



Advances in Research

18(1): 1-8, 2019; Article no.AIR.45056
ISSN: 2348-0394, NLM ID: 101666096

Status of Kitchen Gardening in Punjab

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Authors' contributions

This work was carried out in collaboration between both authors. Author SP designed the study, performed the statistical analysis, wrote the protocol, wrote the first draft of the manuscript and managed the analyses of the study. Author RK managed the literature searches. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AIR/2019/45056

Editor(s):

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Complete Peer review History: <http://www.sdiarticle3.com/review-history/45056>

Original Research Article

Received 23 September 2018
Accepted 05 December 2018
Published 29 January 2019

ABSTRACT

Kitchen gardening project is a revolutionary step to increase vegetable production, enable people to grow insect-free vegetables gainfully using empty tins, old utensils, clay flower pots and extra space in front and backyard and provide cheap and organic vegetables to the households. The present study was conducted with the objective to study the status of kitchen gardening. This study selected the two villages and comprised of households as respondents who were adopting the kitchen gardening. Thus, a total of 79 respondents comprised the sample of the study from two villages. The data were collected through personal interview method with the help of a structured schedule. The study highlighted that half of the population from both the villages engaged in kitchen gardening and almost all the adopters procured the seeds from market shops. Most of the adopters use the produced fully at their home for their family needs. Half of the women from near the city category participating in kitchen gardening operations with their husband. Almost all the adopters grew seasonal vegetables in their kitchen garden and some of them also grew fruits in their garden. Majority of the adopters manage the insect pest attack and diseases with the cultural/ biological methods. This study suggested that special motivational programmes about kitchen gardening

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should be organised for the involvement of women; so that more women should get attracted towards kitchen gardening and demonstration plots of kitchen gardening should be maximised to attract the community. The sale centres should be maximised for the easier access of the community at village level.

Keywords: Kitchen gardening; status; adopters.

1. INTRODUCTION

Indian agricultural economy witnessed a sharp increase in production and productivity due to the green revolution which led to higher income. The food security for an exponentially increasing population, the enhancement and improvement in agricultural profitability and environmental quality are still the major challenges. Safe food production and secure food supply are critical issues for low-income countries and it is important to develop all possible methods for the production and distribution of food [1,2]. In Benin, vegetable farming has provided a balanced diet to urban populations and enhanced farmers' household income and living standard [3,4]. In low-income housing areas of urban Penang (Malaysia), kitchen gardens have proved a symbol of place, identity and sense of belonging for local low-cost flat residents [5].

Fruits and vegetables play a significant role in improving health and providing food security and quality to the country's population. Vitamin deficiencies in developing countries are the "hidden hunger" which strike the core of health and vitality. Vitamin and mineral deficiencies affects over two billion people in 80 developing countries. These deficiencies can affect any and every system of the body and contribute not only to high rates of maternal and child deaths but also increase the morbidity like blindness, decreased IQ, lowered immunity, growth impairment and affliction by various diseases [6]. India alone is home to 40 per cent of the world's malnourished children and 35 per cent of the developing world's low-birth-weight infants. About 2.5 million children die each year accounting for one in five deaths in the world. More than half of these deaths could be prevented if children were well nourished. As per RDA daily intake of vegetables should be 300 g/person including roots and tubers, green leafy and green vegetables while it was very low in rural areas [7]. One of the easiest ways of ensuring access to a healthy diet that contains adequate macro- and micronutrients is to

produce diverse kinds of foods in the home garden [8]. Kitchen gardening is referred to the cultivation of a small portion of land which may be around the household plot or within a walking distance from home. They can be described as a mixed cropping system that encompasses vegetables, fruits, plantation crops, spices, herbs, ornamental and medicinal plants as well as livestock that can serve as a supplementary source of food and income [9]. Even very poor, landless or rural people practice kitchen gardening on small patches of homestead land, vacant lots, roadsides or edges of a field, or in containers. Gardening may be done with virtually no economic resources, using locally available planting materials, green manures, "live" fencing and indigenous methods of pest control. Thus, kitchen gardening at some level is a production system that the poor can easily enter [10]. Therefore, little attention is given to cultivating vegetables, though these are a significant source of human nutrition. The study was aim planned to analyse the status of kitchen gardening in Punjab.

2. MATERIALS AND METHODS

The study was conducted in Ferozepur district of Punjab. The villages of Ferozepur district is located at latitude 31.0026° N and longitude 74.8741° E, was classified into two categories near the city and far off the city. The distance of near the city category was 18-20 km and far off the city was 45-50 km. One village from each set was selected randomly. This study comprised of the households as respondents who were adopting kitchen gardening. One respondent from each household was selected. Thus, a total of 37 respondents far from the city category and 42 from near the city category comprised the sample of the study. Status was the prevailing position of kitchen gardening which was measured w.r.t. different aspects such as its adoption, area covered type of kitchen gardening, crops sown, benefits of the kitchen gardening etc. It was measured by direct questions with the help of an interview schedule.

3. RESULTS AND DISCUSSION

It can be noted from given data in Table 1 that in case of far off the city, nearly half of the respondents adopted the kitchen garden while 50.67 per cent of the respondents never adopted the kitchen garden. In case of near the city, the majority of the respondents adopted the kitchen garden and 40 per cent of the respondents never adopted the kitchen garden. It was further interesting to know that from how many years they were practising kitchen gardening. An equal percentage of the adopters from both the locations practising the kitchen gardening from less than 16 years and more than 33 years. More than one third of the adopters i.e. 37.84 and 38.10 per cent from far off the city and near city category practising the kitchen gardening from 16-33 years respectively.

Almost equal number of the adapters from both the sites engaging in kitchen gardening from less than 16 years and more than 33 years. Less than half of the adopters (40.54%) had a kitchen garden in the backyard of their house and an equal percentage of the adopters had kitchen garden on their farms and near the house. Kitchen gardens which were near the

house was a distance of 100 meter to 200 meters. In case of near the city, the majority of the adopters had kitchen garden on their farms followed by 26.19 per cent near the house and only 11.90 per cent of the adopters had kitchen garden in the backyard of their house and which were near the house was a distance of 30 meters to 50 meters. Almost all the adopters from both the locations procured seeds from the market shops. Only 19.04 per cent of the adopters from near the city and 8.11 per cent from far off the city procured seeds from Punjab agricultural university/KVK. Almost all the adapters from both the villages were not aware of the PAU model. More than ninety per cent of the adopters from both the locations use surplus produce fully at their home. Only 8.11 per cent of the adopters from far off the city and 2.38 per cent from near the city give surplus produce to their neighbours, friends and relatives. About 89.19 and 97.62 per cent of the adopters from both the categories wanted to keep the area constant. Only 8.11 and 2.38 per cent of the adopters from far off and near the city category wanted to increase their area to have more vegetables and fruits in good quality. Very less i.e. 2.70 per cent of the adopters from far off the city wanted to decrease the area of kitchen garden due to the time limit and theft problem.

Table 1. Distribution of adapters according to the status of kitchen gardening

S. no.	Parameters	Category	n=79	
			Far off the city f (%)	Near the city f (%)
1.	Status	Adoption	37 (49.33)	42 (60.00)
2.	Practicing (No of years)	<16	17 (45.95)	6 (14.29)
		16-33	14 (37.84)	16 (38.10)
		>33	6 (16.22)	20 (47.62)
3.	Location	Backyard	15 (40.54)	5 (11.90)
		Near the house	11 (29.73)	11 (26.19)
		On farm	11 (29.73)	26 (61.90)
4.	Source of procurement of seed	Market	34 (91.86)	34 (88.10)
		Punjab Agricultural University/ KVK	3 (8.11)	8 (19.04)
5.	Awareness about PAU kitchen garden model	Aware	1 (2.70)	3 (7.14)
		Not aware	36 (97.30)	39 (92.85)
6.	Use	Fully used in home	34 (91.89)	41 (97.62)
		Saleable surplus	3 (8.11)	1 (2.38)
7.	Prospects	Increase	3 (8.11)	1 (2.38)
		Decrease	1 (2.70)	--
		Keep area constant	33 (89.19)	41 (97.62)

Table 2. Distribution of adopters from far off the city according to the participation of their family members in various operations performed in the kitchen gardening

S. no.	Operations	n=37				
		Adopters				
		Yourself f (%)*	Spouse f (%)*	Children f (%)*	Labour f (%)*	Parents f (%)*
1.	Bed preparation	28 (75.68)	7 (18.92)	7 (18.92)	10 (27.03)	4 (10.81)
2.	Nursery raising/transplanting	28 (75.68)	7 (18.92)	7 (18.92)	9 (24.32)	5 (13.51)
3.	Sowing	27 (72.97)	7 (18.92)	7 (18.92)	9 (24.32)	5 (13.51)
4.	Irrigation	27 (72.97)	6 (16.22)	6 (16.22)	9 (24.32)	6 (16.22)
5.	Hoeing	26 (70.27)	6 (16.22)	6 (16.22)	9 (24.32)	6 (16.22)
6.	Harvesting	30 (81.08)	14 (27.84)	10 (27.03)	9 (24.32)	8 (21.62)

*Multiple response

There were six types of stages which were mainly used by the adopters and these were bed preparation, nursery raising/transplanting, sowing, irrigation, hoeing, harvesting. It is important to know how much of the family members involved in the different operations of kitchen gardening and data is placed in Table 2. In far off the city category, Majority of the adopters doing all the operations of kitchen gardening by their own. A little less than one fifth of the adopters doing bed preparation, nursery raising/transplanting and sowing with the help of their spouse and children. Approximate one fourth of the adopters doing nursery raising/transplanting, sowing, irrigation, hoeing and harvesting with the help of outside labour. An equal percentage of the adopters doing irrigation and hoeing with the help of their children and parents.

Information placed in Table 3 revealed that majority of the adopters from near the city category. An equal percentage of the adopters (23.81%) doing bed preparation, sowing, irrigation and hoeing with the help of outside

labour and their children. More than one-fourth of the adopters doing nursery raising/transplanting, irrigation and hoeing with the help of their children and outside labour. More than half of the adopters (57.14%) doing harvesting with the help of their spouse and therefore it further reveals that more participation of women in operations of kitchen gardening from near the city category. There is less involvement of adopter's parents from near the city is doing the operations of kitchen gardening as a comparison to adopters of far off the city category.

Information placed in Table 4 reveals that more than ninety per cent of the adopters grew spinach and almost equal percentage of the adopters grew coriander leaves and radish in both the locations. More than third fourth of the adopters from far off the city grew radish, mustard leaves (*Sarson ka saag*) and fenugreek leaves and almost equal percentage of the adopters from near the city category grew mustard leaves (*Sarson ka saag*) and coriander leaves. Sixty per cent of the adopters (61.90%) and 45.95 per cent from far off the city grew

Table 3. Distribution of adopters from far near the city according to the participation of their family members in various operations performed in the kitchen gardening (n=42)

Sr. no.	Operations	Adopters				
		Yourself f (%)*	Spouse f (%)*	Children f (%)*	Labour f (%)*	Parents f (%)*
		1	Bed preparation	29 (69.05)	7 (16.67)	8 (19.05)
2	Nursery raising/transplanting	29 (69.05)	9 (21.43)	11 (26.19)	10 (23.81)	2 (4.76)
3	Sowing	28 (66.67)	7 (16.67)	10 (23.81)	12 (28.57)	1 (2.38)
4	Irrigation	28 (66.67)	8 (19.05)	10 (23.81)	12 (28.57)	1 (2.38)
5	Hoeing	28 (66.67)	5 (11.90)	6 (14.29)	10 (23.81)	4 (9.52)
6	Harvesting	28 (66.67)	27 (57.14)	14 (33.33)	11 (26.19)	2 (4.76)

*Multiple response

Table 4. Distribution of adopters according to the vegetables grown in their kitchen garden during winter and summer season

Sr. no.	Vegetables	Far off the city	Near the city
		(n ₁ =37)	(n ₂ =42)
		f (%)*	f (%)*
1.	Carrot (<i>Daucus carota</i>)	17 (45.95)	26 (61.90)
2.	Radish (<i>Raphanus raphanistrum</i>)	27 (72.97)	36 (85.71)
3.	Spinach (<i>Spinacia oleracea</i>)	35 (94.59)	38 (90.48)
4.	Mustard leaves (<i>Sarson ka saag</i>)	27 (72.97)	31 (73.81)
5.	Coriander leaves (<i>Coriandrum sativum</i>)	31 (83.78)	33 (78.57)
6.	Onion (<i>Allium cepa</i>)	14 (37.84)	9 (21.43)
7.	Garlic (<i>Allium sativum</i>)	13 (35.14)	11 (26.19)
8.	Cauliflower (<i>Brassica oleracea</i>)	14 (37.84)	19 (45.24)
9.	Tomato (<i>Solanum lycopersicum</i>)	3 (8.11)	7 (16.67)
10.	Fenugreek (<i>Trigonella foenum</i>)	27 (72.97)	18 (42.86)
11.	Peas (<i>Pisum sativum</i>)	8 (21.62)	10 (23.81)
12.	Radish pods (<i>Raphanus sativus</i>)	10 (27.03)	11 (26.19)
13.	Turnip (<i>Brassica rapa</i>)	13 (35.14)	13 (30.95)
14.	Pumpkin (<i>Cucurbita pepo</i>)	30 (81.08)	38 (90.48)
15.	Bitter gourd (<i>Momordica charantia</i>)	14 (37.84)	29 (69.05)
16.	Capsicum (<i>Capsicum annuum</i>)	10 (27.03)	1 (2.38)
17.	Chilly	9 (24.32)	13 (30.95)
18.	Okra (<i>Abelmoschus esculentus</i>)	26 (70.27)	35 (83.33)
19.	Potato (<i>Solanum tuberosum</i>)	8 (21.62)	9 (21.43)
20.	Brinjal (<i>Solanum melongena</i>)	18 (48.65)	16 (38.10)
21.	Squash melon (<i>Cucurbita maxima</i>)	6 (16.22)	10 (23.81)
22.	Long melon (<i>Lagenaria siceraria</i>)	--	13 (30.95)
23.	Ridge gourd (<i>Luffa</i> sp.)	31 (83.78)	33 (78.57)
24.	Mint leaves (<i>Mentha piperata</i>)	11 (29.73)	3 (7.14)
25.	Cucumber (<i>Cucumis sativus</i>)	11 (29.73)	17 (40.48)

carrot and less than half of the adopters from near the city grew cauliflower and fenugreek leaves. More than one third of the adopters from far off the city category grew onion, garlic, cauliflower and turnip in their kitchen garden. A little less than one third of the adopters (30.95%) grew turnip and almost same percentage of the adopters grew onion, garlic, peas, radish pods (*moongre*) in near the city category. Only 27.03 and 21.62 per cent of the adopters from far off the city category grew peas, radish pods (*moongre*) and very few i.e. 8.11 per cent of the adopters grew tomato in their kitchen garden. Almost all the adopters (90.48%) grew pumpkin in near the city category and nearly equal percentage of the adopters grew pumpkin, ridge gourd and okra in both the locations. Majority of the adopters from near the city category grew ridge gourd and bitter gourd whereas 70.27 per cent from far off the city grew okra. Less than half of the adopters far off the city and near the city grew brinjal and cucumber. Nearly and an equal percentage of the adopters from both the locations grew bitter gourd and brinjal and 30.95 per cent from near the city grew chilly in their

kitchen garden. Same percentage of the adopters in far off the city grew mint leaves and cucumber and 16.22 per cent from this category grew squash melon in their kitchen garden. Only 7.14 per cent of the adopters grew mint leaves and very less i.e. 2.38 per cent grew capsicum in near the city category.

It is cleared from Table 5 that third fourth of the adopters (72.97%) and 69.05 per cent from both the locations grew guava. sixty per cent of the adopters (62.16%) and 57.14 per cent of the adopters grew citrus in both the categories. More than half of the adopters (51.35%) in far off the city category grew *jamun* and almost equal percentage of the adapters from near the city category grew *jamun* and *kinnow*. Nearly one fourth of the adopters from near the city category grew sapota and *ber* and 24.32 per cent of the adopters in far off the city category grew *kinnow*. An equal percentage of the adopters in far off the city category grew sapota and pomegranate similarly in near the city, same percentage of the adopters grew pomegranate and mango. Less than one-fifth of the adopters grew plum and *ber*

Table 5. Distribution of adopters according to the fruits grown in their kitchen garden

S. no.	Fruits	Far off the city	Near the city
		(n ₁ =37)	(n ₂ =42)
		f (%)*	f (%)*
1.	Guava	27 (72.97)	29 (69.05)
2.	Kinnow	9 (24.32)	17 (40.48)
3.	Sapota	8 (21.62)	10 (23.81)
4.	Citrus	23 (62.16)	24 (57.14)
5.	Jamun	19 (51.35)	18 (42.86)
6.	Pomegranate	8 (21.62)	8 (19.05)
7.	Mango	4 (10.81)	8 (19.05)
8.	Peach	3 (8.11)	--
9.	Beetroot	1 (2.70)	7 (16.67)
10.	Sugarcane	5 (13.51)	5 (11.90)
11.	Banana	1 (2.70)	3 (7.14)
12.	Plum (Ber)	6 (16.22)	11 (26.19)
13.	Amla	--	1 (2.38)

*Multiple responses

and almost equal percentage of the adopters grew sugarcane in both the locations. Only 10.81 per cent of the adopters grew mango in far off the category and approximately eight per cent of the adopters grew peach in far off the city and banana in near the city and very less i.e. 2.70 per cent of the adopters grew beetroot and banana in far off the city category respectively.

Data in Table 6 evident that there are two types of pulses which were growing by the adopters of both categories. Only 10.81 and 4.76 per cent of the adopters both the locations grew chick per and very less i.e. 2.70 per cent from far off the city category grew green *moongre* respectively.

The data in Table 7 reveals that 100 percent of the adopters from near the city used

cultural/biological methods for insect pest attack and diseases because the main purpose of the adopters was to get insecticides and pesticides free vegetables and fruits. Majority of the adopters from far off the city used both methods for insect pest attack and only 23.81 per cent of the adopters used chemical methods in near the city category. More than eighty per cent of the adopters (86.49%) and 70.27 per cent from far off the city used both methods and only 23.81 per cent of the adopters from near the city used chemical methods for managing the diseases in their kitchen garden.

They have used some cultural methods before making the kitchen garden. They have adopted the crop rotation, solarisation and deep tillage method for better development of kitchen

Table 6. Distribution of adapters according to the pulses grown in their kitchen garden

S. no.	Pulses	Far off the city	Near the city
		(n ₁ =37)	(n ₂ =42)
		f (%)*	f (%)*
1.	Moong	1 (2.70)	--
2.	Chick pea	4 (10.81)	2 (4.76)

Table 7. Distribution of adopters according to the methods used for managing the insect pest attack and diseases

Sr. no.	Parameters	Category	Far off the city	Near the city
			(n ₁ =37)	(n ₂ =42)
			f (%)*	f (%)*
1.	Insect pest attack	Chemical	26 (70.27)	10 (23.81)
		Cultural/biological	23 (62.16)	42 (100.00)
2.	Diseases	Chemical	26 (70.27)	10 (23.81)
		Cultural/biological	32 (86.49)	42 (100.00)

gardening. Some of the insect pests mentioned by the adopters which attacked their plants. Milibug is the sucking pest which attacks the okra. This insect sucks the cell sap of the plant and due to this plant gets to die. Whitefly which is known as in common language "Chitimakhi". It mainly attacks the chilly and tomato which causes the leaf curling of the plant. Due to this insect, photosynthesis cannot occur in plants and plants cannot get carbon dioxide in the proper amount. Aphid is the insect pest which also blocks the photosynthesis process in all vegetables. In Peas plants, leaf minor feeds the leaves by making tunnels in them. This can damage the plants of peas. Most of the adopters applied home remedies or cultural/biological methods for control of these insect pests. Some of the common methods like spray of old buttermilk + rock salt for most of sucking pest and fungus. After showing of seeds they are applying ash because it retains moisture and provides certain nutrients to germinating the seeds. Rice straw is mixed with cow dung to form slurry. This is applied to the kitchen garden for instantly providing organic manure. Cow dung manure was applied to kitchen garden after every cycle. Hand picking of insects was also done to control caterpillar. A mixture is prepared by *neem* seeds or leaves, *dhatura* seeds and *akk* seeds. This concentrate is then diluted with water and sprayed on crops for control of most of sucking pest. This has been termed as a most effective method for control of insect pest by most of the adopters. Two of the adopters had *gobar* gas plant at their places so they applied the slurry to the kitchen garden after the production of *gobargas* which provided most of NPK (Nitrogen, Phosphorus and Potassium) to the plants. They have also used some chemicals when the attack of insect pest did not control by home remedies or cultural methods. Lesser amount of chemicals were also used by them. These chemicals were Ektara, Mono-crotophos, Neemicide and Malathion. There are some common diseases mentioned by the adopters which attack their kitchen garden. Powdery mildew which mainly attacks the cucurbitaceae family. In this, fungus forms a white floury coating on leaves, stem and other parts of plant. It mainly occurred in dry weather. Leaf curl mainly occurs in chilly and tomatoes which causes stunting of plants with downward rolling and crackling of leaves. It is transmitted by white fly. Phomopsis plight attacks the brinjal plant and causes deep brown spots on the leaves and fruits. Purple blotch attacks the onion plants and causes purple spot on leaves and seed stalks. It also

infects the inflorescence and seed. Most of the adopters applied home remedies or cultural/biological methods for control of diseases. Some of the common methods like spray of old buttermilk + rock salt. Rice straw is mixed with cow dung to form slurry. This is applied to the kitchen garden for instantly providing organic manure. Cow dung manure was applied to kitchen garden after every cycle. A mixture is made by boiling the *neem* with water and then it is applied to the kitchen garden which helps to manage the diseases. Some of the chemicals were also used by adopters in lesser amount to manage the diseases. These chemicals were Neemicide, Endophil, Ektara and Melatione. Data indicated that adopters of near the city used much of the cultural/biological methods as a comparison too far off the city category. Mohsin et al. [11] justified that dominant share of growers have sown the seed kits for vegetables production, mostly for home consumption and was satisfied with the quality and price of seed kit. Most of the growers certified the efficiency of the project in the regular provision of fresh and healthy vegetables. Hence, the project is a successful endeavour and still continuing in the province, benefiting the masses and encouraging urban agriculture.

4. CONCLUSION

It can be concluded from findings of the study that the practice of backyard kitchen garden is generally for the self-consumption, and the practice of macro-level kitchen garden is generally for sale in the market. Majority of the households in near the city and a half from far off the city adopt the kitchen gardening. Here are some proven results in the rural community of Kitchen gardening that it decreases expenditure for vegetables, increase supply variety of vegetables, Increase crop diversity area of kitchen gardening, Improved self-esteem and motivation, Increase community connection after starting kitchen gardening activity and Improved social environment.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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