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INFLUENCE OF SOCIO-DEMOGRAPHIC CHARACTERISTICS ON INTENTION TO ADOPT KITCHEN GARDENING IN FAISALABAD, PAKISTAN

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KEYWORDS	ABSTRACT
kitchen gardening; intention to adopt; socio-demographic characteristics; urban households; Faisalabad; Pakistan	In Pakistan's urban areas, concerns regarding food security and rising vegetable prices have reignited interest in kitchen gardening; however, the practice remains limited and uneven. This study examined how socio-demographic characteristics shape urban households' intention to adopt kitchen gardening in Faisalabad, Pakistan. In a cross-sectional survey, 120 respondents were assessed on eight characteristics and a two-item Likert scale measuring intention to adopt ($\alpha = .827$; inter-item $r = .71$). Intention overall was moderately high ($M = 7.68$, $SD = 1.98$, range 2–10). Intention was significantly associated with education, $\chi^2(4) = 89.169$, $p < .001$, Gamma = 0.841; age, $\chi^2(4) = 57.461$, $p < .001$, Gamma = -0.716 (younger showing higher intention); and prior gardening experience, $\chi^2(2) = 10.144$, $p = .006$, Gamma = -0.534 . Household income was significant on chi-square alone; gender, household size, and house ownership showed no association. Extension programmes should target less-experienced, lower-income, and older households.
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Introduction

Rapid urbanization, rising food prices, and growing concern about the freshness and safety of market vegetables have renewed both global and national interest in household-level food production (Singh et al., 2024). Kitchen gardening growing vegetables, herbs, and sometimes fruit in small spaces in or around the home is among the most accessible of these strategies (Bhimani et al., 2025). In Pakistan, it has gained particular momentum in urban centers as a response to food insecurity, nutritional concerns, and environmental awareness, giving

households a direct route to fresh, pesticide-free produce and some relief on the household food budget (Akbar et al., 2024; Samad et al., 2026).

Despite this, its adoption remains far from universal—even in places where the methodology is well known and its benefits are widely acknowledged. Shah et al., (2023) identifies Production, income, and information are the three key factors determining whether urban households in low- and middle-income countries—such as Pakistan—take up kitchen gardening or small-scale vegetable cultivation. Information plays a decisive role in this regard, particularly where space and resources are limited. Maqbool & Arshad, (2024) similarly point to Education, income, and access to resources are identified as key socio-economic determinants of kitchen gardening potential in urban Pakistan, noting that women, in particular, tend to manage household gardens. Before the actual adoption takes place, households should first form an intention to adopt—a step grounded in the broader behavioral literature on the Theory of Planned Behavior, which posits that behavioral intention is the most immediate and direct predictor of actual behavior (Ajzen, 2020).

Faisalabad, Pakistan's third-largest city, provides a fitting backdrop for examining this issue; here, a densely populated and rapidly growing urban population converges with a robust suburban area rooted in agricultural tradition. This arrangement not only makes kitchen gardening a familiar practice—culturally speaking—but also positions it as a practical and relevant measure to address food security challenges at the urban level. The study under review examines the extent to which urban households in Faisalabad, coming from diverse socio-demographic backgrounds, differ from one another regarding their intention to adopt kitchen gardening.

Purpose of the Study

The purpose of this study is to examine the extent to which individuals from diverse social and demographic backgrounds in urban Faisalabad intend to adopt kitchen gardening, in order to determine which subgroups of the urban population show the highest and lowest inclination towards adopting this practice.

Significance of the Study

These findings are significant for various sectors; for agricultural extension workers and urban food security programs, identifying which social and demographic groups are less inclined to adopt innovations can help in more effectively structuring outreach, training, and practical demonstration efforts. For urban planners and policymakers, the findings indicate that promoting kitchen hygiene as a food safety strategy requires either broad-based public awareness campaigns or more targeted interventions aimed at specific groups, such as inexperienced individuals or low-income households. In practical terms, this study expands the scope of knowledge regarding kitchen gardening in urban Faisalabad and focuses specifically on the socio-demographic correlates of behavioral intention.

Objectives of the Study

1. To describe the socio-demographic characteristics of the respondents in the city of Faisalabad and their intentions regarding the adoption of kitchen gardening.
2. To examine whether there are significant differences in respondents' intentions regarding the adoption of kitchen gardening based on gender, age, education, household income, household size, prior kitchen gardening experience, and home ownership.

Literature Review

A growing body of research presents home gardening within the broader context of urban agriculture and household food security. Pandey & Verma, (2025) describes urban agriculture plays a significant—albeit often overlooked—role in the city's food system, particularly for low-income households with limited access to fresh agricultural produce. In Pakistan specifically, Abid, (2026), studying kitchen gardening in Lahore, found that most gardeners observed a noticeable positive impact on household health and reported a reduction in their grocery bills, while concerns regarding the lack of freshness in store-bought produce proved to be a key motivating factor for almost all participants.

Socio-demographic determinants of kitchen-gardening adoption have received particular attention in the regional literature. Dhayal & Mehta, (2022) studying home-gardening methods, found that gender, education, occupation, income, technology costs, and social networks significantly shaped adoption, while age, household size, limited space, and pest or disease damage acted as constraints. Rauf & Aamir, (2021) likewise stressed education, income, gender roles, and access to resources as central determinants of kitchen-gardening uptake among urban Pakistani households, describing adoption as a multidimensional outcome shaped jointly by socio-economic capacity and attitudes toward food quality, price, and health. Ahmed et al., (2022), evaluating a kitchen-garden intervention among low-income women in Bangladesh, found that participants showed significantly greater knowledge, more favorable attitudes, and stronger behavioral intentions than non-participants underscoring how much direct experience and exposure shape intention to adopt.

Prasai et al., (2022) offers a useful synthesis here, identifying production, income, and knowledge as the three central pathways through which urban households in low- and middle-income countries come to adopt kitchen gardening, and arguing that knowledge is a particularly important lever in dense urban settings where space and resources are limited. Mohsin et al., (2017) adds that kitchen gardening supports household food and nutritional security by providing immediate access to fresh vegetables and legumes, with documented gains in per-capita vegetable availability once recommended practices are followed.

At the level of behavioral theory, Theory of Planned Behavior by Ajzen offers a widely used framework for understanding how intentions to adopt a new practice form, holding that behavioral intention shaped by attitudes, subjective norms, and perceived behavioral control is the most immediate determinant of actual behavior (Salinas et al., 2026; Yuniarsih et al., 2026). Applied to kitchen gardening, this suggests that socio-demographic characteristics associated with greater perceived behavioral control, such as prior experience, adequate income, and house ownership, which together determine a household's practical capacity to start and maintain a garden, should be closely tied to stronger intention to adopt.

Taken together, this literature suggests that intention to adopt kitchen gardening is unlikely to be uniform across urban households, and that socio-demographic characteristics linked to knowledge, prior exposure, and economic and practical capacity are the ones most consistently implicated in shaping adoption. On this basis, the following hypotheses were formulated for the present study:

H1: Respondents' intention to adopt kitchen gardening differs significantly by gender.

H2: Respondents' intention to adopt kitchen gardening differs significantly by age.

H3: Respondents' intention to adopt kitchen gardening differs significantly by education.

H4: Respondents' intention to adopt kitchen gardening differs significantly by household income.

H5: Respondents' intention to adopt kitchen gardening differs significantly by household size.

H6: Respondents' intention to adopt kitchen gardening differs significantly by prior experience in kitchen gardening.

H7: Respondents' intention to adopt kitchen gardening differs significantly by house ownership.

Methodology

This study used a cross-sectional, quantitative design to examine how socio-demographic characteristics influence urban households' intention to adopt kitchen gardening in Faisalabad, Pakistan. The data form part of a broader dataset on knowledge and adoption of kitchen gardening among urban households, collected for an M.Phil (Hons.) thesis in Sociology at the University of Agriculture, Faisalabad, covering households across multiple localities of the city. A total of 120 respondents engaged in, or eligible to engage in, kitchen gardening were surveyed with a structured interview schedule.

Eight socio-demographic characteristics were recorded: gender, age, education, household income, household size, type of house, prior experience in kitchen gardening, and house ownership. Type of house showed no variation in the achieved sample all 120 respondents lived in Pacca (permanent) housing so it was retained for descriptive reporting but dropped from the inferential comparisons. The dependent variable, intention to adopt kitchen gardening, was measured with a two-item, five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree) asking, first, whether respondents intend to adopt kitchen gardening given the necessary resources, and second, whether they predict they will adopt it. A composite score was computed as the sum of the two items (possible range 2–10) and used as the outcome measure for the inferential analysis; item-level responses are reported separately in Table 2.

Data were analysed using descriptive statistics (frequencies, percentages, means, and standard deviations), Cronbach's alpha and the inter-item Pearson correlation to check the internal consistency of the two-item intention scale, and To examine the association between socio-demographic characteristics and kitchen gardening adoption intentions, cross-tabulation was performed. To determine whether differences across socio-demographic subgroups were statistically significant, Chi-Square test of association was used while Goodman and Kruskal's Gamma (γ) was used to measure the strength and direction of ordinal association. Both test statistics and their p-values are reported to show the nature and significance of relationships. All analyses used a .05 significance level.

Results and Discussion

Socio-Demographic Profile of Respondents

Table 1 sets out the socio-demographic profile of the 120 respondents. Three-quarters of the sample (75.0%) were male. Most fell in the 36–45 age bracket (43.3%), followed by those above 45 (31.7%) and those up to 35 (25.0%). Nearly half (48.3%) had completed education between matriculation and intermediate level, 28.3% held a graduate qualification or above, and 23.3% had less than matriculation. Most households (60.8%) reported high income, and just over half (53.3%) had up to five members. All respondents (100.0%) lived in Pacca (permanent) housing, so this variable showed no variation in the sample. Most respondents (80.0%) had prior experience in kitchen gardening, and 78.3% owned rather than rented their homes.

Table 1: Socio-Demographic Profile of Respondents (N = 120)

Socio-Demographic Characteristic	Category	f	%
Gender	Male	90	75.0
	Female	30	25.0

Age	Up to 35	30	25.0
	36-45	52	43.3
	>45	38	31.7
Education	Under Matric	28	23.3
	Matric-Intermediate	58	48.3
	Graduation and above	34	28.3
Household income	High	73	60.8
	Low	47	39.2
Household size	Up to 5	64	53.3
	>5-7	37	30.8
	>7	19	15.8
Type of house	Katcha	0	0.0
	Pacca	120	100.0
Experience in kitchen gardening	Yes	96	80.0
	No	24	20.0
House ownership	Owned	94	78.3
	Rented	26	21.7

Note. f = frequency; % = percentage of total sample.

Intention to Adopt Kitchen Gardening

Table 2 presents respondents' intentions regarding the adoption of kitchen gardening (home-level vegetable cultivation) based on specific individual items. Both items scored above the scale's midpoint (3.0). The mean score for the item "If the facility were available, you think you would adopt it" ($M = 3.85$, $SD = 1.02$) was slightly higher than that for "If the facility were available, you intend to adopt it" ($M = 3.83$, $SD = 1.13$); this indicates that the respondents' anticipated future attitude was marginally more positive than their currently stated intention, although a high degree of consistency was observed between the two. Overall, the combined mean score—based on a possible range of 2 to 10—was 7.68 ($SD = 1.98$), indicating a relatively strong intention to adopt kitchen gardening among the urban respondents in Faisalabad.

Table 2: Respondents' Intention to Adopt Kitchen Gardening

Sr.	Statement	Responses	f	%	Mean	SD
n						
1	Assuming that you have access of it, have your intention to adopt.	Strongly Disagree	7	5.8	3.83	1.13
		Disagree	8	6.7	3.83	1.13
		Neutral	22	18.3	3.83	1.13
		Agree	45	37.5	3.83	1.13

2	Assuming that you will have access to it ,you predict to adopt.	Strongly Agree	38	31.7	3.83	1.13
		Strongly Disagree	4	3.3	3.85	1.02
		Disagree	6	5.0	3.85	1.02
		Neutral	30	25.0	3.85	1.02
		Agree	44	36.7	3.85	1.02
		Strongly Agree	36	30.0	3.85	1.02

Note. Scale: 1 = Strongly Disagree, 5 = Strongly Agree. f = frequency; % = percentage of total sample (N = 120).

Reliability of the Intention to Adopt Scale

The scale comprising two items for 'Intention to Adopt' demonstrated good internal consistency; the Cronbach's alpha value was 0.827, and the inter-item correlation was $r = 0.709$ (Table 3). Both values are significantly higher than the conventionally accepted threshold of 0.70 for reliability in social science research (Nunnally, 1978; Tavakol & Dennick, 2011), supporting the use of the summed composite as a single measure of behavioral intention.

Table 3: Reliability Statistics for Intentions to Adopt Kitchen Gardening Scale

Scale	No. of Items	N	Cronbach's α
Intention to Adopt Kitchen Gardening	2	120	0.827

Testing of Hypotheses: Socio-Demographic Correlates of Intention to Adopt

Table 4 cross-tabulates the socio-demographic variables against respondents' overall intention to adopt kitchen gardening (split into low, medium, and high tertiles of the composite score; type of house is omitted, since it showed no variation in the sample), reporting the chi-square and Gamma statistics used to test each hypothesis. Education showed by far the strongest, fully confirmed association with intention to adopt, $\chi^2(4) = 89.169$, $p < .001$, Gamma = 0.841, $p < .001$ the largest chi-square and Gamma coefficients in the analysis: the positive Gamma confirms a clean, monotonic trend in which higher education goes with higher intention, giving strong support to H3. Age was also strongly and fully confirmed, $\chi^2(4) = 57.461$, $p < .001$, Gamma = -0.716 , $p < .001$, supporting H2; the negative Gamma reflects the direction noted in the Methodology, with younger respondents showing a consistently graded tendency toward higher intention than older respondents.

Prior experience in kitchen gardening was significantly associated with intention to adopt on both tests, $\chi^2(2) = 10.144$, $p = .006$, Gamma = -0.534 , $p = .022$, confirming H6 and pointing to a genuine ordinal pattern in which respondents with prior experience show a consistently higher tendency toward high intention than those without. Household income was

significantly associated with intention on the chi-square test, $\chi^2(2) = 9.935$, $p = .007$, but the Gamma statistic fell short of significance (Gamma = -0.249 , $p = .251$); H4 is therefore only partly supported — intention is not distributed independently of income category, but the relationship is not a fully confirmed monotonic trend. Gender, $\chi^2(2) = 2.439$, $p = .295$, Gamma = -0.249 , $p = .317$; household size, $\chi^2(4) = 2.911$, $p = .573$, Gamma = 0.166 , $p = .410$; and house ownership, $\chi^2(2) = 0.268$, $p = .875$, Gamma = -0.037 , $p = .890$, were not significantly associated with intention on either test, so H1, H5, and H7 are not supported indicating that intention to adopt kitchen gardening in this sample is shaped much more by education, age, prior exposure, and, to a lesser extent, income than by gender, household composition, or tenure

Table 4: Testing of Hypotheses: Demographic Characteristics and Intentions to Adopt Kitchen Gardening

Variable	Chi-square	p	Gamma	Decision
Gender	2.439	.295	-.0249	Not Supported
Age	57.461	< .001*	-.0716	Supported
Education	89.169	< .001*	0.841	Supported
Household Income	9.935	.007*	-.0249	Supported
Household Size	2.911	.573	0.166	Not Supported
Experience	10.144	.006*	-.0534	Supported
House Ownership	0.268	.875	-.0037	Not Supported

Note. * $p < .05$ (chi-square test of association). Gamma (λ) is the Goodman-Kruskal measure of ordinal association, tested against the null of no association; its p value is reported in the final column. Intention to adopt kitchen gardening into Low, Medium, and High tertiles of the composite score ($N = 120$).

Discussion

This study examined whether socio-demographic characteristics influence urban respondents' intention to adopt kitchen gardening in Faisalabad, using chi-square tests of association and Gamma statistics of ordinal association. The results show intention to adopt was significantly associated with education and age on both tests, with prior gardening experience on both tests, and with household income on the chi-square test alone, but not with gender, household size, or house ownership. These findings align closely with, and extend, the broader literature on kitchen-gardening adoption in Pakistan and comparable settings.

The strongest, most fully confirmed correlate in this study was education, $\chi^2(4) = 89.169$, $p < .001$, Gamma = 0.841, $p < .001$, echoing Mohsin et al., (2017) emphasis on education as a central determinant of kitchen-gardening uptake in urban Pakistan, and consistent with Hemani et al., (2026) argument that knowledge is a particularly central pathway to adoption in dense urban settings where space and resources are constrained: more educated respondents are likely better positioned to access, process, and act on information about gardening techniques, inputs, and benefits, which translates directly into stronger intention. The pronounced, fully confirmed experience effect, $\chi^2(2) = 10.144$, $p = .006$, Gamma = -0.534 , $p = .022$ with respondents who had prior experience showing a consistently graded tendency toward higher intention lends strong support to Ajzen, (2020) Theory of Planned Behavior, under which perceived behavioral control, often built through direct prior experience, is a key proximal driver of intention; it also fits Ahmed et al., (2022) finding that direct participation in kitchen-garden programmes measurably strengthens behavioral intentions relative to non-participation.

The strong, fully confirmed age effect, $\chi^2(4) = 57.461$, $p < .001$, Gamma = -0.716 , $p < .001$, is notable for its direction: intention to adopt was consistently highest among the youngest respondents (up to 35) and declined with age the opposite of what one might expect if intention simply tracked household seniority and decision-making authority. This pattern fits a perceived-behavioral-control interpretation under Ajzen, (2020) Theory of Planned Behavior: kitchen gardening, even at small urban scale, involves ongoing physical activity digging, watering, weeding that younger respondents may feel more confident and physically able to sustain, whereas older respondents may perceive greater physical or time constraints despite greater household authority. The pattern may also reflect a generational openness which is in align with Kaur & Singh, 2025 that to newer and trend-driven forms of urban food production which are consistent with broader observations that younger urban residents are often more receptive to home-based food-growing movements. Household income showed a significant chi-square association, $\chi^2(2) = 9.935$, $p = .007$, consistent with Hazra et al., (2025) identification of income as a factor in home-gardening adoption, and reflecting the reality that setting up and maintaining a kitchen garden, even a small urban one, usually requires some outlay for seeds, containers, and inputs that higher-income households can absorb more easily; the Gamma statistic, however, did not confirm a strict monotonic trend (Gamma = -0.249 , $p = .251$), so this association is best read as real but not perfectly graded.

The absence of a significant gender difference in this sample, $\chi^2(2) = 2.439$, $p = .295$, Gamma = -0.249 , $p = .317$, is noteworthy given that Gestasani et al., (2025) describe women as central to household garden management in urban Pakistan; one plausible reading is that while women may be the primary day-to-day managers of kitchen gardens once established, the decision-level intention to adopt in this sample where three-quarters of respondents were male, likely household heads or primary decision-makers is shaped more by household-level socio-economic capacity than by the respondent's gender itself. Similarly,

the absence of a significant effect for house ownership, $\chi^2(2) = 0.268$, $p = .875$, Gamma = -0.037 , $p = .890$, suggests renters in this urban sample are no less inclined toward kitchen gardening than owners, a promising sign for extension efforts, since it implies tenure status need not be treated as a barrier. Household size was likewise unrelated to intention, $\chi^2(4) = 2.911$, $p = .573$, Gamma = 0.166 , $p = .410$. Finally, the complete absence of Katcha housing in this urban Faisalabad sample, and the resulting inability to test type of house as a correlate, reflects the predominantly built-up, permanent-housing character of the study area, and this finding should not be generalized to peri-urban or rural populations where housing type varies more.

Conclusion

This study examined how socio-demographic characteristics influence urban households' intention to adopt kitchen gardening in Faisalabad, using cross-tabulation with chi-square and Gamma tests. Respondents reported moderately high overall intention to adopt. Intention, categorised into low, medium, and high tertiles, was significantly and consistently associated with education, age, and prior gardening experience on both tests, and with household income on the chi-square test alone, but not with gender, household size, or house ownership. More educated, younger respondents with prior gardening experience reported the strongest intention. These findings suggest that knowledge, experiential familiarity, and educational attainment rather than age-related seniority, gender, or housing tenure are the key levers through which extension and food-security programmes can strengthen intention to adopt kitchen gardening among urban households in Faisalabad.

Limitations

This study has several limitations. First, its cross-sectional design captures intention at a single point in time, cannot establish the direction of causality between socio-demographic characteristics and intention, and cannot confirm that stated intention translates into actual adoption. Second, the sample was drawn from urban localities of Faisalabad city and may not generalize to peri-urban or rural populations, or to other cities with different housing and socio-economic profiles; the complete absence of Katcha housing in this sample illustrates this urban-specific limitation. Third, the two-item intention scale, while internally consistent, is narrower than a full multi-dimensional measure of attitudes, subjective norms, and perceived behavioral control as specified in the Theory of Planned Behavior, and future research would benefit from a more comprehensive instrument. Fourth, several socio-demographic subgroups had unequal cell sizes (only 30 of 120 respondents were female, for instance), and collapsing intention into three tertile categories for the chi-square and Gamma analysis further reduces cell sizes within some blocks; the categorical results here should be read as a hypothesis-testing complement to, rather than a replacement for, continuous-score analysis. Fifth, the Gamma statistic assumes an ordinal relationship between row and column variables reasonable for age, education, and income, but more

tentative for prior experience and house ownership, whose categories are binary rather than genuinely ordinal; Gamma results for these variables should be read with this caveat in mind. Finally, household size, while measured and tested, may interact with unmeasured factors such as available outdoor space, which this study did not directly assess.

Ethical Considerations

Verbal consent was obtained from all adult respondents prior to data collection; the purpose of the study, their voluntary participation, and the confidentiality of information were explained to them in their local language. Since literacy rates in the study area were generally low, the method of written consent was not adopted; instead, prior to the start of each interview began. The process of data collection and obtaining consent was initially carried out as part of the first author's M.Phil. degree, under the supervision of the Department of Rural Sociology at the University of Agriculture, Faisalabad.

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