

EVALUATING THE USE OF KITCHEN GARDENING IN RELATION TO THE SOCIO-ECONOMIC CONDITIONS IN LAHORE, PAKISTAN

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ABSTRACT

The world population is increasing with acceleration and increasing demands of abode and food. Kitchen gardening is one of the solutions to resolve these issues. Lahore is the second biggest city in Pakistan by population. Kitchen gardening is practicing in the study area. The main purpose of the study is to identify the areas in Lahore city where kitchen gardening is practicing and evaluate how kitchen gardening is good for health and helps to improve the socio-economic conditions. To achieve the objective, a field survey was conducted based on the questionnaire in Data Ganj Buksh Town, Samnabad town and Gulberg in Lahore. The field data was managed in the MS office. While for mapping and data analysis ArcGIS 10.5 has been used. To identify the areas where kitchen gardening is mainly practiced hotspot analysis was performed. Whereas statistical analysis, correlation is done that was shown the strong relationship between the kitchen gardening and kitchen budget. It has been analyzed by the study that vegetables and fruits that grow in kitchen gardens are utilized at the homes. Among them, 76% of respondents were growing only vegetables while 24% were growing both vegetables and fruits. Almost 100% of respondents responded that market's food products were not fresh. Most kitchen gardeners (81%) were strongly agreed that a kitchen garden has a good impact on health. The kitchen gardeners didn't use pesticides and fertilizers. As the food quality is another major issue in big cities. Hence, the growing fresh vegetables and fruits at home and reduction in the kitchen budget were the main benefits for kitchen gardening.

Keywords: Kitchen gardening, Socio-economic conditions, urban food, Lahore, Pakistan

1. INTRODUCTION

Food is a basic human need, and a balanced diet is important for good health in general. Vegetables are important sources of fiber, vitamins, and minerals that are necessary for a variety of biological processes. Therefore, through providing immediate access to fresh food for everyday consumption, kitchen gardening significantly contributes to ensuring food and nutritional security because kitchen or home gardening is the earliest and most extensive food production system found throughout the world (Chauhan, 2023; Rowe, 2009). Kitchen gardening is one of the most important studies in the agricultural sciences where efforts are on their way to find its association with socio-economic paraphernalia. Kitchen gardening is providing direct

access to fresh food growing by household persons. The people who live more densely populated areas where no additional land available so they can grow food in pots and lawns (Marsh and Talukdar, 1994). The various social benefits that have emerged from kitchen gardening practices are health and nutrition, enhanced income, self-employment, food security within the household, and community social life (Rehman et al., 2013). Fruits and vegetable production give households direct access to important nutrition that might not be within their budget to purchase (Talukder et al. 2001; Sithole et al., 2023). Globally, climate change poses serious problems that have an impact on many facets of society, including the food chain. Maintaining

sustainable livelihoods is becoming more and more challenging, especially in light of issues like food security, poverty, and the general welfare of the world's people. Poverty exacerbates the link between food security and climate change, necessitating more resilience within food production systems. Development experts from all over the world have looked into the many coping mechanisms and adaptation tactics used by farming communities. In order to increase the resilience of farming households in the face of climate change, one such practice is kitchen gardening. In order to achieve nutritional security in the context of a changing climate, this chapter will address the idea of kitchen gardening, its significance, the experiences acquired from its implementation, and future directions for development practitioners (Nag et al., 2023). Increased vegetable availability and nutrient intake at the household level are considered vital. Families were chosen for demonstrations, and post-training evaluations revealed higher vegetable availability and consumption. Protein, iron, calcium, beta-carotene, and vitamin C content all increased. The lack of high-yielding vegetable seeds and good planting material was a constraint (Singh et al., 2022). 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 (Ghazali, 2013).

In the colonial time, a kitchen garden was about an acre in size, and even on the property that is more sizable. The best use of the property was to grow livestock and the grains to feed the livestock. Both men and women were busy in this activity. The men were busy keeping the farm running and leaving the load of labor to the women and their children. This is proceeding to drip lines and proper plumbing. Time and energy were consumed in watering the garden because it had to be drawn from a well or a stream. Not to mention weeding, pest removal, planting, enriching the soil, harvesting (Gothein, 2014).

Fortunately, Pakistan is blessed with conditions suitable for growing almost all kinds of vegetables. The total crop area of Pakistan is about 22.94 million hectares. Out of which vegetables and condiments are grown on 0.35 and 0.18 million hectares, respectively, which is about 2.30% of the total crop area. Punjab contributes its share in the area by 52%, Sindh 26.15%, KPK 10.85%, and

Baluchistan. Around 11% of the total area of Pakistan is under vegetable crops (GOP, 2020). In Punjab province, the project of kitchen gardening is initiated by the provincial government with the goal to deliver immediate relief to the citizens by growing fresh vegetables by their own at homes (Mohsin et al., 2017). Likewise, the district Muzaffargarh is an agricultural and major vegetable growing region in Punjab famous for carrots, cauliflower, and onion production whereas alternative vegetables include turnip, ladyfingers, potato, tomatoes, garlic, and chilies also grown. In 2010, Muzaffargarh district was severely hit with severe flood from rivers Chenab and Indus that severely deteriorate the economic conditions and agricultural output (Hashmi et al., 2012). A study conducted in Kot Addu, district Muzaffargarh (now a separate district of Punjab) studied that women should be involved for growing the vegetables in home gardens. Results showed that huge number of women was attending the training are educated as 67% middle educated involved in this activity. Also, biggest part of them is married. They want to support their families by growing vegetables and by reducing their kitchen budget (Bajwa et al., 2015). The burgeoning population, food security has now become the major objectives of the Government of Pakistan and policymakers have focused on formulating a sound food policy leading to food security (Abbasi et al., 2014). In recent years Pakistan has witnessed increasing impoverishment levels and a higher risk of food insecurity in several areas. For instance, about 58% of its population is malnourished and about 20% are ranked food insecure (Tariq et al., 2014). The main objective of the study is to identify the areas in Lahore city where kitchen gardening is practicing and evaluate how kitchen gardening is good for health, and helps to improve the socio-economic conditions.

2. MATERIALS AND METHODS

The study conducts in the Lahore city of Pakistan in 2020. Lahore is the 2nd biggest city in Pakistan. It is the capital and largest populous city of the province of Punjab. According to the latest national census of 2023, the population of Lahore city is recorded 13,004,135 persons (GOP, 2023). Geographically Lahore lies between the coordinates of 31° 13' to 31° 43' N latitudes and 74° 0' to 74° 39.5' E longitudes (Figure 1) (Naqvi et al., 2015).

Data Collection

The study is mainly based on the primary data. A questionnaire was used as major approach for gathering primary data in order to perform current research. The information was acquired from a group called government officers' residences (GOR) and chosen as a random selection approach to guarantee a representative sample. Secondary data about the kitchen gardening activity in Lahore was provided by the horticulture department. It proved very useful and gives directions to complete the research work.

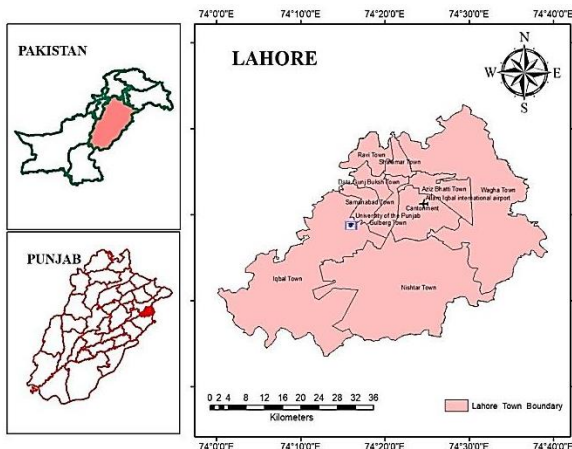


Figure 1: Study Area Map

Sample and Sampling Technique

For present research, a sample size of 100 was meticulously selected with the aim to strike a harmonious balance between practicality and statistical significance. While larger sample sizes might yield more precise results, logistical constraints and resource availability made 100 an optimal choice. It is also ensured that selected sample represented a diverse range of kitchen gardeners, incorporating various experience levels and gardening practices. By employing random sampling, the study’s results are more likely to be representative of the entire population, enhancing the generalizability of the findings. This method is fundamental in producing reliable and credible data, enabling to draw a meaningful conclusion and make informed recommendations related to kitchen gardening at present.

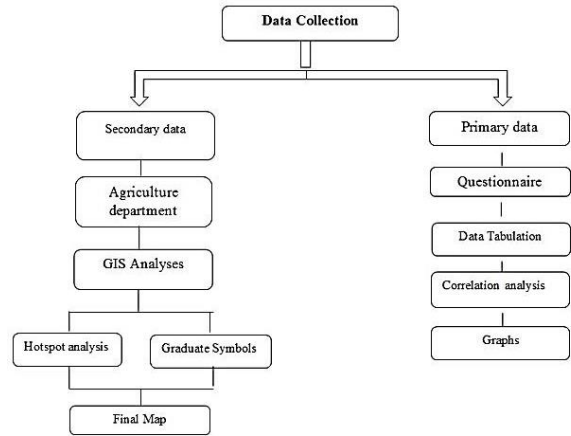


Figure 2: Methodology Flow Chart of the Study

Data Analysis

The analysis of the data is carried out in ArcGIS 10.5 which was used to visualize and analyze the spatial components of kitchen gardening in the study area. By using this software, the created maps were aesthetically appealing that clearly communicated the geographical patterns and distributions. SPSS (Statistical Package for the Social Sciences) version 24.0 was used to carry out a number of statistical tests and processes to analyze and interpret the gathered data. Correlation coefficient was applied to find the relation between the kitchen gardening and the area used for this activity and the descriptive statistics to discuss the main variables of the kitchen gardening activity.

3. RESULTS AND DISCUSSIONS

Graduated Symbols of Kitchen Gardening

Graduate symbols map indicates the areas where kitchen gardening activity was practicing. Dot size increases or decreases according to the activity size and based on the sample size and number of questionnaire (NOQ) filled. Figure 3 shows that in study area dots identify an area where kitchen gardening practicing. Dot size is simply defined in classes and indicates that the dot size is increased where more population doing such activity while the dot size is decreased in size where less population was doing this activity.

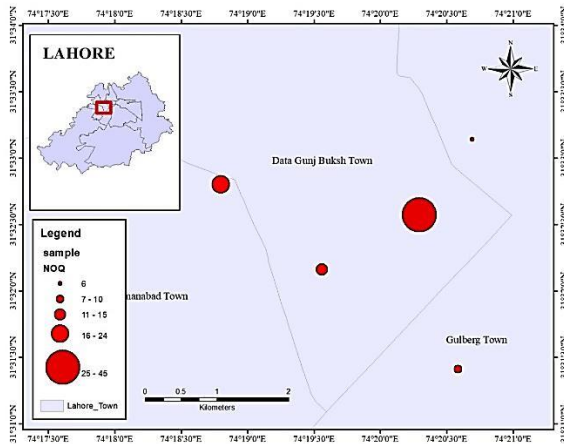


Figure 3: Graduate symbols in the study area

Hotspot Analysis

Hotspot analysis is a useful technique in ArcMap which is used to highlight those areas where kitchen gardening is practicing. Those areas are called hot spot areas. Some classes are defined about the kitchen gardening activity and the red color shows intensity of these activities (Figure 4).

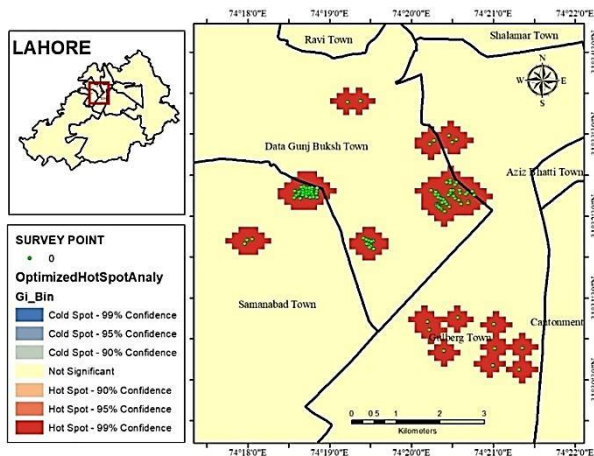


Figure 4: Hotspot analysis in the study area

As the red color goes lighter it means intensity going down. The green points in red areas indicate the location of the areas. Light yellow color presenting no significance. This analysis present result in cells. There are dispersed clusters denoting that there are fewer people practicing kitchen gardening activity. There are green dots in the red color cell which means that there is more population

involved in this activity. The results showed that in Data Gunj Buksh Town, more people were doing kitchen gardening while less population were practicing the kitchen gardening in Gulberg Town because there were a dispersed population found. In Samnabad Town green point is much closer demonstrating that in this area people was also doing such activity.

Survey Results

Growing Product of Kitchen Gardening

If vegetables grown at the household level are more than our requirement then they should be stored in a good manner so that they can save for a long period and on re-using their quality may not deteriorate. The results show that 76% of respondents were growing just vegetables in the garden and 24% of respondents were growing both fruits and vegetables. The respondents growing fruits were nothing else (Table 1).

Table 1: Kind of Product growing in the Garden

Product	Vegetables	Fruits	Both
Percentage	76	0	24

A study aimed to give training and demonstrations to rural women in kitchen gardening and concentrated on the nutritional condition and health of farm women who took part in these programmes. The findings indicate that implementing recommended practices in kitchen gardening positively affects average yield, per capita availability of vegetables, and the fulfillment of daily recommended vegetable consumption, thus improving per capita nutrient availability as well (Chauhan, 2023).

Type of Garden

The best site for a vegetable garden should incorporate the conditions viz. at least six hours of sunlight daily, good drainage and air circulation, and a level location with loose, rich soil. There should also be a nearby source of water, and ideally, convenient access to cool storage and equipment. The survey result shows 41% people were growing their vegetables in large garden area, 35% in back yard garden, 20% in the normal front area and only 4% in terrace or balcony area (Table 2).

Table 2: Type of Garden

Garden Type	Large garden	Normal garden	Terrace or balcony	Back yard garden
Percentage	41	20	4	35

Area of Kitchen Garden

Table 3 shows area used for kitchen gardening in study area. The results clear that 33% respondents were used the area for kitchen gardening having 2 to 3 Marla, 59% were used the area of 4 to 5 Marla for kitchen gardening, 8% respondents were used the area of 6 to 7 Marla for kitchen gardening, 59% respondents were using 4 to 5 Marla, 8% were using the area of 6 to 7 Marla and 33% respondents were

using the area of 2 to 3 Marla for kitchen gardening. It is found that as the area of the garden got increased the production was also increased. A study conducted in Mandya (India) finds that about 64% of the households had kitchen garden area in their houses with a range of 50 m² to 100 m² for self growing of vegetables (Sheethal et al., 2023; Birdi and Shimoni, 2016).

Table 3: Area of Kitchen Garden

Area	2-3 Marla	4-5 Marla	6-7 Marla	More than 7 Marla
Percentage	33	59	8	0

Reduction of the Kitchen Budget

Table 4 shows the reduction of kitchen budget of respondents after engaging in kitchen gardening activity. Results showed that is 44% of respondents were reduced their kitchen budget from 40 to 50% after employing in kitchen gardening and 51% of respondents were get relief in their kitchen budget up to 50% to 60% after practicing kitchen gardening. Remaining 5% respondents were achieved the maximum reduction of 60 to 70% in their kitchen budget from kitchen gardening activity. Hence the activity of kitchen gardening supported the people greatly in the reduction of their kitchen budget. Birdi and Shimoni (2016) conducted a study in Melghat (India) finds that 79% of the respondents were practicing the kitchen

gardening producing vegetables and fruits for own use and to cut the expenditure of buying them from outside.

Mohsin et al. (2017) examine the kitchen gardening project started in the whole Punjab by the Government of Punjab to improve the food production and availability of fresh vegetables grown at home level. In this regard, government spent huge amount of millions rupees from 2011 to 2014. Government provides the subsidy in this programme. Seed kits prepared by government and then sold at low price. Results shows that set target achieved. Seed kits sold out in the urban and semi urban areas. Significant outcomes got in this project and its efficiency was 74%.

Table 4: Reduction of Kitchen Budget

Budget Reduction	40% to 50%	50% to 60%	60% to 70%	More than70%
Percentage	44	51	5	0

Time Consumption in Kitchen Garden Daily

Table 5 showed that the time spent by the respondents in their kitchen garden. Results clear that 3% of respondents were spent daily 30 minutes in the kitchen garden, 7% of respondents were spent 45 minutes daily in the kitchen garden. A great share of 54% respondents was spent an hour daily in

the kitchen garden. Lastly, 36% of respondents were spent more than an hour daily in the kitchen garden. These results show that only a few percent of respondents were interested to spend less time in the kitchen garden and mostly were spent an hour and more because they got fresh air, refreshment and kitchen products from the kitchen garden.

Table 5: Time Spent in Kitchen Garden Daily

Time	30 minutes	45 minutes	An hour	More than an hour
Percentage	3	7	54	36

Kitchen Gardening Impact on Health

Table 6 showed the impact of kitchen gardening on the health of respondents. According to the results, 81% respondents were strongly agreed that kitchen gardening was not only providing them fresh vegetables but also beneficial for supplying fresh air, 19% were also satisfied but they didn't state strongly agree. They also considered other factors important. However, no one was disagreed and strongly disagreed with it because vegetation provides the fresh air too. Sileshi et al. (2022)

explained the adoption of kitchen gardens among farming households in Tanzania along with the examination of the consequences for food and nutrition security. The study uses the Per Capita Kilocalorie Intake (PKCI) and Food Consumption Score (FCS) as indicators to analyze data from 825 families in two districts. The findings imply that supporting and expanding kitchen garden activities can improve the food and nutritional security of the households.

Table 6: Kitchen Gardening Impact on Health

Option	Strongly agree	Agree	Disagree	Strongly disagree
Percentage	81	19	0	0

Purpose of the Gardening

It is hard to know the vegetables or fruits we get from the market are safe to consume or not. If you grow it yourself, you know that it is safe and chemical-free. In the survey results, 100% agreement was recorded on the statement to get fresh vegetables for daily use by the respondents (Table 7). They were growing vegetables for getting fresh and nutritious-rich products. Even they were not doing as saving the money but the results showed that it is not the only way of getting fresh vegetables but also reduce the kitchen budget.

Habimana (2023) investigates that how kitchen gardens affect dietary diversification, vegetable intake, and food consumption. The results show that kitchen gardening improves overall food consumption, increases nutritional diversity, and increases consumption of vegetables frequently. The study emphasizes the potential of kitchen gardens to increase global food security and stresses the significance of both garden size and diversity. These findings offer insightful information for supporting nutritious and sustainable food systems.

Table 7: Purpose of Kitchen Gardening

Option	Enjoyment	To get fresh vegetables	Save money	Other
Percentage	0	100	0	0

Source of Water for Kitchen Gardening

Table 8 showed the results of the source of water for kitchen gardening in sampled sites. Results clear that 100% respondents were used clean pipeline water for kitchen gardening. They didn't use grey, sewage or pump water. Pipeline water is usually clean water. By using clean water products are also

be safe and pure to ensure good health. There were no harmful contaminants mixed in vegetables and fruits that obtained from the kitchen garden. If respondents used sewage water or greywater, harmful contaminants might add to the kitchen garden products and could be fatal to health.

Table 8: Source of Water for Kitchen Gardening

Source	Water pump	Greywater	Sewage water	Pipeline water
Percentage	0	0	0	100

Use of Fertilizer

Kitchen gardeners or respondents did not use the fertilizers. They get 100% organic foods. But when fertilizer is used plants roots take it from the soil as

food. Hence, increased productions but harmful partials are added in products. When consumers used these products it has harmful effects on their health. It also increases the risk of insect attacks.

Table 10: Use of Fertilizer

Option	Yes	No
Percentage	0	100

Use of Pesticide

Pesticides use to protecting vegetables and fruit from insects' attack. But when pesticides are used the contaminants are added to food products. When it consumed it affect human health? In the kitchen

garden, the respondents did not use pesticides. They get pesticide-free vegetables and fruits. However, they used cold water spray or cooking oil or mustard mixed with water then spray on plants to protect them from disease and insects.

Table 11: Use of Pesticide

Option	Don't use	Use but a small quantity	Use greatly	Use when need
Percentage	100	0	0	0

Correlation Analysis

A correlation value of 0.095 was obtained from the analysis of the relationship between kitchen budget reduction and the practice of kitchen gardening. A slight positive correlation between the two variables is shown by this correlation value.

The range of a correlation value is -1 to 1, where 0 denotes no correlation, numbers near to -1 or 1 denoted a strong negative or positive correlation, respectively, and values close to 0 denote a weak correlation. A very slight positive link between the

kitchen budget decrease and the size of the kitchen garden is indicated here by the correlation value of 0.095.

This suggests that there may be a minor tendency for kitchen gardening to rise as kitchen budget reductions took place, although the association is not particularly strong. It is significant to notice that a correlation value of 0.095 is not particularly high, suggesting that other factors may have a bigger impact on the practice of kitchen gardening and that the reduction in kitchen budget may not be the main motivating factor.

Table 12: Correlation between Kitchen Budget Reduction and Area of Kitchen Gardening

		How much area you are using for kitchen gardening	After practicing kitchen gardening at home how much your kitchen budget reduced
How much area you are using for kitchen gardening	Pearson Correlation	1	.095
	Sig. (2-tailed)		.348
	N	100	100
After practicing kitchen gardening at home how much your kitchen budget reduced	Pearson Correlation	.095	1
	Sig. (2-tailed)	.348	
	N	100	100

Because the kitchen budget includes costs for numerous other food or grocery products, the modest association between kitchen gardening and budget decrease can be explained by this. When

analyzing how money is allocated within the kitchen budget, it is likely that different categories, such as fresh produce, packaged foods, cooking ingredients, and housekeeping supplies, would

receive different amounts of money. Although a portion of the money might be set aside for kitchen gardening, this is not the only or main element affecting this area. The extent of kitchen gardening may be significantly influenced by additional variables such as available space, time restraints, individual interests, and gardening skill.

4. CONCLUSION

Kitchen gardening is a useful activity in urban areas of developing world for getting fresh vegetables at home and meet the daily food intake. This study concludes that people are not well aware from the worth of kitchen gardening in Lahore, the second largest city of Pakistan. The people who were practicing the kitchen gardening have the main purpose of getting the fresh food. However, they were also reducing their kitchen budget. Government should give awareness to the public about kitchen gardening. Especially low-income people should practice the kitchen gardening in such a way that they can get fresh food and reduce their kitchen budget. Most of the kitchen gardeners were enjoying of this activity as fresh vegetable has good impact on health so that they can improve their health and nutrition intake. By this way they can increase their saving and improve their living standard. Additionally, there was a positive correlation exists between the area of the kitchen garden and the kitchen budget. If there is more area reserved for a kitchen garden or growing the vegetable kitchen budget reduce more. If there is less area for kitchen budget less budget reduced.

5. CONFLICT OF INTEREST

The authors declare no conflict of interest.

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