RESEARCH ARTICLE

FACTORS AFFECTING URBAN DWELLERS TO PRACTICE URBAN AGRICULTURE.

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Manuscript Info	*Abstract*
	Urban farming is becoming an important activity among the urban dwellers in most developing countries. It is not only to ensure full utilization of the available space for agriculture, but also for sustaining the need of food among the urban dwellers. Since the related campaign and concept of urban agriculture are quite new in Malaysia, the objective of this study is to investigate the intention of urban dwellers towards practicing urban agriculture especially among the strata households. A multistage sampling technique involving stratified sampling was used to select the respondents. A face-to-face interview was carried out using structured questionnaires distributed to 400 respondents. The descriptive analysis, factor analysis, and binary logistic analysis were applied to analyze the data. The results of the study show that respondents have positive perceptions on urban agriculture and most of them have intentions to practice urban agriculture in the future. Factor analysis generated four latent factors that prescribe respondents intention to practice urban agriculture. These factors were positive attitude towards urban agriculture concept, confidence in practicing urban agriculture, societal environment and role model influences. A binary logistic analysis model was used to determine the socio demographic characteristics, and the extracted factors from factor analysis influenced the urban dwellers to practice urban agriculture. The results indicate that age, gender, educational level, and household size with the four latent factors mentioned previously were the likely factors that will influence urban dwellers to have intention to practice urban agriculture.

Introduction:-
Attention to urban agriculture is steadily increasing especially in developing countries. These urban farming activities take place in diverse parts of the cities such as in the backyards, rooftops and others. According to Golden (2013), urban agriculture plays an important role in improving nutrition and health, create job opportunities for the community and contribute to increasing the recycling of nutrients. Therefore, the opportunity to grow or acquire food produce locally becomes a critical component of survival in the city. Thus, urban agriculture plays a significant role in contributing to the welfare especially among the poorer urban residents (Nugent, 2000).

Urban agricultural production generally geared towards consumption within the household. The system also may solve urban waste disposal problems since wastewater and waste disposal are the potential inputs for urban

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agriculture since it can be turned into organic composting fertilizer. Pearson (2011) did not characterized urban agriculture as a single entity. The urban agriculture encompasses residual, often peri-urban broad acres of farmland, small community gardens, personal allotments, portions of parks that previously were planted entirely with amenity species or fruit trees along roadside. Hence, the definition of urban agriculture is wide in terms of its meaning and application.

Urban population growth in Malaysia, especially in Kuala Lumpur, is expected to increase from 1.7 to 1.8 million by the year 2020 (Eleventh Malaysian Plan, 2016). Mok et al.,(2007) noted that urban poverty and food scarcity are increasing along with the unemployment rate and as well as air and water pollution in most urban areas. The land available for agriculture is also reduced due to rapid conversion of land into housing, industrial development, and highways. The concern about the positive impact of urban agriculture has led to the development of policies to encourage Malaysians to participate in urban agriculture. However, the awareness among Malaysians of the benefits of urban agriculture remains unknown.

Malaysia is now facing an increasing food importation and the deficit in food balance of trade keep on increasing every year. In most cases, the self-sufficiency levels of most food including vegetables are less than 100%. Therefore, urban agriculture is bound to become increasingly important in addressing urban poverty and food scarcity and security problems in urban areas. This research sets to identify the perception and factors among urban dwellers living in strata housing towards urban agriculture and their intention to practice urban agriculture.

Literature Review:-

Many researchers have defined urban agriculture and outlined its benefits. Mbiba (1995) defines urban agriculture as the production of crops and livestock on land which is administratively and legally zoned for urban usage. Bailkey and Nasr (2000) defines urban agriculture as an industry that produces, processes, and markets food in response to the demands of people that live in city.

Kekana (2006) views urban agriculture as an informal set of activities focusing on farm production in an urban area. Mougeot (2005), on the other hand, defines urban agriculture as an industry located within (intra-urban) or in (suburban) the city which produces, processes, and distributes food or non-food products. Among others, Aubry (2012) defines urban agriculture as socioeconomic activities that involved the planting of crop and growing of livestock in urban area.

One of the benefits of urban agriculture is that, it can beautify and build trust in the neighborhood as a result of less vandalism and criminal activities (Bradley and Galt, 2013). Urban agriculture can also be an effective way to secure and access food easily (Colasanti et al., 2012). Holland (2004) indicated that by participating in urban agriculture, the urban dwellers are aware of their skills and talents, which can influence them to carry out such activities as their future careers.

The presence of urban agriculture in society can develops physical hobbies by reducing stress and improving mental health as people spend their time to plant something that can be consumed safely (Teig et al., 2009). A study by Kremer and DeLiberty (2011) in Philadelphia pointed out that the expansion of the market for urban agriculture serves as an income generation not only for urban farmers but also for households.

Given a positive reaction from different part of the world about urban agriculture, the likelihood for Malaysian to practice urban agriculture is probably high. It is timely for Malaysia to think about promoting urban agriculture among urban dwellers to keep up with the high demand of food items among the urban dwellers.

Methodology:-

This study was conducted in selected areas around Putrajaya, Kuala Lumpur, and the periphery of Putrajaya. A total of 305 respondents were selected by using stratified random sampling technique. The survey was conducted among strata housing dwellers such as apartment and condominiums. The questionnaire was designed based on the research objective. Respondents were interviewed face-to-face during data collection. Descriptive analysis, factor analysis, and regression analysis were used to accomplish the objectives of this study.

Exploratory factor analysis was used to group the set of variables into major underlying factors that influence the perception of the urban dwellers towards the concept of urban agriculture. In the factor analysis model, 'p' denotes the number of variables $(X_2, X_2..X_p)$ and 'm' denotes the number of underlying latent factors $(F_1, F_2,…F_m)$ generated from factor analysis. X_j is the item represented in latent factors.

$$X_j = aj_1F_1 + aj_2F_2 + …..aj_mF_m + e_j$$
Whereby j = 1,2 …..p.

A binary logistic regression was used to determine the extent of which selected socio demographic characteristics and the attitudinal factors that could influence the dependent variables, in this case are having intention to practice urban agriculture (Rezai, 2011). The dependent variable defines as 'intention to practice urban agriculture' has two categories, which are 'urban dwellers have intention to practice urban agriculture' is coded as one and otherwise is coded as zero. The equation of the model is shown below. All of the explanatory variables have the value 0 or 1. Table 1 shows the explanation and definition of the variables used in the binary logistic regression.
Logit (Y) = natural log (odds) = ln $(\pi /1-\pi)$ = $\alpha + \beta X_i$; whereby i = 1 ….. n

Specifically, the binary logistic model can be stated as below:
ln $(\pi /1-\pi)$ = $\beta_0 + \beta_1 X_1$ *(ease in practicing urban agriculture)* + $\beta_2 X_2$ *(positive perception)* + β_3 X3 *(role model)* + $\beta_4 X_4$ *(societal influence)* + $\beta_5 X_5$*(knowledge)* + $\beta_6 X_6$ *(gender)* + $\beta_7 X_7$ *(income level)* + $\beta_8 X_8$ *(education level)* + β_9 X_9 *(household size)* + $\beta_{10} X_{10}$ *(marital status)* + $\beta_{11} X_{11}$ *(lifestyle)* + $\beta_{12} X_{12}$ *(age)*

Table 1:- Explanatory Variables for Testing Their Influence on Urban Dwellers Intention to Practice Urban Agriculture

Explanatory Variables	Coding System
Ease in practicing urban agriculture	Factor score
Positive perception	Factor score
Role model	Factor score
Societal influence	Factor score
Knowledge	0 = No knowledge 1 = Have knowledge
Gender	0 = Male 1 = Female
Income level	0 = Above RM 1,746 1 = Below RM 1,746
Education level	0 = Non-tertiary 1 = Tertiary
Household size	0 = 1–2 1 = More than 2
Marital status	0 = Single 1Married
Lifestyle	0 = Other than care about the environment 1 = Care about the environment
Age	0= 18–36 years old 1 = 37–71 years old

Results and Discussion:-
Demographic Characteristic:-
Descriptive analysis was used to discuss the results of the socio demographic profile of the respondents. The socio demographic characteristics such as age, gender, education level, income, marital status, and household were analyzed by using descriptive analysis. Table 2 shows the demographic profiles of the respondents. Most of the respondents were female (62%) while male were 38%. More than half of the respondents were married (62.6%) while 37.4% were single. The largest age group were between 18–30 years old (47.5%). The results also showed that 162 respondents (53.1%) attended tertiary education, 126 respondents (41.3%) received secondary education,

and 17 respondents (5.6%) received primary education. About 110 respondents (36.1%) earned below RM 1,000 per month, 152 respondents (49.8%) earned between RM 1,001 to RM 3,000 per month, 39 respondents (12.8%) earned between RM 3,001 to RM 5,000 per month, and four respondents (1.3%) earned more than RM 5,000 per month. Most of the respondents have four to six household members (52.5%), followed by one to three household members (35.1%), and seven to nine household members (12.5%).

Table 2:- Socio demographic profile of respondents (N = 305)

Characteristics	Number	Percentage (%)
Age		
18–30	145	47.5
31–40	63	20.7
41–50	51	16.7
> 50	46	15.1
Gender		
Male	116	38.0
Female	189	62.0
Education Level		
Primary Education	17	5.6
Secondary Education	126	41.3
Tertiary Education	162	53.1
Income		
< RM 1,000	110	36.1
RM 1,001 – RM 3,000	152	49.8
RM 3,001 – RM 5,000	39	12.8
> RM 5,000	4	1.3
Marital Status		
Single	114	37.4
Married	191	62.6
Household Size		
1–3	107	35.1
4–6	160	52.5
7–9	38	12.5

Results of Factor Analysis:-
The result of the Keiser-Meyer-Olkin (KMO) sampling adequacy test for factor analysis to be validated for analysis was 0.918 and the Bartlett's test of sphericity was significant at the 0.00 level, which indicated that the factor analysis could be conducted and was appropriate for this study. The factor loading from the principal component analysis was obtained after varimax rotation was performed on the responses of the urban dwellers to the 21 statements regarding their prior knowledge and intention towards urban agriculture. In total, four factors were identified as important dimensions of the intention of the respondents to practice urban agriculture in their dwellers and they were accounted for 67.449% of total variance as summarized in Table 3. On the other hand, Table 4 shows the reliability test for each factor. The results show that the Malaysian urban dwellers place a relatively high importance on these factors, in their intention to practice urban agriculture. These factors are; (1) the ease in practicing urban agriculture, (2) the positive perception towards urban agricultural concept, (3) being influenced by role models, and (4) the societal environment.

Table 3:- KMO and Bartlett's Test.

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.918
Bartlett's Test of Sphericity	Approx. Chi-Square	3893.589
	Df	210
	Sig.	.000

Table 4:- Dimension of Urban Dweller Perception towards Urban Agriculture

Items	F1	F2	F3	F4
Factor 1: Ease in Practicing Urban Agriculture				
1. Urban agriculture can be practiced in my leisure time	.846			
2. I'll practice urban agriculture if I am exposed to it.	.836			
3. Due to economic advantage, I am able to practice urban agriculture.	.799			
4. I am able to practice urban agriculture if I have a chance to attend a demonstration on urban agriculture planting practice.	.789			
5. Practicing urban agriculture makes me feel good by harvesting my own vegetables.	.783			
6. I am able to practice urban agriculture although my house has a limited space.	.773			
7. I can practice urban agriculture if my house has suitable area.	.734			
Subtotal variance: 23.93%				
Factor 2: Positive Perception		.789		
1. Urban agriculture is environmentally-friendly.		.771		
2. I believe in consuming home-based product than import product.		.762		
3. Involving in urban agriculture will create good feeling in producing own food.		.754		
4. By practicing urban agriculture, we can utilize the organic waste material as organic fertilizer.		.745		
5. I am able to control what kind of production system I used (organic or conventional).		.736		
6. If all Malaysians practice urban agriculture, this can help increase food availability.		.673		
7. To me practicing urban agriculture can reduce the cost of buying fresh food.		.644		
8. Urban agriculture can promote healthy eating.				
Subtotal variance:23.20%			.841	
			.754	
Factor 3: Role Model				
1. Involvement of public figures in urban agriculture encourages me to practice the urban agriculture activities.			.747	
2. Government effort in encouraging urban agriculture practices by carrying out campaigns and showcasing its benefits influences me to practice urban agriculture.				
3. The idea from the environmentalist of creating urban agriculture among strata dwellers encourages me to get involve in urban agriculture.				.802
Subtotal variance: 10.28%				.782
				.704
Factor 4: Societal Environment				
1. My neighbor influences me to practice urban agriculture.				
2. Some of my family members are practicing urban agriculture and are encouraging me to do so.				
3. My friends influence me in practicing urban agriculture.				
Subtotal variance: 10.04%				
Total variance explained = 67.45%				

Table 5:- Reliability Test

Factor	Cronbach's Alpha Score	Number of Item
Confidence in Practicing Urban Agriculture	0.939	7
Positive Perception	0.901	8
Role Model	0.768	3
Societal Environment	0.739	3

Factor 1: Ease in Practicing Urban Agriculture:-
This factor has a total variance of 23.93% and consists of seven sub-variables. The first one is 'Urban agriculture can be practiced in my leisure time' (0.846). This is followed by 'I'll practice urban agriculture if I am exposed to it' (0.836). Then, 'Due to economic advantage, I am able to practice urban agriculture' (0.799), 'I am able to practice urban agriculture if I have a chance to attend a demonstration on urban agriculture planting practice.' (0.789), 'Practicing urban agriculture makes me feel good by harvesting my own vegetables.' (0.783), and followed by 'I am able to practice urban agriculture although my house has a limited space' (0.773), and lastly, 'I am confident that I can practice urban agriculture if my house has a suitable area' (0.734).

Factor 2: Positive Perception:-
This factor consists of eight sub-variables and has a total variance of 23.20%. 'Urban agriculture is environmentally-friendly' has the highest score with 0.789, followed by 'I believe in consuming home-based product than imported product' (0.771), 'Involving in urban agriculture will create good feeling in producing own food.

'(0.762), 'By practicing urban agriculture, we can utilize the organic waste material as compose' (0.754), 'I am able to choose the kind of production system I want to use' (0.745), 'If all Malaysians practice urban agriculture, this can increase food availability' (0.736), 'To me, practicing urban agriculture can reduce the cost of buying fresh food' (0.673), and lastly, 'Urban agriculture can promote healthy eating' (0.644).

Factor 3: Role Model:-
This factor has a total variance of 10.28% and has three sub-variances. 'Public figure involvement in urban agriculture encourages me to practice' scored 0.841, followed by 'Government effort in urban agriculture encourages me to practice' (0.754), and lastly, 'The idea by environmentalist encourages me to get involve in urban agriculture' (0.747)

Factor 4: Societal Environment:-
This factor has three sub-variances with a total variance of 10.04%. 'My neighbour influences me to practice urban agriculture' scored 0.802, followed by 'Some of my family members are practicing urban agriculture and are encouraging me to do so' (0.782), and lastly, 'My friends influence me in practicing urban agriculture' (0.704).

Binary Logistic Regression:-
The result of this analysis found that out of 12 variables, eight variables were statistically significant with positive signs. The results show that four socio demographic factors and four latent factors are significantly determine the urban dwellers intention to practice urban agriculture in the future. Based on the coefficients of socio demographic characteristics, gender, education level, household size, and age have positive signs and significant effects on the urban dwellers intention to practice urban agriculture. The results show that females are 2.727 times more likely to have intention to practice urban agriculture than males. Respondents with higher education level have 2.023 times having intention to practice urban agriculture than respondents with lower education level. Similarly, respondents with larger household size, the likelihood of their level of intention to practice urban agriculture increased 1.174 times than the respondents with smaller household size while older respondents have 2.728 times more intention to practice urban agriculture rather than the young respondents. In the same token with four latent factors resulted from the factor analysis which are 'Ease in practicing urban agriculture', 'Positive towards urban agriculture', 'Role model', and 'Societal environment' are important determinants for the intention of the urban dwellers to have the positive effect to practice urban agriculture by 1.93, 1.77, 1.45, and 1.81 respectively

Table 6:- Estimation of Logit Model for Urban Dwellers' Intention towards Urban Agriculture

Variables	Estimated Coefficients	Standard Error	Wald	Significance	Exponential (B)
Ease in practicing UA	.659	.147	20.150	.000	1.932***
Positives towards UA	.574	.164	12.230	.000	1.775***
Role model	.374	.160	5.461	.019	1.454**
Societal Environment	.594	.115	14.598	.000	1.811***
Gender	1.003	.330	9.267	.002	2.727***
Knowledge of UA	.511	.330	2.400	.121	1.666
Income	-.383	.335	1.313	.252	0.682
Education level	.704	.370	3.617	.057	2.023*
Household size	.161	.086	3.506	.061	1.174*
Marital status	.531	.373	2.019	.155	1.700
Lifestyle	.495	.306	2.615	.106	1.640
Age	1.004	.414	5.881	.015	2.728**
Constant	-1.560	.690	5.118	.024	.210**
2 Log likelihood 284.104 Cox and Snell R square 0.213			Nagel kerke R square 0.308		
denotes statistically significant at 10% level *denotes statistically significant at 5% level* *** denotes statistically significant at 1% level*					

Conclusion:-

The study revealed that the perception of urban dwellers towards urban agricultural practices is greatly shaped by positive perception, confidence in practicing urban agriculture, influenced by the societal environment, and influence of role models. This study identified urban agriculture as a social component with economic benefits both for public and the individuals. This finding is supported by Shamsudin (2014), that the economic benefits can shape urban dwellers' attitudes towards urban agriculture. Therefore, urban agriculture has a potential to gain a ground in Malaysia and the policy makers should consider a number of principles to make this activity meaningful. Societal influences such as family and friends and also role models such as government, public figures, and environmentalists play important roles in creating positive perception towards urban agriculture among urban dwellers.

Other factors such as age and education level also influenced urban dwellers to practice urban agriculture. This is supported by a previous study that stated those with college education and those who were over 50 years old are more likely to be food gardeners (Zahina, 2013). Based on this study, female is likely to have intention to practice urban agriculture compared to male. This is supported by Onyango (2010) in his study that most urban farmers are female. Furthermore, urban dwellers with bigger household size are likely to have intentions to practice urban agriculture. This could be due to the helping hands among family members. Finally, practicing urban agriculture can build a strong and convincing foundation for Malaysians to minimize the impact of food scarcity and also the climate change.

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