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Original Research Article

Perceptions of Urban Agriculture (UA) Practices Among Malaysian Urban Dwellers: An Exploratory Study in Klang Valley

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Abstract: Urban agriculture (UA) programs have experienced a significant rise in demand in Malaysia, particularly during and after the COVID-19 pandemic. Various initiatives by both governmental and non-governmental organisations have aimed to enhance public participation in UA practices. These efforts focus on raising awareness and highlighting the benefits of UA, such as lowering the cost of living for urban residents, providing access to safe and high-quality food, and strengthening social connections within urban communities. Studies have indicated that understanding perceptions of an initiative or event is crucial for promoting its adoption. This forms the rationale for conducting the study, which aims to identify influential dimensions affecting perceptions of UA practices among urban settlements in Klang Valley, Malaysia. The study employed the Exploratory Factor Analysis (EFA) method. An in-person survey was conducted among 875 respondents from various areas within Klang Valley were interviewed using a structured questionnaire. The results revealed that perceptions of UA practices are shaped by six key factors: social and health impact, quantity and quality, environmental impact, economic impact, dietary preferences, and land utilisation. These findings provide valuable insights for policymakers to develop effective strategies, particularly in designing promotional campaigns to enhance participation in UA, especially among urban dwellers in Malaysia.

Keywords: economic impact; environmental impact; land utilisation; social and health impact; urban agriculture; and urban dwellers.

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1. Introduction

Agricultural activity is typically associated with rural areas, but its application in urban spaces has become increasingly common. Malaysia is no exception, as the government has recognised the importance of this activity. This recognition is evident in the establishment of the Urban Agriculture (UA) Division under the Department of Agriculture Malaysia in 2010, where the objectives of the division are to (i) promote agricultural activities in the city to reduce the cost of living the urban community; (ii) to add extra income for the urban community with surplus agricultural production; (iii) to promote awareness and interest in the importance of agriculture as a direct contributor to the reduction in the cost of living of urban community; and (iv) to ensure quality and food safety of the country (Department of Agriculture Malaysia, 2015). UA practices in Malaysia have been gaining popularity, particularly during and after the COVID-19 pandemic. Policy documents have also addressed the importance of UA, including its mention in the *Dasar Agromakanan Negara 2.0* (for food safety and nutritional food for people, enhancing the linkage between urban dwellers and food production, and addressing the scarcity of land resources) as well as the *Dasar Kebun Komuniti Bandar* (to encourage urban dwellers to optimise land resources for urban farming activities). Strengthening community farming has been identified as one of the key short-term strategies by the Ministry of Agriculture and Food Security (KPKM) to enhance the national food supply (Kementerian Pertanian dan Industri Makanan, 2021).

Studies have indicated that UA offers numerous advantages to urban dwellers, including economic, social, and environmental benefits. For instance, Zezza & Tasciotti (2010) demonstrated that urban agricultural activities are closely associated with food security, dietary diversity, and a nutritionally adequate diet. Several studies highlighted the importance of UA, including its capability to feed the total urban population (Clinton et al., 2018; De Simone et al., 2023; Kriewald et al., 2019); to improve food environments and the aesthetic

of urban areas in different socioeconomic contexts (Audate et al., 2021) and provides several benefits apart from food (Pradhan et al., 2023). For the urban poor, UA is more vital as it serves as a reliable and potential survival strategy, enabling them to produce their food to cope with rising living costs in cities (Razak & Roff, 2007). Moreover, previous studies showed that UA could be a source of income (Gockowski et al., 2003; Zezza & Tasciotti, 2010) and create job opportunities for urban residents (Cohen & Garrett, 2010).

In general, it can be said that there is growing interest in practising UA at the international level; however, its adoption in Malaysia remains relatively marginal, although at an increasing rate, especially during and after the COVID-19 pandemic. For comparison, an analysis of data from 15 developing or transition countries found that UA participation rates ranged from 11% to 69% (Zezza and Tasciotti, 2010). In Malaysia, as of December 2016, only about 40,000 urban dwellers were recorded as participating in UA programs conducted by the Department of Agriculture Malaysia. The number of participants recorded was based solely on programs organised by the Department of Agriculture in collaboration with local authorities, government departments, and other relevant agencies. However, it is believed that more urban inhabitants were involved in UA, especially during and after the COVID-19 pandemic, and those practising it informally, as their data were not captured. Given the evident low participation in UA in Malaysia, this study aims to determine the influential dimensions shaping perceptions of UA practices among urban dwellers.

There are studies that highlight the critical role of understanding public perception in driving the adoption of initiatives or events (Rogers, E. M., 2003). Perception encompasses the attitudes, beliefs, and opinions that individuals or communities hold regarding a particular initiative. When these perceptions are positive, they can create a sense of trust, relevance, and alignment with community needs, making individuals more likely to engage with and support the initiative. Conversely, negative or unclear perceptions may lead to scepticism, resistance, or apathy, hindering its adoption. Understanding perception provides valuable insights into the factors influencing public acceptance, including cultural, social, economic, and psychological elements. This knowledge enables policymakers, organisations, and stakeholders to design targeted strategies, such as awareness campaigns or educational programs, that address misconceptions, highlight benefits, and foster enthusiasm for the initiative.

2. Literature Review

There is a growing body of literature that recognises the importance of practising UA. These advantages can be classified into various functions, including food security, economic, social, health, and environmental.

One of the most pertinent impacts of UA is food security. Despite its role in supporting local food production (Kortright & Wakefield, 2011), the ability of UA to improve food security and livelihoods is often cited as one of the primary reasons for promoting UA (Madaleno, 2000; Specht et al., 2013). In this regard, Mougeot (2006) explained how local small-scale food production contributes to food security, especially for poor households, by providing dependable access to food at affordable prices over the long term, particularly in less-developed countries. The significant contribution of UA to food security is also supported by Zezza & Tasciotti (2010) and White & Hamm (2014). From a food availability standpoint, UA plays an important role in ensuring a sufficient food supply. From a food availability standpoint, UA plays an important role in ensuring a sufficient food supply. Findings by Ngome & Foeken (2012) indicated that, of the total farmers surveyed in Buea, Cameroon, 66% considered UA their primary source of calories for their households. Armar-Klemesu (2000), on the other hand, concluded that UA could contribute 15-20% of global food production if 200 million city dwellers were involved in this activity.

In the case of food accessibility, UA enhances both economic and physical access to food because the distribution channel of food products will be shortened (Lovell, 2010), and food is close to the consumers. Producing food in urban areas provides an alternative, shorter food chain that tends to be more profitable (Aubry & Kebir, 2013). Owing to shorter food chains, UA offers quick advantages in terms of food utilisation. For instance, UA can offer nutritionally rich foods (van Leeuwen et al., 2010), enhance the consumption of fresh produce (Corrigan, 2011), improve food diversity, quantity, and quality, and ensure that food can be eaten fresh and tastes better (Poulsen et al., 2015; Flachs & Oberlin, 2010). UA also plays a crucial role in safeguarding food stability. Memon & Lee-Smith (1993) provide a compelling example from Kenya, where they found that 40% of the respondents interviewed said they would starve if they were prevented from farming. This is further supported by Poulsen et al. (2015), who concluded that a more stable food source, including food preservation and storage, is highly valued by UA practitioners. (Gallaher et al., 2013; Warren et al., 2015a) supported this point, noting that urban farmers in Kenya were aware that they always had a backup in case they ran out of food. Although participation in UA varied by location, this

activity was seen as a coping mechanism when food access was limited or during economic crises (Warren et al., 2015).

In addition to food security, UA offers significant economic benefits. For example, studies by Asomani-Boateng (2002) and Adeoti & Egwudike (2003) found that the majority of UA participants were motivated by both providing food for their households and income-related factors. (Ayenew et al., 2011; Warren et al., 2015a) reported that income generation was a key motivation for engaging in UA. Similarly, Ngome & Foeken (2012) examined the impact of gender on UA practices and concluded that men typically view UA primarily as a source of income. Another study by Kremer & DeLiberty (2011) suggested that income generation from UA is not only a concern for poor farmers but also for wealthier households.

UA plays a significant role in enhancing social interactions within neighbourhoods, with gardening activities providing valuable opportunities for socialisation. The positive impact on social connections is particularly evident at the community level, particularly through community gardens, where people feel at ease meeting and interacting (Flachs & Oberlin, 2010). On a broader scale, Whatley et al. (2015) found that community gardens promote social inclusion and occupational participation by fostering a sense of community, providing a flexible environment for engagement, and supporting learning opportunities. Moreover, researchers agree that UA helps create safe spaces for recreation and improves the physical environment of neighbourhoods (Golden, 2013). In addition, community gardens contribute to the beautification of neighbourhoods, cultivating local pride and attachment to the area space (Bradley & Galt, 2014). This, in turn, leads to reduced vandalism and crime within these UA spaces (Flachs & Oberlin, 2010); Ober Allen et al., 2008)). Saldivar-Tanaka (2004) further supports the notion that UA can reduce crime, particularly as vacant lots are often hotspots for criminal activity. As such, the presence of community gardens enhances the attractiveness of neighbourhoods, creating opportunities for community development. Furthermore, UA fosters social interaction among residents, offering numerous benefits beyond just "growing food" as highlighted in previous studies (Holland, 2004; Patel, 1991) and plays a role in community empowerment (Howe & Wheeler, 1999).

The urbanisation process has also altered food consumption patterns, particularly in urban areas. For example, Somerset et al. (2005) found that in developed countries, many urban dwellers, especially children, consume fewer fresh fruits and vegetables and tend to eat more processed foods while being less physically active compared to children living in rural areas. In this context, Block et al. (2012) suggested that UA, particularly in the form of

community gardens, could be a potential tool to counteract these trends. A considerable body of literature has demonstrated the connection between healthier food intake and gardening activities. (Armstrong, 2000; Kingsley, Townsend, & Henderson-Wilson, 2009; Teig et al., 2009).UA contributes significantly to human health, particularly by improving dietary diversity and quantity through the production of a wide variety of foods. In scenarios where diverse vegetables are grown, micronutrient intake among community members is enhanced (Warren et al., 2015b). In fact, Angotti (2015) suggested that urban farms could promote healthy local food production, which, over time, would improve the quality of food intake among urban populations. Furthermore, studies have found that UA participants tend to have healthier nutrition compared to non-participants (Lovell, 2010). In some cases, UA also plays a vital role in improving mental health, as it is regarded as a form of therapeutic activity (Sempik, 2010).

The literature on UA highlights several positive environmental impacts of this activity (Shackleton & Blair, 2013). The motivations for practising agriculture in urban areas are often driven by its environmental benefits. The urbanisation process typically degrades urban environments, with cities facing numerous environmental challenges such as air and water pollution, limited green spaces, the urban heat island effect, rising waste management costs, excessive carbon emissions, and a decline in ecological biodiversity. Despite the recognised positive impacts of UA, it is crucial to investigate the factors that influence perceptions to inform policies that can encourage greater engagement with UA in Malaysia. Given the limited research on this topic, this study aims to identify the key factors shaping urban dwellers' perceptions of UA in Malaysia.

3. Materials and Method

3.1 Study Area

The study focused on the Klang Valley area, which is considered the most concentrated and urbanised region in Malaysia. In general, there is no clear definition or official designation of boundaries for the Klang Valley. However, the Klang Valley is commonly grouped into three main areas: the Federal Territory of Kuala Lumpur (KL city area, Petaling, Cheras, Setapak, Ulu Klang, Batu, and Ampang), the Federal Territory of Putrajaya, and Selangor (Petaling, Klang, Kuala Selangor, Gombak, Hulu Selangor, Sabak Bernam, Hulu Langat, Sepang, and Gombak).

3.2 Sampling and Instrument

A total of 875 urban dwellers across the Klang Valley were interviewed face-to-face using convenience sampling to explore their perceptions of UA practices in Malaysia. Based on the current Klang Valley population of over six million, Krejcie & Morgan (1970) suggested a minimum sample size of 384. Therefore, the sample size of 875 is adequate to support the generalisation of the study results.

Respondents were asked to rate 38 statements on a four-point scale (1 = strongly disagree, 4 = strongly agree) regarding their perceptions of UA practices in Malaysia. The selection of the 38 statements was based on the social, environmental, and economic impacts of UA practices. The questionnaire was divided into two sections. The first part consisted of statements on respondents' perceptions of UA practices, while the second part collected socio-demographic information, including age, gender, ethnicity, highest level of education, employment status, type of housing, and household income.

To assess the internal consistency and reliability of the multi-item variables across all 30 items, Cronbach's Alpha Coefficient was used, ensuring the validity of the data collected and the variables measured. To achieve the study's objectives, Exploratory Factor Analysis (EFA) was employed to identify the key dimensions of UA practices in Malaysia. Although EFA is brief and exploratory, it is well-established for determining the fundamental constructs from a large set of controlled variables. EFA reduces the number of extracted factors and specifies patterns of association between measured variables and common factors. In other words, EFA groups variables into major latent factors that influence public participation in UA activities

4. Results

4.1 Socio-demographic Profiles of Respondents

The socio-demographic profiles of the respondents are illustrated in Table 1. Of the 875 respondents interviewed, approximately 48% of the sample comprised males, with a mean age of 36.6 years. More than half of the respondents were Malay (57%), followed by Chinese (24.2%), Indian (15.4%), Bumiputera Sabah and Sarawak (2.7%), and Others (0.6%). In terms of age group, the highest proportion of respondents was in the 30-39 years old group (33.9%). About 30% were in the 20-29 years old group, and 26% were in the 40-49 years old group, respectively. Additionally, 8.9% were in the 50-59 years old group, and only 2.5% were above 60 years old. As for the highest level of education obtained, the majority had tertiary education (college or university), at 79.8%. About half were employed in the private

sector (46.4%), followed by those in the government sector (34.7%) and full-time students (6.2%). About 6% worked from home, 3% were pensioners, and another 4% were still looking for a job. The majority of respondents (49.5%) lived in terrace houses, followed by those living in condominiums (24.5%), flats (14.6%), and bungalows (11.4%). In terms of monthly household income, more than half of the respondents earned less than RM5,000 (50.2%), while only 15.5% earned more than RM10,000 per month.

Table 1: Demographic Profiles of Respondents

Demographic Profiles		Frequency (n=875)	Percentage (%)
Gender	Male	422	48.2
	Female	453	51.8
Age (years old)	20–29	255	29.1
	30–39	297	33.9
	40–49	223	25.5
	50–59	78	8.9
	60 and above	22	2.5
Ethnic	Malay	499	57.0
	Chinese	212	24.2
	Indian	135	15.4
	Bumiputera Sabah and Sarawak	24	2.7
	Others	5	.6
Highest Education Level Obtained	Primary school	17	1.9
	Secondary school	160	18.3
	Tertiary education level	698	79.8
Employment	Government sector	304	34.7
	Private sector	406	46.4
	Unemployed/looking for a job	36	4.1
	Home duties	49	5.6
	Full-time student	54	6.2
	Retiree	26	3.0
Monthly Household Income (RM)	Less than RM5,000	439	50.2
	RM5,001–10,000	300	34.3
	More than RM10,000	136	15.5
Type of House	Flat	128	14.6
	Apartment/ Condominium	214	24.5

Demographic Profiles		Frequency (n=875)	Percentage (%)
	Terrace	433	49.5
	Bungalow	100	11.4

4.2 General Opinions Regarding UA Practices in Malaysia

Several questions regarding general opinions on UA practices in Malaysia were also asked of the respondents (Table 2). Of the 875 respondents interviewed, 94% indicated that they were aware of the benefits of UA practices. Positive responses were obtained regarding the importance of UA practices, with 94% indicating that UA was important for the future. In terms of its ability to reduce national food imports, only 76% of respondents agreed. Additionally, 43% of respondents mentioned that it was not easy to practice agriculture in urban areas. This could stem from low participation in agriculture communities, as only 55 respondents stated that they joined a relevant agriculture community.

Table 2: General Opinions on UA Practices in Malaysia

Description	Feedback	Frequency (n=875)	Percentage (%)
Awareness of the Benefits of UA	Yes	819	93.6
	No	56	6.4
UA practices are important for the future	Yes	819	93.6
	No	56	6.4
UA is able to reduce national food imports	Yes	662	75.7
	No	213	24.3
UA is easy to practice	Yes	495	56.6
	No	380	43.4
Involvement in any agricultural community	Yes	55	6.3
	No	820	93.7

4.3 Descriptive Analysis of the Perceptions

The feedback received regarding perceptions of UA practices in Klang Valley, Malaysia, based on 38 statements presented to the respondents, is summarised in Table 3. In general, most of the statements tested received an average rating score of at least three (except for the ability of UA in "adding value to the land" and "ease of management in urban areas"), indicating that the respondents at least agreed with all the statements. The highest average score of 3.52 was shared by "more access to fresh vegetables" and "increase the consumption of fresh produce," with only 1% of respondents strongly disagreeing with both statements.

More than 95% of responses were either "agree" or "strongly agree," suggesting that the respondents believe UA practices would significantly improve the accessibility and consumption of fresh produce.

From an environmental point of view, the ability of UA to cool and green urban areas was agreed upon by the respondents, with an average score of 3.44. UA was also regarded as a source of organic production, with 96% of respondents agreeing that it has the potential to produce organic vegetables, which could lead to healthier eating habits (average score: 3.4). The contribution of UA in terms of health and education was also notable, with both the "gardening makes me healthy" and "educate younger generations" statements receiving an average score of 3.42.

A majority, 93.7% of respondents, agreed or strongly agreed that UA practices contribute to ensuring the food safety of their food intake. Furthermore, the role of UA in improving dietary habits was acknowledged, with 39.4% strongly agreeing that UA helps them "meet nutritional values of diet," 39.1% strongly agreeing it helps them "get a sufficient amount of food," 38.3% strongly agreeing it helps them "meet dietary preferences," and 39.7% strongly agreeing it helps them "enjoy diversity in vegetable intake."

Regarding the ability to "develop social interaction among neighbours" and "traceability of fresh vegetables," both received an average rating score of 3.4. Additionally, UA's contribution to economic factors was notable. Statements such as "reducing food bills," "creating entrepreneurial traits," "reducing food waste," "reducing transportation costs for vegetables," "creating job opportunities," and "reducing urban poverty" all received average scores above three. Respondents also agreed that UA promotes "reuse and recycle" and "energy conservation," with average scores of 3.26 and 3.23, respectively. The ability of UA to "beautify urban areas" and "enhance the tourism industry" was also recognised, with average scores of 3.33 and 3.08, respectively. However, when it came to "adding value to the land," respondents tended to disagree, with an average rating score of 2.96. This was consistent with the assumption that "practising agriculture in urban areas is easy," where about 40% of respondents at least disagreed.

Table 3: Feedback on Perceptions based on Frequency and Percentage (n=875)

Item	Description	Strongly Disagree (SD)		Disagree (D)		Agree (A)		Strongly Agree (SA)		Avg. score
		f	%	f	%	f	%	f	%	
P1	Reducing food bills	17	1.9	71	8.1	405	46.3	382	43.7	3.32
P2	Reducing food waste	13	1.5	100	11.4	401	45.8	361	41.3	3.28
P3	More access to fresh vegetables	9	1	31	3.5	337	38.5	498	56.9	3.52
P4	Increase the consumption of fresh produce	9	1	26	3	341	39	499	57	3.52
P5	A sufficient amount of food	10	1.1	95	10.9	428	48.9	342	39.1	3.26
P6	Able to generate income	16	1.8	96	11	406	46.4	357	40.8	3.26
P7	Reduce urban poverty	31	3.5	138	15.8	397	45.4	309	35.3	3.12
P8	Create job opportunities	18	2.1	125	14.3	397	45.4	335	38.3	3.20
P9	Creating entrepreneurial traits	10	1.1	74	8.5	438	50.1	353	40.3	3.30
P10	Meet diet preferences	10	1.1	92	10.5	438	50.1	335	38.3	3.26
P11	Meet the nutritional values of the diet	7	0.8	94	10.7	429	49	345	39.4	3.27
P12	Change eating habits to become healthier	11	1.3	51	5.8	388	44.3	425	48.6	3.40
P13	More variety for vegetables	9	1	71	8.1	401	45.8	394	45	3.35
P14	Reduce transportation costs to buy vegetables	10	1.1	108	12.3	388	44.3	369	42.2	3.28
P15	Better time management instead of going shopping	14	1.6	123	14.1	406	46.4	332	37.9	3.21
P16	Better use of available land in residential areas	10	1.1	61	7	413	47.2	391	44.7	3.35
P17	Restrictions on utilising the land	32	3.7	183	20.9	376	43	284	32.5	3.05
P18	Adding value to the land	29	3.3	218	24.9	389	44.5	239	27.3	2.96
P19	Easy to manage in urban areas	41	4.7	304	34.7	329	37.6	201	23	2.79
P20	Gardening makes me healthy	2	0.2	37	4.2	430	49.1	406	46.4	3.42

Item	Description	Strongly Disagree (SD)		Disagree (D)		Agree (A)		Strongly Agree (SA)		Avg. score
		f	%	f	%	f	%	f	%	
P21	Reduces stress level & improves mental health	8	0.9	70	8	437	49.9	360	41.1	3.31

Table 3: Feedback on Perceptions based on Frequency and Percentage (n=875) (continued)

Perception	Description	Strongly Disagree (SD)		Disagree (D)		Agree (A)		Strongly Agree (SA)		Avg. score
		f	%	f	%	f	%	f	%	
P22	Create self-reliance, self-esteem	5	0.6	71	8.1	475	54.3	324	37	3.28
P23	Educating younger generations	4	0.5	32	3.7	435	49.7	404	46.2	3.42
P24	Gardening enhances knowledge sharing	5	0.6	63	7.2	469	53.6	338	38.6	3.31
P25	Develop social interaction among neighbours	3	0.3	45	5.1	434	49.6	393	44.9	3.40
P26	Ensuring food safety	9	1	46	5.3	436	49.8	384	43.9	3.37
P27	Ensuring food security	10	1.1	105	12	493	56.3	267	30.5	3.17
P28	Ability of urban areas to produce food	9	1	86	9.8	492	56.2	288	32.9	3.21
P29	Vegetables can be produced organically	12	1.4	23	2.6	421	48.1	419	47.9	3.43

Perception	Description	Strongly Disagree (SD)		Disagree (D)		Agree (A)		Strongly Agree (SA)		Avg. score
		f	%	f	%	f	%	f	%	
P30	Traceability of fresh vegetables	7	0.8	32	3.7	439	50.2	397	45.4	3.40
P31	Diversity of vegetables	8	0.9	84	9.6	436	49.8	347	39.7	3.29
P32	Beautifying the urban areas	14	1.6	76	8.7	395	45.1	390	44.6	3.33
P33	Cooling and greening the urban areas	7	0.8	51	5.8	374	42.7	443	50.6	3.44
P34	Enhance the tourism industry	25	2.9	157	17.9	415	47.4	278	31.8	3.08
P35	An efficient waste management system	24	2.7	145	16.6	456	52.1	250	28.6	3.07
P36	Promote reuse and recycling	11	1.3	80	9.1	455	52	329	37.6	3.26
P37	Promote energy conservation (through a shorter supply chain)	7	0.8	72	8.2	512	58.5	284	32.5	3.23
P38	Reduce carbon footprint (through less carbon emission)	9	1	39	4.5	474	54.2	353	40.3	3.34

4.4 Perceptions towards UA Practices in Malaysia

Based on the 38 statements discussed in the previous section, further analysis was conducted to examine the key dimensions shaping respondents' perceptions of UA practices. The results of the Kaiser-Meyer-Olkin (KMO) sampling adequacy test were recorded at 0.949, and Bartlett's test of sphericity was significant at the 0.01 level, indicating that EFA is appropriate for this study.

EFA was performed to group the 38 variables into major underlying factors influencing respondents' perceptions of UA activities. However, only 31 variables were included in the EFA, as the remaining seven variables did not meet the minimum factor loading criterion of 0.5. In total, six factors were identified as key dimensions shaping respondents' perceptions, accounting for 63.15% of the total variance (Table 4). Although naming each factor can be challenging (Hair et al., 1998), extensive discussions among researchers led to the identification of the following six factors: (1) social and health impact, (2) quantity and quality, (3) environmental impact, (4) economic impact, (5) dietary preferences, and (6) land utilisation. The discussion of these six influential dimensions of Klang Valley respondents' perceptions will be elaborated in the following subsection. To ensure the reliability and validity of the results obtained from the EFA, the internal reliability consistency of multi-items across all 31 variables tested in the study was evaluated using Cronbach's Alpha coefficient. The summary of constructs and reliability scales for each of the six factors generated is illustrated in Table 5. Based on the results presented in Table 5, all of the constructs measured have an α value greater than 0.70.

Table 4: Influential Dimensions of Urban Dwellers' Perception towards UA Practices

Variable	Component					
	Social and Health Impact	Quantity and Quality	Environmental Impact	Economic Impact	Diet Preferences	Land Utilisation
Create self-reliance, self-esteem	.730					
Gardening makes me healthy	.728					
Gardening reduces stress levels and improves mental health	.704					
Helps to educate younger generations in terms of agricultural practices	.696					
Gardening enhances knowledge sharing	.683					

Variable	Component					
	Social and Health Impact	Quantity and Quality	Environmental Impact	Economic Impact	Diet Preferences	Land Utilisation
Develop social interaction among neighbours	.649					
Better use of available land in residential/housing area	.476					
More access to fresh vegetables		.736				
Increase the consumption of fresh produce		.716				
Reducing food bills		.655				
Traceability of fresh vegetables		.618				
Vegetables can be produced organically		.610				
Ensuring food safety		.571				
Reducing food waste		.530				
Efficient waste management system			.755			
Promote reuse and recycling			.723			
Promote energy conservation (through a shorter supply chain)			.709			
Reduce carbon footprint (through less carbon emission)			.663			

Variable	Component					
	Social and Health Impact	Quantity and Quality	Environmental Impact	Economic Impact	Diet Preferences	Land Utilisation
Enhance tourism industry			.627			
Cooling and greening the urban areas			.529			
Create job opportunities				.776		
Able to generate income				.756		
Reduce urban poverty				.669		
Able to create entrepreneurial traits				.636		
Meet the nutritional values of the diet					.765	
Meet diet preferences					.759	
Change eating habits to become healthier					.603	
More variety for vegetables						
There are restrictions from government agencies on utilising the land						.768
Adding value to the land						.643
Agriculture activities are easy to manage in urban areas						.576
Eigenvalue	12.41	1.83	1.60	1.44	1.19	1.11

Variable	Component					
	Social and Health Impact	Quantity and Quality	Environmental Impact	Economic Impact	Diet Preferences	Land Utilisation
Variance Explained (%)	40.03	5.91	5.17	4.63	3.82	3.59

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalisation.
a. Rotation converged in 8 iterations.

Table 5: Summary of Constructs and Reliability Scales

Component Factor	% of Variance Explained	Number of Items		α coefficient (overall = 0.958)
		Initial	Excluded	
1- Social and Health Impact	40.032	7	0	0.884
2- Quantity and Quality	5.913	7	0	0.858
3- Environmental Impact	5.167	6	0	0.874
4- Economic Impact	4.634	4	0	0.851
5- Diet Preferences	3.826	4	0	0.843
6- Land Utilisation	3.584	3	0	0.794

5. Discussion

Social and Health Impact

The first factor extracted from our analysis was "Social and Health Impact," which contributed approximately 40% of the total variance explained. Seven statements were grouped into this factor. The items were: (1) "create self-reliance, self-esteem"; (2) "gardening makes me healthy"; (3) "gardening reduces stress levels and improves mental health"; (4) "helps to educate younger generations in terms of agricultural practices"; (5) "gardening enhances knowledge sharing"; (6) "develop social interaction among neighbours"; and (7) "better use of available land in residential/house areas."

Based on this preliminary finding, it can be concluded that the general perception of Malaysian urban dwellers toward UA practices is linked to the "social and health impact," as reflected in the high score obtained by this factor. In general, the results of this study align with previous findings, where social and health impacts have often been key motivations for promoting UA initiatives. The positive impacts of UA on social and health aspects have been well documented in the literature. Both impacts are commonly observed at the community

level, often in the form of community gardens. For instance, several studies have illustrated that UA has positive educational purposes for schools or provides positive externalities on participants' health ((Jiang, 2014); (Lovell, 2010); (Bellows et al., 2003); (Maxwell, Levin, & Csete, 1998); (Brown & Jameton, 2000); and (Birley & Lock, 1998)). Moreover, it is evident that UA practices also encourage community empowerment (Howe & Wheeler, 1999), knowledge sharing, and social cohesion (Teig et al., 2009), as well as local food production (Kortright & Wakefield, 2011).

Quantity and Quality

The second factor extracted from our analysis is "Quantity and Quality." The items grouped into this factor were: (1) "more access to fresh vegetables"; (2) "increase the consumption of fresh produce"; (3) "reducing food bills"; (4) "traceability of fresh vegetables"; (5) "vegetables can be produced organically"; (6) "ensuring food safety"; and (7) "reducing food waste." Two broad terms have been used here: quantity and quality, both of which are linked to food consumption patterns in urban areas. Generally, the contribution of UA in supplying food to people is undeniably important, with around 15% of the world's food being grown in urban areas (Gerster-Bentaya, 2013). As suggested by Mougeot (2000), UA should be regarded as a complementary supply to support production from rural areas. In some cases, UA can mitigate urban food insecurity among the urban poor due to its ability to supply food (Madaleno, 2000; Specht et al., 2013). Given the ability of UA to supply food to urban communities, this could be one of the motivations behind the goals set by the Urban Agriculture Division, Department of Agriculture Malaysia, which include generating additional income for the urban community through surplus agricultural production. Despite its importance in terms of quantity, the role of UA in providing better quality food to urban dwellers should also be considered. In general, an increase in income leads to changes in food quality. As urbanisation progresses, urban incomes are expected to rise, and consequently, the demand for higher-quality food will also increase. By practising UA, fresh produce does not have to go through a long distribution channel, as compared to the traditional approach (Lovell, 2010), where vegetables are usually produced in rural areas. Thus, UA provides better food quality in terms of freshness. Moreover, shorter distribution channels can reconnect consumers with producers, addressing issues such as product traceability and food safety. For UA practitioners, the consumption of fresh and organic produce is expected to increase, as vegetables can be picked whenever needed (van Leeuwen, Nijkamp, & de Noronha Vaz, 2010). This may lead to a more varied and higher-quality diet (Poulsen, McNab, Clayton, & Neff, 2015). Furthermore, UA optimises food waste, as only

the needed vegetables are harvested by consumers, rather than stockpiling vegetables in their refrigerators. As a result, the food consumed is fresher. At the same time, by optimising food waste, consumers may reduce their food bills, though the savings may be modest.

Environmental Impact

"Environmental Impact" accounted for 4% of the total variance explained regarding perceptions of UA in Malaysia. Although the contribution of this factor is low, the influence of environmental impact on UA practices is still notably important. Six items were grouped into this factor: (1) "efficient waste management system"; (2) "promote reuse and recycling"; (3) "promote energy conservation (through shorter supply chains)"; (4) "reduce carbon footprint (through lesser carbon emissions)"; (5) "enhance the tourism industry"; and (6) "cooling and greening urban areas." Typically, UA contributes to a healthier urban climate for both people and nature when practised correctly. When food is produced in the city, food miles are generally reduced, and thus, carbon dioxide emissions are also reduced (Islam & Siwar 2012; Dubbeling & Zeeuw 2011). (Lovell (2010) also supported the idea that UA can shorten the distribution channel of food, where food production is near consumers. Apart from shortening the food distribution channel, UA has been noted as a potential solution to climate change issues. As the amount of vegetation in a city increases, levels of humidity, temperatures, and rainfall can be regulated (Lovell, 2010); van Leeuwen et al., 2010), which could help ease climate change problems. Moreover, UA is also capable of greening and beautifying the city (Madaleno, 2000). Waste management could be improved, as UA promotes reuse and recycling activities (Dubbeling & Zeeuw, 2011); Aubry et al., 2012).

Economic Impact

Another influential factor that shapes perceptions of UA in Malaysia is the "Economic Impact." The items that fall into this group include: (1) "create job opportunities"; (2) "able to generate income"; (3) "reduce urban poverty"; and (4) "able to create entrepreneurial traits." In general, urban settlements are net food buyers, as they depend largely on cash income to access food (Islam & Siwar, 2012). Poor urban households tend to suffer more than others from price increases because they spend a greater portion of their income on food (Cohen & Garrett, 2010). This factor was one of the prioritised factors considered by the Department of Agriculture in promoting UA initiatives in Malaysia. In most cases in developing countries, UA is generally practised for food-producing activities that generate

self-employment, direct revenues, or savings, thus contributing to greater social stability (van Leeuwen et al., 2010). In an earlier study by Madaleno (2000), UA was considered important for home consumption, both by middle- and lower-income families in Brazil. UA is said to be comparatively affordable, a source of income and savings, and more profitable than rural-based production (Mougeot, 2000).

Although there is no concrete evidence on the economic impact of UA practices in Malaysia, several studies from other countries have successfully demonstrated that UA practices have a positive impact on the economic aspects. These include the findings from Ayenew et al., (2011), who found that income generation was the main reason for engaging in UA. Similarly, the contribution of UA in terms of economic factors is significant, as UA can both provide food for households and generate income (Asomani-Boateng, 2002); Adeoti & Egwudike, 2003; White & Hamm, 2014). Gockowski et al. (2003) found that UA practitioners in Yaoundé, Cameroon, enjoyed returns greater than the minimum wage. Like in other countries, UA practices in Malaysia are also expected to yield positive economic impacts for urban households, provided they are practised properly.

Diet Preferences

The fifth factor is "Diet Preferences," which consists of four items: (1) meet nutritional values of diet, (2) meet diet preferences, (3) change eating habits to become healthier, and (4) more variety of vegetables. Diet preferences are linked to consumers' health concerns, as the demand for healthy food is expected to increase over time. As suggested by Corrigan (2011), despite its contribution to food insecurity, UA can help develop a healthier and more varied diet for society, particularly for those involved in community gardens. This is supported by the findings of Algert et al., (2014), who observed an increase in fresh vegetable intake among gardeners participating in community garden programs. A similar trend of dietary changes towards healthier eating is expected among Malaysian urban dwellers, where UA practices are anticipated to contribute as a factor encouraging a healthier diet.

Land utilisation

"Land Utilisation" also contributes to the factors influencing perceptions of UA practices in Malaysia. Three items fall into this group: (1) restrictions from government agencies on land use, (2) adding value to the land, and (3) agricultural activities being easy to manage in urban areas. Commonly, competition for land with other urban functions, high intensity of

land use, and the corresponding higher price leave little land available for agricultural activities in urban areas. This is also true for Malaysia, where prioritisation of land use is often given to more lucrative and higher-demand sectors rather than agriculture. However, with strong support and the right policies from the government, UA can be successfully conducted in cities. In fact, it is evident that UA has become a significant land-use type in some cities. For example, in Chicago, USA, a total area of 26.5 hectares is devoted to food production in both residential and other types of urban gardens (Taylor & Lovell, 2014). A study by (McClintock, Pallana, & Wooten, 2014) also demonstrated the importance of land devoted to UA activities, where vacant land and community spaces are being used by activists, community members, non-profit organisations, and local governments to increase food production in cities.

6. Conclusion and Recommendations

The primary aim of this study was to identify and elaborate on the influential dimensions that shape Malaysian urban dwellers' perceptions of UA. By analysing the data, the study highlights six key factors that contribute to shaping these perceptions: social and health impact, quantity and quality of food, environmental impact, economic impact, diet preferences, and land utilisation. These factors provide a comprehensive framework for understanding the multifaceted influences on urban dwellers' views about UA. The study reveals that, in Malaysia, UA practices are primarily seen through the lens of health and social benefits. Specifically, the willingness to adopt or engage in UA is closely tied to the perceived positive effects it has on social well-being and health outcomes for urban communities. Social impacts, such as fostering community engagement and promoting healthier lifestyles, were particularly emphasised. Health impacts, like stress reduction, improved mental health, and better access to fresh, nutritious food, are key motivators for many urban dwellers to consider adopting UA practices.

Although the economic impact was a central focus in the creation of UA initiatives in Malaysia, the study suggests that economic factors do not currently play a strong role in triggering widespread participation in UA. One potential reason for this is the relatively low cost of fresh produce available in local markets, which reduces the immediate economic incentives for individuals to turn to the UA for food production. Additionally, the ease of access to fresh produce and the convenience of local markets further diminishes the necessity of engaging in UA purely for economic reasons.

However, it is expected that as urbanisation continues to accelerate and living costs in cities rise, economic factors will become more influential in encouraging greater participation in UA. For instance, if food prices increase or if the availability of fresh produce in local markets diminishes, UA could emerge as a viable alternative for urban households seeking to reduce food costs or supplement their income. The ability of UA to generate income or savings through the self-production of food could become more appealing as economic pressures mount.

Moreover, environmental factors are becoming increasingly important in shaping perceptions of UA. With growing concerns about climate change, sustainability, and environmental degradation, there is heightened awareness of the role UA can play in promoting environmental sustainability. Participants in UA are motivated not only by the direct benefits to their health and social lives but also by the broader environmental benefits, such as reducing carbon footprints, promoting waste recycling, and contributing to green urban spaces. These environmental benefits align with the global push towards more sustainable urbanisation practices and are expected to further drive engagement in UA in the future.

Given the current landscape, where social and health factors dominate perceptions of UA, it is essential for policymakers to continue to emphasise these aspects when promoting UA initiatives. This is particularly crucial in a rapidly urbanising society where the pressures of urban living are becoming more noticeable. By focusing on the immediate social and health benefits of UA, policies and strategies can effectively encourage greater involvement in UA practices. Over time, as economic and environmental factors gain more importance, UA may evolve into a more integrated and vital component of urban living, contributing not only to healthier communities but also to more sustainable and resilient cities.

In conclusion, while the current perception of UA in Malaysia is primarily driven by its social and health benefits, future trends may see a shift towards greater emphasis on its economic and environmental contributions. To foster greater participation in UA, policymakers need to recognise these evolving dimensions and adapt their strategies to reflect the changing needs and concerns of urban communities.

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