

AVAILABILITY OF FOOD COMMODITIES THROUGH URBAN AGRICULTURAL PRACTICES: A STUDY IN DELHI

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Abstract- Space and population are the major problems of Indian Cities. It is making urban life increasingly difficult. Generally, the nutritional security is compromised in these areas because of non-availability of food, price fluctuations and poverty. However, in the recent years concerns about the quality of home-grown food has increased. Considering this change in the urban population, the study on Availability of food commodities through Urban Agricultural Practices was conducted in Delhi.

A total of 60 samples (20 each) were purposively taken from the three locales of South Delhi; Green Park, Greater Kailash and Vasant Kunj. The findings of the study revealed that majority of the participants, who were involved in agricultural practices were females. The reasons cited for doing these practices were: health and importance of organic food in maintaining a healthy lifestyle. Rooftop gardens were commonly adopted by the respondents. The commonly grown vegetables reported were brinjal, spinach, lettuce, salad leaves, okra, tomato, beans, carrot, beetroot and white & red radish. Herbs and spices included green chillies, coriander, fenugreek, paprika, basil, mint, parsley and turmeric whereas fruits like guava, sapota, lemon, cherry, fig and sweet lime were also reported to be grown.

Majority of the respondents felt that the quantity produced is not sufficient enough to fulfil the whole nutritional requirement but they felt that the vegetables and fruits which are grown in their gardens are seasonal in nature and it fulfils the requirement of seasonal vegetables and fruits. As per the respondents the home-grown food items are far better in terms of quality, taste, appearance, price etc. They said that food commodities purchased from market have pesticides whereas they grow food crops in an organic manner. The findings suggest that with increasing *urbanization in India, it is important to adopt agricultural practices to get food commodities at household level.*

Keywords- organic food, rooftop gardens, agricultural practices, food commodities

1. Introduction

Generally, it is found that people living in urban areas have very less control over the supply and quality of the food they consume as compared to the rural population. The food prices, vegetables and fruits are often subject to huge fluctuations due to many factors ranging from the vagaries of the monsoon to spread of diseases to the changes in price in the international market and to the changes in policies governing import and export of agricultural commodities (Orsini, 2017).

Urban people also have no control over the use of pesticides and other chemicals used in producing the food, which has serious implications for nutritional value and safety of the food consumed. By the time it reaches the urban consumer the food will not be fresh and maybe refrigerated or artificially ripened. Use of chemicals to increase shelf life of the produce is also prevalent.

The proportion of the world's population living in urban areas is increasing rapidly, with majority of this growth in developing countries. As modernization engulfs both the developed and developing world, it is critical to address the

importance of urban agriculture (Mehta, 2017). Urban growth dynamics and development have posed serious questions of food production and processing, transport, and consumption. Sustainable urban food production has recently become a subject of interest across a range of professional and academic disciplines (Ramaswami, 2017). With food prices rising and with increasing incidence of extreme climatic events, the Food and Agricultural Organization of the United Nations (2018) has identified urban and peri-urban agriculture as a farming system that can contribute to domestic food & nutritional security and sustainable urban development.

Although in India urban agriculture has not been very popular as the rural areas have traditionally provided food for the country's population. In recent years there has been some interest in urban agriculture in some cities in India (Murro, 2016). In India, urban agriculture is being carried out in many cities including Mumbai, Delhi, Kolkata, Bengaluru and Chennai under the leadership of the government, private agencies or even individuals.

Rooftop gardens in the National Capital Region are growing in numbers. There has been an increase in the number of

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urban households growing vegetables for everyday consumption, but most need help in growing and maintaining the plants. Entrepreneurs have now started providing these services (fertilizer, cow dung, botanical pesticides, pots and even a gardener) to urban customers. Also, an increasing number of professionals in Delhi and NCR are now renting agricultural land for organic farming for the growing desire among urban residents to grow their own food. There are many enterprises, which help them lease farms, provide technical guidance and raw materials (Ramaswami, 2019).

Considering the importance of urban agricultural practices in achieving food availability, the present study was undertaken in Delhi. The present study reflects upon various aspects of availability of food at household level in urban areas by performing agricultural practices.

1.1 Objectives

- To determine the reasons for performing agricultural activities at households
- To find out the food crops grown by the participants
- To know the opinions in regard to acquirement of recommended vegetables/ fruits in balanced diet
- To understand the opinions regarding home-grown and purchased food commodities

1.2 Study area

There has been an increase in the number of urban households growing vegetables and fruits for everyday consumption, especially in Delhi. South Delhi part, which included Green Park, Greater Kailash and Vasant Kunj was selected for the present study, due to high density of people engaged in urban agricultural practices at household level.

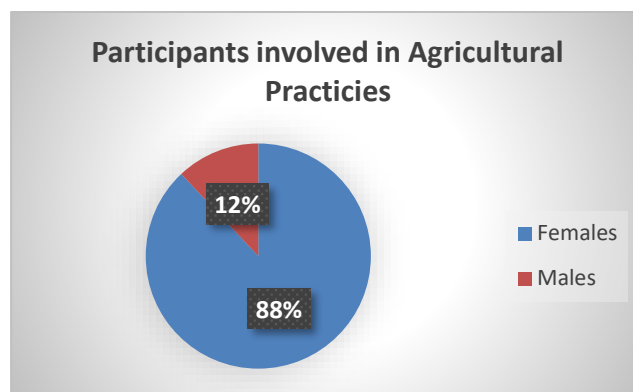
2. Methodology

Semi-Structured Interview Schedule was the tool used to get in-depth information regarding various aspects of availability of food commodities through Urban Agricultural Practices.

Aspects related to access to fresh fruits and vegetables, access to sufficient amount of food, nutritional requirement of diet were covered under this section. To gather the opinions regarding the difference between the home-grown vegetables and fruits and purchased ones, the tool was strengthened. This section mainly incorporated accessibility, acquirement and availability of food commodities to the respondents through the terrace/ verandah garden.

3. Findings and Discussions

3.1 General description of respondents



Graph 1. Participants involved in Agricultural Practices

**N=60, 20 households each from Green Park, Greater Kailash and Vasant Kunj*

Usually, studies related to agriculture in rural areas involve male participants but in the present study, 88 percent of the participants, who were involved in agricultural practices were females (Graph 1) and 48 percent of participants were more than 30 years of age.

The females reported to get engaged in these activities more than males due to concerns about their health and importance of organic food in maintaining a healthy lifestyle. The graduation was the minimum qualification attained by all the respondents. 62 percent of respondents reported to have nuclear family.

3.2 Garden Infrastructure

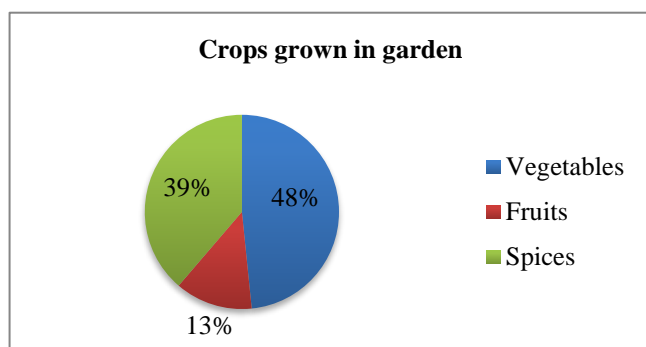
Rooftop gardens were commonly utilized by the respondents due to vacant unused open spaces. About 85 percent of the respondents were engaged in rooftop gardening while others (15%) in verandah gardening due to rooftop being more spacious as compared to their verandah. One of the reasons revealed by participants was that the plants attract many insects such as mosquitoes and other pests which get access to their homes. Also, if in future they want to expand their garden by growing more food items, they can allocate more space of their rooftops to their gardens.

Respondents who were engaged in verandah garden were the ones who were either living in single apartments and did not have access to rooftops or they only wanted to grow few food crops which can be grown in the verandah itself. Few respondents also had a spacious verandah, therefore used it for growing food crops. Respondents growing in verandah were usually using baskets for growing leafy vegetables such as fenugreek, celery and coriander so that it doesn't occupy much of the space.

Studies done by Specht, 2015; Thomaier et.al, 2015; Randhawa, 2017; Gupta et.al, 2015; Khumalo & Sibanda, 2019 and Berges, 2016 also had similar findings and concluded that rooftop gardens are highly appreciated as rooftops are generally vast, unused spaces that present opportunities for productive use and people usually appreciate green areas for recreational spaces. Therefore, urban

agricultural activities on rooftops, even if they are dedicated to private activities, are less often perceived as competing or conflicting forms of land use.

3.3 Food Crops grown by the participants



Graph 2. Crops grown in garden by the participants

**N=60, 20 households each from Green Park, Greater Kailash and Vasant Kunj*

It can be noted from the given figure (Graph 2) that about 48 percent of participants were growing vegetables followed by 39 percent of respondents were engaged in growing herbs and spices and only 13% of them were growing fruits.

The major vegetables reported to be grown were brinjal, spinach, lettuce, salad leaves, okra, tomato, beans, carrot, beetroot and white & red radish. Herbs and spices included green chillies, coriander, fenugreek, paprika, basil, mint, parsley and turmeric whereas fruits include guava, chiku, lemon, cherry, fig and sweet lime. It was observed that food crops which are easy and fast growing were grown mostly by the respondents. It was also reported that selection of crops done on the basis of demand and ease to maintain. While Dubey et. al, 2017; Hallet et.al, 2016; Mehta et.al, 2017; Deller, 2017 and Burgin, 2018 proposed that agriculture practicing households in urban areas predominantly practised field crops because they provide households with staple food items for their diets.

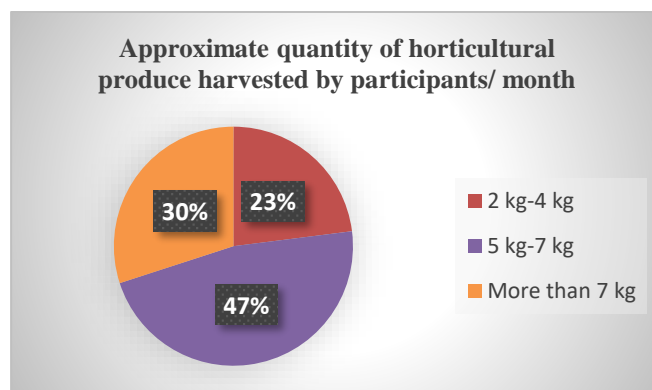


(a) Celery



(b) Tomatoes

(Photograph 1: Vegetables grown in gardens)



Graph 3. Approximate quantity of horticultural produce harvested by participants/ month

**N=60, 20 households each from Green Park, Greater Kailash and Vasant Kunj*

Most (47%) of the respondents stated that they are able to harvest approximately 5 to 7 kg of horticultural produce in a month from their gardens followed by 30% of the respondents who could obtain more than 7kg/ month while 23% of the total participants were able to harvest the produce between 2 and 4 kg, these were the ones who had very limited piece of land and were involved in verandah gardening, having an area of less than 100 sq. ft. It can be inferred that the respondents who had allocated more of the area to their gardens with proper maintenance and nurture the plants had reaped the benefits in terms of quality production.



(a) More than 300



(b) Area between 150-200

(Photograph 2: Area used for rooftop gardens in sq. ft)

3.4 Responses regarding access to fresh horticultural produce

The researchers wanted to find out about the main reasons for performing agricultural practices at households. She got to know that many households practice agriculture, because they did not have access to healthy and fresh food earlier. About 63 percent of respondents agreed that they obtain more fresh vegetables and fruits from their gardens as they directly collect them when the produce attain desired maturity. They responded that food commodities purchased from the market come from distant farms so they are not as fresh as their own produce.

Similar kind of findings were cited by various researchers like Rezai et.al, 2016; Specht, 2015; Murro, 2016; Berges, 2016; Randhawa, 2017. They reported that growing daily basic vegetable crops improves the fresh food availability of an individual. The fresh food products are more available and accessible by households engaged in practicing. Products

obtained from grown at households are superior in terms of “freshness” and have positive effects on the healthy and quality life. While contradictory results were cited by some of the researchers like Tornaghi, 2015; Kortright & Wakefield, 2015; Soga et.al, 2017; Sahasranaman, 2016. They reported about the perceived risks of contamination through air and soil.

3.5 Responses regarding access to sufficient amount of food

Respondents were interviewed regarding the access to sufficient amount of food through their gardens. 72 percent of them disagreed regarding the access to sufficient amount of food, followed by 13 percent of neutral responses and only 15 percent of the respondents agreed to the fact that their gardens are able to provide sufficient amount of food commodities to them.

Most of the respondents reported that although their gardens provide them with fresh food commodities but do not provide it in sufficient quantity and to supplement it, they need to purchase from markets. People who had a big terrace or rooftop and have their gardens covering the entire space and the ones with nuclear families were the ones, who agreed that they get sufficient amount of food. The main reason behind this might be the large producing area for growing food crops.

Berges, 2016; Thomaier et.al, 2015; Shisanya et.al, 2016; Sahasranaman, 2016; Nugent, 2016; Rezai et.al, 2016; Randhawa, 2017 in their studies claimed that urban agriculture at households cannot be expected to satisfy the urban demand for food. In the present study majority of the participants were not satisfied with the amount of food obtained or produced from their garden to fulfil their requirements as they had to rely on market purchased products to satisfy the needs of their family members but at the same time some of them were satisfied who had big spaces.

3.6 Responses regarding acquirement of recommended vegetables/ fruits in balanced diet

In this study, 57 percent of the total respondents agreed that they get recommended vegetables/ fruits in their diets. Majority of the sample responded that this is the main reason behind choosing vegetables and fruits to be grown in their gardens and requirements of seasonal vegetables and fruits are met through it. They obtain plenty of vegetables and fruits depending on the season. At the same time some of the participants disagreed with this statement and said that produce is less in comparison to their requirement and they have to buy required amount of fruits and vegetables from the market to fulfil the requirement. Seasonally, few of the crops flourish well, hence providing them with fair amount of vegetables/fruits required.

Respondents who remained neutral reported that mostly in winter season they obtain good amount of fruits and vegetables from their garden but as soon as summers approaches and heat increases, many crops fail to grow and it makes them unable to get required amount of vegetables/

fruits. Therefore, they do get recommended fruits and vegetables in some seasons and do not get in others. It also depends upon maintenance of their garden by their gardeners or organisation they are connected with for maintenance purposes as there are times when due to lack of proper maintenance, the crops fail to produce the amount of vegetables/fruits it is supposed to. Khumalo & Sibanda, 2019; Shisanya et.al, 2016; Deller, 2017; Murro, 2016; Hartmann et.al, 2016; Ali & Srivastava, 2017; Burgin, 2018, Mehta et.al, 2017; Dubey et.al, 2017 reported in their studies that households involved in own food production were concerned about food requirement in diet than those households that mainly relied only on purchasing of food commodities.

3.7 Responses regarding meeting nutritional requirements in the diet

Information regarding meeting nutritional requirement in the diet, through food crops in rooftop/ verandah garden was sought by the researcher. 62 % of the total respondents agreed that the food crops grown in their gardens ensure meeting the nutritional requirement of the diet. They believed that growing of organic food commodities and consumption of those fulfil the nutritional requirement of the diet. Consumption of fresh food crops, which are free from any chemical pesticides and fertilizers ensures the nutritional quality of food as compared to those purchased from market. Those who could do proper maintenance of their gardens and obtain good amount of vegetables and fruits contemplate that their nutritional requirements are fulfilled by those home-grown food crops.

At the same time some of the respondents disagreed and stated that insufficient amount of food commodities is obtained from their gardens. Most of these participants had area less than 100 sq. ft. Murro, 2016; Zezza & Tasciotti, 2015; Rezai et.al, 2016; Orsini, 2017; Gupta et.al, 2015; Kaur et.al, 2015, Tornaghi, 2015; Dhyan et. al, 2019 in their results confirmed that engagement in farming by urban households can allow them consuming better, more nutritious diets, filling an essential share of nutritional needs. It impacts the dietary adequacy and has the potential to improve nutritional security through direct availability of food in a cost-effective way.

3.8 Opinion regarding difference between home grown and purchased food commodities

All of the respondents felt the difference between home grown and purchased food commodities based on various parameters. 43 percent of the participants stated that quality as the major difference, followed by taste (24% participants), appearance (20% participants) and price (13% participants).

According to interviewees, the home-grown food commodities are far better in terms of quality, taste, appearance and price. Participants stated that food commodities purchased from market carry pesticides whereas they grow fully organic food crops. This in turn enhances the quality and taste of the food grown at homes. As the products obtained grow under their care and observation, they make sure that quality is not compromised. Also, the food crops are harvested as soon as they reach their full maturity, providing

fresh appearance as compared to market purchased products. They felt the difference between freshly harvested food crops and the ones purchased from market having undergone transportation and storage changes. The difference in price were felt by few respondents as the cost of installation and maintenance of garden were also not too less in comparison to the purchased commodities, but when the comparison is made with organic products sold in the market, the difference could be perceived much larger by the most of the participants. Kortright & Wakefield, 2015; Rezai et.al, 2016; Oberndorfer, 2016; Natalie; 2017; Hallet, 2016; Tornaghi, 2015; Dhyani et.al, 2019 and Thomaier et.al, 2015 concluded in their studies that urban agriculture provides a high level of transparency in terms of the origin of the food and its production process, which is a major concern of any consumer and shapes the individual experience and perception about difference in various parameters like quality, taste, price & appearance of home grown food and purchased ones. The perception of food quality is also affected by aspects related to origin, trust, freshness and flavour; thereby people have suspicions about the origin and quality of the products available in grocery stores and supermarkets.

4. Conclusions

In the present study Rooftop gardens were commonly utilized by the respondents due to vacant unused open spaces and opportunity for further expansion. Majority of the participants were growing Fast growing vegetables like brinjal, spinach, lettuce, salad leaves, okra, tomato, beans, carrot, beetroot and white & red radish, as it was easy to maintain and give results in minimum time. Herbs and spices like green chillies, coriander, fenugreek, paprika, basil, mint, parsley and turmeric crops were also found to be grown. Few of the participants, who had large area grew fruits also, guava, sapota, lemon, cherry, fig and sweet lime.

62 % of the total respondents agreed that the food crops grown in their gardens ensure meeting the nutritional requirement of the diet. They believed that growing of organic food commodities and consumption of those fulfil the nutritional requirement of diet. All of the respondents felt the difference between home grown and purchased food commodities based on various parameters like quality, taste, appearance and price. It can be concluded that urban agricultural practices enhance the availability of food along with nutritional security. So, more facilities and training should be provided to people living in urban places to address food security issues.

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