Consumer Preferences for Urban Farming Kits and Services: A Comparative Study of Residential Categories in Hyderabad

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Abstract

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| **Aims:** The present study aimed to analyze consumer preferences for various attributes of urban farming kits and services and to compare these preferences across different residential categories in Hyderabad.  **Study design:** A descriptive and analytical research design was employed, using both exploratory and inferential statistical techniques.  **Place and Duration of Study:** The study was conducted in residential areas of Hyderabad, Telangana, India, between April 2025 and June 2025.  **Methodology:** Primary data were collected from 120 households across four major urban zones (Charminar, LB Nagar, Kukatpally, and Serilingampally). A multi-stage purposive sampling method was applied. Data were gathered using a structured schedule with a five-point Likert scale to capture consumer attitudes. Factor analysis (Principal Component Analysis with Varimax rotation) was used to identify the underlying dimensions of consumer preferences. One-way Analysis of Variance (ANOVA) was employed to assess whether significant differences existed among three residential categories: gated communities, independent houses, and standalone apartments.  **Results:** Factor analysis extracted two key dimensions explaining 63.65% of the total variance. Factor 1, Kit Value and Flexibility, included attributes such as digital support (loading 0.856), modular design (0.852), and eco-friendly materials (0.705). Factor 2, User Convenience, comprised variables like minimal effort and maintenance (0.922) and easy setup (0.878). ANOVA results indicated statistically significant differences across residential categories for both factors. For Factor 1, F(2,117) = 13.55, p < 0.001; for Factor 2, F(2,117) = 6.55, p = 0.002. Post hoc tests showed that gated communities reported significantly higher scores for Kit Value and Flexibility, while standalone apartments scored relatively higher for User Convenience.  **Conclusion:** Consumer preferences for urban farming kits and services vary significantly by residential category. Gated communities value premium, customizable features, while standalone apartment residents emphasize ease of use. These findings highlight the need for differentiated marketing strategies and product designs tailored to diverse urban living environments. |

*Keywords: Urban Farming, Consmer preferences, Residential categories,Urban farming kits and services, Kit value & Flexibility, User convenience, Consumer preference attributes,Gated communities, Independent houses, Standalone apartments, Hyderabad.*

1. INTRODUCTION

Rapid urbanization is transforming global food systems, creating both challenges and opportunities for sustainable living. The United Nations projects that 68% of the world’s population will reside in urban areas by 2050, up from 55% in 2018, while India’s urban share is expected to exceed 40% by 2030 (UN DESA, 2018). This demographic change reduces cultivable land near cities, lengthens supply chains, and increases food costs and carbon emissions. It also widens dietary inequalities, with affluent groups consuming more processed foods while lower-income residents struggle to access fresh produce(Observer Research Foundation, 2023). Thus, food insecurity in cities is increasingly shaped by both spatial and socioeconomic pressures, highlighting the need for localized solutions such as urban farming.

Urban agriculture is emerging as a viable response to these challenges, combining food production with environmental and social benefits. According to the FAO, more than 800 million people are already engaged in urban farming globally, ranging from household gardens to commercial vertical farms. Countries are integrating it into their food security strategies in different ways. Singapore’s “30 by 30” policy aims to produce 30% of its nutritional needs locally by 2030 through hydroponics, vertical farming, and rooftop cultivation. China, meanwhile, incorporates greenhouses and rooftop farming in urban planning, with projections suggesting urban agriculture could meet 15% of its vegetable demand by 2030. (Acumen Research and Consulting, 2023). These examples show that urban farming is no longer peripheral but increasingly central to national food strategies.

In India, however, the integration of urban farming into planning remains limited. National missions such as AMRUT 2.0 and the Smart Cities Mission promote green spaces but have not directly included food production, reflecting a clear policy gap (People’s Resource Centre, 2024). Despite this, states and communities are adopting their own initiatives. Delhi contributes substantially to its own food production, particularly in meat, milk, and vegetables. Kerala, Tamil Nadu, and Bihar encourage rooftop and household farming through subsidies, kits, and training programmes, while Pune has experimented with community-driven urban agriculture. However, broader adoption is slowed by land scarcity, poor water availability, pollution, and lack of institutional support (Down to Earth, 2022). Hyderabad stands out as a more structured model: India’s first rooftop Urban Farming Centre was established on the CDMA building, promoting soil-free cultivation of vegetables, herbs, and medicinal plants, while also training women’s self-help groups to improve household nutrition and livelihoods (Krishi Jagran, 2023). The Telangana Horticulture Department has further identified nearly 60,000 square meters of potential rooftop farming space and has been supporting terrace cultivation since 2012 under the Rashtriya Krishi Vikas Yojana (Telangana Horticulture Department).

At the household level, urban farming adapts flexibly to different spatial constraints. Terrace and rooftop gardens have become popular in Indian cities, providing fresh vegetables and fruits while reducing indoor temperatures and improving household food security (Bhat & Paschapur, 2020). Apartment residents often rely on balcony and container gardening, which offers an affordable way to grow herbs and leafy vegetables and also contributes to mental well-being through stress relief and mindfulness (IJBPAS, 2023). In high-density areas, vertical farming provides year-round production in limited space, though its high initial investment restricts widespread adoption (Teoh et al., 2024). Similarly, hydroponics and aquaponics are gaining traction for their efficient water use and soil-free cultivation, with private companies increasingly offering ready-to-use kits and training to urban households (Just Agriculture, 2023). Community gardens add a social dimension, bringing residents together to share resources, build relationships, and strengthen collective responsibility for sustainability (TUSPH, 2024).

Beyond food supply, urban farming generates broader social and ecological benefits. It promotes recycling of organic waste into compost, efficient use of water, and reduction of pollution, aligning with principles of circular economy (Izawati et al., 2017). Research also suggests that engagement in gardening can improve mental and physical health, offering psychological relief and a sense of purpose, benefits that became especially evident during the COVID-19 pandemic (Mladenović et al., 2017). Rising concerns over pesticide use, climate change, and food miles further strengthen its appeal. By lowering packaging waste and reducing emissions from long-distance transportation, urban farming enhances sustainability and climate resilience, making it an attractive strategy for policymakers and private investors alike (Grebitus et al., 2020; The Business Research Company, 2025).

By combining modern technologies such as hydroponics with community-based models like rooftop and shared gardens, urban agriculture can help cities move toward more sustainable, inclusive, and resilient futures.

Objectives of the study:

1. To identify the determinants of consumer preferences for urban farming kits and services.

2. To assess differences in preferences across residential categories in Hyderabad.

2. material and methods

**2.1 Data**

Primary data for the study were collected in 2025 from four key residential zones of Hyderabad - Charminar, LB Nagar, Kukatpally, and Serilingampally, to capture diverse urban settings and socio-economic backgrounds. A multistage purposive sampling method was employed. From each zone, three areas were chosen purposively, giving a total of twelve areas. In each area, ten households were selected, resulting in a total sample of 120 households. The sample included residents from three different residential categories: gated communities, standalone apartments, and independent houses, ensuring representation across socio-economic levels.

A structured schedule was used to collect data on consumer preferences for urban farming kits and services. Respondents were asked to rate various attributes such as kit design, digital support, ease of use, maintenance requirements, eco-friendly materials, and aesthetic appeal using a five-point Likert scale (1 = strongly disagree, 5 = strongly agree).

**2.2 Analytical Framework**

To identify the underlying factors influencing consumer preferences, factor analysis was applied using SPSS. Before analysis, the adequacy of the data was tested using the Kaiser-Meyer-Olkin (KMO) measure and Bartlett’s Test of Sphericity. Factor analysis helped group related attributes into common factors, reducing data complexity and revealing key dimensions of consumer preferences. Principal Component Analysis (PCA) with Varimax rotation was used to extract factors with eigenvalues greater than one, ensuring a robust solution. Variables with factor loadings above 0.50 were considered significant for inclusion in each factor.

To examine differences in preferences across residential categories, one-way Analysis of Variance (ANOVA) was conducted. The factor scores obtained from PCA were treated as dependent variables, while residential categories (gated communities, standalone apartments, independent houses) were considered independent variables. Post hoc analysis using Tukey’s HSD test was employed to identify specific group differences. Descriptive statistics such as mean, standard deviation, and confidence intervals were computed prior to ANOVA to assess central tendencies and variability in consumer responses.

3. results and discussion

**3.1 Descriptive Statistics**

Descriptive statistics of the respondents show that the sample is largely composed of younger and early middle-aged individuals. On average, 45 per cent of respondents fall in the 25–34 years category, while 22.5 per cent are between 35–44 years. Respondents below 25 years account for 16.7 per cent, suggesting that even younger consumers are engaged in urban farming. By contrast, only 2.5 per cent of respondents belong to the 45–54 group, and 13.3 per cent are 55 years and above, highlighting limited representation of senior participants.

Education levels indicate a highly qualified sample. Nearly half of the respondents (49.2%) reported postgraduate and above qualifications, and 37.5 per cent hold undergraduate degrees. A smaller share of 10 per cent completed diploma or intermediate courses, while only 3.3 per cent had schooling up to the 10th standard. Notably, no respondents reported having no formal education, pointing to the concentration of well-educated households in the study.

The occupational distribution reveals that private sector employees (34.2%) form the largest group, followed by students (27.5%) and government employees (19.2%). Business owners represent 12.5 per cent, while homemakers make up just 6.7 per cent. The absence of retired respondents indicates that the consumer group is primarily active in either work or study.

In terms of family size, 70 per cent of respondents live in households with 3 - 4 members, which dominate the sample. Families with 5–6 members comprise 21.7 per cent, while smaller (1 - 2 members) and larger (more than six members) households are relatively rare. These patterns suggest that medium-sized nuclear families are the predominant consumer segment for urban farming kits and services in Hyderabad.

**3.2 Consumer preference Dimensions**

Factor analysis was conducted to identify the underlying dimensions of consumer preferences for urban farming kits and services. The model was found suitable, with a KMO value of 0.754 and a significant Bartlett’s Test of Sphericity (χ²(45) = 681.673, *P* < .001). Table 1 shows two factors with eigenvalues greater than one were extracted, together explaining 63.65% of the total variance.

The rotated component matrix represented inTable 2 identified two distinct dimensions of consumer preferences for urban farming kits. Factor 1, labeled “Kit Value and Flexibility,” captured attributes such as digital support (0.856), modular or customizable design (0.852), organic seeds and compost (0.804), aesthetically appealing design (0.735), expandable components (0.721), eco-friendly materials (0.705), and high-quality features (0.590). These high loadings indicate that consumers value adaptability, premium features, and eco-friendly aspects of the kits. Factor 2, labeled “User Convenience,” included minimal effort and maintenance (0.922), easy setup (0.878), and reliable customer service (0.646), highlighting the importance of ease of use and practical support in adoption decisions. Together, these two factors explain the core dimensions driving consumer evaluation: a balance between product functionality and premium features versus usability and convenience, offering guidance for product design and targeted marketing in urban households.

**3.3 Differences in Consumer Preferences across Residential Categories**

To examine differences in preferences across residential categories, descriptive statistics showed that gated community residents reported the highest mean scores for Kit Value and Flexibility (0.61), compared to independent houses (–0.30) and standalone apartments (–0.30). For User Convenience, gated communities scored 0.41, standalone apartments 0.34, and independent houses 0.07. This indicates that gated community residents place more importance on premium, customizable features, whereas apartment residents value ease of use, and independent house residents show moderate preferences.

One-way ANOVA confirmed that these differences were statistically significant across residential categories. Table 3 shows the ANOVA result. For Kit Value and Flexibility, the variation among groups was highly significant (F(2,117) = 13.55, P < .001), while for User Convenience, differences were also significant (F(2,117) = 6.55, P = .002). This suggests that residential context strongly influences consumer priorities when selecting urban farming kits.

The Tukey HSD post hoc test was conducted to identify which residential categories differed significantly, and the results are presented in Table 4. For Factor 1 (Kit Value and Flexibility), gated community residents scored significantly higher than both independent houses (mean difference = 0.918, P < .001) and standalone apartments (mean difference = 0.914, P < .001). There was no significant difference between independent houses and standalone apartments (P = 1.000). This indicates that gated community residents place a stronger emphasis on kit value and flexibility, while independent house and standalone apartment residents show similar preferences for this factor. For Factor 2 (User Convenience), standalone apartment residents scored significantly higher than gated community residents (mean difference = 0.763, P = .002), reflecting a greater preference for ease of use and low-maintenance kits. Differences between gated communities and independent houses, as well as between independent houses and standalone apartments, were not statistically significant, suggesting comparable levels of preference among these groups.

These findings suggest that residential context shapes consumer priorities: gated communities strongly favor kit value and flexibility, whereas standalone apartment residents prioritize user convenience. Independent house residents occupy a middle ground, without strongly leaning toward either dimension.

**Table 1. Total variance explained of consumer preference attributes**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Component** | **Initial Eigenvalues** | | | **Extraction Sums of Squared Loadings** | | | **Rotation Sums of Squared Loadings** | | |
| **Total** | **% of Variance** | **Cumulative %** | **Total** | **% of Variance** | **Cumulative %** | **Total** | **% of Variance** | **Cumulative %** |
| 1 | 4.168 | 41.678 | 41.678 | 4.168 | 41.678 | 41.678 | 4.024 | 40.240 | 40.240 |
| 2 | 2.197 | 21.974 | 63.652 | 2.197 | 21.974 | 63.652 | 2.341 | 23.412 | 63.652 |
| 3 | .996 | 9.960 | 73.612 |  |  |  |  |  |  |
| 4 | .736 | 7.363 | 80.976 |  |  |  |  |  |  |
| 5 | .642 | 6.421 | 87.396 |  |  |  |  |  |  |
| 6 | .415 | 4.153 | 91.550 |  |  |  |  |  |  |
| 7 | .324 | 3.237 | 94.787 |  |  |  |  |  |  |
| 8 | .252 | 2.523 | 97.310 |  |  |  |  |  |  |
| 9 | .140 | 1.403 | 98.713 |  |  |  |  |  |  |
| 10 | .129 | 1.287 | 100.000 |  |  |  |  |  |  |
|  | | | | | | | | | |

**Table 2 Rotated Component Matrix of consumer preference attributes**

|  |  |  |
| --- | --- | --- |
| **Variable** | **Component** | |
| **1** | **2** |
| Digital support | .856 |  |
| Modular or customizabe design | .852 |  |
| Organic seeds and compost | .804 | -.142 |
| Aesthetically appealing | .735 |  |
| Expandable components | .721 | .306 |
| Eco-friendly materials | .705 | -.306 |
| High quality features | .590 | -.290 |
| Minimal effort and maintenance |  | .922 |
| Easy setup |  | .878 |
| Reliable customer service |  | .646 |
|  | | |
|  | | |

Table 3 12 One-way ANOVA Results for Consumer Preferences across Residential Categories

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | | **Sum of Squares** | **df** | **Mean Square** | **F** | **Sig.** |
| **Factor 1**  **Kit Value & Flexibility** | Between Groups | 22.38 | 2 | 11.19 | 13.55 | <.001 |
| Within Groups | 96.61 | 117 | .826 |  |  |
| Total | 119.00 | 119 |  |  |  |
| **Factor 2**  **User Convenience** | Between Groups | 11.98 | 2 | 5.99 | 6.55 | .002 |
| Within Groups | 107.01 | 117 | .915 |  |  |
| Total | 119.00 | 119 |  |  |  |

Table 4 Post Hoc Multiple Comparisons Identifying Group Differences in Consumer Preferences by Residential Category (RC)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Dependent Variable** | **(I) RC** | **(J) RC** | **Mean Difference (I-J)** | **Std. Error** | **Sig.** | **95 per cent Confidence Interval** | |
| **Lower Bound** | **Upper Bound** |
| **Factor 1**  **Kit Value & Flexibility** | 1 | 2 | .918\* | .203 | <.001 | .435 | 1.400 |
| 3 | .914\* | .203 | <.001 | .431 | 1.396 |
| 2 | 1 | -.918\* | .203 | <.001 | -1.400 | -.435 |
| 3 | -.004 | .203 | 1.000 | -.486 | .478 |
| 3 | 1 | -.914\* | .203 | <.001 | -1.396 | -.431 |
| 2 | .004 | .203 | 1.000 | -.478 | .486 |
| **Factor 2**  **User Convenience** | 1 | 2 | -.493 | .213 | .059 | -1.001 | .0143 |
| 3 | -.763\* | .213 | .002 | -1.270 | -.255 |
| 2 | 1 | .493 | .213 | .059 | -.014 | 1.001 |
| 3 | -.269 | .213 | .419 | -.777 | .237 |
| 3 | 1 | .763\* | .213 | .002 | .255 | 1.270 |
| 2 | .269 | .213 | .419 | -.237 | .777 |
| \*. The mean difference is significant at the 0.05 level. | | | | | | | |

4. Conclusion

This study examined consumer preferences for urban farming kits and services across different residential categories in Hyderabad. Factor analysis identified two key dimensions: Kit Value and Flexibility, emphasizing premium, customizable, and eco-friendly features, and User Convenience, reflecting preferences for ease of use and low-maintenance kits. ANOVA results showed significant differences across residential categories. Gated community residents prioritized Kit Value and Flexibility, while standalone apartment residents emphasized User Convenience. Independent house residents exhibited moderate preferences for both dimensions. These findings indicate that urban living environments shape consumer priorities, suggesting that marketing strategies and product designs should be tailored to residential contexts. Overall, the study provides actionable insights for urban agriculture service providers, highlighting the need to offer differentiated kits that balance premium features with user convenience to meet the diverse demands of city dwellers.

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