فصلنامه مدیریت شهری
(ضمیمه لاتین)
Urban management
No.**46** Spring **2017**
19 - 34
***Received** 4 Sep 2016**; Accepted** 28 Nov 2016*

"Design-based components" in developing urban farms from the viewpoint of Tehran's managers

Mehdi Khakzand[1] **-** *(PhD), Assistant Professor, School of Architecture and Environmental Design, Iran University of Science and Technology, Tehran, Iran.*
Sina Yazdanparast-*MS student in Architecture, Islamic Azad University (Qazvin Branch), Qazvin, Iran*

Abstract
Urban farms can have the potential to have a great impact on the stability of crowded cities. The purpose of the present study is discovering the effective design-based components in developing urban agriculture in the viewpoint of Tehran's urban managers. It is assumed that the design-based development of urban agriculture improves economic conditions and also food security for Tehran's citizens. A combination of qualitative and quantitative research methods were used in this research. In the qualitative section of the research, analysis of the influential factors was carried out. Then in order to assess the credibility of the obtained data and obtaining the opinions of the managers, the Delphi method was used. Afterwards, their opinions were gauged and categorized using Shannon's Entropy. The statistical population in this study consisted of 71 city managers and the consultants on designing city spaces who had over 10 years of experience on the job. Quantitative analysis of the data was carried out using the SPSS 22 statistical software. The results showed that establishing and developing design-based urban farming could lead to elevated qualities of environment, food security and economic well-being more than any other factor.

Keywords: *urban farms, design-based development, economy, food security, urban managers, Tehran*

1. Corresponding Author, Tel:+98 9123976054, Email Address: mkahzand@iust.ac.ir

Introduction and Background

Nowadays, the world is facing three major problems: ever increasing demand for food products, ever increasing population increase and ecological changes. In 2005, the OECD (Organization for Economic Cooperation and Development) announced that the mega cities could be the source of major solutions are in developing food security and improving environmental conditions. Kumssa (2011) believes that the mega cities in Asia which are in the process of developing, face more challenges related to the three problems (Kumssa, Williams & Jones,2011,PP.10-23). According to the United Nation's report, approximately 15% of the world's food products are produced in urban areas or cities; and this percentage has been on the rise (UN, 1995). The main question of this research is whether the design-based urban agriculture improves the economic conditions, food security, and ecology in Tehran?

FAO and Dubbeling stated that city dwelling in the developing countries could lead to increase in the number of poor people and lower food security (FAO, 2007, 2010; Dubbeling and Santandreu, 2003, PP.1-4). The reason is that city dwellers spend 30% more on food than do people who live in villages and countryside. Poor city dwellers spend 60-80% of their income on food products (Matuschke and Qaim, 2009,PP. 493-505). The purposes of the present study are extracting the managers' viewpoints towards the development of urban farms in Tehran, recognizing the methods of developing urban farms, and persuading managers to perform the design-based development of urban farms. For urban farming to be realised, overcoming obstacles and problems such as changing the way citizens and city planners of Tehran think about economic profit from urban farming. The researchers of this study believe that the barriers of the development of the urban agriculture include economic, management (this type of barriers are emphasized in this study), and executive barriers.

It is assumed that the design-based development of urban farming not only can produce health food for the citizens, but also brings about other positive effects such as improving the environment, providing economic well-being, improving social security, welfare and public health.

Stable farming could be defined in various ways. This goes to show that it covers a vast range of issues (Adeyemi, 2000, PP. 20705-2351). Urban farming, based on its nature, refers to the process of producing any kind of agricultural products within the city limits and its surrounding areas (Viljoen, Bohn and Howe, 2005, PP.34-35). In general, urban farming refers to growing farm products in small city spaces and offering them to the consumers in the local markets (Ringenbach, Valcourt and Wang, 2013, P.4). Urban farming could be considered as an industry in mega cities and could lead to diversified food and non-food products (Mougeot, 2010, P.59).

Farming in the city contributes to social stability (Ferris, Norman, and Sempik, 2001, PP. 559-568). In addition, it leads to many environmental benefits, improved use of the available resources and better utilisation of those resources (Specht et al., 2014, PP.33-50).

In relation to urban farms and the problems in cities, Mazereeuw (2005, PP.3,5) points out that the relationship between urban farming and maintaining it in designing the landscape results in the city becoming people oriented, nature oriented and creating a sense of belonging and memorability. By utilising the urban farming landscape, the city's green space is formed and managed by the people (Viljoen, Bohn and Howe, 2005, PP.34-51). Through farming in the city, what appears in the landscape of the city is a place that has been created by public participation (Howe, Bohn and Viljoen, 2012, PP. 95-107). Producing food products in urban farms and shortening the distance between the producer and the consumer results in shortening the time of commuting, improved quality

of the food products, reduction of the emitted greenhouse gases and lowering the cost (Viljoen, Bohn, Tomkins, and Denny, 2009, pp. 57-65; Girardet, 2004, P. 48-49; Elmqvist, 2010, PP.4-10; Peck, 2003, PP.4-5). On the other hand, using fruit producing orchards as green spaces in the city improves the quality of the soil, water and air. In addition, it helps improve public health and the environment (Doron, 2005, PP.52–59; Kaplan, Kaplan, 1989, PP.2-6; Sutic, Nada, 2003, PP.31, 33, 35; Schmelzkopf, 2002, PP. 323-343; Patel, 1991,PP.53-55; Flores, 2006,P.334; Brown,2000, PP. 20-39.). Moreover, the orchards within the cities could provide a safe haven for birds and various invertebrates. Due to the variety in plant coverage in the cities, honeybees produce more honey in cities than they do in natural places (Paxton, 1997, PP.53-55). Expanding cities leads to controversial challenges such as lack of food security, poverty and depriving certain social groups from social urban services (FAO, 2010). Urban farms could provide city dwellers with an opportunity to increase their physical activities by visiting the orchards (Viljoen, Bohn and Howe, 2005, PP.34-35; Twiss et al, 2003, P.1435). The problem of food security in the developing areas of the cities has a great impact on the poor residents (those who are deprived of social and cultural benefits) (Barrs, 1997; Lynch, 2013, PP.31-39). Urban farming leads to the creation of new employment opportunities, because the goods produced in these farms are sold and bought. In addition, it lowers dependency on purchasing food products and increases the opportunity for trading and sharing food (Moustier, and Pagès 1997, PP. 48-55; Dennery, 1997, PP. 46-48). Moreover, it could be an important source of food production, especially among the poor (Kutiwa, Boon, and Devuyst, 2010, PP. 85-96). Also, urban farming provides spaces within cities for the residents to interact (Doron, 2005, PP. 52–59; Paxton, 1997, PP. 53-55; Hampwaye, Nel and Rogerson, 2007, PP. 553-572). Social enablement, the sense of belonging to the society and the sense of ownership resulting from food projects could bring about more cooperation with regard to local issues. Furthermore, it could lead to more effective actions in developing social improvements (Paxton, 1997, PP.53-55). Through social cooperation and group production, hope about life and the future among people increase (Viljoen et al., 2005, PP.34-51). Zezza and Tasciotti (2010) have observed a positive statistical relationship between participating in urban farming and suitable food indices. Participating in urban farming affects food diversity and calorie use of the cities and leads to improved health (Blair, Giesecke, Sherman, 1997, PP. 161-167; Mougeot, 2010, PP. 195-199). Also, plant coverage in the cities could be used to improve cognitive understanding of the environment (Smardon, 1988; Adedeji, 2009, P.43). Mougeot (2000) has clarified the role which urban farming plays in the employment within the city, the income which it brings into the city and the cost of food products. Urban farming not only helps provide employment opportunities, produces and offers services; it also creates a connection between marketing and sale of the food products, and by doing this, leads to stability of the city (Howe and Wheeler, 1999, P.13; Amoah, Drechsel, Abaidoo, and Ntow, 2002, PP. 1-6). Urban farms possess a high capacity for absorbing the rain water and lowering the sewage flow (Girardet, 2004, P. 48-49). Urban farms, also, have the capability of lowering the greenhouse gases and the needed energy for transporting food products from the producers to the consumers (Smith et al., 2008, PP. 789-813 ; Howe, Bohn and Viljoen, 2012,PP. 95-107). Urban farming results in more and better access to food products (Hampwaye,2007, PP. 553-572), creating local capital in the form of food products (Glover, 2006, PP. 48-49), increased private production and employment (Sutic and Nada, 2003,P.31; De Zeeuw, van Veenhuizen and Dubbeling, 2011,PP. 153-163), strengthening the local economy (Masi, 2008, pp. 85–102), and conse-

quently, lowering poverty in the city (Kaurman and Bailkey, 2000,P. 32; Hampwaye, 2007, PP. 553-572), providing financial benefits (Dixon et al., 2007, PP. 118-129 ; Brown and Jameton, 2000, PP. 20-39) and social equality (Smit et al., 1996, PP. 36,45-46). On the other hand, social orchards possess the potential for improving environmental justice in the cities, especially in the suburbs and poor regions (Schmelzkopf, 2002, PP. 323-343). These orchards provide a venue for improving relationships among people (Carver, 2005, PP. 216-220), increasing physical presence, social interaction and monitoring. In addition, this could result in lower crime rates and improved security and safety for the citizens (Van Veenhuizen, 2006; Bonham, Blain, Spilka & Rastorfer, 2002, PP. 506-507; Wells, 2000, PP. 775-795; Gifford, 2007, PP.1-5; Kuo and Sullivan, 2001, PP. 343-367; Viljeon et al., 2005, PP.34-51). Social orchards could, also, lead to economic improvement and tourism in the society. Orchards attract capital and residents. This causes economic growth and revitalisation of the dead and abandoned spaces in the city (Lerner and Poole, 1999; Smart, 2015). Social orchards play a vital role in increasing real estate values (Schmelzkopf, 2002, PP. 323-343). Moreover, urban farming could be a way for the residents to improve the economy of their communities and cities (James, Lahti and Paehlke, 2005, PP. 88-107; Girardet, 2004, P. 48-49; Kaurman and Bailkey, 2000, P. 32). Despite the natural crowdedness of the cities, a great potential for growing food products exists in them (Smit et al., 1996, PP.36, 38, 40-44). Barriers to the development of urban agriculture include air pollution, soil pollution, water pollution, and the health risks due to cultivation under such conditions. Furthermore, management problems and vague policies in planning, poor definition or understanding of the role of agriculture in urban planning are consequences of the lack of development in urban agriculture (Mougeo,2000, PP. 195-199; Dubbeling, & Santandreu, 2003,PP.1-4;fao,2010; Hampwaye,2007, PP. 553-572; Brown,2000, PP. 20-39; Smith,2008, PP. 789-813).

Research field

In Tehran's current condition: its ever increasing population, pollution and high density of buildings, the quality of the environment in the city has vanished and the fruit orchards have been destroyed. In Iran, increased density of the population and buildings has always been accompanied by lowered social stability and disrupted access to natural resources (Azizi, 2003, PP.1-26).

Due to the high density of the population and power of the economic entities, in some parts of Tehran, the impact of green spaces has totally been ignored and has given way to high-rise buildings. This phenomenon has disrupted the comfort, mental and physical health of the residents (Seifoddini, Zayyari, Purahmd, and Nikpour, 2012, PP. 155-179). According to the studies conducted by the Economist magazine, in 2015, Tehran has entered the list of cities deemed unsuitable for living. Tehran, next to cities such as Jakarta, is placed at the lowest ranking among 50 major cities in the world. Tehran is the only Iranian city which has been studied with regard to infrastructure, access to the necessary goods, security and services in this magazine (The Economist, 2015).

With respect to the indices of poverty and the population under the poverty line, there is no information and statistics available; however, based on other indices such as sub-index of employment and housing, it can be deduced that there is a severe inequality among various areas in Tehran. Moreover, in recent years, the pollution rate in Tehran city has become dangerous and is now classed as one of the most polluted cities in the world (Bahreini, 1994, PP.1-7). The most important environmental problems of Tehran are lack of proper natural air purification, stability of the polluted air, dryness of the air, excessive amount of dust particles, noise pollution, lack of enough suitable places for people to spend their leisure times and destruction of natural ecosystems

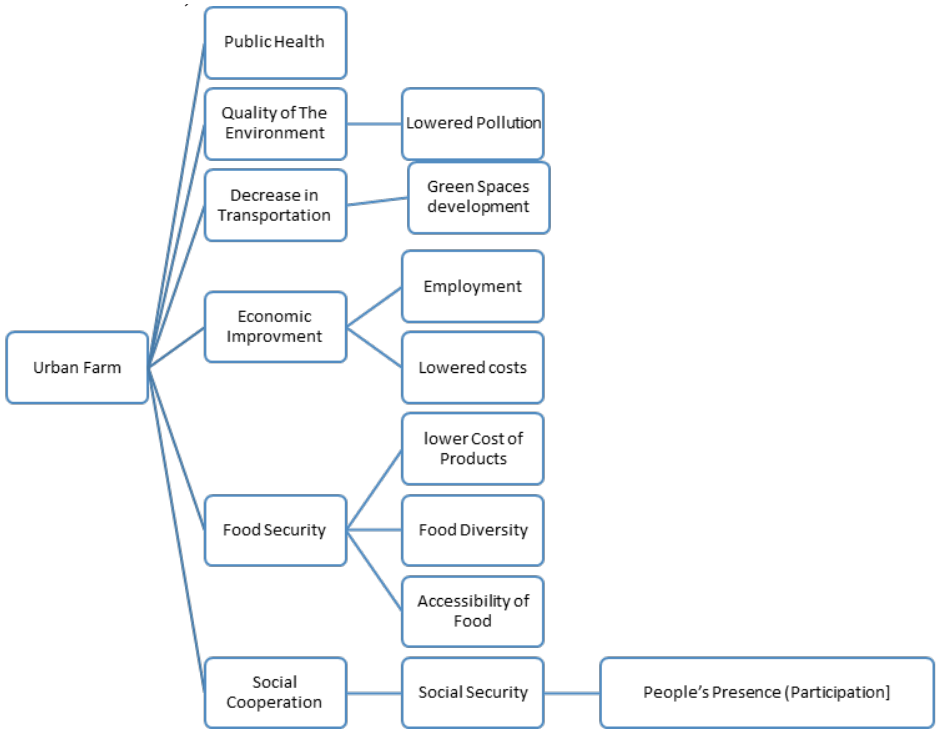

Figure 1. The relationship between the theoretical areas of the study (By Authors)

(Karhroodi, 1992,PP. 1-6). Considering the condition of this city, implementing design and the plans for urban farms and their positive environmental and economic impacts is of vital importance to the city. Moreover, it could be used as a way to gain food and economic security for its residents.

Research method

The research method used in this study was a combination of qualitative and quantitative methods, which took place in order to identify the effective factors in urban farming in Tehran. In the qualitative section, the analysis of the effective factors was obtained. The result showed that six factors, that of, economy, public health, environment, social security, public participation and food security are important (see Table 1). Then, to verify and for the purpose of credibility of the obtained information, the Delphi method, questioning the experts, was used. First, by using face to face in depth interviews, a set of questions about the environmental factors affecting the city were asked of the experts on the subject. Using the answers provided by the experts in city design and planning, 12 questions about how these factors affected the city were designed. At this stage, a questionnaire was designed based on the results of the qualitative analysis section and the results of the questionnaires were weighed and quantified using Shannon's Entropy. The statistical population in this study consisted of 71 of the city managers of Tehran who had over ten years of experience. The questionnaires were filled out anonymously. According to the writers of these questions, each group of questions was representative of one of the factors obtained in the qualitative section. The questionnaire was designed in three sections. The first section contained a simple definition of urban farms. The second section contained the personal information of the person filling out the questionnaire and the third section consisted of 12 questions using a Likert scale with five categories. The reliability of the questionnaire was determined based

on its content (approval of the expert instructors) and its validity was determined using Cronbach's Alpha with a coefficient of 0.93. In the next steps, the data was analyzed both descriptively and deductively. In the first part of this section, frequency distributions were calculated and in the second part the hypotheses were deductively analyzed. In order to test the hypotheses, first, Kolmogorov-Smirnov was used to study the normality of the data, and then, SPSS statistical software was used to analyze the data and assess their validity. In addition, regression, one sample t-test and correlation tests were carried out.

Analysis

In this study, using content analysis, the effective factors were determined. The bases for this determination were the opinions of the experts and the factors. The result of this analysis is shown in Table 1 and Figure 1.

÷Considering the reviewed resources (1988-2013) by the authors of this study, it can be said that generally poor African and American cities had to deal with food security issues. Moreover, the investigations showed that in the same years and period of time, economical issues and food security have been of great importance in American and African countries. However, from 1996 to 2007, environment was only discussed in American cities and little attention was paid to this issue in African countries.

In the next stage, to assess validity of the questionnaire, the Alpha Cronbach method was used. To calculate the Cronbach alpha coefficient, first, the variances of the scores of each subgroup of the questionnaire and the total variance were calculated; and then, using the formula below, the alpha coefficient was calculated:

$$ra = \frac{J}{J-1}\left(1-\frac{\Sigma S^2 J}{S^2}\right)$$

مدیریت شهری
فصلنامه مدیریت شهری
(ضمیمه لاتین)
Urban Management
No.46 Spring 2017

Development Benefits	Important points	Researchers	Quantity
Social safety and security	food need of individuals or household or spending free time improving environmental justice, lowering crime rate, hope for living and social interaction	(Barrs ,1997),(Wells,2000) (Schmelzkopf,2002),(Gifford,2007) (Paxton,1997),(Viljoen,2005) (Moustier,1996),(Dennery,1997) (Hampwaye,2007)	**9**
Food security	lowering poverty, food security, lowering dependency to food purchase	(Fao,2010) (Lynch,2013) (Peck,2003),(Barrs,1997) (Moustier,1996),(Dennery,1997) (Ringenbach,2013)	**7**
Economical improvement	spending 60-80% of the income of the poor on food 41 growing unlimited resource of city food, strengthening local economy, environmental conditions and ecotourism, improving the inner city real estate, lowering poverty in the city, revitalizing urban farming	(Matuschke,2009) (Viljoen, 200۵),(Doron,2005) (Lerner and Poole,1999),(Mougeot,201۰) (Howe and Wheeler,1999),(Glover,2006) (Kutiwa et al.,2010) (Nada and Sutic,2003).(Hampwaye,2007) (Kaurman and Bailkey, 2000) (Brown and Jameton,2000)	**21**

Table1. Content analysis of the studied texts (By authors)

	creating local capital	(James, Lahti, and Paehlke, 2005) (Girardet, 2004),(Dixon et al.,2007) (Moustier,1996),(Dennery,1997),(Masi,2008) (Patel,1991),(Flores,2006) (Smart,2015)	
Environment	quality of air, water, residence, safe location, variety of birds and use of toxins, protecting the city environment , lowering greenhouse gases lowering the island heat effects, environmental diversity	(Shmelzkopf,2002),(Paxton,1997) (Viljoen,2005),(Sutic and Nada,2003) .(Viljoen,Bohn,Tomkins,anandDenny, 2009) (Elmqvist,2010) (Bonham et al.,2002) (Hampwaye,2007) ,(Peck,2003) (Girardet,2004) (Smardon,1988) (Adedeji,2009)	**12**
Public health	more effect on public health on city community than the village communities, improving the quality of the food products, lowering greenhouse gases, lowering the cost of fruit and vegetable-rich diet, physical activity, the cognitive quality of the environment, lowering the developing time of health, lowering stress.	(Moustier,1996),(Dennery,1997) (Schmelzkopf,2002) (Blair,Sherman,1991) (Twiss etal, 2003) (Smardon,1988),(Brown,2000) (Kaplan and Kaplan,1989),(Carver,2005) (Sutic and Nada,2003), (Vilijoen, 2005) (Barrs,1997),(Hampwaye,2007)	**13**
Public participation	formation and management of city spaces with people's cooperation, sense of ownership due to food projects, sense of belonging to the society, food diversity and distribution of non-food products	(Howe, Bohn and Viljoen, 2012),(Paxton,1997) (Gifford,2007),(Carver, 2005) (Tasciotti and Zezza,2010) (Mougeot,2010),(Doron,2005) (Hampwaye,2007)	**8**
Total			**70**

Table1. Content analysis of the studied texts (By authors)

Using Cronbach's Alpha, the validity of the questions asked for analyzing each variable is as follows:

(WJ) = Importance coefficient, (DJ) = percentage of frequency of the responses, (EJ) = degree of distrust

To determine the type of the statistical test, the Kolmogorov-Smirnov test was used. The result showed that the Z value for all the data at Cronbach's Alpha of five is not significant, because p value is greater than 0.05. Therefore, the null hypothesis is not rejected. In fact, the data follows a normal distribution pattern. In this study, to determine the relationship between the data, analysis and regression with inter method was used. In addition, to study the condition of the existing agricultural lands, due to development of city green space, the single sample t-test was used.

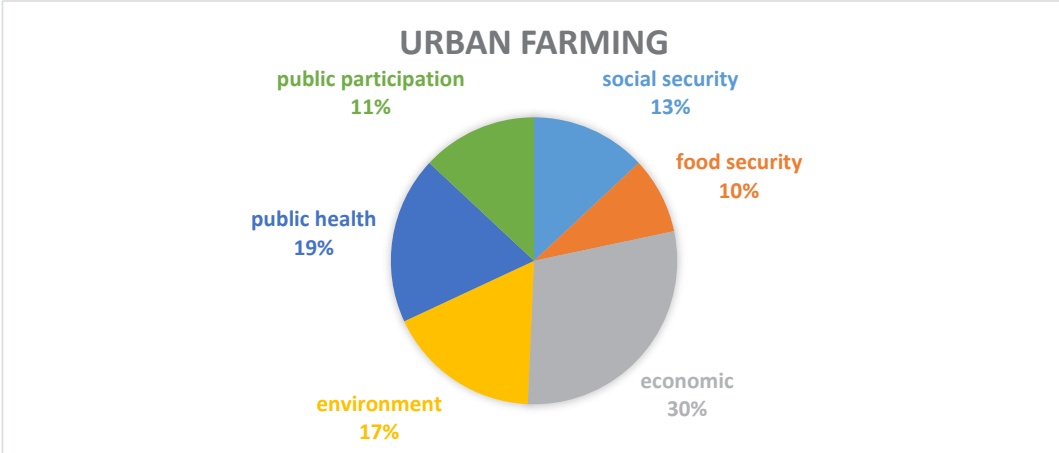

Figure 2. Percentage of effectiveness according to the researchers' view (By authors)

Rejected	Accepted	Calculated Cronbach's	Variable
	✓	0/755	Public participation
	✓	0/843	Social safety and security
	✓	0/750	Public health
	✓	0/881	Economic
	✓	0/959	Environment
	✓	0/946	Food security

Table 2. Calculating Cronbach's Alpha (By authors)

indices	EJ	DJ	WJ	priority
Economic	0/965	0/168	0/167	3
Public health	0/948	0/151	0/164	6
Environmental	0/970	0/965	0/168	1
Social security	0/968	0/161	0/168	4
Public	0/959	0/150	0/166	5
Food security	0/970	0/170	0/168	2

Table 3. Prioritising based on the importance of the indices (By authors)

فصلنامه مدیریت شهری
(ضمیمه لاتین)
Urban Management
No.46 Spring 2017

Results

In this section, in order to consider the results of the tests, descriptive and inferential analysis of the hypotheses was carried out. Ultimately, the hypotheses either are rejected or accepted.

First hypothesis: in the managers' viewpoint, developing farm lands on a design basis can improve the ecological quality of Tehran.

Second hypothesis: in the managers' viewpoint, developing urban farming leads to food security.

Third hypothesis: in the managers' viewpoint, developing urban farming on a design basis improves economic conditions of the city.

Fourth hypothesis: in the managers' viewpoint, developing urban farming improves public health quality and wellbeing of the citizens.

Fifth hypothesis: the design-based development of urban farming increases social participation in the managers' viewpoint.

In the above mentioned hypotheses, the null hypothesis and the opposing hypothesis are defined as follows: the null hypothesis states that the obtained mean is equal to or lower

than 3. The opposing hypothesis states that the mean is higher than 3.

$$H_0 = M \leq 3$$
$$H_1 = M \succ 3$$

The results in Table 4 show that the value of the observed t in the first, second and third hypotheses with 0.05 degree of freedom are significant; therefore, the null hypothesis is rejected. However, in the fourth and fifth hypotheses, the t value does not show a significant difference.

Considering the mean, 3.94, improving quality of the environment, among the other issues, has the highest priority. Forty one per cent of the people gave the highest score to the fourth option. In other words, they believed that developing farm lands in the city helps improve the quality of the environment.

With regard to the second hypothesis, which states that the presence of farming results in improved food security for the citizens, since the mean is 3.42, it can be deduced that the impact of farming on food security takes the second place. The mean score of the opinions, 36.6, was the middle option with a score of 3. However, those who agreed with it constituted 40.8% of the voters and the opposing votes amounted to 22.6%.

With respect to the third hypothesis, the impact of urban farming on economic well-being, the mean of the votes was 3.39. Thus, impact of urban farms on the economy of the city takes the third place. Forty three per cent of those who were questioned had a neutral opinion on the issue, 35.2% of the participants agreed with it and 21% opposed it. It was interesting that the respondents had selected the fifth option in the Likert scale (i.e 'it is very effective') to this question more than any other question. This goes to show that the respondents believed with high certainty that urban farming impacted economic well-being in the cities.

Since the means were near 3, hypotheses four and five had the least significance and were rejected. A single variable t-test for the fourth hypothesis, which was introducing an ecological plan to improve public health of the citizens, showed that the observed t value equals to 0.935 with an alpha value of 0.05 is not significant, thus the null hypothesis is not rejected. In other words, the observed mean (3.11) is almost equal to the expected mean (3). Therefore, it could be said that it was believed that urban farming does not result in improved public health for Tehran's residents.

Furthermore, the observed mean for the fifth hypothesis was 3.15 which is also almost equal to the expected mean (3), so it could be said that it was believed that urban farms do not lead to public participation in Tehran.

Is it possible to predict food security using an economic improvement index?

÷The results displayed in the correlation in Table 5 show that there is a positive and significant correlation between food security and

The expected mean=3

	Mean	Difference between the means	Degree of significance	Degree of freedom	T
First hypothesis	3/94	0/943	0/001	70	9/57
Second hypothesis	3/42	0/415	0/001	70	3/88
Third hypothesis	3/39	0/394	0/001	70	3/89
Fourth	3/11	0/106	0/353	70	0/935
Fifth hypothesis	3/15	0/147	0/068	70	1/58

Table 4. Single variable t-test (By authors)

economic comfort or well-being (r=0.404) with an Alpha value of 0.05. The correlation is direct and positive. In other words, In other words, managers' opinions imply that the higher the economic comfort, the better is the food security. Based on the determination coefficient, it could be said that 16.3% of the changes related to food security is determined by economic comfort. Also, considering the beta coefficient, it could be stated that for every unit increase in the economic comfort of the residents, the food security increases by 0.404 units. Therefore, one could say that based on the managers' views the economic comfort can be used as a predictor of food security.

On the other hand, can social security be predicted by public participation?

The results of the correlation table (Table 7) shows that there is a positive and significant relationship between social security and public participation (r=0.505, alpha=5%). This relationship is direct and positive. In other words, according to the managers' point of view, the higher the social security is, the higher is the public participation. Based on the determination coefficient, it could be said that 25.6% of the changes resulted from social security is contributed by public participation and cooperation. In addition, based on the Beta value, it could be said that for every unit increase in level of public cooperation and participation, social security increases by 0.505 units. That is to say, according to the managers' opinion, public participation and cooperation can predict social security.

Discussion

In this research, content analysis and study of the city managers' responses were carried out. From the point of views of researchers such as Mougeot (2010), Nada (2003) and Kutiwa (2010), farming in the city could help the financial state of the residents. By analysing these points of view, it could be said that economic factor is the most important factor in developing urban farms. Whereas, according to the opinions of city managers in Tehran, environmental factors are the most important

Beta coefficient	Deviation from the expected (std error deviation)	Modification coefficient	Determination coefficient	Correlation coefficient	Model
0/404	1/78	0/151	0/163	0/404	1

Table 5. Regression determination coefficient (By authors)

Regression model	B	Non-standard Beta (Standard ERROR)	Standard Beta	T	Level of significance
Distance from the origin(a)	2/62	0/275		9/549	0/001
economic comfort	0/296	0/081	0/404	3/669	0/001

A=Food security, B= economic comfort A=B+2.62, food security=2.62+0.296 (economic comfort)

Table 6. The equation of the regression line (By authors)

Model	Correlation coefficient	Determination coefficient	Modification coefficient	Deviation from the expected (std error deviation)	Beta
1	0/505	0/256	0/245	1/41	0/505

Table 7. Determination coefficient of regression (By authors)

Regression model	B	Non-standard Beta (Standard ERROR)	Standard Beta	T	Level of significance
Distance from the origin(a)	1/09	0/452		2/423	0/018
Public participation and cooperation	0/683	0/140	0/505	4/866	0/001

Table 8. Equation of the regression line (By authors)

reasons for developing urban farms. The difference of opinion between the well-known scholars and the city managers with regard to the economic benefits of urban farming is due to the city managers' lack of awareness of urban farms' economic benefits, because considering the fact that with the rate of unemployment in Tehran is 10.8% (Fa.Trading Economics, 2015), urban farms could be a great solution to the unemployment problem in Tehran which indicates that they are not aware of the substantial effect of urban agriculture on employment and economic development of the city. Ignoring the effective economic factor by the city managers in Tehran is the reason behind their lack of attention to urban farming and lack of development of urban farms in the city. In this study, a direct and significant relationship between public participation and cooperation with social security and safety was found, but the hypothesis of impact of urban farming on public participation and cooperation was rejected by the city managers. Whereas, according to Tasciotti and Zezza, (2010), urban farming leads to increased social participation and cooperation. This indicates that despite the high rate of crime (56.8%) in Tehran (Numbeo, 2015), it can be concluded that the managers are dealing with the issue of lack of social security and safety rather inappropriately and callously.

According to researchers such as Peck (2003) and Viljeon (2005), creating and developing farmlands with the aim of developing green spaces in the city could lead to ecological improvement. Based on the analysis of the results of this study, with 95% degree of certainty, it could be deduced that in this case the city managers concur with the opinion of the researchers. However, the city managers did not agree with the researchers such as Kaplan and Kaplan, (1989), Viljeon et al.,(2009),Schmelzkopf,(2002) and Blair (1991)on the fact that urban farming impacts on public health. On the other hand, the city managers accepted the fact urban farms could lead to higher food security. Researchers such as Viljeon (2005) and Zezza (2010) also believe that urban farming lowers dependency for purchasing food products and increases the trade opportunities, accessibility to food and sharing food products. This, in turn, leads to food security. Food security not only requires supplying enough food, but also needs fair distribution and monitoring of the food and income, as well, so that everyone in the community gains access to them. This could easily be accomplished by the presence of farms in the neighbourhoods, production of crops and their unmediated distribution among the residents. Based on the opinions of the city managers in Tehran, there is a positive and significant relationship between food security and economic well-being as they believe that food security is accomplished through increased residents' economic means. In their opinion, the higher the economic means of the citizens, the easier it is for them to have food security. Analysis showed that 16.3% of the changes in food security is related to economic comfort

and well-being. Moreover, it could be said that for every unit increase in economic well-being, food security increases by 0.404 unit. Even though, this impact is higher than the result of this study shows, urban farming could provide stable products for creating local capital in the form of food products.

The presence of urban farms in Tehran could encourage the residents to grow and produce food products within green spaces and partaking in an income producing social activity as the motivation. In addition, a farming landscape, due to its different and unique characteristics, can besides acting as a natural landscape such as a park where people spend their free time, have other functions like bazaars.

Conclusion

In the researchers' perspective, economic feasibility of urban farms is the major reason for urban agricultural development, while paying more attention to the environment by the managers and lacking enough economic reasons have been the key factors which hinder the agricultural development of Tehran.

From the city managers' point of view, the dilemma of the environment is far more severe than unemployment and food security. They believe that public health is far less important than environmental, food security, economic, social security and public participation issues or it can be understood that in the eyes of the managers, agriculture is only environmentally justified and it has little economic feasibility. Since the urban managers of Tehran do not believe in the economic efficiency of urban agriculture development, it seems that this perspective has led to their failure in the agricultural development of Tehran. Nevertheless, the government can provide a better condition in this regard by offering efficient incentive policies.

One of the suitable solutions to this dilemma is creating functional fruit orchards in the city. Urban farms result in economic comfort, so developing farms in the poor neighbourhoods could lead to higher real estate values and better economic conditions in those neighborhoods. In addition, the revenue generated by these farms improves social equality, too. Designing urban farms with economic, environmental and social approaches in mind could provide the city of Tehran with suitable solutions to achieving economic, social and ecological stability. Changing economic attitudes towards economic interests and benefits is another significant action. Urban farming use is in fierce competition with business, housing, and industrial uses which have higher benefits. Overcoming this problem can develop urban agriculture. The solution is changing the economic structure which only considers the economic benefits among the direct benefits of the land development.

Furthermore, increasing social interactions results in higher and better social security, so these farms could be used as crop-producing green spaces and places in the high-density residential complexes and projects in new and developing cities where social interaction is encouraged. For example, an orchard could be designed with various stepwise layers on the ground, which could provide spaces for various functions in the neighborhood. These spaces could be designed in a way that could be used by the residents of the neighbourhood as a local produce market, shops, an exhibition site, office spaces, parking, and even, as a tourist attraction in a way that people visit them to do their shopping or just to enjoy the orchards and the gardens. These orchards could be designed in a way that people could spend some of their time farming so that they could provide what their families need or sell their crop or products in supermarkets; and at the same time, be used as public spaces where all of the residents in the neighborhood have an active presence there. The presence of farming in Tehran could provide the residents with an opportunity to have easy access to food products. This would lead to food security for the residents of the city. By designing multifunctional urban farms in different neighbour-

hoods of the city and by creating economic incentives for cooperation of the people and the city, this could help create a sense of ownership in citizens by allowing them to control the issues related to farming in the neighborhoods, improve their contentment and social capital. Therefore, the government and the planners could be persuaded to pay a special attention to farming in the city. Urban farming could create a healthy living opportunity and an important source of healthy food products for the residents of the city by revitalizing, improving and increasing the value of city real estate properties.

References

Adedeji, O. H., & Ademiluyi, I. A. (2009). Urban agriculture and urban land use planning: Need for a synthesis in metropolitan Lagos, Nigeria. Journal of Geography and Regional planning, 2(3), 43.

Adeyemi, A. (2000). Urban Agriculture: An Abbreviated List of References and Resource Guide2000.RetrievedFebruary2005from: http://www.nal.usda.gov/afsic/AFSIC_pubs/urbanag.htm

Amoah, P., Drechsel, P., Abaidoo, R. C., & Ntow, W. J. (2006). Pesticide and pathogen contamination of vegetables in Ghana's urban markets. Archives of Environmental Contamination and Toxicology, 50(1), 1-6. (DOI: 10.1007/s00244-004-0054-8)

Azizi, M. M. (2003). Density in Urban Planning, Principles and Criteria for Density Determination. University of Tehran. Second edition.

Bahreini, S.H. (1996). Development and sustainable development: a theoretical analysis. Iranian Society of Environmentalists conference. Faculty of Technology, University of Tehran. 19-20 Nov. 1996.

Barrs, R. (1997). Sustainable Urban Food Production in the City of Vancouver: An Analytical and Strategy Framework for Planners and Decision-Makers. Vancouver, BC: City Farmer, Canada's Office of Urban Agriculture.

Blair, D., Giesecke, C. C., & Sherman, S. (1991). A dietary, social and economic evaluation of the Philadelphia urban gardening project. Journal of Nutrition Education, 23(4), 161-167. (DOI:10.1016/S0022-3182(12)81191-5).

Bonham Jr., J. Blaine, Gerri Spilka, and Darl Rastorfer (2002). Old Cities/Green Cities: Communities Transform Vacant Land, Planning Advisory Service Report 506/507. Chicago: American Planning Association.

Brown , K. H., & Jameton, A. L. (2000). Public health implications of urban agriculture. Journal of public health policy, 21(1), 20-39.

Carver,C. (2005). A place to grow. Canadian living magazine. April, 2015. 216-220

Dennery, P. (1997). Urban agriculture in informal settlements: how can it contribute to poverty alleviation? Agriculture and Rural Development 4 (2): 46-48.

De Zeeuw, H., 47, R., & Dubbeling, M. (2011). The role of urban agriculture in building resilient cities in developing countries. The Journal of Agricultural Science, 149(S1), 153-163. (DOI: http://dx.doi.org/10.1017/S0021859610001279)

Dixon , J., Omwega, A.M., Friel, S., Burns, C., Donati, K. & Carlisle, R. (2007). The Health Equity Dimensions of Urban Food Systems. Journal of Urban Health: Bulletin of the New York Academy of Medicine, 84(1): 118-129. (DOI: 10.1007/s11524-007-9176-4)

Doron, G. (2005). Urban Agriculture: Small, medium, large. Architectural Design, 75(3): 52–59. (DOI: 10.1002/ad.76)

Dubbeling, M. & Santandreu, A. (2003). Urban Agriculture: A Tool for Sustainable Municipal Development. International Development Research Centre (IDRC), Canada. 20 responses. World Development, 26(2)

Elmqvist, T., Maltby, E., Barker, T., Mortimer, M., Perrings, C., Aronson, J., & Salles, J. M. (2010). Biodiversity, ecosystems and ecosystem services.

Fa.tradingeconomics, (2015). Iran Unemployment Rate. Retrieved from http://fa.tradingeconomics.com/iran/unemployment-rate

FAO (Food and Agriculture Organization of the United Nations) (2007).THE STATEOF FOOD AND AGRICULTURE. FAO Agriculture Series No. 38

FAO (Food and Agriculture Organization of the United Nations) (2010). Fighting Poverty and Hunger. What Role for Urban Agriculture? Economic

and social perspectives. Policy brief No.10`
Ferris, J., Norman, C. & Sempik, J. (2001). People, Land and Sustainability: Community Gardens and the Social Dimension of Sustainable Development, Social Policy & Administration, 35(5): 559-568
Flores, H.C. (2006). Food Not Lawns: How to Turn Your Yard into a Garden and Your Neighbourhood into a Community (p. 334). Virginia: Chelsea-Green Publishing Company
Gifford, R. (2007). Environmental psychology: Principles and practice. Colville, WA: Optimal books.
Girardet, H. (2004). Cities people planet: Liveable cities for a sustainable world. New Jersey: Wiley-Academy.
Glover, P. (2006). AN ABUNDANCE OF Small, Sustainable Solutions. Communities, (133):48-49
Hampwaye, G., Nel, E., & Rogerson, C. M. (2007). Urban agriculture as local initiative in Lusaka, Zambia. Environment and Planning C, 25(4), 553-572. (DOI: 10.1068/c7p)
Howe, J., Bohn, K., & Viljoen, A. (2012). Food in time: The history of English open urban space as a European example. Continuous Productive Urban Landscapes: Designing Urban Agriculture for Sustainable Cities, edited by Andre Viljoen, 95-107.
Howe , J., & Wheeler, P. (1999). Urban food growing: The experience of two UK cities. Sustainable Development, 7(1), 13
James, S., Lahti, T., & Paehlke, R. (REVIEWER) (2005) City Stepping: The Natural Step for Communities: How Cities and Towns can Change to Sustainable Practices. Alternatives Journal, 31(4/5), 40
Kaplan, R., & Kaplan, S. (1989). The experience of nature: A psychological perspective. CUP Archive.
Karhroodi, M. (1992). Creating and developing green spaces in order to improve Tehran environment. Green space seminar proceeding. Tehran Parks & Green Space Organization publishing.
Kaurman, J. L., & Bailkey, M. (2000). Farming inside cities: Entrepreneurial urban agriculture in the United States (p. 32). Cambridge, MA: Lincoln Institute of Land Policy.
Kumssa, A., Williams, J. H., & Jones, J. F. (2011). Conflict and human security in Africa: Kenya in perspective. Palgrave Macmillan.(DOI: 10.1057/9780230119260)
Kuo, F. E., & Sullivan, W. C. (2001). Environment and crime in the inner city does vegetation reduce crime? Environment and behaviour, 33(3), 343-367.
Kutiwa ,S., Boon, E. & Devuyst, D. (2010).Urban Agriculture in Low Income Households of Harare: An Adaptive Response to Economic Crisis, Journal of Human Ecology, 32(2): 85-96.
Lerner,S., and Poole, W. (1999). The Economic Benefits of Parks and Open Spaces: How Land Conservation Helps Communities Grow Smart and Protect the Bottom Line.San Francisco, CA: The Trust for PublicLands.
Lynch, K., Maconachie, R., Binns, T., Tengbe, P., & Bangura, K. (2013). Meeting the urban challenge? Urban agriculture and food security in post-conflict Freetown, Sierra Leone. Applied Geography, 36, 31-39.
Masi, B. (2008). Defining the urban-agrarian space. Cities growing smaller (pp. 85–102).Kent State University's Cleveland Urban Design Collaborative.
Matuschke, I., & Qaim, M. (2009). The impact of social networks on hybrid seed adoption in India. Agricultural Economics, 40(5), 493-505. (DOI: 10.1111/j.1574-0862.2009.00393)
Mazereeuw, B. (2005). Urban agriculture report. Region of Waterloo Public Health. Prepared for the Region of Waterloo Growth Management Strategy, 28.
Mougeot, L. J. (2000). Urban agriculture: definition, presence, potentials and risks. Growing cities, growing food: Urban agriculture on the policy agenda, 1-42
Mougeot, L. J. (Ed.). (2010). Agropolis:" The Social, Political and Environmental Dimensions of Urban Agriculture". Routledge
Moustier, P., & Pagès, J. (1997). Le péri-urbain en Afrique: une agriculture en marge? Economie rurale, 241(1), 48-55.
Numbeo, (2015). Crime in Tehran, Iran Retrieved from http://www.numbeo.com/crime/city_result.jsp?country=Iran&city=Tehrand
Patel, I.C. (1991). Gardening's Socioeconomic Impacts. Journal of Extension, 29(4): 7–8.
Paxton, A. (1997). Farming the city: Food growing projects can improve the quality and sustainability of

urban living. Landscape Design, 53-55.
Peck, S. (2003). Towards an integrated green roof infrastructure evaluation for Toronto. The green roof infrastructure monitor, 5(1),4-5.
Ringenbach,j Valcourt,M &Wang,W 2013 - Urban Agriculture in Providence, 2013, p.4
Schmelzkopf, K. (2002). Incommensurability, Land Use, and the Right to Space: Community Gardens in NewYorkCity1. Urban Geography,23(4), 323-343. (DOI: 10.2747/0272-3638.23.4.323)
Seifoddini, F., Zayyari, K., Purahmd, A. & Nikpour, A. (2012) Explanation of Dispersion and Compactness of Urban Form in Amol City, Considering Sustainable Urban Form. Human Geography Research, 44 (80), pp. 155-179.
Smardon, R. C. (1988). Perception and aesthetics of the urban environment: Review of the role of vegetation. Landscape and Urban Planning, 15(1), 85-106. (DOI: 10.1016/0169-2046(88)90018-7)
Smart, J. (2015). Urban agriculture and economic change in the Zambia Copperbelt: The cases of Ndola, Kitwe and Luanshya (Doctoral dissertation, University of Otago).
Smit J, Ratta A & Bernstein J. (1996). Urban agriculture: an opportunity for environmentally sustainable development in sub-Saharan Africa. The World Bank.
Smith, P., Martino, D., Cai, Z., Gwary, D., Janzen, H., Kumar, P., ... & Smith, J. (2008). Greenhouse gas mitigation in agriculture. Philosophical Transactions of the Royal Society B: Biological Sciences, 363(1492), 789-813. (DOI:10.1098/rsth.2007.2184)
Specht , K., Siebert, R., Hartmann, I., Freisinger, U. B., Sawicka, M., Werner, A.,Thomaier,S., Henckel, D., Walk,H., & Dierich, A. (2014). Urban agriculture of the future: an overview of sustainability aspects of food production in and on buildings. Agriculture and Human Values, 31(1), 33-51. (DOI: 10.1007/s10460-013-9448-4).
Sutic, N. (2003). How green roofs can improve the urban environment in uptown Waterloo. Retrieved July, 31, 2008.
The Economist Intelligence Unit (2015). The Safe Cities Index: Assessing urban security in the digital age, pp31-35.
Twiss , J., Dickinson, J., Duma, S., Kleinman, T., Paulsen, H., & Rilveria, L. (2003). Community gardens: lessons learned from California Healthy Cities and Communities. Journal Information, 93(9). (DOI: 10.2105/AJPH.93.9.1435)
UN (United Nations), (1995). World Urbanization Prospects: The 1994 revisions. United Nations, New York.
Van Veenhuizen, R. (Ed.). (2006). Cities farming for the future: Urban agriculture for green and productive cities. IDRC.
Viljoen , A., Bohn, K., & Howe, J. (2005). More food with less space: why bother. Continuous productive urban landscapes, 19.
Viljoen, A., Bohn, K., Tomkins, M., & Denny, G. (2009, June). Places for People, Places for Plants: Evolving Thoughts on Continuous Productive Urban Landscape. In II International Conference on Landscape and Urban Horticulture 881 (pp. 57-65).).(dol: 10.17660/ActaHortic.2010.881.3)
Wells, N. M. (2000). At home with nature effects of "greenness" on children's cognitive
Functioning. Environment and behavior, 32(6), 775-795.81-
Zezza, A., & Tasciotti, L. (2010). Urban agriculture, poverty, and food security: Empirical evidence from a sample of developing countries. Foodpolicy, 35(4), 265-273. (doi:10.1016/j.foodpol.2010.04.007)