way, terrarium indeed can act as an aesthetic and practical interior design element. Terrariums developed as a miniature landscapes are an interior-scaping masterpiece, made in just about any glass container. It is planted to look like a miniature garden or forest enclosed in its own little world, depending solely on style or type. For people who live in cities and have minimal or no garden space, their thirst for a small touch of nature has been quenched by Bonsai/indoor plants/window baskets, but a terrarium is the most wonderful addition on the list.

Terrarium making: Entrepreneurial opportunity for creative migrant women

'*Sashakt Mahila, Sashakt Bharat*' ideology is a motto that will enable 50% of the country's population to contribute their share of GDP. The Indian government has worked extensively towards the upliftment of rural women in the country. Indian women have been intrinsically and historically involved in art and craft to become financially independent. This skill set can even help landless reverse migrants being retained in their own states and give them good work opportunities in their own villages. Training rural agriculture women farmers in the

art of terrarium making and converging the women into SHGs for marketing of their produce by e-commerce will go a long way in metamorphosing skilled creative women into empowered entrepreneurs. This skill will prove to be an asset for women as they can take it up along with household work. The scope of this business will bloom,



Rainforest themed terrarium



Terrarium made by students

and the group of women can make this business along with plant production for a terrarium as a niche business, and they won't find much competition. In the times of the COVID-19 pandemic, urban people have realized the value of greenery within four walls of their apartments; thus terrarium as a center decorative piece in the living room can be the next big thing to boast of!!

Instilling creativity in Graduates of PDUCH&F

Terrarium is one of the topics in the undergraduate course of Horticulture in the aegis of Ornamental Horticulture. After familiarising students with all theoretical parts, components, and working of a terrarium, an individual assignment was planned for a batch of 24 students to make a terrarium with available materials in their home and use non-conventional ornamental plants chosen from the surrounding. As this assignment was performed in times of the COVID-19 pandemic when teaching was online, the students were given 10

minutes each to make an interactive video presentation on how they made their terrarium. After this exercise, qualitative feedback was taken from students, and they found the assignment 'creative', 'enjoyable', and 'fun'. The teaching innovation was so inspiring that the students even made and displayed their terrarium in *kisan mela* and demonstrated the making technique to farmers, which attracted lots of women farmers who expressed their interest in taking up this business. Students can take this venture as a part of their student-ready program as well and can try their hands at developing it further into a full-fledged business opportunity later on.

Guiding principles

A terrarium is a glass container that allows for a mostly closed enclosed environment for plants. It allows for control of the conditions that will be optimal for the care of the plants inside. A terrarium has its own miniature climate, and the closed glass container acts like a greenhouse where sunlight enters through the glass and warms the air, soil, and plants the same way that sunlight coming through the atmosphere warms earth's surface thus mimicking the greenhouse effect. The glass holds in some of the warmth, just as earth's atmosphere does. In summary, it can be said that terrariums are the evolved form of a greenhouse, a self-sustaining miniature ecosystem, with its very own flora-fauna interaction, own water cycle, and nutrient cycle. Terrariums are easy-to-make, low-maintenance, and can thrive well indefinitely with minimal water application. The principle behind a closed terrarium is simple; the water from the soil is taken up by the plant as it grows. The water is then released through the leaves via transpiration. This water condenses on the glass and runs back to the soil where it can be used again. Due to this mini-cycle, the plants can go for months without water. It also creates a jungle-like atmosphere of high humidity and warm temperature and no drafts, which are perfect conditions for native tropic house plants.



Desert landscape

Materials required

Containers from aquarium houses, amazon, antique stores, or even from around the house like an old jar, fused bulbs can make beautiful terrariums. They can be of different size, shape, hanging type, tabletop type, etc. It is possible to use anything for a terrarium, as long as it is glass. The container can be left open or closed depending on the selection of plants. Preferably the jar or container should have a wide mouth. While it is possible to use something with a small opening, placing the plants is easier if the container has a wide mouth. Also, ideally, the plants shouldn't touch the sides of the jar. A large container has a greater choice of types and sizes of plants and the option of fitting in decorative elements, such as shells, figurines, or ornaments. Other materials may include rocks, pebbles, recycled glass chunks, activated charcoal (or activated carbon), potting soil/media/moss/sand, spoon, scissors, and gloves, etc.

Plant elements

Generally, small plants of slow-growing habit are preferred that can be fitted inside a terrarium jar and won't grow too tall. Some plants having multiple stems; can be separated even further. Terrarium will be successful only when an appropriate group of plants is chosen. It is advised to keep succulents and cacti together as they are of xerophytic nature, and while making a tropical theme-based terrarium, fern, mosses and tropical plants can be kept together. Each group requires different amounts of water and soil. First, all the plants selected for the single terrarium need to thrive in the same kind of environment. If a fern is paired with a cactus, one or the other might not do well (the fern if it gets too dry, the cactus if it gets too wet). Cacti and succulents require well-drained sandy soil, while rich potting soil is needed for a tropical terrarium. If the planting plan contains succulents, beautiful terrariums with these plants can be made, but no cover terrarium is required. Picking different shapes, colours, sizes, and varieties in a pleasing combination will add to the aesthetics of the terrarium. When considering terrarium plants, chosen plants should thrive in low to medium light. Getting a mix of sizes, leaf textures, and leaf colours is recommended for terrariums. There are tonnes of great terrarium plants, such as croton, pothos, dracaena, small ferns, lucky bamboo, nerve plant, prayer plant, club moss, orchids and creeping fig.

Making technique

The terrarium container does not have drainage holes in the bottom, so there is a need to create a place for extra water so that the roots do not rot. A thick layer of sheet moss at the bottom of the terrarium can soak up extra water. The moss sheet can even be replaced by a layer of stones. It is advised to put at least a 2-inch layer of stones in the bottom. The next step is the addition of 1/4- to a 1/2-inch layer of activated charcoal on top of the stones. The purpose of this is to help in drainage and control any odour that might occur inside the terrarium. It acts as an adsorbent and filters the draining water, and avoids fungal growth. The rocks are used above charcoal as a false drainage layer,



Terrarium samples made by students during practical class

while the activated charcoal helps keep the terrarium healthy, and the moss can be used for decoration and to help soak up and retain water. Add polythene or wire mesh to separate the charcoal layer from the soil layer to prevent their mixing. The next step is to add moss on top of the stones and charcoal. This extra layer keeps the next layer, potting soil, from mixing in with the charcoal and stones. This is an aesthetic decision, so this step is optional. It can add visual interest to the terrarium by displaying different layers from see-through terrarium containers. The addition to sterile soil-less potting mix on top of moss or on top of charcoal is given. This layer fulfills the nutrient requirement of the plant and provides anchorage to the plants, the depth of potting soil can be at least a couple of inches. As it is needed to make sure the selected plants fit into the terrarium with the lid on, plants need to be measured before planting.

Landscape principles

Selecting the design of the terrarium too is a very important point to ponder. The plants and different elements of the terrarium should be placed nicely and must not be cluttered. The arrangement should follow the landscape principles given here.

- **Style/Theme:** A theme such as desert/tropics/jungle/park needs to be decided beforehand for pleasing landscape development. It is suggested to contour the soil so that it mounds and sinks to create interest. The layout can be formal or informal.
- **Colour scheme:** The plants should follow a proper colour scheme, such as monochromatic/complementary or supplementary, etc. A flashy colour of one element can be added to create interest or draw attention.
- **Balance:** Will the terrarium have a back and a front? Or it should be visible from all sides; this depends on the place of placement, type of container and design of terrarium, etc. If it is visible from only one side, it may be required to put the tallest plant in the back or in the middle.
- **Focalization:** One object of interest having some curiosity/aesthetic factor to it.



Tropical closed moss terrarium

- **Simplicity:** The design needs to be simple but attractive. The utmost requirement is to avoid clutter and keep the terrarium from becoming a horticultural zoo.
- **Ratio and proportion:** The plants, focal element/Rock/other objects should be in a pleasing proportion. The size of the selected plant shouldn't be too big for the terrarium.

Removing the plants from the pots and trimming/separating the root-bound plants by teasing the roots apart, even cutting some off, should be prioritized. Cutting off some of the roots, called root pruning helps retard a plant's growth, which is usually a good thing when growing plants in the confines of a terrarium. If the selected terrarium has a narrow neck, cooking chopsticks, tongs, or long tweezers can be used to place plants. It should be made sure that there are no air pockets between the roots of terrarium plants and the soil. Thus, the soil around the plants must be pressed firmly.

Aftercare

Over time, it is necessary to monitor the terrarium's water needs based on how dry the soil is. For terrariums with closed lids, if water is dripping down from the top, the lid has to be opened to allow evaporation. It does not need water very often. If leaves die or wilt, then they must be removed from the terrarium immediately. If an entire plant dies, it needs to be taken out. For precautionary measures, it must never be placed in direct sunlight. Placing the plants in indirect light gives the best results. If the terrarium is closed, taking off the top at least once a month to air it out is a must. If there is lots of condensation, top should be left open until it has had a chance to dry out. It is not required to fertilize the terrarium because encouraging growth is not a motive;

the healthy survival of plants is!! The terrarium enables people to enjoy a larger variety of plants and widens the decorative usage of flora. It enables people to grow exotic and demanding plants and also to have plants in places of limited daylight. The terrarium prolongs the plants' beauty and growth season by providing a protected atmosphere. Any kind of plant, including herbs, grasses, and mushrooms, can be easily grown, provided the size is small and fits inside the container. Terrarium containers are also used to preserve seasonal plants over winter. Some companies are even providing novelty features like automated control of lighting, heating, and humidity; thus, these features can also be explored for the Indian market.

Marketing

Terrarium is a very attractive novelty item; thus can be popularized through offline, online, direct sale, displayed in gift shops/nurseries, and can be sold through homes, plants, gardening, and interior magazines as well. It can also be sold through specialists like florists and interior designers. Initially, the terrarium can be marketed to knowledgeable hobbyists, direct sales, and specialty boutiques. Based on experiences from the initial market, the product can develop and evolve. Terrariums can be used instead of bouquets/garlands as a part of offering to the end customers. Marketing strategy involving professional florists, nurserymen, and designers, as well as by gifting to chief guests, the product can get visibility and thus a market among a wider audience. Finally, when the production cost is low enough, the product can be offered to a mass market through departmental stores and supermarkets as well.

It is an appealing interior design element with functionality of a mini greenhouse that enables the growth of decorative and useful plants. These types of novelty items will for sure help young, innovative and creative women to open a world full of opportunities in the ornamental and decoration industry.

Companies/Online communities involved in Terrarium business in India and abroad

In India, there are many gifting companies and startups venturing into this arena. Some well-established online gifting platforms like ferns and petals are selling terrariums in a wide range of prices starting from INR 399 to 5599, and they are a popular gifting choice according to the website. Flower aura sells terrariums ranging from INR 599 to 2499 in 21 states. Flower aura also gives buyers a chance to select terrarium plants to terrarium containers and accessories; thus, a personalized self-designed terrarium can be purchased, that's a novel selling method used by the startup. They are popularizing terrarium gifting through different social media campaigns and targeting the tech-savvy youth by giving discounts on using hashtags such as #gracefulgreens. Woodlings is a Bengaluru-based startup that offers a wide range of indoor plants and handmade terrariums. They don't believe in mass production and consider all terrariums to be unique. No two terrariums would be exactly the same, and that novelty is something that sets it apart from the rest. The challenges it faces are dealing with fragile glass containers

and fast shipping for its live plants. Some other companies in this space include My Bageecha, Urban plant, Nursery live, Ugao, West Elm, Decorizz India, etc

Way Forward

Greenpiece Terrariums, a Kerala-based company, is a joint venture handled by Lakshmi Raju and Ganga Fischbeck since 2015. 'We never thought of starting Greenpiece Terrariums as a startup. Being a stay-at-home mother of two young children, what this venture has given me is the convenience of making these at my home itself. A lot of promotion happened because of word of mouth as people really loved our terrariums and spread the word', said Lakshmi. Today, their business is thriving to the extent that Greenpiece Terrariums rakes in an income of ₹ 70,000 every month! People in Kochi began loving these tiny gardens so much that requests for workshops and DIY kits soon started dropping in.

As researched, there are not many people involved in this business, but a few communities of hobbyists turned into entrepreneurs, but the demand for this seemed very high, especially in times of pandemic when people were stuck indoors for more than 1.5 years worldwide. If seized properly, terrarium making would prove to be a good export commodity. Government support per se is not available for terrariums. Under NHB/start-up Incubation/MIDH scheme, some financial support can be availed, but detailed information could not be obtained specifically.

If the marketing of the terrariums can be taken up along with nursery raising, this business can even be expanded for export. In developed nations, there is a huge demand for ornamentals for gifting on different occasions. The terrariums can be promoted as miniature landscapes for gifting purposes. It is a possibility that democratic institutions such as self-help groups may help elevate household economics through rural women as agents of change. The group marketing will also empower them by giving them a voice in decision-making. Women are endowed with aesthetic acumen and have innate skills for crafts and arts. Crafts have been coexisting with agriculture, farming, and natural resources for a very long



Zen terrarium

time in India. A set of sustainable skills imparted to the horizontally marginalized group of persons will indeed result in the economic empowerment of women.

For further interaction, please write to:

Roshni Agnihotri (Assistant Professor), Tirhut College of Agriculture, Dr. Rajendra Prasad Central Agricultural University, Pusa, Samastipur, Bihar 848 125. *Corresponding author's email: roshni@rpcau.ac.in

Mushroom as successful enterprise under ARYA in Kokrajhar district of Assam

KVK developed entrepreneurship in mushroom production in Rangati village by training 22 youths during 2019–20. On completion of training five youth were selected and provided with inputs for establishing Mushroom production unit. Shri Rajib Baruah is one among them who started his mushroom production unit (oyster mushroom) with the inputs provided. In first year, he got a production of 7 q mushroom which he sold @ ₹ 180/ kg. He could get a return of ₹ 126,000. In second year, he got a production of 24 q mushroom which he sold @ ₹ 200/kg and got a return of ₹ 432,000. He invested his income for increasing the capacity of his unit. In addition to that he also started button mushroom cultivation. He also provides training to local youth as and when needed. Presently 4 youths have got full employment along with partial employment of 15 youths. He has also engaged several youths in his entrepreneurial unit thus, providing employment generation. His productions are mostly marketed to nearby state of Arunachal Pradesh as well as within and outside the district and also among the local small entrepreneurs. The mushroom production under ARYA has proved to be a successful enterprise for providing employment opportunity to the rural youth of the district.

Source: ICAR Annual Report 2021-22