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BA Reddy Prasad

MBA (ABM) Scholar,
Department of Agricultural
Marketing, Cooperation and
Business Management,
University of Agricultural
Sciences, GKVK, Bengaluru,
India

KH Nagaraj

Editor, Communication Centre,
UAS, GKVK, Bengaluru, India

Terrace gardening in Bengaluru: An analysis

BA Reddy Prasad and KH Nagaraj

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Abstract

The study was conducted in Bengaluru city of Karnataka, India to examine, explore and analyze the various dimensions of terrace gardening including the constraints faced by the terrace gardeners. The primary data was collected from 60 terrace garden practitioners of Bengaluru by personal interview method through a pre-tested interview schedule. The stakeholder mapping showed that all the stakeholders were passionate terrace gardeners and some of them were input agents and consultants. To grow and consume fruits and vegetables as a means of nutritional security was the first preference for the majority of the respondents for adopting terrace gardening and practitioners had devoted 85.7 per cent of their terrace space for terrace gardening activity. Majority of the respondents (66.67 per cent) gained information from the terrace garden enthusiasts by meeting them regularly on monthly basis. The major constraints expressed by the terrace gardeners were pest & disease infestation followed by non-insect pests such as rodents, monkeys and cats. There is a need for concerted efforts by the State Department of Horticulture and related Institutions to solve the problems by providing technical consultancy and ensure supply and services to the needy.

Keywords: Terrance gardening, constraints, cost of cultivation, source of information, ornamental and nutritional terrace gardens

Introduction

The pressure on land and its cost in urban areas is a known fact and that there is hardly any space to cultivate a garden. If anyone wants to grow vegetables domestically, there are other avenues now that need to be looked at. A terrace above the house provides an ideal space to fulfill the purpose. Terrace gardening not only provides some space back to agriculture, but also helps the house holder to obtain sustainably, the chemical free fresh vegetables, fruits and flowers.

The first known historical reference to a roof garden above grade is for the stone temples in the region of Mesopotamia (Werthmann, 2007). Civilizations in Mesopotamia built roof gardens thousands of years ago on the landings of Ziggurats, or stepped pyramids. The plantings of trees and shrubs softened the climb, provided shade and relief from the heat (Dunnett and Kingsbury, 2008) [3]. The Hanging Gardens of Babylon built by the Persians around the 500 B.C. (Weiler and Barth, 2009) [8] is the next known successor of the roof gardens. In Russia, under the czarist rule, roof gardens were considered as a luxury by the nobility. Catherine II of Russia (1729-96) commissioned the famous roof garden on the Winter Palace in Saint Petersburg. A terrace garden has many benefits like ecological benefits, water conservation, energy conservation, decorative enhancement and attraction to birds and insects. Terrace gardens also contribute towards the health betterment of the occupants of the building. There are many people who are passionate of gardening but often are disappointed, as they may not be fortunate enough to have open spaces for the same.

Terrace gardens give pleasure to city dwellers and provide an opportunity for enhancing creativity as well psychological benefits. In addition, they change the visual appearance of the building, screening from neighbors, conceal unwanted pipeline and unappealing scenery. Bengaluru is experiencing unprecedented urbanization and sprawl in recent times due to concentrated developmental activities with impetus on industrialization for the economic development of the region. Land use patterns reveal the main concentration areas and can provide invaluable inputs for sustainable city planning (Anonymous, 2014) [1]. The Terrace Gardening is emerging as an important business venture under different formats in Bengaluru city due to presence of large number of urban middle and upper class families who thrive to

Corresponding Author:

KH Nagaraj

Editor, Communication Centre,
UAS, GKVK, Bengaluru, India

have a garden on terrace due to space constraint on the ground. So far very few systematic efforts have been made to document different types of terrace gardens, their maintenance and cost of cultivation. Keeping these issues in mind, the present study is undertaken with an attempt to examine, explore and analyze various dimensions of terrace gardeners including establishment and maintenance costs in Bengaluru city.

Materials and Methods

Bengaluru in India is the principal administrative, cultural, commercial, industrial, and knowledge capital of the State of Karnataka in India. The Bruhat Bengaluru Mahanagara Palike (BBMP) is the agency responsible for the governance of the Greater Bengaluru Metropolitan area. Within the city boundary, 198 administrative sub-divisions or wards are established. Greater Bengaluru with an area of 741 sq. km has agglomerated the defense and biotechnology based industries (Nagendra *et al.*, 2012) [5]. In addition, numerous services, trade and banking activities mark the city's economic landscape.

Bengaluru is purposefully selected for the study to document the terrace gardening practices prevailing in the city. On one hand, it has rich history of greenness and on the other hand, technologically intensive industries and fast growing real estate properties are declining the green cover of the city. The citizens of Bengaluru are in between striving to bring back the green cover on the available spaces such as terrace. Other factors to consider Bengaluru as the study area is the availability of terrace gardens to document, large number of terrace garden practitioners, Organic Terrace Garden groups (OTGs) and Non-Profit organizations such as Garden City Farmers (GCF). The study particularly confines to Bengaluru urban as most practitioners are found to reside here.

The primary data was collected from 60 terrace garden practitioners of Bengaluru who constituted the main respondents of the study through a pre-tested interview schedule developed for the study. The list of terrace gardeners was obtained from Garden City Farmers (GCF) organization and the respondents were selected randomly. Respondents for the study included passionate terrace gardeners, terrace garden consultants and input agencies. The information collected from terrace gardeners were tabulated and analyzed using descriptive statistical tools. Garrett's ranking technique was used to analyze the constraints in terrace gardening and to rank the purposes of adopting terrace gardening. The order of the merit given by the respondents was changed into ranks using the following formula.

$$\text{Per cent Position} = \frac{100 (R_{ij} - 0.5)}{N_j}$$

Where R_{ij} = Rank given for i^{th} item by j^{th} individual

N_j = Number of items ranked by j^{th} individual

The per cent position of each rank was converted to score by referring to tables given by Garret and Woodworth (1969) [4]. Then for each factor, the score of individual respondents were summed up and divided by the total number of respondents for whom scores for all the factors were ranked, following the decision criterion that higher the value the more important is the constraint for adopting terrace garden.

Results and Discussion

A cursory look at the Table 1 reveals that the terrace gardening practitioners had devoted 85.7 per cent of their terrace space for terrace gardening activity. Out of it, 28.33 per cent of the practitioners had dedicated 400-600 square feet of terrace space for gardening followed by 18.33 per cent of the practitioners who had dedicated 600 to 800 square feet, while 15 per cent practitioners had dedicated 800 to 1000 square feet space for terrace gardening. The possible reason for this type of area dedication for terrace gardening depends on the area available for the said purpose, passion and also the purpose for which it is cultivated apart from the factor of ownership of the building.

The purpose of adopting terrace gardens based on the ranking given by the practitioners is stated in the Table 2. To grow and consume fruits and vegetables as a means of nutritional security was the first preference of the majority of the respondents for adopting terrace gardens, followed by; to have attractive, beautiful and aesthetic ambience; as a hobby to enjoy during leisure time; to reap health benefits; to have clean air & contribute to the society and to conduct workshops & events which were ranked accordingly. Only few practitioners adopted terrace gardening as a means of additional income to family which was ranked least. The purpose of adopting terrace garden differed among the respondents based on their requirement, level of education, available space and their passion for terrace gardening.

The stakeholder mapping (Pramodita Sharma, 2013) [6] showed that all the stakeholders were passionate terrace gardeners. Some of them were also input agents and consultants. All terrace gardeners may not be experts in cultivation of crops. Even though many practitioners had lot of experience, they were enthusiastic in gaining and sharing the knowledge about terrace gardening and also to promote the same. Sources of getting information by the terrace gardeners for terrace garden maintenance are listed in Table 3. It was found that all (cent percent) the practitioners followed social media such as WhatsApp, Facebook, YouTube etc., regularly as a source of obtaining information regarding terrace gardening activities. Terrace gardeners have formed terrace garden groups in WhatsApp and Facebook based on the region they reside. They do share the knowledge and clear their doubts about terrace gardening activities as and when required.

The data revealed that the terrace garden enthusiasts play a vital role in providing information to others as 66.67 per cent of the respondents gained information from the terrace garden enthusiasts by meeting them regularly on monthly basis. Terrace garden groups are conducting monthly meets during which they motivate and guide other practitioners about good terrace gardening practices. It is found that 60 per cent of the respondents asked solutions from the consultants for their terrace garden maintenance. Further, nearly 42 per cent of the respondents obtained information through e-commerce websites that are maintained by terrace gardening companies to promote their business. The data depicted that only few of the practitioners obtain information from Agricultural and Horticulture Colleges. This might be due to the reason that the Institutions are located away from their localities and in some cases they might not be aware of their existence. The contribution of Television, newspaper and magazines were also meager in providing information regarding terrace gardening.

It is observed that all the terrace gardens were customized. There was no particular standard cost of installation and maintenance of terrace gardens on any basis like per square feet area or per pot. Therefore an attempt was made by generalizing the cost of installation and maintenance of terrace garden based on "per pot" as well as "per square feet" area by collecting the data from the terrace garden installation and maintenance companies. All these costs are basic which may vary according to the choices and preferences of those willing to adopt terrace gardens. Terrace gardens of the practitioners were majorly classified into nutritional and ornamental, wherein in both the cases, people spent money on installation and maintenance. Both the categories had common spending on pots, compost, filler material, plant material, staking and irrigation equipment.

Nutritional garden has exceptional spending on seeds, fertilizers and pesticides for maintenance of vegetables and fruit plants. Similarly, ornamental garden has exceptional spending on plants/seedlings. Ornamental gardens usually consist of aesthetic plants which are costlier than nutritional plants. In nutritional garden, on an average, the cost of each pot with all other gardening components was around Rs.181 for less than 500 Sq. ft. exclusive of maintenance cost as depicted in Table 4 and it was almost same for 1500-2000 sq. ft. In ornamental garden on an average the cost of each pot with all other gardening components was around Rs.273.00 for less than 500 Sq. ft. exclusive of maintenance cost as depicted in table 5 and it was Rs.280.00 for 1500-2000 sq. ft. There are some people who would become self-sufficient in gardening and the details are presented in Table 6. They tend

to produce their inputs after certain time of experience in practicing terrace garden, though initial cost is nearer to the other two types mentioned above. In a long run self-sufficient gardeners would not spend money on recurring costs involved in maintenance of their garden. Similar findings were reported by Carter Timorothy and Keeler Andrew (2008).

Practitioners may face many constraints while installing and maintaining terrace gardens. The practitioners ranked the constraints as perceived by them and the details are depicted in Table 7 using Garrett's Ranking technique. Practitioners expressed that they faced severe problem due to insect pest infestation as it was ranked first, followed by disease incidence to plants, non-insect pests such as rodents, monkeys, cats & birds. These constraints were followed by the lack of space available on the terrace for expansion and to grow plants of their choice which was ranked as the fourth most severe constraint followed by lack of knowledge in handling plants. Leaking of the roof due to terrace gardening, lack of time, non-availability of inputs such as compost, organic fertilizers and lack of guidance from the experts are the least faced constraints by the practitioners. It is a misconception that terrace gardening leads to leaking of roof, and that it was noticed that only improper water proofing leads to leaking of the roof and not due to terrace gardening activity. The constraints as perceived by the practitioners were expressed based on the felt need towards terrace gardening and in a way to improve upon the gardening. The results are in conformity with the findings of Tailor Ravi (2012) [7].

Table 1: Area dedicated for terrace gardening by the respondents

(n=60)

Sl. No	Area (sq.ft)	No. of respondents	Per cent
1	Less than 200	1	1.67
2	More than 200 to 400	4	6.67
3	More than 400 to 600	17	28.33
4	More than 600 to 800	11	18.33
5	More than 800 to 1000	9	15.00
6	More than 1000 to 1200	6	10.00
7	More than 1200 to 1400	4	6.67
8	More than 1400 to 1600	3	5.00
9	More than 1600 to 1800	4	6.67
10	More than 1800 to 2000	1	1.67
Total		60	100

Table 2: Purpose of adopting terrace gardens by the terrace gardeners

(n=60)

Sl. No	Purpose	Mean Garrets score	Garrett's rank
1	To grow and consume fruits and vegetables as a means of nutritional security	72.85	I
2	To have attractive, beautiful and aesthetic ambience	64.45	II
3	As an hobby to enjoy during leisure time	63.26	III
4	To reap health benefits	59.14	IV
5	To have clean air and contribute to the society	43.98	V
6	To conduct workshops and events	36.06	VI
7	As a means of additional income to family	26.17	VII

Table 3: Source of information to the terrace gardeners for maintaining terrace gardens

Sl. No	Particulars	Frequency of Contact				No. of respondents	Percentage
		Daily	Fortnightly	Monthly	Once in two months		
1	Consultants	-	2	31	3	36	60.00
2	Input agencies	-	-	7	12	19	31.67
3	Agri/Horti colleges	-	-	-	3	3	0.50
4	Enthusiasts	-	-	40	-	40	66.67
5	T.V, Newspaper, Magazine	2	2	-	-	4	0.60
6	e-commerce website	-	25	-	-	25	41.67
7	Social media	60	-	-	-	60	100.00

(n=60)

Table 4: Cost of installation and maintenance of nutrition terrace gardens

Sl. No	Particulars	Cost (Rs)			
		< 500 (Sq.ft)	500-1000 (Sq.ft)	1000-1500 (Sq.ft)	1500-2000 (Sq.ft)
1	Pots	5062	10491	15010	18763
2	Compost	1667	3333	4990	6238
3	Filler material	303	388	502	628
4	Fertilizer	520	492	409	511
5	Pesticide	321	296	310	388
6	Seedlings/plants	1109	2041	2998	3748
7	Seeds	102	202	280	350
8	Irrigation	221	511	2980	3725
9	Staking	106	493	450	563
10	Maintenance/month	1000	1500	2580	3225
Total		10411	19747	30509	38139
Number of pots required		52	98	156	190
Cost per pot		181.00	186.00	179.00	183.75

(n=60)

Table 5: Cost of installation and maintenance of ornamental terrace gardens

Sl. No	Particulars	Cost (Rs)			
		< 500 (Sq.ft)	500-1000 (Sq.ft)	1000-1500 (Sq.ft)	1500-2000 (Sq.ft)
1	Pots	5010	9018	16909	16909
2	Compost	1667	3001	5626	5626
3	Filler material	301	542	1016	1016
4	Fertilizer	56	101	189	189
5	Pesticide	33	59	111	111
6	Seedlings/plants	5020	9036	16943	16943
7	Seeds	59	106	199	199
8	Irrigation	320	576	1080	1080
9	Staking	107	193	361	361
10	Maintenance/month	500	900	1000	1000
Total		13073	23532	43434	43434
Number of pots required		46	83	122	155
Cost per pot		273.00	272.50	348.00	280.00

(n=60)

Table 6: Cost of installation and maintenance of self-sufficient terrace garden

Sl. No	Particulars	Cost (Rs)			
		< 500 (Sq.ft)	500-1000 (Sq.ft)	1000-1500 (Sq.ft)	1500-2000 (Sq.ft)
1	Pots	5231	6173	14074	19161
2	Compost	1667	1967	2892	3557
3	Filler mat	288	340	500	614
4	Fertilizer	393	464	682	838
5	Pesticide	329	388	571	702
6	Seedlings/plants	994	1173	1724	2121
7	Seeds	98	116	170	209
8	Irrigation	280	1330	5486	10597
9	Staking	113	1033	1906	5241
10	Maintenance/month	0	0	0	0
Total		9393	12984	28005	43040
Number of pots required		47	126	165	217
Cost per pot		200.00	103.00	170.00	198.00

(n=60)

Table 7: Constrains faced by the terrace gardeners in installation and maintenance of terrace gardens

(n=60)

Sl. No	Constraints	Mean Garrett's score	Garrett's rank
1	Insect pest infestation	369.75	I
2	Disease incidence	350.50	II
3	Problem of rodents, monkeys, cats, birds etc...	337.33	III
4	Lack of sufficient space on terrace for expansion	285.67	IV
5	Lack of knowledge in handling plants	279.00	V
6	Irrigation/scarcity of water	248.25	VI
7	Climatic conditions	238.67	VII
8	Lack of co-ordination from other family members	178.00	VIII
9	leakage of roof	176.67	IX
10	Lack of free-time	176.33	X
11	Non-availability of inputs in time	142.83	XI
12	Lack of guidance from the experts	119.50	XII

Conclusion

The study has found out several dimensions of Terrace Gardening including several constraints faced by the terrace gardeners. Therefore the Government should encourage the concerned institutions to promote terrace gardening in Bengaluru city. Efforts should be made by department of Horticulture and related Institutions to solve the problems by providing technical consultancy and ensure supply and services to the needy.

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