Creating new avenues in Vertical Gardening

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Inspiring innovative structures and deep sense of recycling and reuse set this farmer innovator as a model to emulate for many aspiring urban gardeners

Renowned Agricultural scientist, Dr. Rattan Lal in one of his talks, talked about how South Asia is considered as one of the hot spots of food insecurity as reported by various studies. It has also been reported that 57% or more of South Asian population cannot afford healthy diets. With an ever increasing population, the burden of food insecurity is rising every day, especially with the cities brimming with packed spaces. There is a dire need to adopt more resilient food systems, improve urban food supply chains, promote home gardening and urban agriculture. Urban home gardens offer a better microenvironment around the home besides providing healthy vegetables for home consumption. They can be grown by effectively utilizing limited spaces.

Mr. Varghese is a popular figure in the small town of Pulpally, Wayanad in Kerala. He has pioneered in the area of vertical gardening with his curious and enthusiastic mindset. Mr. Varghese, at the age of 60, besides being an innovative farmer is also a very humble human being. By utilizing the front and back yard of his house, he has successfully created unique functional models. He started experimenting in farming since twenty years after quitting his service as a radio mechanic. Currently, he is cultivating diverse crops like carrots, cabbage, potato, tapioca, fennel, strawberry, chilies, sweet potato through vertical gardening and other innovations. Mr. Varghese, initially had grown some ornamentals in his front yard. Having realized that they cannot provide food for his family, he decided to grow vegetables. He decided to develop systems which can be aesthetic, effective in space utilization, promote crop diversity, use wastes such as kitchen waste, dried leaves and paddy straw along with manure and soil for planting.

Eco friendly low cost structures using betel nut wood

Vertical gardening structures

Mr. Varghese developed several innovative vertical gardening structures.

The GI net and PVC pipe structure system: This structure is primarily used to cultivate wide varieties of vegetables including carrots, cabbage, chillies, capsicum, brinjal, sweet potato and also strawberry in his front yard. Around 24 plants can be accommodated in one structure. The system is a cylindrical tower like a structure. It uses a fine sturdy fibre/cloth or shade net which is further covered by the GI net (2 inch gaps). This cylindrical structure is then layered and filled with plant growing media. At the bottom, either paddy straw waste or dried leaves are put to avoid water leakage. This is followed by putting kitchen waste with some soil and manure. Every layer is shoveled down to pack it tightly so that it remains compact. The

structure also has a thin cylindrical pipe in the centre to supply water for irrigation purpose with holes at 3.5 inch distance. At present, Mr. Varghese is supplying water through drip irrigation at the top of various structures. Some zip ties are also attached for opening and closing the structure, so that it can be used for around 10-15 years.

Small PVC pipes are fitted at appropriate spacing to plant the vegetable seedlings. Extra pipe setting is provided for support later as the plants grow in size. Pipes are filled with a mixture of soil and organic manure (cow dung) along with neem cake.The mixture helps in easy absorption of water and nutrients to the plants.

One can even cultivate strawberry in this system efficiently, without attaching the PVC pipe. It is done by creating holes at adequate spacing and propagating the runner throughout the structure.

Mr. Varghese proudly affirms that the system allows effective utilization of space and also reduces the pest and disease incidence due to adequate spacing while weed management is also not required in this system since the system has optimum spacing for the crop only.

The betel nut wood structure system: Similar to the previous model, this system is an eco-friendly alternative and is also inexpensive. The cloth and GI net is replaced by betel nut (areca nut) wood and dried leaves. The structure is developed through narrow wooden planks that are tied together to form a cylindrical shape which is then filled with straw, dried plant leaves on the side. Then in a similar manner, kitchen waste along with soil and organic manure, neem cake, etc., is filled inside. After the system is complete, holes are made on the surface where potato eyes (around 120 eyes can be planted in 10 towers) are planted for sprouting. This system allows good harvest of potato through lot of plants being accommodated in a single structure. On a timely basis, he also supplies the plants with organic manure, Jeevamrutham and neem cake for additional nutrition. Interestingly, Mr. Varghese also tried out integrating chilies and tomato in the same tower at different levels, successfully. He reflects that the good harvest of all the crops and the individual yields were not affected.

The PVC pipe structure system: A common structure of vertical gardening used by Mr. Varghese for growing crops like carrots, fennel, chilies, etc. is through the use of PVC pipes. A PVC pipe of 6 inch diameter is utilized for cultivation, cuts are made at appropriate spacing for sowing or planting. Cuts are pushed back or holes are made through a heated iron rod for making space for sowing or planting. Around 16 to 20 plants can be accommodated in the system. Extra support is provided through pipes as the plants grow in size. A central pipe (with multiple small outlets) is attached in the structure for irrigation either manually or through drip irrigation.

Mr. Verghese has been working on the PVC and GI system of vertical gardening for a while now. With the support of a welder, he recycles old PVC pipes and GI net as and when necessary. Based on the need, he also purchases new PVC pipes or GI net to construct the vertical gardening structure.

A praiseworthy point in all these systems is that the filling inside the structures can be reused for planting again by mixing it with vermi compost. The enriched filling can also be filled in *grow bags* and further crops can be cultivated. Thus, Mr. Varghese is efficiently operationalizing the principle of *"Reduce Reuse Recycle"* on his farm.

Wide varieties of vegetables grown in vertically stacked layers

Bio-inputs Preparation and future plans: Apart from these vertical gardening structures, Mr. Varghese is continuously thriving towards innovation and integration at his farm. He also prepares bio fertilizers and nutrient amendments like Jeevamrutham, Beejamrutham, Fish Amino, etc. He is planning to set up a nursery near his house to sell seedlings at a remunerative price where he plans to sell vegetable surpluses, harvested from his vertical gardening structures. The nursery shed is already constructed and will be ready to go into business in the coming months. In the coming year, along with his family, Mr. Varghese plans to open his own nursery to provide various vegetable seedlings and planting material at a cheaper price to the farmers.

Sharing with others: He is part of various farmer groups and Whats App groups where he shares his knowledge and wisdom. He also serves as a resource person for training activity. With the help of his son, he has also started his own YouTube channel (https://www.youtube.com/c/VARGHESEPULPALLY (https://www.youtube.com/c/VARGHESEPULPALLY)) where he showcases details of his innovative practices in vegetable gardening. He told that he was not able to share his knowledge efficiently with everyone through calls and Whats App and that led him to make his own YouTube channel. Even at this age, Mr. Varghese is very passionate about farming and keenly learning new techniques serving as a big inspiration for fellow farmers and youth. He acknowledges the various media platforms that helped him being recognized, gain recognition and thrives to upscale his innovations and share with fellow farmers. He has many ideas to upscale his innovation but on account of fund constraints, he is unable to refine further his gardening system. He strongly believes that this vertical gardening system when up scaled can be a cost effective model for city dwellers.

Innovative method to cultivate Tapioca

Apart from the general vertical gardening, Mr. Varghese has developed an innovative method to cultivate tapioca which allows him to harvest good quality tapioca with high productivity. His creative method gives tapioca tubers from three areas from a single plant. In this method, two additional soil layers are created apart from the ground root zone by placing grow bags on the layers and the main stem is allowed to pass through both the layers. In advance, small incisions are made on the stem part in contact with the soil in grow bags to facilitate rooting and tuber formation. Mr. Varghese proudly affirms that he gets good shaped tapioca tubers worth 25 kg from a single plant at three zones through this method.

He is also innovatively cultivating vanilla in shade net and mint in plastic bottles.

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AME Foundation

AME Foundation is a resource organization, motivated by a deep-going concern for improving the farm livelihoods in fragile ecosystems.

Twenty five years ago, in 1982, AME was set up in The Netherlands, in response to worldwide concerns regarding environmental degradation, in the wake of the Green Revolution. It migrated to Pondicherry, India, in 1986, intensifying its hands-on training in sustainable agriculture. With a growing realization of the importance of rehabilitating the resource poor farmers in fragile dry farming situations, it moved on to the Deccan Plateau, based in Bangalore, in 1994. AME was transformed into a charitable Indian Trust, as AME Foundation, in 2001.

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