# Urban Agriculture: a way forward to augment Food and Nutritional Security in cities

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## Abstract

*The process of urbanisation is fast spreading across different countries and regions to which India is no exception. Migration to urban areas is increasing to access the facilities and improved level of living. This process has resulted in emergence of many issues such as demand for food, employment, income generation, safe disposal of urban waste etc. in urban areas. Since provision of food and nutritional security of the population in urban areas is a top priority it is felt necessary to introduce urban agriculture as a development strategy to address the requirement partially. The present study examines the profile of urban population, the pattern of purchase and consumption and level of satisfaction with two major commodities like vegetables and milk. The study highlights the need to promote urban agriculture as a development strategy.*


## Introduction

Urbanisation as a process of development is happening across various countries and regions within the countries. Urban centers are emerging as growth points of the economy due to industrialization, education and employment opportunities and provision of other facilities for the population. The rate of Urbanization at various levels is alarming due to migration of rural population to urban centers in search of growth opportunities. As such, the implication of urbanization is multidimensional resulting in large-scale demand for employment, income generation, food and nutritional security, safe disposal of urban waste apart from environmental impact in the urban areas.

Since urban areas have the potential to sponsor growth in the economy, the crucial requirement is to maintain a large scale working population involved in various activities. Hence provision of necessary food products for the working population in urban centers assumes priority. At present most of the food products including vegetables, milk, eggs, fruits, coarse grains etc. produced in distant rural areas are being routed to the urban centers to maintain the population. This has

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resulted in increased cost of the products to the urban consumers since the products pass through the different levels of middlemen, hiking the price. Apart from this, there is an additional cost of transportation, packing, handling, losses in transit etc affecting the product quality and availability in the urban centers. Hence promotion of urban agriculture can address various issues of food production and supply in the urban centers, especially with perishable products.

It is also very appropriate to promote urban agriculture in the present context as agriculture in rural India is facing challenges like fragmented holdings, depletion of soil nutrients, exploitation of ground water, declining trend of food production, and least preference for agriculture as an option of livelihood by the farmers due to less profitability and high uncertainty, non availability of agricultural labourers in rural areas etc.

Urban agriculture is one of the important activities to achieve greater food production, improve livelihood opportunities for urbanities, and to enhance quality of cities. Improved urban agriculture would offer a potential solution to address the current challenges by way of recycling of urban waste, saving on transport cost of farm produce from distant production centers, poverty alleviation by providing employment for the urban poor, effective post harvest technologies, distribution and marketing. It would also be an important coping strategy for the urban households in the present scenario of soaring prices of fruits and vegetables. Urban agriculture would also be one of the mitigation strategies of climate change by improving the green cover in the urban areas.

Certain activities relating to urban agriculture have been practiced, though not on scientific lines, in the areas of horticulture, dairying, backyard poultry etc. to meet personal needs or as a livelihood vocation. However, documentation of these activities and assessing the perception of various stakeholders in undertaking urban agriculture are very limited. In this context an effort has been made to understand the response of the urban population towards urban agriculture, in the present study with the following objectives.

## Objectives

1. To understand the profile of urban population
2. To assess the extent of consumption of vegetables and milk by the urban population

3. To explore the procurement pattern of vegetables and milk by the urban population and their level of satisfaction
4. To know their willingness to take up urban agriculture and
5. To suggest suitable strategies for promotion of urban agriculture

## Methodology

The study was conducted in Hyderabad city of Andhra Pradesh state. Stratified random sampling method was used to identify the sample. The data was collected using pre-tested questionnaire sent to 200 respondents from the urban population. Sixty responses received from the urban population have been considered in the study. Simple percentage analysis was used for analysis of data.

## Results and Discussion

### Profile Characteristics of Respondents

It is seen from Table 1 that 41.67 per cent of respondents were young, followed by 35.00 per cent in middle age and 23.33 per cent of the respondents were in the category of old age. Over all it could be observed that around 76 per cent were in young to middle age group.

It is interesting to see from the table that a great majority (93.33 per cent) of the respondents studied upto college level and only a meager number of respondents (6.67 per cent) studied upto secondary education. Hence introduction of extension efforts through literature support can help to promote urban agriculture.

Regarding occupational status it was found that a majority (68.33 per cent) were government employees and 16.67 per cent of the respondents were self-employed. Ten per cent of the respondents were working in the private sector while 3.33 per cent and 1.67 per cent were retired employees and house wives respectively. Since majority of the population are employees depending on salaried income, fluctuation of prices of food commodities affect their consumption pattern. Hence it is desirable to introduce urban agriculture as a part time activity. It can be observed from Table 1 that 63.33 per cent of the respondents have a family size of 3-4 members followed by 25.00 per cent of them having upto two members and 11.67 per cent had five and above.

**Table - 1.: Distribution of Respondents based on the Profile Characteristics of Respondents**

(N = 60)

| S.No. | Category | No. of Respondents | Percentage |
|---|---|---|---|
| **I.** | **Age** | | |
| **1.** | **Young** | **25** | **41.67** |
| 2. | Middle | 21 | 35.00 |
| 3. | Old | 14 | 23.33 |
| **II.** | **Educational Status** | | |
| 1. | Secondary | 4 | 06.67 |
| 2. | Collegiate | 56 | 93.33 |
| **III.** | **Occupational status** | | |
| 1. | Government Employee | 41 | 68.33 |
| 2. | Private | 6 | 10.00 |
| 3. | Self employment | 10 | 16.67 |
| 4. | Retired employee | 2 | 3.33 |
| 5. | House wife | 1 | 1.67 |
| **IV.** | **Family size** | | |
| 1. | Up to 2 Members | 15 | 25.00 |
| 2. | 3 to 4 Members | 38 | 63.33 |
| 3. | 5 and above | 7 | 11.67 |

## Perception about Cost of Vegetables

It can be observed from Table 2 that a great majority (98.33 per cent) of the respondents opined that cost of vegetables in the recent times is increasing and they find it difficult to afford. They expressed that steep rise in price of vegetables in the present day forced them to reduce the consumption of vegetables and would affect their health in the long run.

**Table - 2:. Perception of Urban Population about Cost of Vegetables**

**(N = 60)**

| S.No. | | No. | Percentage |
|---|---|---|---|
| 1. | Increasing | 59 | 98.33 |
| 2. | Not Increasing | 1 | 1.67 |
| | Total | 60 | 100.00 |

## Monthly Expenditure towards Vegetables and Milk

Monthly expenditure of urban population towards purchase of vegetables and milk is presented in Table 3.

**Table 3. Monthly Expenditure towards Vegetables and Milk**

(N = 60)

| S.No. | Money spent in a Month | Vegetables | | Milk | |
|---|---|---|---|---|---|
| | | No. | % | No. | % |
| 1. | (Up to Rs 500) | 16 | 26.67 | 17 | 28.34 |
| 2. | (Rs 501 -1000) | 28 | 46.67 | 27 | 45.00 |
| 3. | (Rs 1001 -1500) | 10 | 16.67 | 9 | 15.00 |
| 4. | (Rs 1501- 2000) | 4 | 6.66 | 5 | 8.33 |
| 5. | Above Rs 2000 | 2 | 3.33 | 2 | 3.33 |
| | **Total** | **60** | **100.00** | **60** | **100.00** |

It is evident from the above Table that 26 per cent of the respondents spent upto Rs 500 per month towards vegetables followed by 46 per cent who spent between Rs 501 - 1000 in a month for purchase of vegetables. The rest of the members spent more than Rs 1000 per month. The data reveals that a large population is spending between Rs 500-2000 per month towards vegetables. Similar is the situation with milk . Considering large urban centers like Hyderabad these figures highlight tremendous expenditure being incurred by a family per month. This highlights the volume of business that can be created in the urban areas if urban agriculture is introduced.

## Consumption Pattern of vegetables

It can be observed from Table 4 that about 33 per cent of the population consumes upto ½ kg of vegetables per day. In contrast more than 55 per cent of the urban population consume about ½ to 1 kg vegetables per day. Consumption pattern of the vegetables also depends on the purchasing power of the family apart from fluctuation in the price of the vegetables. Introduction of urban agriculture can help the urban population produce the required vegetables and improve their consumption pattern and nutritional status.

**Table- 4: Consumption Pattern of Vegetables**

(N = 60)

| Sl.No | Quantity of vegetables consumed | No. | Percentage |
|---|---|---|---|
| 1. | Less than ¼ kg /day | 4 | 6.66 |
| 2. | ¼ to ½ Kg /day | 16 | 26.67 |
| 3. | ½ to 1 Kg /day | 33 | 55.00 |
| 4. | More than 1 Kg/day | 7 | 11.67 |
| | **Total** | **60** | **100.00** |

Conservative estimates indicate that about fifty percent of the total population lives in urban and peri urban areas. This indicates that there is a huge demand for the vegetables in the urban and peri urban areas which otherwise have to come from the distant production points from rural areas. Supply chain of agricultural produce in India is very long, inadequate and inefficient; as a result huge post harvests losses occur especially in case of perishable commodities like vegetables and fruits. In addition to this the production units are very small and producers are unorganized and hence fruits and vegetables have to pass through many intermediaries before reaching the consumers in the urban areas resulting in escalation of prices which the urban population has to bear. In case, required vegetables are produced on their own either fully or partly with available space and water in urban areas, many of these constraints could be addressed.

## Procurement Places of Vegetables

It can be observed from the result presented in Table 5, that 29.70 percent of the respondents purchase required vegetables from Shandy (Raithu Bazaar) and super markets followed by 28.72 per cent from retail shop and 11.88 per cent from push cart.

**Table- 5: Procurement places of vegetables among urban population**

**(N = 60)**

| Sl.No | Procurement places | No.* | Percentage |
|---|---|---|---|
| 1. | Push cart | 12 | 11.88 |
| 2. | Small Retail shop | 29 | 28.72 |
| 3. | Shandy (Raithu Bazaar) | 30 | 29.70 |
| 4. | Super Markets | 30 | 29.70 |
| | **Total** | **101** | **100.00** |

• Multiple responses

The data reveals that most of the population depends on larger markets rather than pushcart. This may be due to the availability of a variety of vegetables at a single place, low prices, quality of vegetables, convenience of shopping etc. The profile of the respondents clearly indicates that a majority of them who are employees do not find sufficient time to purchase vegetables daily.

## Frequency of Purchase of Vegetables

It can be observed from Table 6 that half of the respondents purchase vegetables once in a week followed by 35 per cent of the respondents who purchase on alternative days.

**Table- 6: Frequency of Purchase of Vegetables among Urban Population**

(N = 60)

| Sl.No | Frequency of procurement | No. | Percentage |
|---|---|---|---|
| 1. | Daily | 8 | 13.33 |
| 2. | Alternative days | 21 | 35.00 |
| 3. | Weekly once | 30 | 50.00 |
| 4. | More than one week | 1 | 1.67 |
| | **Total** | **60** | **100.00** |

The pattern above reveals that the urban population spent their time and resources to purchase vegetables either weekly or on alternate days. Those who purchase weekly necessarily are spending for storage of vegetables in fridges and also not getting the fresh vegetables daily. There is a clear case to introduce urban agriculture for reducing the transportation cost, storage cost, price fluctuation in markets apart from saving time and energy and getting fresh vegetables.

## Level of Satisfaction

The satisfaction levels of urban population with regard to purchase of vegetables on various parameters are presented in Table 7.

**Table- 7: Level of Satisfaction on Purchase of Vegetables**

(N = 60)

| Sl. No | In terms of | Vegetables | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Fully Satisfied | | Partially Satisfied | | Not Satisfied | | Total | |
| | | No. | % | No. | % | No. | % | No. | % |
| 1. | Timely Availability | 21 | 35.00 | 29 | 48.33 | 10 | 16.67 | 60 | 100 |
| 2. | Price | 1 | 1.66 | 24 | 40.00 | 35 | 58.34 | 60 | 100 |
| 3. | Quality | 12 | 20.00 | 39 | 65.00 | 9 | 15.00 | 60 | 100 |
| 4. | As per Quantity required | 21 | 35.00 | 28 | 46.67 | 11 | 18.33 | 60 | 100 |
| 5. | Satisfaction with the measurement | 15 | 25.00 | 32 | 53.34 | 13 | 21.66 | 60 | 100 |
| 6. | Distance of Procurement place from the residence | 15 | 25.00 | 23 | 38.33 | 22 | 36.67 | 60 | 100 |

It is evident from the above table that only 35 per cent of the respondents were fully satisfied with timely availability of vegetables and availability of adequate quantity as required. A great majority viz., 65 per cent and 53.34 per cent of the respondents were found satisfied partially about the quality of vegetables purchased and measurement of vegetables by the vendors respectively. Majority (58.34 per cent) of the respondents were not satisfied with regard to price of the vegetables.

This clearly indicates that satisfaction level of the respondents on various parameters with regard to purchase of vegetables varied hence this is a clear case to introduce a system of self production and utilization of perishable products like vegetables in the urban environment.

## Consumption Pattern of Milk

The data presented in Table 8 indicates that 56.67 per cent of the urban population consume one to two liters of milk per day followed by slightly more than one fourth (26.67 per cent) of the respondents who consume less than one liter a day. Milk is one of the key requirements of food products in the urban areas. Most of the milk is supplied through the organized dairy farms which is generally not the fresh milk of the day. Promotion of urban diary farms can help the urban population in getting fresh milk.

**Table - 8: Consumption pattern of Milk among urban population**

**(N = 60)**

| Sl.No | Quantity of Milk consumed | No. | Percentage |
|---|---|---|---|
| 1. | Less than one liter | 16 | 26.67 |
| 2. | One to two liters | 34 | 56.67 |
| 3. | More than two liters | 10 | 16.66 |
| | **Total** | **60** | **100.00** |

## Level of Satisfaction on Purchase of Milk

Satisfaction level of respondents on various parameters with regard to purchase of milk is depicted in Table 9.

**Table- 9: Level of Satisfaction on Purchase of Milk**

**(N = 60)**

| Sl. No | In terms of | Milk | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Fully Satisfied | | Partially Satisfied | | Not Satisfied | | Total | |
| | | No. | % | No. | % | No. | % | No. | % |
| 1. | Timely Availability | 36 | 60.00 | 22 | 36.67 | 2 | 3.33 | 60 | 100 |
| 2. | Price | 9 | 15.00 | 37 | 61.67 | 14 | 23.33 | 60 | 100 |
| 3. | Quality | 22 | 36.67 | 28 | 46.66 | 10 | 16.67 | 60 | 100 |
| 4. | As per Quantity required | 28 | 46.67 | 25 | 41.66 | 7 | 11.67 | 60 | 100 |
| 5. | Satisfaction with the measurement | 34 | 56.67 | 18 | 30.00 | 8 | 13.33 | 60 | 100 |
| 6. | Distance of Procurement place from the residence | 29 | 48.33 | 24 | 40.00 | 7 | 11.67 | 60 | 100 |

It could be observed from the table that 60 per cent of the respondents were fully satisfied with timely availability of milk. More than half (56.67 per cent) of the respondents were also fully satisfied with measurement of milk. This may be

due to the availability of packed milk from organized dairy supplied by the vendors at doorsteps of urbanites. However 61.67 per cent of the respondents were partially satisfied with price of milk. The results in the table clearly indicate that overall satisfaction level of the respondents on purchase of milk is relatively better than the satisfaction level of purchase of vegetables on various parameters. Since milk is a product of daily use, efforts towards production and supply of the same in urban areas may have to be promoted for supply of fresh and quality milk.

## Willingness of Urban Population to Produce Vegetables

The information relating to the willingness of respondents to produce vegetables on their own is presented in Table 10.

**Table - 10: Willingness of urban population to produce vegetables**

**(N = 60)**

| Sl. No | Willingness of the respondents to produce vegetables | Yes | | No | |
|---|---|---|---|---|---|
| | | No. | Percentage | No. | Percentage |
| 1. | Willingness to produce vegetables | 33 | 55.00 | 27 | 45.00 |
| 2. | Willing to pay for the technical knowledge and other services | 32 | 53.33 | 28 | 46.67 |
| 3. | Availability of space | | | | |
| a) | Roof top | 7 | 11.67 | 53 | 88.33 |
| b) | Back yard | 10 | 16.67 | 50 | 83.33 |
| c) | Balcony | 10 | 16.67 | 50 | 83.33 |
| d) | Other open places | 12 | 20.00 | 48 | 80.00 |
| 4 | Availability of adequate water for producing vegetables | 25 | 41.67 | 35 | 58.33 |
| 7. | Possessing required knowledge to produce vegetables on their own | 33 | 55.00 | 27 | 45.00 |
| 8. | Require technical advice to produce vegetables in their surroundings | 24 | 40.00 | 36 | 60.00 |

It is interesting to observe from the Table that 55 per cent of the respondents would like to produce their vegetables on their own. A great majority (53.33 per cent) of the respondents expressed their willingness to pay nominal cost incase technical know how, necessary inputs and equipments are arranged to facilitate them to produce required vegetables on their own. It was also found that a majority of the respondents were having some place either on the rooftop, balcony, backyard and other open places to produce vegetables. A considerable (41.67 per cent) of respondents expressed that there is adequate water for producing vegetables. Interestingly 55 per cent of the respondents opined that they possess required knowledge to produce vegetables on their own.

This clearly indicates that many urban of the population were not fully satisfied with the present way of purchase of vegetables in terms of price, quality, timely availability, measurement etc. On the other hand they were willing to produce on their own and pay a nominal cost incase technical know how, necessary inputs and equipments are arranged. They also have adequate space and water to produce vegetables to meet their requirement.

Based on the understanding and learning's during the study, the following steps are proposed to promote urban agriculture.

## Suggested Road Map to promote Urban Agriculture

- Need to promote schemes to support the concept of urban agriculture in the cities and urban centers. The technical department along with local bodies may be made responsible for planning and operationalising urban agriculture initiatives as specific projects.
- A large-scale awareness campaign may be undertaken on urban agriculture through various media for the urban population.
- Adequate extension support to introduce urban agriculture through the existing public extension system, NGO's, Consultants may be promoted effectively.
- Promoting a one stop shop for urban agriculture or a Mall on urban agriculture on a PPP mode, which can provide all inputs like seeds, equipments, and other related services under a single umbrella, along with technical guidance needs to be promoted.
- Documentation has to be done on experiences and learning from the existing practices or situations and dissemination of the same to the urban population.

- Knowledge sharing platform like creation of websites or linking to the existing websites may be done to share the evidence and experiences among all the stakeholders. It could be success stories, photos, projects, programmes etc.
- The entire stakeholder base like entrepreneurs, nursery growers, retired technical personnel need to be identified and involved in providing the necessary services for successful take off of urban agriculture.
- Research activities may be initiated on urban agriculture to evolve different models and location specific technologies on urban agriculture.
- There is a need to develop technical manpower on urban agriculture across the country and involve them in capacity building activities for the producers of urban agriculture and other stakeholders.
- There is a need to link technical institutes like SAUs/ICAR research organizations and experienced and successful practioners in capacity building activities.

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