
Urban Agriculture: Experiences of Practitioners of Rooftop Gardening

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Abstract

A study on urban agriculture was conducted in selected urban areas of Hyderabad City. Fifty respondents who were practicing rooftop gardening were selected for the study. Vegetables, fruits and flowers were the commonly grown plants found in these rooftop gardens. It was found that majority of the practitioners were growing these plants organically and they were able to meet their household requirements to a great extent except during the summer season. However, poor access to technical advice, non availability of services and quality inputs at reasonable price, potential leakages, lack of training and follow-up etc. were the major hindrances found in sustaining the practice.

Keywords: Urban Agriculture, Rooftop Gardening.

Introduction

Globally, it is estimated that the food demand will grow by 70 per cent by 2050 to cater to the needs of 9.3 billion global population (Korth *et al*, 2014). As the natural resource to feed the growing population is going to be difficult task, urban agriculture is seen as a big solution to the problem (Vadlapatla, 2013). Urban agriculture can be defined as growing of plants and raising of animals within and around cities. Researchers believe that urban agriculture will help people in improving their access to food and lead to increased income (Mougeot, 2005). The food is also adequate; being nutritious, safe and produced in an environmentally sustainable manner; is acceptable to the people as it is being produced by them.

In India more than 30 per cent of the population lives in urban areas which is expected to grow further and certainly the demand for food items is going to increase for the people living in the urban areas. As the open space in urban residential areas is shrinking, rooftop gardening is seen as an alternative place to grow food for meeting the household needs. The concept of rooftop gardening

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is gaining importance in all the metro cities of India including Hyderabad. The Department of Horticulture, Government of Andhra Pradesh (undivided state), has implemented a scheme under RKVY to promote urban rooftop gardening in which they provided a kit consisting of seeds, seedlings, silpaulin covers, potting mixture, neem cake, neem oil, implements *etc.* on 50 per cent subsidy (*i.e.* Rs. 3000/=). In addition, social media groups like *Intipanta* on Facebook and Google+ are also actively promoting rooftop gardening by exchanging ideas, seeds, solutions to the problems, *etc.* of the practitioners.

Therefore, the present study was conducted in Hyderabad city to know the existing status of urban agriculture covering rooftop gardens of the residences with the following objectives:

Objectives

- i. To understand the profile of the practitioners of rooftop gardening
- ii. To know the perceptions of the practitioners about rooftop gardening
- iii. To document the experiences and constraints faced by the practitioners of rooftop gardening
- iv. To suggest measures for sustaining and upscaling urban agriculture.

Methodology

Roof top gardening as a concept and practice is gaining popularity slowly in the metropolitan cities. The Horticulture Department of Andhra Pradesh (combined state of Andhra Pradesh and Telangana) distributed gardening kits to the city dwellers during 2013-15 under urban farming.

A list of 200 active rooftop practitioners was obtained from the Horticulture Department. They were provided with gardening kits, out of which 50 practitioners were selected randomly for data collection. These 50 practitioners of rooftop gardening were scattered in nine colonies of Hyderabad city namely Vanasthalipuram, Kalyannagar, Dilsuknagar, Uppal, Tarnaka, HMT Nagar, Khairatabad, Mehdipatnam and Attapur.

All the respondents of the study were having rooftop gardens. However, during the field study the researchers have come across some respondents having independent houses with rooftop gardens along with a small kitchen garden in their backyard.

The respondents were interviewed personally using a semi structured interview schedule and the data was analyzed using simple frequency and percentages.

Results and Discussions

Socio-economic profile of the practitioners

It is observed from Table 1 that majority (56%) of the rooftop gardening practitioners were below 45 years of age. Women (54%) were more involved in setting up the rooftop gardens and more than 80 per cent of the respondents were graduates. Almost all the families were nuclear and 64 per cent of the sample families have less than five members.

Table 1. Profile of the practitioners of rooftop gardening

S. No.	Parameter	Per cent
1	Age	
	45 and above	22 (44.0)
	Below 45	28 (56.0)
2	Sex	
	Male	23 (46.0)
	Female	27 (54.0)
3	Education	
	Graduation and above	41 (82.0)
	Intermediate	09 (18.0)
4	Family size	
	5 and above	18 (36.0)
	Less than 5	32 (64.0)
5	Occupation	
	Govt. Job (including retired people)	09 (18.0)
	Private job (including retired people)	27 (54.0)
	Business/entrepreneurs	14 (28.0)
6	Earning members in the family	
	One	20 (40.0)
	More than one	30 (60.0)
7	Residence	
	Own house	43 (86.0)
	Rented house	07 (14.0)

Figures in parenthesis are percentages.

The economic profile of the respondents families shows that more than half (54%) were engaged in private jobs followed by business (28%) and government jobs (18%). It was also noticed that 60 per cent of the respondent families have more than one earning member and majority of the respondents (86%) are residing in their own houses. Probably having own houses is one of the success factors for establishing and continuing with the rooftop gardens.

General information of the rooftop garden practitioners

It was found that 90 per cent of the respondents have roof top gardens, many of which were situated on second and third floors of the building. In addition to the roof top gardens of 50 respondents, 74 per cent of them also have a garden in their front or backyard where they have planted fruits, ornamental, flowers, *etc.* for shade or to provide an aesthetic look to their homes. Respondents have also utilized their balconies and stair cases (34%) for growing ornamental plants.

Containers used: Plastic bags and cement pots were commonly used as containers for planting (88%). Thirty six per cent of the respondents have constructed beds on their rooftops for growing the plants. However, some respondents (16%) have used broken buckets, decorative containers, different types of clay pots *etc.* as containers for planting.

Table 2. General information of the practitioners of roof top gardening

1	Place for gardening	Percentage
	Terrace	45 (90.0)
	On ground	37 (74.0)
	Balcony/Staircase	17 (34.0)
2	Material used for gardening	
	Polybags/plastic containers/ Cement pot	44 (88.0)
	Constructed beds	18 (36.0)
	Used material, clay pots, etc	08 (16.0)
3	Motivation for gardening	
	Personal motivation (agricultural family/ interest/hobby)	42 (84.0)
	Print and electronic media(newspaper, <i>Intipanta</i> , etc)	28 (56.0)
	Any other (exhibitions/ friends & relatives/ govt. scheme, etc)	12 (24.0)
4	Experience in gardening	
	Less than 3 years	28 (56.0)
	3-5 years	15 (30.0)
	5 years and above	07 (14.0)
5	Average time spent in gardening (per day)	
	Less than 2 hours	38 (76.0)
	2 - 4 hours	12 (24.0)
6	Availed subsidy from Horticulture Department	35 (70.0)

1 – 3 are multiple responses, Figures in parenthesis are percentages.

Majority of the respondents (80%) were found personally motivated for gardening as they were all from agricultural families. More than half (56%) of the respondents informed that the Print (the special articles on roof top garden in different local newspapers) and electronic media (different TV channels) have played a major role in creating awareness about the importance and benefits of rooftop gardens in urban areas. In addition, a significant number (24%) of the respondents also got motivated after visiting horticulture exhibitions.

More than half of the respondents (56.0%) have informed that they have an experience of less than 3 years in rooftop gardening, whereas, 30 per cent of them fall in the category of 3-5 years of experience and only 14 per cent respondents were having experience of 5 years in roof top gardening. According to the respondents these gardens require continuous attention. More than two-third's of the respondents (76%) spend two hours a day for watering and maintenance of the garden. It was also found that 70 per cent of the respondents have availed the urban farming kits on subsidy from the Horticulture Department and some of them have started their rooftop gardens using these kits.

Table 3. Perceptions about the rooftop garden

S. No.	Perception	Frequency	Percentage
1	Received appreciation of people	48	96
2	Others got motivated and started roof top gardens	35	70
3	Children showed interest in gardening	24	48
4	Visitors were skeptical about rooftop gardening	17	34

It was found that majority (96%) of the family members of the respondents appreciated their effort in establishing and maintenance of rooftop gardens. Though, initially they were not in favour, but when they saw the plants flowering and bearing fruits, family members have also started taking interest in gardening. It was also observed that, among the family members, the person who established the rooftop garden was mainly taking care of its maintenance, sometimes with the help of servants or wage labourers. Further, families with school going children have shown interest in taking care of plants and helped their family in gardening (48%).

Seventy per cent of the respondents reported that others got motivated by seeing their gardens and started gardening on their roof tops. Thirty-four per cent of the respondents reported that visitors were skeptical about rooftop gardening and used to raise different queries regarding the weight on roof, clogging of the drains by

plant waste and mud, water scarcity, water leakages, difficulty in lifting the inputs to the rooftop *etc.*

The respondents (practitioners of rooftop garden) were growing different varieties of vegetables, flowers, fruits, medicinal and ornamental plants. Table 4 shows the percentage of yearly household needs met from the produce they got from rooftop gardens. Green leafy vegetables were the commonly grown varieties and among them spinach, fenugreek, coriander, mint, *etc.*, was grown by many of the practitioners. It was found that 70 per cent of the households, growing green leafy vegetables were able to meet 70 per cent of their requirement of green leaves. They felt that growing green leafy vegetables is easy, throughout the year, when compared to the other vegetables.

Table 4. Percentage of household needs met through rooftop/backyard gardening

S. No.	Cultivated items	Average household need met (yearly)	Per cent	
1	Green Leafy Vegetables	70 % and above	70	
		Less than 70 %	30	
2	Seasonal Vegetables			
		• Tomato, Brinjal, Gourds <i>etc.</i>	50-70 %	74
			Less than 50 %	26
		• Cabbage, Cauliflower, Capsicum, Ladyfinger <i>etc.</i>	30- 40 %	24
		Less than 30 %	76	
3	Flowers	70 -80%	54	
4	Others (fruits, medicinal plants <i>etc.</i>)	30-40 %	48	

Seasonal vegetables like tomatoes, cherry tomatoes, brinjal, bitter gourd, bottle gourd, chillies, drumsticks, *etc.* were the other vegetables which were found grown in the respondent's rooftop gardens. These vegetables were slightly affected by pest and diseases. As these are seasonal vegetables, 74 per cent of the households were able to meet 50-70 per cent of their needs. It was also reported by the respondents that during the season they have plenty of vegetables, in case they were not affected by the pest and many a times they distributed these vegetables to their neighbours and relatives and preserved the excess vegetables after drying.

Some vegetables namely cabbage, cauliflower, capsicum *etc.* are more susceptible to pest attack and many respondents expressed the difficulty in controlling the pest and diseases. Thus, only 24 per cent of the households were able to meet 30-40 per cent of their needs. Flowers grown by the practitioners were mostly

used for worshipping and aesthetics. As they were easy to grow in comparison to vegetables, more than 50 per cent of the households were able to meet 70-80 per cent of household needs of the flowers.

Table 5. Perceived benefits of the rooftop gardens by the respondents

S. No.	Benefits	Frequency (%)
1	Availability of fresh vegetables and fruits	50 (100.0)
2	Free from chemicals	45 (90.0)
3	Used leisure time and served as physical exercise	43 (86.0)
4	Others (aesthetics, education to children, cooling effect, <i>etc.</i>)	38 (76.0)

Urbanites are dependent on the fruits and vegetables available in nearby markets, which are perceived to be produced through unsafe practices and consist of high level of pesticide residues. Therefore, it is evident from Table 5 that majority of the respondents (90%) have started their rooftop/backyard gardens using organic inputs and they do not use any chemicals. The respondents felt that the organic fruits and vegetables grown by them are good in taste, have long shelf life, are more nutritious and healthy than the vegetables available in the markets.

Apart from the above, 86 per cent of the respondents said that they have utilized their leisure time fruitfully by engaging themselves in gardening which has served as physical exercise too. The other benefits perceived by the respondents are that rooftop gardens provide an aesthetic look, cooling effect in summer, helped in educating the children about plants, gained recognition in the society *etc.*

Table 6. Constraints experienced in maintaining rooftop gardens

S. No.	Constraints	Per cent
1	Pest and disease attack	84
2	Limited water, light, space and time	76
3	Harsh summer	74
4	Menace of monkeys, rodents, birds, <i>etc.</i>	66
5	Demands regular attention	88
6	Non availability of quality inputs in small quantities, in nearby places	68
7	Lack of technical support at door step	56
8	Others (Ill health, aged, lack of helping hands <i>etc.</i>)	60

Setting up of rooftop gardens was not easy for all the respondents and the constraints reported by them are presented in Table 6. Majority of the respondents (88%) said that the garden requires regular attention which limits their movements

and restricts them from leaving the house locked. Pest and disease was the second most common constraint faced, as most of the respondents have insufficient knowledge about growing plants on rooftop and this problem has become more severe due to less access to technical knowledge and services. Water scarcity, poor lighting, less space and less time are the other constraints expressed by 76 per cent of the respondents. Moreover, nearly two thirds of the respondents expressed the problem of harsh weather during the peak summer which refrains them from continuing their roof top gardens. However, to overcome this problem some of the respondents have used shade nets. Further, 68 per cent of the respondents faced problems of non-availability of quality inputs namely seeds, manures, nutrient mix *etc.* in small quantities. Menace of monkeys, rodents, birds *etc.*, lack of technical support, old age and ill health are the other important problems expressed by the respondents in maintaining the rooftop gardens.

Table 7. Sources used for technical advice and procurement of inputs by the respondents

S. No.	Technical advice	Frequency (%)	Procurement of inputs	Frequency (%)
1	Social media (<i>Intipanta</i> , newspaper, Internet, etc.)	46 (92)	Private shops/ Exhibitions	40 (80)
2	Family members	38 (76)	Horticulture department/ State Agricultural University	34 (68)
3	Horticulture Department	32 (64)	Own production of seeds/exchanging seeds	31 (62)
4	Non-governmental organizations	14 (28)	Nurseries	28 (56.0)
			From village	21 (42)

As most of the respondents have limited knowledge about growing plants they were dependent upon social media for technical information. It was found that 92 per cent of the respondents use social media like *Intipanta* group on Facebook, Google+ where they used to post photographs of the plants affected with pest and used to get the advice from the members in the group. The other sources were newspaper articles, Internet, *etc.* for getting information related to source of seeds, sharing seed among the groups, manure preparation, pest and disease control *etc.* (Table 7).

It was also noticed that in some areas colony associations, NGOs, media have organized orientation sessions on rooftop gardening. However, 76 per cent use

their own experience for maintaining the garden. Those respondents who availed the urban farming kit from horticulture department, took technical advice from the departmental officers (64%).

Majority of the respondents reported that they procured plastic bags, pots, seeds, garden tools, *etc.* from private shops and exhibitions organized in the city. Almost 70 per cent of the respondents procure seeds, manure and compost from horticulture department and SAU. However, 62 per cent produce their own seeds or exchange them with others who are connected through social media like *Intipanta* group. More than 50 per cent of the respondents purchased the plants / seedlings from nurseries and 42 per cent bought seeds from their native villages.

Suggestions for sustaining and upscaling rooftop gardens

Suggestions offered by respondents of the study, officials and the experts on urban agriculture for promoting and upscaling rooftop gardening are:

- i. Quality inputs in small quantities should also be made available at one stop shops (malls, gardens, *etc.*) for the convenience of the practitioners.
- ii. Getting manure in a required quantify is a problem for the practitioners and thus training on compost making from household waste needs attention as it will also help in converting urban waste into organic manure.
- iii. Practitioners faced water scarcity for continuing their gardens thus, training on efficient use and reuse of water is found necessary. For example, use of drip, mulch, *etc.*
- iv. Majority of the respondents were interested in organic cultivation. Therefore, it is suggested to provide training on organic cultivation to the residents of colonies in cities.
- v. During the field survey it was observed that few practitioners have constructed the beds in an incorrect manner and placed the grow bags in a haphazard manner without keeping in mind weight and other related issues. In view of this, it is suggested that there should be proper training covering both technical and maintenance related aspects of rooftop gardening to sustain the practice.
- vi. Customized events such as demonstrations, trainings, workshops, seminars on urban agriculture may be organized as per the level of knowledge and experience of the practitioners.

Promoting urban agriculture

- i. Department of Horticulture and Agriculture should train their extension functionaries on urban agriculture to create awareness and provide technical support to the practitioners of urban agriculture.
- ii. Special schemes on urban agriculture should be promoted in all the states taking the experiences from the cities like Bengaluru, Hyderabad, Thiruvananthapuram, etc.
- iii. Demonstrations of different urban agriculture models including vertical gardening, hydroponics, etc. should be organized at educational institutes, offices, community gardens, shopping malls etc. for creating awareness and to motivate people.
- iv. Regular and periodic trainings and follow-up workshops on cultivation practices should be organized in various colonies for clarifying doubts and providing up to date information, and in the long run to sustain the practice of urban agriculture.
- v. Awareness should be created regarding food and nutritional security among the urban people where emphasis should be given on the composition and varieties to be included in kitchen garden, better cooking methods, good eating practices etc.
- vi. Publishing the success stories of the practitioners of urban agriculture and also rewarding them by giving Certificate of appreciation.
- vii. Government should consider giving rebate in property tax for the urban agriculture practitioners.
- viii. Upscaling
- ix. Develop dedicated phone lines, user friendly learning material, special website etc. for providing information to practitioners.

Conclusion

In recent years, urban agriculture has gained importance and is seen as one of the options to get fresh food locally. Growing vegetables and fruits in each house, on the roof tops, backyards, balconies *etc.*, will certainly help in providing safe and healthy food to the urban population. Similarly, in Hyderabad the concept of urban agriculture in the form of rooftop/backyard gardens has started three years ago, resulting in meeting the household needs of the urbanites, to some extent.

However, poor access to technical advice, services and quality inputs at reasonable price, technical advice for rooftop gardening related to load bearing capacity of roof, potential leakages, lack of training and follow-up *etc.* are the major hindrances in sustaining the practice. Therefore, to strengthen the urban agriculture practices, these constraints are required to be addressed. Media can play a greater role in popularizing this concept.

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