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Urban farming: Knowledge Management and Impact – Lessons from twin cities of Hyderabad and Secunderabad

A. Vincent[1], Saravanan Raj[2] and B. Suchiradipta[3]

Abstract

Urban farming is now seen as a way to nutritional security of the burgeoning city masses and a means to daily sustenance. Most of the population in the cities have started practising agriculture on the spaces available to them. Urban agriculture is catching up in most of the Indian cities such as Chennai, Bangalore, New Delhi, Mumbai and Pune etc. In Hyderabad as well, increased access to information and extension advisory services of the Urban Farming Division (UFD) of Horticulture Department, Hyderabad have induced most of the urbanities to practice agriculture. Urban farming has a positive impact on both the practitioners and the city. In view of this, a study was taken up on Urban farming: Knowledge management and impact – Lessons from twin cities of Hyderabad and Secunderabad to understand information sources for urban farming practitioners and impacts of urban farming on cityscape. The study revealed that online content and virtual knowledge were found to be the most important sources of agricultural knowledge. A variety of ICT services were used by the urbanites for sourcing the information, which include Facebook groups, online agri store, WhatsApp groups etc. In the same way, neighbours with similar interests were one of the major sources for crop production knowledge. The study further observed that Urban Farming is capable of recycling the wastes, restoring the urban ecosystem and stabilising the health of both human and urban city scape. It is believed that the results of the study would help the scientific community, general public, extension functionaries to understand the importance of urban farming as well as to upscale good practices.

Key Words: Urban Farming, Information and Impact

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Introduction

Urban farming is capable of bolstering more social and political inclusion and is capable of sustaining the environment, facilitating economic progress, aiding water and land use management of the urban landscape. Urban farming also paves a way to nutritional security of the population and ensures access to daily sustenance of food and nutritional needs. According to the FAO report, 2015, urban garden lands are 15 times more productive than the rural holdings and further, the study noted that one square meter of the urban farm is capable of producing 36 heads of lettuce every 60 days, 10 cabbages every 90 days and 100 onions every 120 days.Further, FAO articulates that, of the 54.29 per cent of the urban population, 10.66 per cent of (0.8 billion) of the population is found to be involved in urban farming and believed to have produced one-fifth of the world food production.

Most of the population in the cities has started practising agriculture on the spaces available to them. They also source information from a variety of domains and platforms. The information sources that the urbanites tap into are unique as they use different cognitive approaches to learn and share information related to farming and crop production. In Hyderabad as well, increased access to information and extension advisory services of the Urban Farming Division (UFD) of Horticulture Department, Hyderabad have induced most of the urbanities to practice agriculture. The initiatives and a broad range of extension services of the Urban Farming Division of Horticulture Department have played a major role in creating awareness about agriculture among the urbanites. This coupled with, the rural farming background of most of the urbanites has kindled interest among them to pursue the noble profession of agriculture. These twin characters have led to large scale adoption of agriculture by most of the urbanities.

Overall, urban farming has a walloping positive impact on both the practitioners and the city as a whole and it also comes at a time when the cities have become a prey to the growing industries, tanneries, concrete jungle, pollution and booming population. In view of this, a study was taken up on Urban farming: Knowledge management and impact – Lessons from twin cities of Hyderabad

and Secunderabad to understand information sources for urban farming practitioners and impacts of urban farming on cityscape.The outcome of the study is expected to help the scientific community, general public, extension functionaries to understand the importance of urban farming and to upscale it across the cities and cosmopolitans with suitable extension strategies. The study has documented about 25 urban agricultural practitioners and their knowledge sources regarding agriculture and the impacts of urban farming/agriculture with the following objectives:

Objectives

1. Identification of sources of information followed by urbanites on urban crop production

2 Analyzing the impacts of urban farming.

Review of Literature

Urban farmers are from all age categories and all walks of life (women, men wealthy, poor, locals and immigrants) and most of them are from low income households (FAO, 2014 and Robertson, 2013). The location, is either in the midst of the city or alongside or periphery of the city or intra-urban or inter-urban (Van Veenhuizen, Moustier and Danso 2007 and Lynch *et al, 2001)*. As far as crops included in urban farming, the urbanites practice urban farming essentially to meet their own food requirement (Devenish, 2006; Veenhuizen, Moustier and Danso, 2006). Many of the urban cities, have a family farm that includes production of foods for self-consumption and sale of the surplus to the markets for some income (Moustier and Danso, 2006).The Mexican city has produced an annual average of 15 000 tonnes of vegetables from 22 800 hectares of land. In the Peru capital Lima, 5 000 ha of irrigated land is utilised for short-cycle vegetable crops for sale in city markets. The urban dwellers of Hyderabad city cultivate mostly para grass accounting for 65.00 per cent of the urban produce followed by leafy vegetables and one per cent of fruits, crossandra and jasmine flowers (Buechler and Devi, *2002)*.

As far as information sources for urban farming are concerned, 88.00 per cent of the vegetable farmers in the urban part of Accra, Ghana have radio as a source of information followed by friends (64.00 %), extension agents (52 %), agro-chemical shops (45.00 %), television (37.00 %) and others (27.00 %) regarding farming and 68.00 per cent of the urban vegetable farmers use information on application of fertilisers followed by 63.00, 62.00, 56.00, 32.00, 31.00 and 30.00 per cent of them using information on organic farming, weedicides, soil improvement, pest management, market price, and pesticides respectively. (Osei *et al, 2017*). About 77.20 per cent of the livestock keepers of Kinondoni and Morogoro urban areas of Tanzania depend mostly on veterinary shops for their information and almost 63.80 per cent of them contact extension officers for information followed by 40.20, 39.80, 29.10 and 12.60 per cent of the livestock keepers who access information from fellow livestock keepers, print media, agricultural exhibitions and meetings/seminars (Angello et al, 2016).

Material and Methods

An ex post facto research design was followed in this study. The respondents were selected by using the snowball sampling method. The case study analysis was also followed to study the good practices of urban farming. The information was collected using a semi-structured interview schedule and focus group discussion. Simple percentage analysis was used to assess the degree of impact of urban farming.

Background of urban farming practitioners

The study was carried out among 25 urbanites who are residents of Hyderabad. Most of the urbanites who have been interviewed were retired employees of both public and private sectors. Some of them are working in banks, private sector (Consultancy, engineering etc.). These urbanites have been habituated to work in (urban) garden as it gives a soothing impact from their “business as routine”.

Knowledge Management

Real time and virtual contacts for venturing into Agriculture- the first step to success

One of the major requirements of urban farming is the medium/culture for the production of crops. Urban agriculture is practiced in a variety of ways, unlike, rural agriculture, where the soil is the substance which is utilized as the growth medium/culture by virtue of its nature. In the urban landscape, the practitioners are dependent on the "kits" provided by the UFD. It has soil mixed with organic matter, seeds, and grow bags of different sizes. Likewise, the awareness of the urbanites about various online markets has helped them to purchase the inputs which are essential to the production of crops. All the more, the usage of these inputs is being learnt from social media like Facebook and WhatsApp besides the neighbouring practicing urban farmers, books and magazines. It was observed during the study that 15 of the 25 urbanites have purchased the urban farming kits at subsidized rates. These kits encompass crop production inputs including seeds (mostly vegetables and greens).Although the initiative of UFD has met the necessary inputs of agriculture, most of the urbanites have said that some of the online sites are selling the quality seeds with background information on the seeds (Table 1). The following are the most trusted online sites for the purchase of the seeds.

Table 1. Online sites for seed purchase for urban farming

S.No.	Online sites	Images	Available seeds
1.	www.ugaoo.com	UGAOO	Seeds of all vegetables, greens, fruits and flowers available.
2.	www.trustbasket.com	TRUST BASKET	Almost all varieties of vegetables, fruits and leafy vegetables are available. However, most of them are hybrids.
3.	https://www.facebook.com/intipanta.in/	INTIPANTA	Shares the availability of images and seeds pertaining to urban farming
4.	https://seedbasket.in	SeedBasket	Seeds of all vegetables, greens, fruits and flowers available.
5.	www.niamigarden.in		Seeds of vegetables, greens and fruits and to some extent ornamental flowers . The most noteworthy is that the online shop sells only the open-pollinated variety and non-hybrids seeds and local cultivars of years old. Hence, all of these seeds are organically viable and germinal.

A start-up on the website for Urban Farming Kits – A case of Mrs Vijayalaxmi

The seeds for Mrs Vijayalaxmi's farming were purchased from various parts of the country, through her friends i.e., seeds of vegetables and leafy vegetables from local farmers at Pune and Jammu. However, in due course of time,Mrs Vijayalaxmi has started selling her own seeds, which were produced from her garden, through the online website www.MyEdibleGarden.in and facebook.com/MyEdibleGardenIndia. Besides, she maintains a wide range of gardening materials, equipment, tools and crop inputs required for practising agriculture on her website, thereby enabling the urbanites to procure all the necessities of gardening on a real time basis. The chief aim of starting the sites is that every urban dweller can become a producer rather than just a consumer. These online

sites and novel initiatives may help the urbanites to become self-sufficient in seed production, in particular, the areas adjoining Sainikpuri, Secunderabad. What is more important is that, by now, these urban farmers have started producing seeds of their preference and suitability, thereby creating a new domain "Seed Urban". The initiative was found to be more successful as the access to quality and preferable seeds are now at the hands of urbanites. Hence, the extension functionaries of both the State Agricultural Management and Extension Training Institute(SAMETI), in Hyderabad and urban farming division need to popularise such innovations across the twin cities (Hyderabad and Secunderabad). Extension strategies may also be developed to upscale the practice to the other cities of the country.

"Home Made Remedy" for the Management of Crops

Plant protection plays a crucial role in the management of crops. Due to the cent percent literacy of the practitioners (respondents of the study),the management of crops be it protecting the crops from insects and pathogens or watering the plants or manuring the crops, the practitioners are largely dependent on various platforms. Many times, the urbanites have also sourced the information from the neighbours regarding the preparation of Farm Yard Manure (FYM), Terracotta composting, common bin method (dumping of kitchen wastes and other wastes), vermicompost, fish tank water etc.

Urbanites have started preparing homemade pesticides such as bio liquid, bio liquid extract,Amrithapani etc. and, water management is done with the help of wastewater, greywater, recycled water etc. Thirteen of the 25 urbanites in the study use the hose for watering, the bucket method, rose cane watering method are also wisely used by the urbanites (Table 2). Crop management is done by both men and women alike in the urbanscape of Hyderabad and Secunderabad.

Table 2. Method of Irrigation

n=25

S.No.	Method of Irrigation	Urbanites	Per cent
1.	Hose watering	13	52.00
2.	Bucket watering	4	16.00
3.	Drip irrigation	3	12.00
4.	Rose cane watering	1	4.00
5.	Hose watering + Bucket watering	2	8.00
6.	Hose watering + Rose cane watering	2	8.00
	Total	**25**	**100.00**

Social media as a virtual learning platform for urban farming

Virtual learning has also gained momentum among the urbanites as it reduces time and makes the leaning easier and simpler. Several social media platforms are used by the urbanites to source information concerning crop production. Among them, Facebook groups, YouTube channels etc., have increasingly been used by the urbanites. However, the print medium has not lost its vibrancy owing to its established credibility among urban readers.

Table 3. Connecting through Virtual Platforms

S.No.	Sources	Remarks
I	**YouTube channel**	There are a variety of YouTube channels which have served as the source of information for crop production in urban farming.
1.	eTV Abhiruchi (https://goo.gl/oH8Zfu)	The famous Telugu YouTube channel with the subscription base of 80,000 mostly focusses on the kitchen recipes of Telangana and Andhra Pradesh. Besides, it features successful kitchen

		gardening of Hyderabad and Secunderabad cities and their good practices. Therefore, many of the urbanites who are in need of information in urban farming can view the related information by searching in the search box provided e.g. Rooftop gardening.
2.	Nature's Voice (https://goo.gl/Y14rE7)	It has more than 11,000 subscribers and it brings out the farming practices done organically and with nature. It covers farmers who have been successful in natural farming. Importantly, it covers urban farming also so as to help the urbanites who are interested or practising farming at their terrace, garden, backyard, etc.
3.	Gardens of Abundance (https://goo.gl/FkiE2K)	It posts the videos related to urban farms which are under permaculture. It covers farming done on rooftops, balcony, terrace, backyards and so on.
4.	Kitchen Garden (https://goo.gl/PGthVz)	It posts videos related to basics on the know-how of soil, compost, pot preparation for urban farming, gardening and how to grow care crops.

II	**Facebook groups**	There are some urbanites whose source of information on urban farming are the following Facebook groups
5.	Intipanta - organic kitchen/ terrace gardening (https://goo.gl/dr7qPh)	The membership of this Facebook group is about 34,000 and this group shares the information through experience and query posts, photos and videos related to organic urban farming. Members of the group update the site with the products they cultivate from their own households, pest and disease affected plants so as to get the responses on organic control measures from the respective members in the group; the procedures of preparation of bio and organic pesticides and manures like bio-enzymatic cleansers. Articles on urban organic farming and related posts released elsewhere are made available on the pages of group members. Besides, the demos conducted elsewhere are made available so as to inform the other members of this group, if they were not able to attend the demonstration on preparation of organic fertilisers and pesticides for example.

6.	MyediblegardenIndia (https://goo.gl/wNvJZD)	Website created by Mrs Vijayalaxmi, a retired teacher residing at Sainikpuri, Secunderabad (Telangana State) It deals with day to day garden practices and posts information related to crop production, seeds and materials needed for urban farming, news and events related to urban farming.
III	**Newspapers**	Information and articles about successful urban farming initiatives are covered in newspapers.
7.	Sakshi	A few of the success stories of urban practitioners, case studies etc., relating to urban farming are circulated in these newspapers
8.	Eenadu	

Virtual -extension- A case of Sainikpuri garden club

Urban farming facilitates people of all classes, castes, creed, education and occupation to unite together under one umbrella "urban farming". This is evident from a WhatsApp group of Sainikpuri garden club, Secunderabad. It was established among the urbanites who maintain either a backyard garden, or a rooftop garden or kitchen garden. The group is two years old. It is one of the effective WhatsApp groups as claimed by the administrator of the group, Mrs Deepa Shailendra. The members of the group share information on production practices of various crops of vegetables, greens and fruits.The members also post pictures of the crops affected by pests and diseases to identify and to recommend advisory measures to control them on a daily basis. The administrator of the group opined thatit is extremely supportive at the time of sudden outbreak of pests and diseases during peak season.

The members of the group respond to the queries as soon as they see the posts. The Sainikpuri Garden club also shares information like exhibitions, trainings, workshops, seminars, meetings and other similar activities related to urban farming. As the members (Mrs. Sudha Gorthi, Mrs Vijayalaxmi and Mr V.S. Moorthy) of this group claimed, many a times, they have come to know about exhibitions and meetings pertaining to urban farming through this group. Above all, this group shares information about availability of seeds of various vegetables, fruits and greens available with them along with the images of the seeds. Thus it is facilitating the members to approach the concerned persons to get the seeds. Whenever there is a bulk yield of crops, it is shared on the WhatsApp group and those who require can buy them.

Therefore, the WhatsApp group-Sainikpuri Garden Club is immensely helpful to the members of Sainikpuri colony who have been practising urban farming for some time now.

Besides, urban farming, it facilitates people of similar interests to discuss various practices and methods related to urban farming. It is evident from Habsiguda urban farming, wherein the urbanites like Er. Babu. P. John, Mr Hemanth V. Mulay, Mr Mallikarjuna Rao, Dr K. Sudhakar Reddy and Mr K. Bhaskar, have united on the common grounds of urban farming, irrespective of the fact that they are from different locations of Habsiguda, Hyderabad. Moreover, they have been planning to take urban farming to the next level and are discussing various innovative practices and technologies that can be employed in urban farming, thereby making urban farming more viable and in harmony with nature.

Therefore, it is observed that urban farming has paved the way for these urbanites to have a common forum of discussion and conversation. However, many of the urbanites have no access to these groups neither have they heard about the existence of the WhatsApp group and other groups on Facebook like www.facebook/intipanta/. www.facebook/ Grow your own food/. Therefore, the Urban Farming Division of Horticulture Department, Hyderabad, Telangana, may create awareness among the other potential urbanites and can make use of mass media for wider publicity about these groups.

The groups' activities may be telecast and broadcast through television and radio respectively. The information about these social media sites initiated by the urbanites may be displayed at horticulture and agriculture exhibitions along with the technologies and innovations pertaining to urban farming and gardening practices. As these groups are effective in spreading knowledge and hands-on experience, sharing the stories ofsuccessful practitioners of urban farming, innovations and localised practices etc, can help scale them up. Similarly, the Urban Farming Division of Horticulture Department, may also start a Facebook page, WhatsApp group and YouTube channels on Urban Farming, so as to make available good practices and information related to urban farming anytime, anywhere and to the concerned urbanites. Thus, the development of the social media groups would not only help the government to share and get feedback but also help learn about the real time problems faced by the urbanites regarding the practices and management of crop production.

Impact of Urban Farming

The following elucidation gives an idea to what extent urban agriculture sustains the city atmosphere and how it impacts the landscape of cities.

Impact of urban farming on the environment of the cityscape

The environment is largely encompassed with natural resources. However, in the course of time, the natural resources like soil, air and water as well as flora and fauna have been ruined on account of anthropocegenic activities like over-exploitation of natural resources for the development of various industries. Moreover, the increasing population has led to the inevitable burden on both the availability and use of water, food and shelter. The water has become scarcer and food availability has turned out to be uneven and the spatial area for shelter has been hampered. These are more pronounced in urban areas.

As far as the impact of the urban farming is concerned, most of the practices included in urban farming are done in close proximity with nature. Similarly, several of those practices are capable of even offsetting ruined nature. Urban

farming is a way for a sustainable city environ, as it thrives under the conceptual framework of cultivation by conservation. Starting from the location of the urban farm to the harvesting of crops, urban farming encompasses innumerable good practices, for instance, the location for establishing urban farms is mostly rooftops, backyards, terraces, balcony and the exclusive land area which are mostly vacant and unused. Therefore, it makes use of the vacant area and transforms the cityscape into farms of greenery.

The advantages of establishing rooftop and terrace gardens are two fold; firstly it is able to prevent the penetration of scorching sunlight into the house directly and the other is the crops which grow on the rooftops/terrace are able to absorb and use the sunlight effectively for their metabolism. Moreover, when it comes to soil, the predominant soil used is red soil and it is generally taken from the lakes and ponds available in the city, (in this case the lakes of Ramanthpur and Himayatsagar) which deepens the lakes thereby helping to hold more water during the rainy season. However, one of the urbanites has even invented a novel method of growing crops, - the Compost of Coco Peat (CCP) Ravichandra's Growth Culture recognized by the Government of India. It has even reduced the exploitation of the soil medium as this growth culture has replaced the need of soil for crop production. More importantly, most of the growing medium is available at household levels, such as, waste buckets, containers, mud pots, waste tyres, broken aluminium vessels and so on, as observed among all the 25 urbanites who have used one or the other growing medium mentioned above.

Thereby, urban farming is an effective measure of reusing the plastic and other petrochemical materials used in the households which are otherwise dumped in the waste bins or thrown away.

Similarly, for the production of crops, urban farming does not use chemical fertilisers as is evident from the 25 urbanites, who use mostly homemade fertilisers like compost and vermicompost or the Coco Peat and cow dung from the Goshala. Again, in the preparation of the fertilisers, like compost and vermicompost, these urbanites make use of all the kitchen wastes, fruit peels,

rotten vegetables and fruits, leaf litter, waste paper and so on. Therefore, almost all of the household's wastes are converted into manure, through composting. Therefore, it is yet another way of conserving the environment. Urban farming follows organic farming method. In this way, urban farming has reduced the use of synthetic pesticides.

The pests and diseases are mostly controlled by using homemade pesticides or neem oil or other natural pesticides purchased from the markets. It is also evident from the urban farming models of Mr Vijay Uppal, Mrs. Vijayalaxmi, Mrs. Deepa, Mrs. Lalitha Iyar, Mr. V.S. Murthy, Mrs. Susie Tharu, Mrs. Beyniaz Edulji of Sainikpuri, Secunderabad and Mr. Ravichandra Kumar of Dilsukhnagar, Mr. Subba Rao of L.B.Nagar, Hyderabad that they have their own unique ideas for preparation of bio-liquid pesticides and bio-liquid extract. These bio/organic pesticides are also prepared using materials mostly available at the household level and kitchen waste. Therefore, it is not only effective against the pests and diseases of the crops but also protects the environment, in particular, the land, water and air from the waves of chemical pesticides and pollution.

Impact of urban farming on dwindling water resources and increasing power consumption

Urban farming is a unique farming model in the 21st century. It functions against the odd rule of exploitation of nature but for conserving and sustaining nature. As it is evident from the urbanites practising urban farming, in particular from the case of Mr Daniel and Mrs Vijayalaxmi of Sainikpuri, Secunderabad, and Mr Ravichandra Kumar of Dilsukhnagar, Hyderabad. In the case of Mr Daniel, it is unique as his backyard garden is irrigated only with rainwater harvested during rainy days in a special cement tank. Mrs Vijayalaxmi has also been irrigating the crops with the rainwater harvested in the tank. The most unique model in the conservation of water is the practice of Mr Ravichandra Kumar of Dilsukhnagar. Though the water source is municipal water, he recycles the water for more than 6 months. In this method, the water is lifted to the fish tank placed at the corner of rooftop on the stand and the water is carried to the crops through the PVC pipes connected with the fish tank. The valve is used for

opening and closing the release of water from the fish tank. The water is drained from the holes at the bottom of every growth medium through the pipes connected with the hole in each growth medium and gets collected in a common pool. The water is then filtered using filters. The filtered water is again carried to the fish tank and the cycle continues for about 6 months. Thus, these practices are not only effective in conserving water but also in recharging the groundwater. However, most households are not involved in rainwater harvesting and the water is being wasted as runoff and eroding the good mineral soil along with it. The government must make necessary efforts to make rainwater harvesting pits compulsory in every house on a priority basis. Besides, the government and other organisations may encourage the urban households to adopt and practice recycling of water. Moreover, the practices followed in urban farming increases the visits by birds into the household and the city more than before.

Impact on health

Urban farming is another way of improving health. All 25 urbanites perceived that after eating the produce from their own garden/farm, their asthma, blood pressure and thyroid have reduced as they have been cultivating their crops organically and do not use synthetic pesticides to control pests and diseases. According to the urbanites, these organic produce are better in taste and flavour.The greater advantage of urban farming is that it improves access to fresh and green vegetables. Most of the urbanites cultivate even Cole vegetables like cabbage, broccoli etc. As a result, these serve as a natural medicine to arthritis and diabetes. On health impacts, Mrs. Deepa Shailendra of Sainikpuri, Secunderabad, spoke about it as, “it gives exercise to the human body as farming requires a fair amount of activity that is to be done in order to maintain the farm; besides, urban farming is a stress buster, maintains the blood pressure and diabetes at perceivable level”.

Impact on monetary savings

It was observed during the survey that the practitioners have also recorded monetary savings apart from the health benefits. The study results show the

impact made by urban farming on reduced purchase of vegetables, greens and fruits, and the savings thereof. The following table gives the illustration of savings on the reduced purchase of vegetables from the market.

Table 4. Vegetable Crops cultivated in Urban Farming n=24

S.No.	Vegetables	Urbanites	Percentage
1.	Tomatoes	17	68.00
2.	Brinjal	16	64.00
3.	Bhendi	14	56.00
4.	Chilli	14	56.00
5.	Bitter gourd	9	36.00
6.	Bottle gourd	7	28.00
7.	Ridge gourd	7	28.00
8.	Snake gourd	5	20.00
9.	Cluster bean	3	12.00
10.	Pumpkin	3	12.00
11.	Kovakkai	3	12.00
12.	Broadbean	2	8.00
13.	Lab lab	1	4.00

*Multiple response

Table 5.Impact on savings of vegetables n=24*

S.No.	Savings on expenditure on vegetable purchase (INR) /month	Urbanite	Per cent	Yearly saving (INR)
1.	About 200	11	45.84	26400
2.	400	6	25.00	28800
3.	600	2	8.34	14400
4.	800	1	4.16	9600
5.	1000	2	8.34	12000
6.	2000	1	4.16	24000
7.	50	1	4.16	600
	Total	**24**	**100.00**	**115800**

* One of the urbanites (Mrs. Beyniaz Edulji of Sainikpuri, Secunderabad) interviewed did not have any vegetable but has only fruit crops

It is noted that 45.84 per cent (11 of 25) urbanites have been able to save about Rs. 200 every month on the purchase of vegetables. Similarly, 25 per cent (6 of 25) urbanites saved about Rs.400 every month on vegetable purchase and that is about Rs. 28,800 every year. Another two urbanites saved Rs.600 on an average every month on vegetable purchase and two saved about Rs.1,000 every month on vegetable purchase. One urbanite saved about Rs.2,000 every month. Put together, all of these 25 urbanites together saved about Rs. 115,800 every year. (Table 5) Public and private extension systems need to create awareness and upscale the existing strategies on urban farming.

The government may take necessary efforts to promote urban farming across the city. This could ensure food and nutritional security of the mounting urban population.

Impact of savings on greens

Greens are the major nutritious source of human diet. Greens have long been considered to be the supplier of energy and fillip to the metabolism of the human body. Moreover, greens are always a part of Indian cuisine. In this backdrop, the survey result encompassed the savings out of cultivation of greens under urban farming.

Table 6. Leafy vegetables in urban farming n=24

S.No.	Leafy vegetables	Urbanites	Per cent
1.	Spinach (Palak)	14	56.00
2.	Hibiscus (Gongura)	10	40.00
3.	Fenugreek	8	32.00
4.	Coriander	7	28.00
5.	Mint	6	24.00
6.	Lettuce	5	20.00
7.	Basil	4	16.00
8.	Amaranthus	4	16.00
9.	Curry leaf	4	16.00
10.	Ponnaguni keera	3	12.00

11.	Chukka	2	8.00
12.	Bachalakura	2	8.00
13.	Drum stick	2	8.00
14.	Turnip	1	4.00

Table 7. Impact of Urban Farming on Monetary Savings on Greens n=24*

S.No.	Savings on expenditure on greens purchase (INR) /month	Urbanite	Per cent	Yearly saving
1.	About 100	15	62.49	18000
2.	200	5	20.83	12000
3.	300	0	00.00	-
4.	400	1	4.17	4800
5.	500	1	4.17	6000
6.	25	1	4.17	300
7.	50	1	4.17	600
	Total	**24**	**100.00**	**41700**

* Mrs Beyniaz Edulji has not been taken into account since she has no greens except fruit crops

It is noteworthy that, growing of greens has led to considerable savings that 62.49 per cent (15 of 24) of the urbanites saved about Rs.100 every month on purchase of greens. In total, these 15 urbanites saved about Rs.18,000 every year. On the other hand, 5 of 25 urbanites saved Rs.300 every month on purchase of greens i.e., they have saved about Rs.12,000 every year. One of the urbanites saved about Rs.400, another saved Rs.500 on the purchase of greens every month, while a minimum of Rs.25 and Rs.50 had been saved by the respective urbanites who have been cultivating greens on a small scale. Put together, these urbanites who have been growing greens have saved up to Rs.41,700 every year. The government and Metropolitan Development Authorities of the twin cities of Hyderabad and Secunderabad have to take more steps towards establishing urban farms in all households. Also, urbanites who have no interest in urban farming should be encouraged to cultivate at least greens on a small scale.

Impact of Savings on Fruits

When it comes to savings on fruit purchase, all urbanites have not been able to make monetary savings as made with respect to vegetables and greens. However, Mrs Beyniaz Edulji does not depend on the market for fruits, as fruit crops grown in her household are sufficient to meet her household demand and saves about Rs.2,000-2,500 on a monthly basis.

Impact of Urban Farming on the Avian Activities in the twin cities

Modern urban conglomeration and unplanned developmental activities have halted the presence and mobilisation of birds to a greater degree. In this backdrop, urban farming is considered to be a fillip to the birds to revamp their activities in the urban areas, as it was observed that birds are seen more in households where urban farming has been practised. As a result of urban farming, these birds come to the plants and search for food from the crops grown either on the rooftops or terrace or the backyards Besides, all of these urbanites have a water dip (a bowl containing water at an accessible point to the birds) for the visiting birds to quench their thirst. Mrs Kaniza Yosaf Garari of Sainikpuri, Secunderabad, grows pearl millet exclusively for the birds visiting the terrace farm. Major Vijay Uppal of Sainikpuri, Secunderabad, has water and provision for the birds to build their nests in his backyard and surrounding garden in the house. Similarly, Mr Mallikarjuna Rao of Habsiguda, Hyderabad has a water container on his rooftop urban garden which serves as the water feed for the birds. Mrs Deepa Shailendra had built shelters for birds to nest and rest after seeing that the birds' movements have greatly increased on account of urban farming. Therefore, urban farming has become not only beneficial to human beings but also has become an abode of shelter to the birds. The government must take necessary steps to bring more urban farming into the city so as to enhance both the welfare of city dwellers and nature, including birds. Besides, urban farming has increased the activities of several butterflies as indicated by the urban farming practitioners.

Conclusion

It is evinced from the study that a number of information sources are utilised by the urbanites to learn and practice agriculture in the urban landscape. Urban farmers have their own way of sharing and receiving information pertinent to these practices which include social media like Facebook, YouTube channels and WhatsApp groups that have been serving as an effective way of getting and sharing information effectively among themselves. The information sources have led to the adoption of various good practices. On the other hand, these good practices followed in the urban landscape are capable of conserving the natural resources of the city landscape, saving the daily food basket expenditure, enhancing the health benefits and transforming the concrete jungle into greenery.

Recommendations

1. It was observed that, lack of scientific information as to how these practices are done is unknown. Thereby, efforts could be taken by the government, State Agricultural Universities (SAUs), to document the procedure and application of the practices followed in urban farming.

2. On the other hand, both the central and state Government could include promotion of urban farming as one of the mandatory activities of Krishi Vigyan Kendra(KVKs)/Agricultural Technology Management Agency (ATMA) in particular the KVKs/ATMAs located near the city or urban or sub-urban areas. Moreover, the government may possibly allot funds to KVKs to document and validate the novel practices followed in urban farming by various urbanites and conduct various training programmes to diffuse the knowledge of the same to the other urbanites who are in need of good practices for establish urban farms.

3. In the same way, the Agricultural and Horticultural universities and other institutes which are closely working with agriculture may take up projects and research on urban farming practices and information approaches across the country. This would bring to light more unseen and unexplored practices and information approaches followed in urban farming.

4. Moreover, video modules and models of good practices and information approaches are to be documented. These are to be uploaded on a common domain under Urban Farming (UF) either by Urban Farming Divisions or Department of Horticulture. Moreover, an exclusive website, Facebook page, Youtube channel may be created to host all of these practices and information approaches so as to make urban farming more viable and practically applicable in coming days. The Sainikpuri Garden club WhatsApp group approach in urban farming could be used as a model for creating ICT based groups in the near future.

5. The state and central government may perhaps take more steps toward implementing urban farming in schools located in both urban and sub urban regions in the country. It may not only help the school students to understand the importance of urban farming, but also kindle their interest and knowledge about the nutritive value of the crops right from the beginning.

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