



ISSN (E): 2277- 7695  
ISSN (P): 2349-8242  
NAAS Rating: 5.23  
TPI 2021; SP-10(7): 507-513  
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[www.thepharmajournal.com](http://www.thepharmajournal.com)

Received: 21-05-2021

Accepted: 25-06-2021

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## Urban farming: A step towards nutritional, health and economic security amid – COVID-19 pandemic

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### Abstract

The present study entitled “Urban Farming - A step towards nutritional, health and economic security amid - COVID-19 Pandemic” was conducted during 2020 to characterise urbanites practicing urban farming located in twin cities of Hyderabad and to assess the received benefits (nutritional, health, ecological and economic) in practicing urban farming. An *ex-post facto* research design was followed to achieve the objectives of the study as the variables already occurred. A total of one hundred and twenty urban farming practitioners having more than three years’ experience was selected randomly at the rate of 20 respondents from each zone. The data were collected by a personal interview method with the help of structured interview schedule and data was analysed by employing suitable statistical methods. The findings of the study revealed that, urban farming practitioners were of middle age (36-58 yrs.) with graduation to post graduation and belonged to upper middle to high income groups (₹300000-900000) with low farming experience (3-12 years). It was also found that; majority of the urban farming respondent’s first preference was leafy vegetables, received medium family support, with BCR more than 1.0 (70.84%). Further, it was also observed that, greater majority of the respondent’s intake of energy, protein, Iron, calcium, high  $\beta$ -Carotene, Vitamin C, Thiamin, Riboflavin and Niacin as high when compared with national average intake. Similarly, introduction of urban agriculture helped urban population to produce required greens, improve consumption pattern and nutritional status. The urban farming offers physical exercise, ensures availability of chemical free vegetables and house hold level nutritional security were the major benefits as perceived by the respondents.

**Keywords:** Urban farming, pandemic, nutritional, health, economic security

### Introduction

COVID-19 pandemic has disrupted many industries and behaviour across the globe amongst them economic activity, employment, food consumption and workplace environments had visualised significant shifts <sup>[1]</sup>. Being an agrarian economy, the lockdowns and restrictions imposed in India at regional and national level movement had strong impact on the supply chain and logistics on part of both producers and as well as consumers that resulted in poor access to fresh and nutritious food. The complexity of vegetable supply chain is associated with the perishable nature of the product, high level of uncertainty in demand - costs and the large number of intermediary traders involved <sup>[2]</sup>.

The urban population in India is 377 million that accounts to 30% of the total population <sup>[3]</sup> and it is expected to escalate to 404 million by 2050 <sup>[4]</sup>. Global food demand will enhance by 70% by 2050, to cater the needs of 9.3 billion population <sup>[5]</sup>. The rural areas have traditionally provided food for the country’s population. Increasing urbanization along with the demographic pressure has led to contraction of cultivable areas and migration of rural population to urban areas in search of jobs that also raised problems of food and nutrition security.

During the pandemic situations these constraints were aggravated due to low production, lockdowns, restrictions in work areas and transport that led to severe shortage in supply of nutritionally rich fresh greens and vegetables. Under these situations, urban farming is a sound and viable option to combat shortage of nutritional foods. It is based on the concept of own grown food in balconies, roof tops and backyards that facilitates to spend quality time in gardening as a stress buster, health promoter and creates a sense of pride of owning a farm at home.

Urban farming is a “catch all” that provides access to local and fresh nutritious food <sup>[6]</sup> apart from increased income and enables to grow own food and less dependent on traditional food outlets <sup>[7]</sup>.

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Urban food gardens and farms have been found to help conserve agro-biodiversity [8] and urban farms are also merited for their ability to re-use waste water, waste heat, and organic waste from homes and businesses in limited-input food production systems [9].

The expansion of urban farming plays a heavy toll on local resources, such as affordable food retail options, to meet the needs of household within cities, which was highlighted by COVID-19. Urban garden lands are 15 times more productive than rural holdings and 1m<sup>2</sup> of urban farm is capable of producing 36 heads of lettuce every 60 days, 10 cabbages every 90 days and 100 onions every 120 days. Urban farming improves better access to food and greater dietary diversity which in turn will improve the nutritional status of urbanites [10].

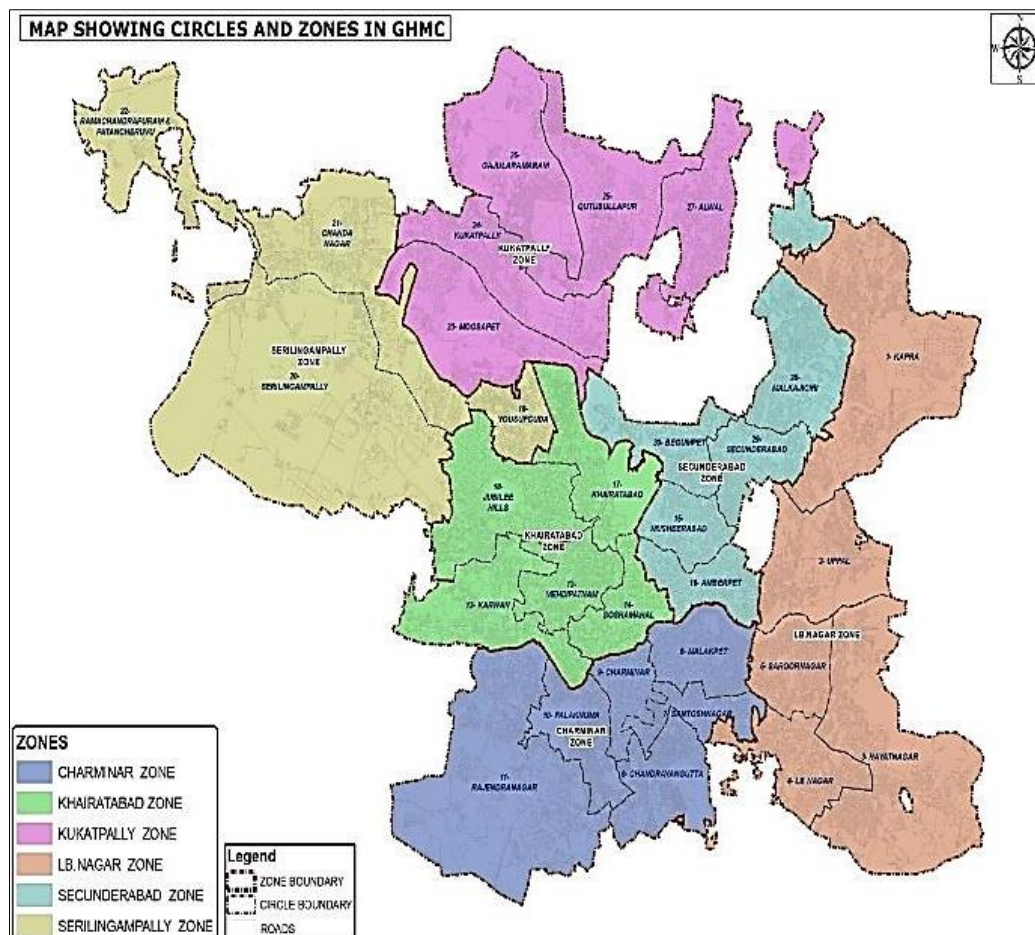
The motivation for home growing during the pandemic may be attributed to several factors. Recently, it was reported that households adopted it to counter food shortages, minimize the frequency of shopping trips, avoid going to the stores all together, even if gardening at home only proved to be “supplementary” [11, 12]. The current COVID-19 pandemic has emphasized the importance of local food production [13].

## Material and Methods

The present study entitled “Urban Farming - A step towards nutritional, health and economic security amid - COVID-19 Pandemic” was conducted during 2020 to emphasise the role of urban farming. It was designed with the specific objectives.

1) To characterise urbanites practicing urban farming located in twin cities of Hyderabad and 2) Perceived benefits (nutritional, health, ecological and economic) apart from constraints in practicing urban farming. An *ex-post facto* research design was followed to achieve the objectives of the study as the variables already occurred.

The twin cities of Greater Hyderabad Municipal Corporation (GHMC) of Telangana (Hyderabad and Secunderabad) were chosen purposively for the study as it has large number (4000) of actively practicing urban farmers. Urban Farming Division of Horticulture Department, Telangana has imparted training and distributed more than 5700 subsidized (50%) urban farming kits to Urbanites of Hyderabad and Secunderabad. A total of 120 urban farmers with more than 3 years of urban farming experience were selected randomly at the rate of 20 from each zone of GHMC (Hyderabad and Secunderabad twin cities).



**Fig 1:** Map depicting six zones of twin cities Hyderabad and Secunderabad (GHMC)

A total of 120 respondents were interviewed using a questionnaire and data was analysed the by utilizing qualitative descriptive analysis. The data on urban farmer characteristics included age, education, farming experience, annual income, institutional support, pride of ownership, preference of crops, time utilization patter, family support, and economic motivation. Benefits perceived by the respondents by practicing urban farming can be in the form of

material, psychological, financial or any other perceived gain. Open ended questionnaire was prepared with statements pertaining to the perceived economic benefits, health and nutritional benefits, socio-psychological benefits, ecological benefits of urban farming and same was administered to the respondents for recording their responses. Descriptive analysis was done and frequencies and percentages were calculated and ranking was given in order of magnitude.

**Results and Discussion**

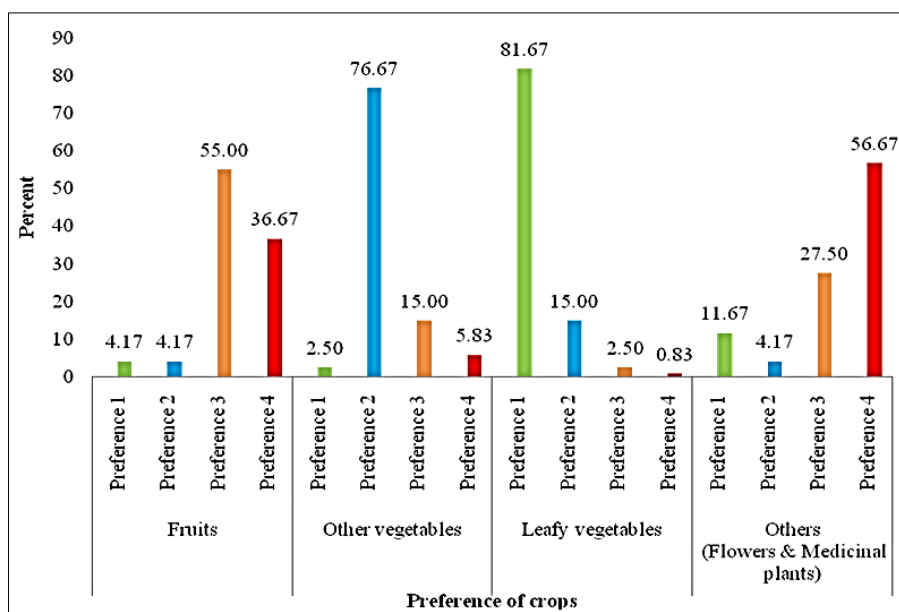
**Table 1:** Characteristics of the urban farmers in twin cities of Telangana (n = 120)

Profile characteristic	Frequency	Percentage
<b>Age</b>		
Young age (less than 35 years)	14	11.67
Middle age (36-58 years)	75	62.50
Old age (greater than 58 years)	31	25.83
<b>Education</b>		
Primary School	15	12.50
High School	7	05.83
Graduation	65	54.17
Post-Graduation	33	27.50
<b>Farming experience</b>		
Low (3-12 years)	106	88.33
Medium (13-22 years)	8	6.67
High (23-32 years)	6	5.00
<b>Annual income</b>		
Low income (₹≤75000)	4	3.33
Lower middle Income (₹75000-300000)	12	10.00
Upper middle income (₹300000-900000)	66	55.00
High income (₹≥900000)	38	31.67
<b>Institutional support</b>		
Low (5-6)	36	30.00
Medium (7-8)	74	61.67
High (9-10)	10	8.33
<b>Pride of ownership</b>		
Low (10-12)	14	11.67
Medium (13-15)	52	43.33
High (16-18)	54	45.00

Urban farming practitioners were of middle age (36-58 yrs.) with graduation to post graduation and belonged to upper middle to high income groups (₹300000-900000) with low farming experience (3-12 years). Urban farming was considered as a pride of ownership by the majority of the respondents and had received good institutional support in the form, incentives, technical knowledge, etc., in taking up of urban farming (Table 1) [14]. Most of the urban farmers (70%) in Yogyakarta attended secondary education at the minimum, indicating that the urban farmers are moderately educated to accept new knowledge and technology and approximately 50 % of them were employed, indicated that urban farming was

not the main activity. The average age of participants is 53 years. The education level of the sample ranges from high school diploma (13%), some college experience (23%), 2 year degree (11%), 4 year degree (32%), to a professional degree (18%) and doctorate (2%), 2% have less than a high school degree. Approximately 50% of the participants have lower than \$70,000 annual income before taxes [15].

With respect to choice of crops, majority of the urban farming respondent’s first preference was leafy vegetables due to ease in cultivation (Fig. 2), possibility to grow in small available spaces in relatively less growing period apart from awareness among respondents regarding the nutritional value [16].



**Fig 2:** Distribution of respondents according to their preference of crops

About 75.00 per cent of the respondents had small family size [16]. Majority of the respondents were with medium family support. This might be due to interest of the family members for productive utilization of free time to reduce expenditure on hired labour and personal their interest. There results find

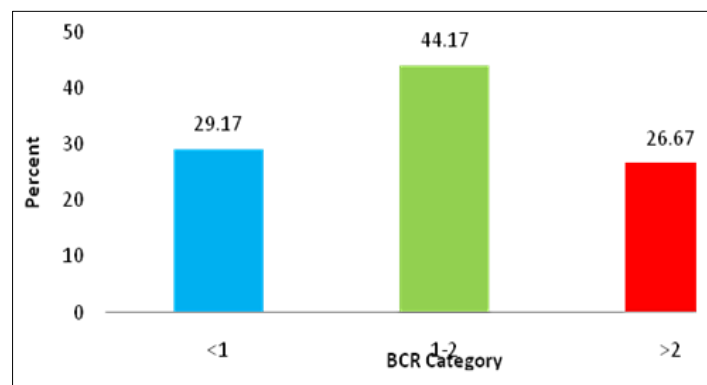
support from [17, 18]. About 70.83 % of the urban farming respondents are working early in the morning or evening or both spending 10 to 31 minutes in a day and area allocated for urban farming was in the range of 15 to 350 m<sup>2</sup> which was the probable reason for low time allocation (Table 3).

**Table 2:** Characteristics of the family size of urban farmers in twin cities of Telangana (n = 120)

S. No.	Category	Frequency	Percent
<b>Distribution of respondents according to their family size</b>			
1	Small family (Up to 5 members)	90	75.00
2	Big family (Above 5 members)	30	25.00
<b>Distribution of respondents according to their family support</b>			
1	Low family support	31	25.83
2	Medium family support	74	61.67
3	High family support	15	12.50
<b>Distribution of respondents according to the amount of time spent in urban farming</b>			
1	Low (10 - 31 minutes/day) (0.69 - 2.08 %/day)	85	70.83
2	Medium (32 - 53 minutes/day) (2.09 - 3.13%/day)	26	21.67
3	High (54 - 75 minutes/day) (3.14 - 5.21%/day)	9	7.50

Majority (70.84%) of the urban farming respondents had BCR more than 1.0, indicating that urban farming as a more profitable enterprise besides offering other invaluable benefits of greenery, physical exercise, clean air, cooling the terraces and balconies in the summer, attracting birds and besides producing chemical pesticide-free fresh greens. Benefit costs

of different homestead vegetable gardening on improving household food and nutrition security in rural Bangladesh and found that home gardens have found to play an important role in improving food security for the resource poor households in developing countries [19].



**Fig 3:** Distribution of respondents according to benefit-cost ratio excluding family labour

In low income urban areas, the dietary deficiency of micronutrients, such as iron, zinc, iodine, and vitamin A is more common [20]. The local food supply can have multiple positive impacts on humans, such as strengthening social cohesion and the local economy [21] apart from positive attitudes toward nature and natural habitats [22].

As a part of objectives, nutritional security vis-a-vis nutritional status of the respondent households was assessed through 'food and nutrient intake' and was compared with the National Nutrition Monitoring Bureau (NNMB) technical report no. 27 obtained from nutritional status survey on urban

population in India, the intake of all the nutrients was more than the national average intake, which clearly indicated the contribution of urban farming in healthy intake of nutrients among urban farming practitioners. Further, it was also observed that, greater majority of the respondents intake of energy, protein, Iron, calcium, high  $\beta$ -Carotene, Vitamin C, Thiamin, Riboflavin and Niacin as high when compared with national average intake. Similarly, introduction of urban agriculture helped urban population to produce required greens, improve consumption pattern and nutritional status [23].

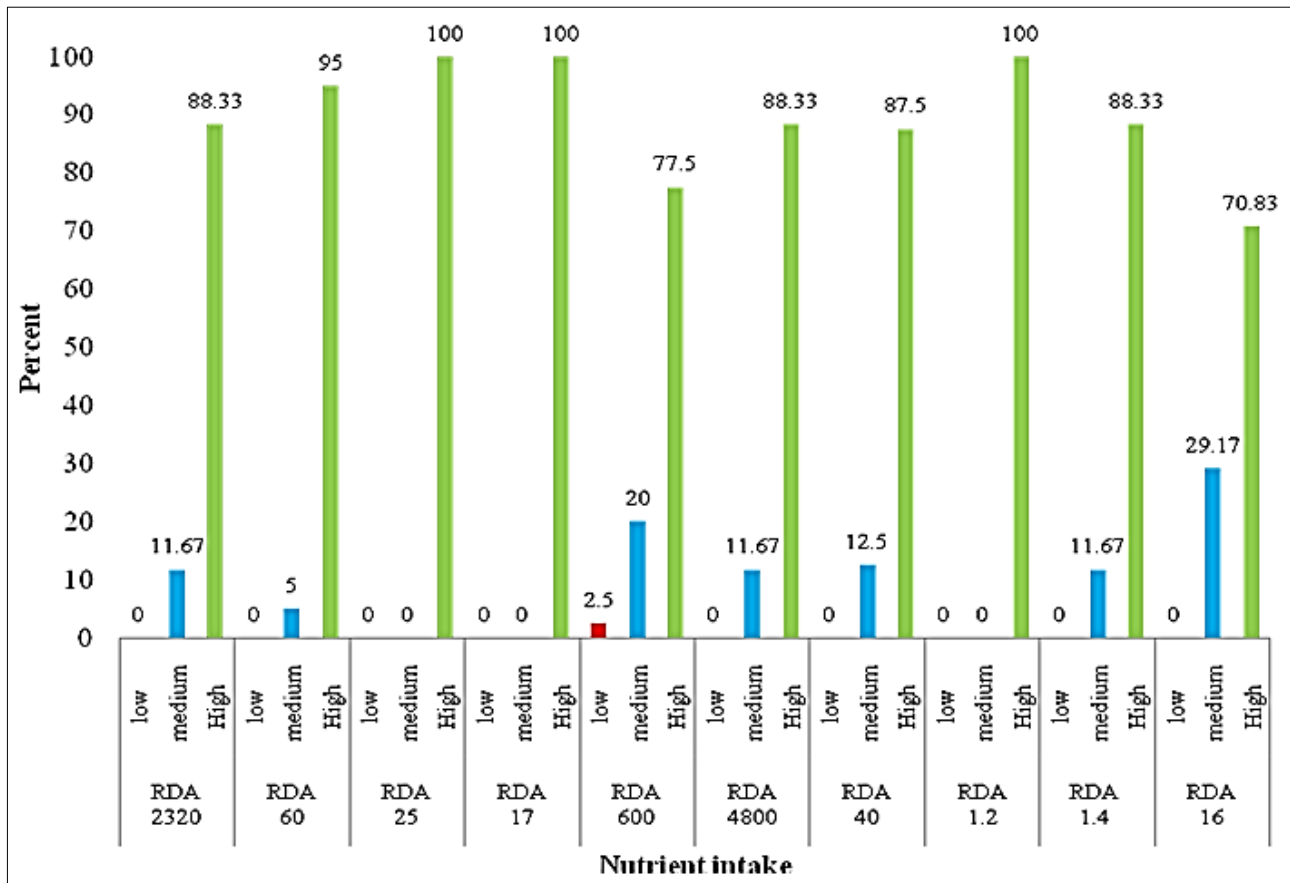
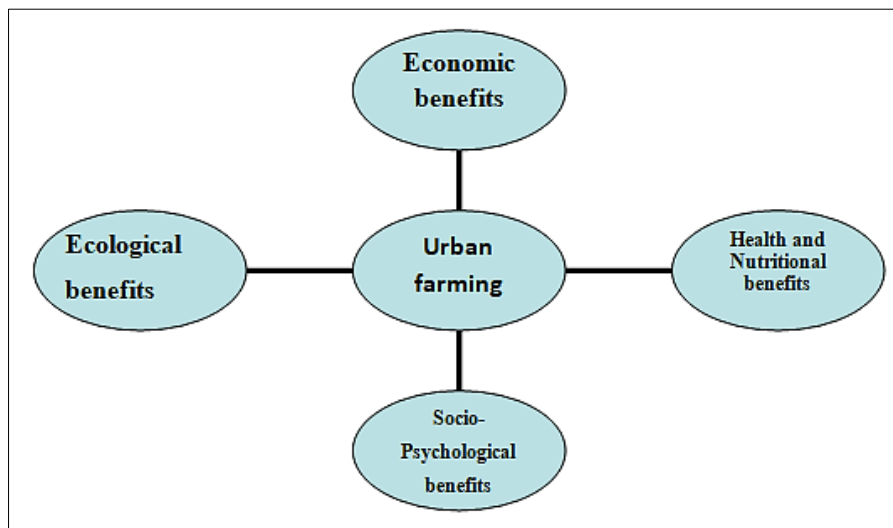


Fig 4: Distribution of respondents according to their nutrient intake

Table 3: Benefits perceived by respondents in urban farming (n = 120)

S. No.	Benefits in urban farming	F	P	Rank
<b>A</b>	<b>Economic benefits</b>			
1	Urban farming ensures year-round availability of vegetables	107	89.17	I
2	Urban farming helps to overcome vegetable price fluctuation and market inflation	85	70.83	III
3	Urban farming ensures sustainable savings on household food expenditure	85	70.83	III
4	Cooling effect inside home during summer due to terrace garden	97	80.83	II
5	Supplemental income can be generated in urban farming	13	10.83	IV
<b>B</b>	<b>Health and Nutritional benefits</b>			
6	Urban farming offers physical exercise	96	80.00	III
7	Urban farming ensures availability of pesticides/chemical free vegetables	115	95.83	I
8	Urban farming improves nutritional security at household level	101	84.17	II
<b>C</b>	<b>Socio-Psychological benefits</b>			
9	Working in urban farming reduces stress	110	91.67	I
10	Urban farming enhances social identity and recognition	98	81.67	III
11	Urban farming improves family & social relations	79	65.83	IV
12	Urban farming improves quality time spending with family	98	81.67	III
13	Urban farming offers efficient time utilization	79	65.83	VI
14	Urban farming can be practiced in leisure time	100	83.33	II
15	Urban farming improves awareness & knowledge among children regarding farming and plants	48	40.00	V
<b>D</b>	<b>Ecological benefits</b>			
16	Safeguards environment by increasing greenery	87	72.50	II
17	Provides opportunity to utilize domestic waste	88	73.33	I
18	Provides opportunity to utilize domestic waste water	53	44.17	V
19	Urban farming improves household aesthetics	85	70.83	III
20	Small and limited unused spaces can be used for practicing urban farming	82	68.33	IV



On a sight into the table 5, it can be concluded that, 95.83 per cent of the urban farming respondents perceived availability of pesticide free vegetables as top ranked benefit from urban farming, followed by stress reduction through working in urban farm (91.67%), year round availability of vegetables (89.17%), improvement in nutritional security at household level (84.17%) and feasibility to practice urban farm in leisure time (83.33%). Year round availability of vegetables (89.17%) ranked top among economic benefits, followed by cooling effect inside home during summer due to terrace garden (80.83%), overcoming vegetable price fluctuations (70.83%) and sustainable savings on food expenditure (70.83%). Regarding health & nutritional benefits, availability of chemical free vegetables topped the list with 95.83 per cent respondents, followed by improvement in nutritional security at household level (84.17%) and offers physical exercise (80.00%). The probable reason for these perceptions might be because almost all respondents were not using any chemicals and growing diverse group of leafy vegetables, other vegetables and fruits in urban farm. Regarding socio-psychological benefits, it was found that working in urban farm reduces stress topped the list with 91.67 per cent, followed by urban farming can be practiced in leisure time (83.33%), enhances recognition in society (81.67%), improves quality time spent with family (81.67%). The probable reason for these perceptions might be due to working closely with nature acting as stress buster, pursuing hobby of growing plants, special recognition given by peers and neighbours to urban farming practitioners.

In ecological benefits, it was observed that opportunity to utilize domestic waste topped the list with 73.33 per cent, followed by increases greenery (72.50%) and improves aesthetics (70.83%). The probable reason for these perceptions might be due to solution offered by urban farming for waste disposal and greenery and beauty added by plants.

The studies on urban farming and gardening offers physical exercise, ensures availability of chemical free vegetables and house hold level nutritional security. It improves greenery, aesthetics, reduces stress, provides social identity, and improves family and social relations in the community<sup>[24, 25]</sup>. Urban farming reduced existing tensions and foster social integration between otherwise segregated groups by bringing people of diverse races/ethnicities, cultures, religions, socio-economic classes, genders, ages, and educational backgrounds together to participate in shared activities with a common purpose<sup>[26-29]</sup>.

### Conclusion

This study highlighted that amid COVID -19 pandemic, urban farming was an environmentally, ecologically and economically viable approach at house hold level towards direct access to self-produced diverse nutritious food items all-round year, extending nutritional security apart from a sound resource conservation technology through recycling of kitchen wastes and water.

### Conflict of interest

Authors declare no conflict of interest.

### Acknowledgement

We thank Professor Jayashankar Telangana State Agricultural University, Department of Agriculture and Department of Horticulture, Telangana for providing the opportunity and also thank urbanites for sharing their information and their support during the data collection.

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