



Terrace Gardening: A Sustainable yet Economic Approach

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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

The study emphasizes the importance of terrace gardening in providing fresh, seasonal, and most importantly, chemical-free vegetables for everyday family requirements. It also tackles the problem of odorous, untouchable and unwanted kitchen waste by converting it into valuable organic manure that may be used as a low-cost, environmentally acceptable input for organic terrace gardening. This study was conducted with the ultimate aim to document the socio-economic profile of households practicing terrace gardening and list out the perceived benefits and constraints in adoption of terrace gardening. Ninety sample respondents who were practicing terrace gardening in Hyderabad were chosen for the study. Respondents who were practicing terrace gardening for the past 5 years were selected randomly from the list obtained from Horticulture Training Institute. The results inferred that majority of the respondents perceived that terrace gardening was providing them fresh fruits and vegetables with minimal investment as well as increased emotional

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well-being. Lack of availability suitable land near residential areas is identified as the major constraint and followed by lack of time was reported along with other constraints.

Keywords: Terrace gardening; pandemic; sustainability; urbanization; psychological well-being.

1. INTRODUCTION

Agriculture is the anchor of the global economy as it is the main source of livelihood. Over years, agriculture's contribution in the Indian economy has logically declined to under 15percent, because of the great development phase of the industrial and service sectors. Urbanization all around the World is ineludible condition. By 2050, 2/3rd of the World's projected 9.2 billion population will live in urban areas.

The urban population in India which stands at 377 million is expected to grow by 404 million by 2050 (World Urbanization prospects-2014 Within the state of Telangana, [1] Hyderabad accounts for the largest share of the urban population i.e., 28.9 per cent of state urban population (Telangana Socio-economic Outlook, 2021) [2]. With increasing urbanization, there is an increasing burden on rural agriculture to feed the urban population. People living in urban areas have much less control over the supply and quality of food they consume as compared to their rural counterparts. The growing urbanization of the developing countries is putting immense strain on urban food supplies [3]. Unfortunately, indiscriminate use of chemicals and pesticides, the use of improperly treated waste water for the cultivation of vegetables is a bellyache for urban dwellers. Thus, the practice of growing fruits and vegetables on terrace's has emerged as terrace gardening in urban areas.

Amidst the Covid-19 pandemic, many urbanites being caged in their homes, has taken a toll over their mental health. There is a great need to break the monotony and provide relaxation for the tiring mind. They started incorporating plants into their living spaces and eventually started growing leafy greens and vegetables. The pandemic has exacerbated food insecurity in urban areas due to disruptions in the food supply chain, aggravation of physical and economic barriers to food access, and a catastrophic increase in food waste due to labour shortages [4]. Thereupon, terrace gardening is gaining momentum by increasing the availability of fresh and (chemical) free vegetables and fruits for urbanites with minimal investment.

A Terrace Garden is a garden in which vegetables, fruits, ornamental and medicinal plants are grown on terraces. It reduces the poverty and food insecurity arising from urbanization, at the same time improving the health of urbanites and preserving the environment [5].

There are many benefits of terrace gardens such as the utilization of vacant terraces, provision of fresh fruits and vegetables, recycling of kitchen waste, helping in maintaining ecological diversity by attracting birds and insects, enhanced aesthetic pleasure, helps in moderating micro climate of cities, etc.

Terrace gardens give rustic pleasure to urbanites. It also provides an opportunity for creativity as well as the psychological well-being of city dwellers [6]. All over the world terrace gardens are customary elements of modern cities. Therefore, the present study was undertaken to document the socio-economic profile of urban households practicing terrace gardening and to study the perceived benefits and constraints in adoption of terrace gardens.

2. METHODOLOGY

The study was conducted in Hyderabad GHMC (Greater Hyderabad Municipal Corporation) area. The main objective of the study was to understand the socio-economic profile of respondents practicing terrace gardening and to study the perceived benefits and constraints in adoption of terrace gardening in Hyderabad. Ninety sample respondents who were practicing terrace gardening from the past 5 years are selected randomly, from the list obtained from Horticulture Training Institute (Nampally). Data regarding socio-economic status, the area allocated under terrace garden, the perceived benefits and constraints in adoption of terrace gardening was collected through a personal interview during 2021-2022 using a structured questionnaire. The collected data were tabulated and analyzed using economic tools. Garrett's ranking technique is employed to analyse the constraints in adoption. As per this method, respondents are allowed to rank their preferences on which they perceived more and

the outcomes of such ranking have been converted into score value with the help of the following formula:

$$\text{Percent Position} = 100(\text{Rij}-0.5)/\text{Nj}$$

Rij = Rank given for ith item by the jth sample respondents

Nj = Total rank given by the jth sample respondents

To obtain meaningful results, percentages and averages were computed.

30-year) 22 per cent of the respondents were in the middle age group (30-50 years) and 32.22 per cent of the respondents were found to be more than 50 years. Thus, majority of respondents above 50 years were found to be interested in practising terrace gardening. Of the total respondents, 58.90 per cent respondents were females and 41.11 per cent were males, indicating that females are more concerned in consumption of fresh fruits and vegetables for better family health. Similar results are quoted by Naveena and Sahana [7].

3. RESULTS AND DISCUSSION

Details regarding socio-economic profile of urban households practicing terrace gardening is presented in Table 1. It is observed that, 15.55 per cent of total respondents were young i.e., (<

Regarding their educational qualification, 47.78 per cent of the respondents completed their higher secondary education, followed by 32.22 per cent of the respondents are graduates and other higher level of education and 20 per cent of them completed their secondary education.

Table 1. Socio-economic profile of urban households practising terrace gardening (n = 90)

S.No	Characteristics	Total	Percentage (%)
1	Age		
a	<30 years	14	15.55
b	31-50 years	47	52.22
c	>51 years	29	32.22
2	Gender		
a	Male	37	41.11
b	Female	53	58.89
3	Educational Qualification		
a	Secondary Education	18	20.00
b	Higher Secondary Education	29	32.22
c	Graduation & above	43	47.78
4	Family size (Members)		
a	1-3	21	23.33
b	3-5	47	52.22
c	>5	22	24.44
5	Marital status		
a	Married	78	86.67
b	Unmarried	12	13.33
6	Occupation		
a	Working	36	40.00
b	Retired	10	11.11
c	Homemaker	44	48.89
7	Type of house		
a	Owned Independent house	41	45.56
b	Owned villa	12	13.33
c	Rented Independent house	29	32.22
d	Rented villa	8	8.89
8	Annual income		
a	<1 Lakh	8	8.89
b	2-5 Lakh	16	17.78
c	5-10 Lakh	41	45.56
d	>10 Lakh	25	27.78

Thus, majority of the respondents completed their higher secondary education. Occupationally, it is evident from the table that, 48.89 per cent of the respondents are home makers, 40 per cent of them are working professionals and 11.11 per cent of them are retired persons. Thus, indicating that majority of the respondents are homemakers, which permits them to have their own garden. In case of annual income of respondents, 45.56 per cent of the respondents earn 5-10 lakh annually, 27.78 per cent earn > 10 lakh annually followed by 17.78 per cent of the respondents are earning in the range of 2-5 lakh and only 8.89 per cent of the respondents earn < 1 lakh. Therefore, majority of the respondents practicing terrace gardening are earning 5-10 lakh annually.

Marital status of the respondents shows that, 86.67 per cent of the respondents are married and 13.33 per cent of them are unmarried. Therefore, majority of them are married and they also conveyed that terrace gardening was providing them an opportunity to get away from household chores and stress. Family size of the respondents reveals that, i.e., 52.2 per cent of respondents are with a family size of 3-5, followed by 23.33 per cent of them with family size of 1-3 members and 24.44 per cent of the respondents consists of more than 5 members in their families. Therefore, respondents practicing terrace gardening are mostly nuclear families.

It is observed that, 45.56 per cent of the respondents who are practicing terrace gardens are residing in owned independent houses. 32.22 per cent of the respondents are residing in rented independent houses and practicing terrace gardening because of no objection or restriction from their owners. 13.33 per cent of the respondents are residing in owned villa and only

8.99 per cent of the respondent are residing in rented villas. Thus, it can be concluded that most of the respondents practicing terrace gardening are residing in independent houses.

It is evident from Fig. 1 that, diverse range of food crops are grown in terrace gardens, ensuring nutritional security as well as preserving local culture, heritage, and biological diversity. Staggered sowing is commonly practiced to assure year-round availability fresh produce.

Table 2. Most popular crops grown by the urban households*

S. no	Type of crops	Percentage
1.	Tomatoes	85
2.	Cherry tomatoes	67
3.	Chillies	91
4.	Brinjal	89
5.	Gourds	75
6.	Beans	30
7.	Spinach	90
8.	Amaranthus	71
9.	Rosella	60
10.	Curry leaves	50
11.	Coriander	87
12.	Mint	95

The most commonly crops grown in terrace gardens by the sample respondents are tomatoes, chili, brinjal, leafy greens, and gourds (summer). Majority of the respondents are growing mint (95%), followed by chillies (91%), spinach (90%). Because of their short duration and ease of cultivation, many respondents are growing leafy vegetables. From Table 2, it is evident that tomatoes, brinjal, and chillies are the most sought-after vegetables by households. Gourds are grown by majority of the households especially during summers.

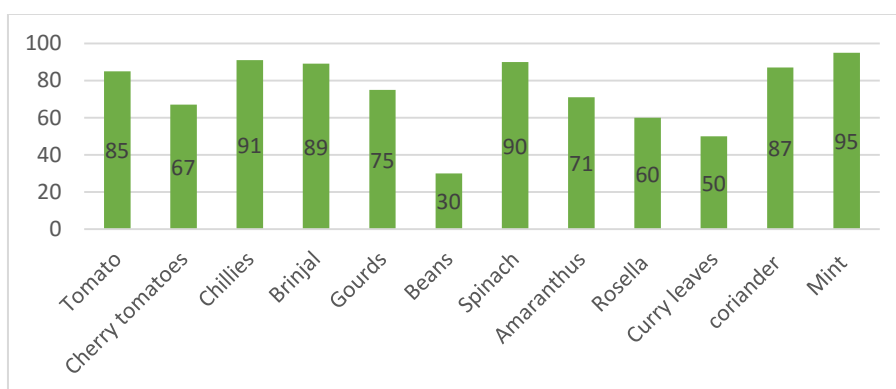


Fig. 1. Popular crops grown by sample respondents in terms of percentage

Table 3. Area allocated for terrace gardening by households

S.no	Area in squarefeet (sft)	No of respondents	Percentage
1.	100-750 Sft	29	32.22
2.	750-1500 Sft	34	37.77
3.	>1500 Sft	27	30

**Multiple responses are recorded*

Table 4. Perceived benefits in adoption of terrace gardening

S. no	Perceived benefits in adoption of terrace gardening	Frequency	Percentage
1	Economic Benefits		
A	Increased savings	34	37.77
B	Decreased expenditure on fruits and vegetables	35	38.88
C	Decreased hospital expenditure	18	20.00
D	Ensures year-round availability of vegetables	59	65.56
E	Overcome vegetable price fluctuation and market inflation	31	34.44
2	Environmental Benefits		
A	Reduces air temperatures	37	41.11
B	Efficient use of vacant spaces	63	70.00
C	Clean air	35	38.89
D	Provides opportunity to utilize domestic waste	70	77.78
3	Health benefits		
A	Increased food and nutritional security	79	87.78
B	Fresh and Healthy vegetables	87	96.67
C	Ensures availability of pesticides/chemical free vegetables	84	93.33
D	More physically active	67	74.44
4	Social benefits		
A	Increased emotional well being	82	91.11
B	A sense of pride among community	73	81.11
C	Aesthetic pleasure	76	84.44
D	Social inclusion	53	58.89
E	Interpersonal relations	56	62.22

**Multiple responses are recorded*

From Table 3 it is observed that, 37.77 per cent of them are practising terrace gardening in roof area of 750-1500 sft, followed by 32.22 per cent of them practising in 100-750 sft roof area and 30 per cent of the respondents are practising in area of >1500 sft. Thus, majority of them are growing in roof area of 750-1500 sft, as majority of the independent houses in Hyderabad are constructed in area of 100 - 150 square yards.

Details with regard to perceived benefits in adoption of terrace gardening are presented in Table 4. From the table 2, in health benefits it is clearly evident that, 96.67per cent of the urban households reported that, they were having fresh and healthy vegetables by practicing terrace gardening, 93.33per cent of the respondents also stated that with adoption of terrace gardens they were able to consume chemical free vegetables. The probable reason for these perceptions might be, because they were growing their own food with their own resources. 87.78per cent of the

respondents reported that, their families have increased food and nutritional security as their have their own sufficient produce and 74.44 per cent of the respondents expressed that they were more physically active than before, as they were doing all the gardening work by themselves with-out use of any outside manual labour.

Regarding social benefits, increased emotional well-being was ranked as top i.e., 91.1per cent of the respondents explained that there were experiencing comparatively better mental state of health by just relaxing in their own gardens. 84.44 per cent of the respondents reported that aesthetic pleasure derived from having their own terrace garden is beyond measuring .81.1per cent of the urban households were having a sense of pride among the community, followed by 62.22 per cent of the respondents reported increased interpersonal relationships among the community. 58.89 per cent of the respondents reported that they developed more social

inclusion in the community, because of frequent attending of training programmes, garden meets and also interaction on social media regarding various aspects of terrace gardening.

Among environmental benefits, 77.78 per cent of the respondents reported that terrace gardening was providing them an opportunity to utilize domestic waste generated in households, i.e., by composting fruits and vegetable peels, egg shells, etc., which turns as a precious source of food for plants. 70.0 per cent of the respondents were of the opinion that terrace gardening as an activity was providing them an opportunity to use vacant spaces thereby adding beauty to the house. 41 per cent of the respondents also experienced cooler temperatures during summers and 38.89 per cent of the urban households disclosed that, they experienced clean air in their surroundings.

Regarding economic benefits 65.56 per cent of the respondents conveyed that there were

having year-round availability of vegetables as they were having their own garden and 34.44 per cent of the urban households also reported that they were able to overcome the price fluctuation (especially tomatoes) which is experienced in the market during periods of shortage. 38.88 per cent of the respondents reported that their expenditure was reduced on purchase of fruits and vegetables from outside because of their own garden they were able to produce sufficient food for few days in a week. 37.77 per cent of the respondents expressed that there was significant increase in the savings, as the expenditure was reduced on purchase from markets, and only 20 per cent of the respondents reported that there was decreased hospital expenditure because of good mental state. Similar results are quoted by Mahesh et al. [8].

The results pertaining to constraints encountered by the urban households in adoption of terrace gardening are presented in Table 5.

Table 5. Category-wise constraints as perceived by the urban households

S. No	Constraints	Mean garrette score	Rank
A	Input Constraints		
1.	Non-availability of suitable land near residential area	65.00	1
2.	Lack of awareness on research institutes for purchase of quality seeds	55.00	2
3.	Lesser availability of quality FYM	46.00	3
4.	Lesser availability of Biofertilizers and biopesticides in the market	31.98	4
B	Technical constraints		
1.	Lack of knowledge about the major pest and disease identification and their management	53.80	1
2.	Lack of knowledge about recommended fertilizer and manure application	51.00	2
3.	Lack of knowledge about improved varieties, seed rate and sowing time	48.00	3
4.	Lack of knowledge about seed treatment	43.00	4
5.	Lack of guidance from the experts	40.00	5
C	Socio-cultural Constraints		
1.	Lack of interest among youth	61.70	1
2.	Lack of involvement of household women in kitchen gardening	58.21	2
D	General constraints		
1.	Time and space constraint	66.40	1
2.	Rodents and monkey attack	63.16	2
3.	Leakage from roof	53.90	3
4.	Frequent inundation of kitchen garden during rainy season	51.64	4
5.	Maintenance of garden	47.10	5
6.	Non-availability of inputs in time	37.57	6

3.1 Input Constraints

The data in the table reveals that non-availability of suitable land near residential areas (Mean Garrette Score of 65) is the major constraint followed by, lack of awareness on research institutes for purchase of quality seeds (II), lesser availability of quality FYM (III), lesser availability of bio fertilizers and biopesticides in the market (IV) .

3.2 Technical Constraints

Lack of knowledge about the major pest and disease incidence and their management (Mean Garrette Score of 53.8) is ranked as the top constraint by the urban households, lack of knowledge about recommended manures and fertilizer application for different crops (II), lack of knowledge about improved varieties (III), lack of knowledge about the seed treatment (IV) and lack of guidance from experts (V).

3.3 Socio-cultural Constraints

Lack of interest among youth (Mean Garrette score of 61.7) is identified as the major constraint and lack of involvement of household women in terrace garden (II) is ranked as the second major constraint because they were exhausted with household chores.

3.4 General Constraints

Time and space constraint (Mean Garrette score of 66.4) is ranked as the major constraint by the urban household's, rodent and monkey attack (II) followed by leakage from roof (III), frequent inundation of kitchen garden during rainy season (IV), maintenance of garden (V) and non-availability of inputs on time (VI). The results are in accordance with findings of Singh et al. [9].

4. CONCLUSION

The results from the study revealed that majority of the respondents are females, and those of > 50 years were practicing terrace gardening. And majority of the respondents were residing in owned independent house. The main motivation for these gardens is concern about the poor quality of vegetables available in urban markets, as well as the recycling of household waste. lack of space was identified as the major constraint. This study found that terrace gardening was an environmentally and economically viable

approach. Thereby ensuring year-round access to fresh leafy greens and vegetables to urban dwellers in their very own spaces. Terrace gardening has become not only beneficial to humans but also a source of shelter for birds. The government must take the necessary steps to increase terrace gardening in the city in order to benefit both city dwellers and nature, by organizing training programmes and providing incentives and subsidies for purchase of inputs.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Available:<https://www.un.org/en/about-us>.
2. Available:<https://telangana.gov.in/PDFDocuments/Telangana-Socio-Economic-Outlook-2021.pdf>.
3. Available:<https://www.fao.org/home/en>
4. Kandalkar P. Terrace gardens" utilization of terraces for green future: a review. An International Journal of Contemporary Studies. 2021;6(2):1-8.
5. Naveena KP, Sahana RT. Organic terrace gardening, a new vista in bringing back to traditional food system: Economic issues. The Journal of Rural and Agricultural Research. 2017;17(2): 11-14.
6. Lal R. Home gardening and urban agriculture for advancing food and nutritional security in response to the COVID-19 pandemic. International Society for Plant Pathology and Springer Nature B.V. 2020;12:871–876.
7. Bhatt C, Paschapur A. Urban agriculture: The savior of rapid urbanization. Indian farmer. 2020; 7(1): 1-9.
8. Kumar M, Savitha, Rekha B, Prashanth P. Urban farming: A step towards nutritional, health and economic security amid – COVID-19 pandemic. The Pharma Innovation Journal. 2021; SP-10(7): 507-513.

9. Singh P, Singh J, Dhillon BS, Singh S. Constraints as perceived by the respondents in adoption of recommended kitchen gardening techniques in district Amritsar, Punjab. *Agric. Update*. 2017; 12(3): 347-350.

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