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Sustainability of Urban Vegetable Gardening in Tamil Nadu, India

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Urban vegetable gardens are being developed in many places in India and abroad. A lot of passionate urban dwellers are taking up such initiatives in their own households. A study was conducted on sustainability of Urban vegetable gardening in Tamil Nadu, India with the objective to study the nature of urban vegetable gardening and to develop strategy for sustainability of urban vegetable gardening.

The beneficiaries of vegetable kit distribution programme and other vegetable gardeners were purposively selected. A total of 120 respondents was selected randomly. It was found that about 50 percent of the respondents were house wives and nearly 50 percent had garden in their terrace. Nearly 52 percent of the respondents took up gardening to avoid chemicals while 48 percent took it up as hobby. 100 percent took gardening only for household consumption, none of them had any commercial outlook on the products. Recycled products were utilized by majority of the people (58%), almost equal proportion of respondents purchased material from JDAs office, Shops, online.

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About 48 percent used coir pith while the remaining used soil as the medium for growth. Homemade composting and vermicompost were used by majority of the respondents to a tune of 1-5 kg per month.
The potager scheme was very well taken by the urban dwellers in Coimbatore but it was discontinued after a year. However, it has caused a lot of awareness among them and their requirements are fulfilled by online sellers. Sustained and profitable terrace gardening requires scientific and precise calculations on inputs and time of use. Planned development in urban and peri urban areas by institutional interventions will lead to sustained and feasible projects which will contribute to the green cover and contribute to the food requirement of the urban areas.

Keywords: Urban gardening; roof top gardening; sustainability.

1. INTRODUCTION

Global food production faces great challenges in the future. With a future world population of 9.6 billion by 2050, rising urbanization, decreasing arable land, and weather extremes due to climate change, global agriculture is under pressure [1]. Urban agriculture, as a way for production of food and other goods within the cities, nowadays is an upcoming phenomenon in the urban landscape design [2]. The standard per capita requirement of vegetables for adults is 300 g/day. But as per our current production levels, 130 g/day alone can be supplied [3]. However it is reported that there is 74% low Fruits and vegetable consumption amongst adults in India [4]. The population of Coimbatore is 34 lakhs and the district has a total Geographical area of 367097 Ha with net cultivated area of about 165260Ha The urban population in the district is 75.7%, the third highest among the district in the State[5]. The urban population is 25 Lakhs in Coimbatore.

The demand for vegetables for the urban population is 750000 Kg(25 lakhs *300 gm). Urbanization in the next few decades will primarily be a problem in developing countries [6]. Now the demand is for revelation, to make the city “Green” utilising the space on the terrace and common open space. Keeping this revelation, a number of urban dwellers have started taking up vegetable gardening as an option specially to grow it organically. Safe production of vegetables without using chemicals is gaining momentum worldwide. This is owing to increasing health awareness and concern on adverse effects of indiscriminate use of chemical fertilizers and pesticides on food quality, soil health, human health and environment. Safe and non-chemical vegetables can be produced by small farmers too. This could be at the household level as kitchen gardens or homestead gardens or could be at a commercial level resulting in certified organic produce. Besides being a significant part of peri urban agriculture, vegetable cultivation has moved to urban areas and onto the rooftops [7].

The state government of Tamil Nadu started a special programme called Potager or distribution of Roof top gardening Kit in urban areas in 2017-18. The key points of this programme are given below:

1. Motivating the urban dwellers to grow their own vegetables on the roof top or common open space at every household in all district’s.
2. Self-sustained vegetable production throughout the year.
3. Provide nutritional security through fresh green vegetables and provide a tangible security to vegetable production.
4. Mitigate the environmental impacts in cities by conserving energy and water, improving air and water quality.
5. Dissemination of technology to peoples.
6. Eco-friendly technology to combat the pollution through automobiles & dust.
7. Women empowerment by making them economically self sufficient

Benefit of the Scheme:

1. The passion for gardening and nurturing plants has gained momentum in Tamil Nadu harnessing the interest of the people.
2. Escalation in per capita consumption of vegetables
3. Self-sustained vegetable production for every household
4. Invigorating the environment.
5. Market Intervention
6. Nutritional security through production of fresh green vegetables on their own.
7. Training the public to farm-at-home is financially rewarding to the soaring vegetable prices today.

Highlight of the Scheme:

1. Light weight growing medium.
2. Light weight containers.
3. Hybrid seedlings.
4. Water soluble fertilizer.
5. Bio pesticides and fungicides.

Total Cost of the kit: Rs. 522.10/kit

In Coimbatore district the project was implemented in 2017-18 and completed by March 2019. The demand for the kits was high and there was a mismatch between supply and demand of the kits and later the scheme was discontinued.

Apart from the kits distributed by the state department, individuals establish gardens by purchasing materials from nurseries and also other private service providers and self designed gardens.

The study was conducted to study the nature of urban vegetable gardening and to develop strategy for sustainability of urban vegetable gardening

2. METHODOLOGY

The study was conducted in Coimbatore district. The Potager scheme was first implemented in Chennai and later spread to other districts. Coimbatore was selected as it was the recently introduced district and the ease of data collection. A total of 20955 kits have been distributed in Coimbatore district. Data was collected by interview schedule. The beneficiaries of vegetable kit distribution programme and other vegetable gardeners were purposively selected. A total of 120 respondents was selected randomly. Data was analysed using percentage analysis and ranking.

3. RESULTS AND DISCUSSION

The beneficiary list from Periyanaikenpalayam block has been collected as this was the block which had maximum takers. A number of you tube channels and facebook groups have been identified and beneficiaries were selected from these groups too as was suggested by DDH since the beneficiary list included people who purchased in Coimbatore and transferred the kits to other places outside Coimbatore too.

Some of the major findings are given below 50 percent of the respondents were house wives while 50 were doing business. Nearly 50 percent had garden in their terrace while 25 percent had in open area around the house, the remaining in balcony area.

Nearly 52 percent of the respondents took up gardening to avoid chemicals while 48 percent took it up as hobby. 35 percent of the respondents had utilized more than one cent for gardening, 25 percent had 15 to 20 pots.

List 1. Subsidy Cost of the kit: Rs. 200/kit

S/No	Kit items	Rates (Rs)
1	Seeds	69.40
2	Azospirillum (200g)	3.65
3	Phosphobacteria (200g)	3.65
4	Trichoderma viridi (100g)	6.00
5	Pseudomonas fluorescens (100g)	6.00
6	Azadiractin (100ml)	22.00
7	Polythene cover with compressed coco pith 2Kg bricks - 6 bags per kit	329.40
8	18:18:18 (urea , super phosphate with SOP) 1Kg	74.00
9	Technical Know How folder 1No	8.00
	Total Cost	522.10

Table 1. Location of farm

S. No	Location of the farm	Percentage
a.	Roof top	50
b.	Household surrounding	25
c.	Balcony	25

Table 2. Purpose / Motive for starting gardening

S. No	Purpose of gardening	Percentage
1	Household consumption	100
2	Distribute to friends	Nil
3.	Sale	Nil

Recycled products were utilized by majority of the people(58%), 22 percent utilized grow bags while the rest made use of pots and open ground. Almost equal proportion of respondents purchased material from JDAs office, Shops, online. Almost 50% had purchased the kit from JDAs office last year. About 48 percent used coir pith while the remaining used soil as the medium for growth. Home made composting and vermicompost were used by majority of the respondents. Home made composting was made of vegetable waste to a tune of 1-5 kg per month. Among the vegetables cultivated are tomato, brinjal and gourds were grown in that order of preference; among the green sirukeerai; among fruits guava and papaya. Seeds/seedlings were purchased from government sources, nurseries and friends in order. All of them used home made pesticides. 75 percent used ground water and 25 percent used municipality water. Majority of them watered alternate days and it was done by women in the house. The maximum production included Brinjal – 12Kg, Beans – 10Kg, Tomato – 8Kg, Radish - 3Kg, Green Chilli - 3Kg in one season, however records of farming activities such as yield were not kept.

More than 50 percent sought online support for information. The average amount spent on vegetables ranged from 1000 to Rs.3000/- while the savings was not visible, a maximum of Rs 5000 has been spent on structures

The respondents needed more nurseries in the neighbourhood and access to raw materials like coirpith and seeds and also information on pesticides for garden level.

One case of terrace garden is explained for further understanding. Mr. Murali's terrace garden at Thoppampatti. Coimbatore, Tamil Nadu. He started farming in the year 2015. At present he is having more than 25 varieties of plants which includes vegetables, medicinal plants, flower crops. He installed automatic drip irrigation system which can be operated using smartphones. Inference: This would be a boon to urban residents. This is a useful technology for people who opt for a healthy lifestyle. On the other hand, it has been said that gardening reduces the stress of many people which ultimately helps in improving the body health. He explained that it is essential to monitor the plants regularly to avoid the incidence of pest and diseases. The polybags are placed in a wooden plank that is lifted above the ground to avoid the wetness spreading from ground. Automatic drip irrigation system His terrace garden – 50 percent shade net is used. He also adds vermicompost in each pot mixture along with sand and coirpith

4. CONCLUSION

A few suggested models are described below for the upgradation of terrace gardening in urban areas:

- Video modules and models of good practices, information and approaches are to be shot and drawn respectively. These videos and modules uploaded under a common domain of Urban Farming, either by Urban Farming Divisions or Department of Horticulture would be useful. Moreover, an exclusive website, Facebook page, YouTube channel may be created to host all materials so as to make urban farming more viable and practically applicable in the coming days
- Establishment of nurseries for vegetable and planting materials and composts in periurban areas using Self Help Groups / MGNREGA workers funded by DRDA. Establishment of stall in Uzhavar sandhais and horticulture dept by urban SHGs. Networking the SHGs for online sales of products.
- The university may prepare of package of practices as per number of family members eg. Two or three packages for a family of four which includes vegetables of their interest, greens and curry leaves.
- Student may be encouraged in forming business in the areas of urban gardening including many other services like follow up, fertilizer application. coir pith, installing shade nets, etc.

It may be encouraged to develop vegetable gardens in the common areas/ public areas like walking space. Green areas in apartments and colonies by communities with the help of alumni entrepreneurs. Community gardens' promise to stimulate social cohesion in inner-city neighbourhoods, to be seen in the light of the 'participatory society [8]. Multiple social benefits

of home gardens include enhancing food and nutritional security in many socio-economic and political situations, improving family health and human capacity, empowering women, promoting social justice and equity, and preserving indigenous knowledge and culture [9] [Urban gardening including roof top gardening has aroused as a passion amongst the urban dwellers and it is evoked by the call for organic foods and recycling for environmental conservation. The potager scheme was very well taken by the urban dwellers in Coimbatore but it was discontinued after a year. However, it has caused a lot of awareness among them and their requirements are fulfilled by online sellers. Sustained and profitable (not suitable here) terrace gardening requires scientific and precise calculations on inputs and time of use. Urban agriculture may solve issues of feeding urban population [10,11]. Planned development in urban and peri-urban areas by institutional interventions will lead to sustained and feasible projects which will contribute to the green cover and contribute to the food requirement of the urban areas.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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