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Research Article

Factors affecting agricultural land use changes in the city of Varamin from the perspective of farmers and agricultural experts

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ABSTRACT

The purpose of this research was to determine the factors affecting agricultural land use changes in the city of Varamin from the perspective of farmers and agricultural experts. A descriptive–correlation survey approach was used in this study. On the basis of review of the literature, a questionnaire was developed to collect the necessary data. Validity of questionnaire was determined by investigating the attitudes of some specialists and university professors. Reliability of questionnaire was confirmed through calculating Cronbach's Alpha. The study population consists of farmers and agricultural experts in Varamin (N=3562) and a sample of 350 people was selected by using the random sampling method. Based on the results, 27.1% of the experts' attitude toward agricultural land use changes was described moderate. The results of multiple regression showed that educational factor has the most effect on the dependent variable.

Keywords: land use changes, Agricultural land, Agricultural expert, Varamin, Iran.

INTRODUCTION

Land is one of three major factors of production in classical economics (along with labor and capital) and an essential input for housing and food production. Thus, land use is the backbone of agricultural economies and it provides substantial economic and social benefits. Land use change is necessary and essential for economic development and social progress (Wu, 2008).

During the past several decades, developing countries has experienced rapid urban transformation, represented by significant changes in its demographic composition and large-scale expansion of the urban landscape (Pannell, 2002; Wang et al., 2012). Given the decline of cultivated land, the level of inputs and out-puts or frequency of cultivation against constant land (Turner and Doolittle, 1978), or intensity of agricultural land use, is of great importance for maintaining the food production capacity. However, urban expansion and economic development can lead to a rise in the off-farm opportunities and the resulting labor shortage in the agricultural sector (Wu et al., 2011). Declines in the intensity of agricultural land use and farmland abandonment have been documented for many regions and for different crops (Chen et al., 2009; Li and Wang, 2003; Liu and Li, 2006). This has posed additional challenges for the security of food provision and the preservation of natural ecosystems.

As urbanization intensifies, agricultural and nonagricultural land use conflicts become more severe. This may lead to an increase in local ordinances designed to force farmers to pay for some of the negative impacts generated by agriculture. As the nearest input suppliers close because of insufficient demand for farm inputs, a farmer may have to pay more for inputs or spend more time to obtain equipment repairs (Lynch and Carpenter, 2003).

According to various studies, Land use change, however, does not come without costs and has many damaging impacts. Some of socioeconomic impacts of land–use changes listed in the study by (Wu, 2008):

- Conversion of farmland and forests to urban development reduces the amount of land available for food and timber production
- Soil erosion, salinization, desertification, and other soil degradations associated with agricultural production and deforestation reduce land quality and agricultural productivity
- Conversions of farmland and forests to urban development reduce the amount of open space and environmental amenities for local residents
- Urban development reduces the "critical mass" of farmland necessary for the economic survival of local agricultural economies
- Urban development patterns not only affect the lives of individuals, but also the ways in which society is organized
- Urban development has encroached upon some rural communities to such an extent that the community's identify has been lost
- Suburbanization intensifies income segregation and economic disparities among communities
- Excessive land use control, however, may hinder the function of market forces
- Land use regulations that aim at curbing land development will raise housing prices, making housing less affordable to middle– and low–income households
- Land use regulation must strike a balance between private property rights and the public interest

Conversion of farmland and forests to urban development reduces the amount of lands available for food and timber production. Soil erosion, salinization, desertification, and other soil degradations associated with intensive agriculture and deforestation reduce the quality of land resources and future agricultural productivity (Lubowski et al. 2006).

A land use change with incorrect management is one of the main reasons for creating the greenhouse effects and earth warming during recent decades (Fitzsimmons et al, 2004). Land use and land cover effect on carbon storage and distribution in ecosystems. In fact, carbon sequestration potential is doubled by proper management activities (Lal, 2004). Loss of soil organic carbon storage has a great effect on soil structure through increasing soil compaction, soil erodability and runoff probability (Hoover et al, 2003). Land degradation due to land use change in arid and semi-arid regions entered many threats for land sustainability land uses that major changes is created by human activities (Dumanski and Pieri, 2000).The risk of soil degradation can be related to natural critical conditions, but in comparison to human factor effects is negligible (Blum, 1998). Land use changes can reduce vegetation cover and prevents the perseveration of the organic matter in the soil. On the other hand, restoring the degraded land to the natural vegetation can reduce these effects and by increasing carbon inputs to the soil through organic matter, serve in favor of the accumulation of carbon. These changes lead to improved soil fertility and functions. The amount of carbon in soil is usually greater than the amount in living vegetation in terrestrial ecosystems. It is therefore important to understand the dynamics of soil carbon as well as

its role in terrestrial ecosystem carbon balance and the global carbon cycle (Post and Kwon, 2000).

Land–use change is arguably the most pervasive socioeconomic force driving changes and degradation of ecosystems. Deforestation, urban development, agriculture, and other human activities have substantially altered the Earth's landscape. Such disturbance of the land affects important ecosystem processes and services, which can have wide–ranging and long–term consequences. Some of environmental impacts of land–use changes include (Wu, 2008):

- Land use and land management practices have a major impact on natural resources including water, soil, air, nutrients, plants, and animals
- Runoff from agriculture is a leading source of water pollution both in inland and coastal waters
- Draining wetlands for crop production and irrigation water diversions has had a negative impact on many wildlife species
- Irrigated agriculture has changed the water cycle and caused groundwater levels to decline in many parts of the world
- Intensive farming and deforestation may cause soil erosion, salinization, desertification, and other soil degradations
- Deforestation adds to the greenhouse effect, destroys habitats that support biodiversity, affects the hydrological cycle and increases soil erosion, runoff, flooding and landslides.
- Urban development causes air pollution, water pollution, and urban runoff and flooding
- Habitat destruction, fragmentation, and alteration associated with urban development are a leading cause of biodiversity decline and species extinctions
- Urban development and intensive agriculture in coastal areas and further inland is a major threat to the health, productivity, and biodiversity of the marine environment throughout the world.

On the other hand, Land use regulation can take many different forms. The traditional command and control approach often involves zoning, density regulation, and other direct land use controls. Although these policies can be quite effective as regulatory tools, they could lead to substantial social welfare loss in the form of higher housing prices, smaller houses, and inefficient land use patterns (Cheshire and Sheppard 2002; Walsh 2007).

Borras and Franco (2012) to explore different ways and reasons that land has been used for producing different crops such as rice, rubber trees, fruit trees and cassava as well as the switching between one crop to another in a changing context. Therefore, the change in land use in agriculture in the Thai-Laos border zone has significantly contributed to changes in land control, land rights and rural social differentiation.

According to Lubowski et al. (2006), farmers tend to keep highly productive cropland in cultivation regardless of changing economic conditions.

But economic conditions, such as changing commodity prices or production costs, encourage farmers to expand production to less productive land or to shift less productive croplands to other uses. Agricultural and conservation policies also affect land use. These land-use changes affect environmental quality, particularly when affected lower-quality lands are environmentally sensitive.

So it is important to identify the factors contributing to such changes. According to the reasons noted above, this research aimed to determine the factors affecting agricultural land use changes from the perspective of farmers and agricultural experts in Iran. This study was conducted in Varamin where is a city of Tehran province.

MATERIALS AND METHODS

The approach of this study employed an analytical research. The method of this study is descriptive-correlation. The study population consists of farmers and agricultural experts in Varamin (N=3562). Target population have been selected by random sampling method (n=350).On the basis of review of the literature, a questionnaire was developed to collect the necessary data. The questionnaire covered five parts including: 1) demographic characteristics such as age, sex, education level, etc.; 2) social factor which was measured by 8 question; 3) economic factor which was measured by 10 question; 4) educational factor which was measured by 6 question; 5) political factor which was measured by 8 question. These questions were measured on a five-point Likert scale which ranged from 1(very low) to 5(very high).

Content and face validity of instrument were established by investigating the attitudes of some specialists and university professors. A pilot study was conducted with 30 agricultural experts. Questionnaire reliability was estimated by calculating Cronbach's Alpha. Reliability for the overall instrument was estimated between 0.85 to 0.90. Data collected were analyzed using the Statistical Package for the Social Sciences (SPSS/21). In descriptive level, through statistical measures such as frequency, percentage, average, variance and standard deviation and in inferential level, Pierson and Spearman correlation coefficient and regression analysis have been used.

RESULTS

Based on the findings of this study, the average age of studied experts was 41 years and 45% of them with highest frequency were between 37 to 48 years old. Also the average age of studied farmers was 62 years and about 37.5% of them with highest frequency were between 62 to 71 years old. The findings on education level showed that more than half of the studied experts (56.7%) had bachelor degree and about 28.6% of them with highest frequency were illiterate. The results showed that the average of experts' experience was 13.4 years and the average of farmers' experience was 19.3 years.

In this study, 9 different statements were used to assess the attitude toward agricultural land use changes. The results of table 1 indicates that according to 27.1% of the surveyed experts, with the highest frequency, the attitude toward agricultural land use changes was described moderate.

Table 1- The attitude of respondents about toward agricultural land use changes

Attitude	Frequency	Percent	Cumulative Percent
Very low	48	13.71	13.71
Low	61	17.42	31.13
Moderate	95	27.14	58.27
High	76	21.73	80.00
Very high	70	20.00	100
Total	350	100	—

Mean: 28.12 Mode: Moderate SD: 2.13 Minimum: 22 Maximum: 45

Scale: (1-9= very low, 10-18= low, 19-27= moderate, 28-36= high, 37-45= very high)

In this study, t-test was used to compare the studied farmers and experts' attitude toward agricultural land use changes based on marriage status. According to the results of the t-test, no significant difference was exposed in respondents' attitude toward agricultural land use changes when two groups of married and single respondents are compared together (table 2).

Table 2– Comparing the respondents' attitude toward agricultural land use changes

Variable		N	M	SD	t	sig.
Marriage status	Married	298	2.16	0.324	0.453	0.123
	Single	52	2.68	0.347		

In this research to consider the relationship between independent and dependent variables Pierson and Spearman coefficients were used. The data of table 3 shows that the variable of education level of experts, economic factor, social factor, educational factor, and political factor have positive and significant relation with attitude of respondents about toward agricultural land use changes. On the other hand, the variables of age and work experience of respondents had no significant relationship with dependent variable. Other results of correlation analysis are shown in the table 3.

Table 3- Relationship between attitude toward agricultural land use changes and independent variables

Variables	Measure	Correlation Coefficient	r	sig.
Age	Scale	Pearson	0.112	0.407
Work experience	Scale	Pearson	0.115	0.454
Education	Ordinal	Spearman	0.132*	0.013
Economic factor	Scale	Pearson	0.301**	0.001
Social factor	Scale	Pearson	0.328**	0.000
Educational factor	Scale	Pearson	0.449*	0.015
Political factor	Scale	Pearson	0.468**	0.009

** Significant in 0.01 level; * Significant in 0.05 level

According to the results of regression analysis, in first step "economic factor" was entered in the equation that the multiple regression coefficient (R) was 0.660 and determining coefficient was 0.435. It means that 43.5 percent of changes of attitude toward agricultural land use changes are explained by this variable. In the next step, the variable "educational factor" was entered in the equation. This variable increased the multiple regression coefficient of (R) to 0.764 and determining coefficient to 0.568 percent. Actually, this variable can explain 13.3 percent of changes of dependent variable.

In the third step, the variable "political factor" was entered in the equation that showed 0.815 of correlation coefficient and 0.665 of determining coefficient. This variable can explain 9.7 percent of changes in dependent variable (table 4).

Table 4- Determining coefficients of effective variables in attitude toward agricultural land use changes

Step	R	R^2	R^2Ad
1	0.660	0.435	0.421
2	0.764	0.568	0.520
3	0.815	0.665	0.610

Table 5- Effect rate of variables in attitude toward agricultural land use changes

Variables	B	*Beta*	t	sig.
Constant coefficient	11.782	—	9.378	0.000
Economic factor (X_1)	0.610	0.356	3.454	0.000
Educational factor (X_2)	0.623	0.369	4.787	0.001
Political factor (X_3)	0.689	0.281	3.577	0.003

The results of the regression analysis shows that after entrance of all independent variables which had significant correlation with dependent variable, only the variables of economic factor, educational factor and political factor remained. These three variables can totally explain 66.5 percent of changes of the dependent variable. Of course, other changes are related to other elements which have not been studied in this research. So, According to the results, the linear equation of regression would be as follow (table 5):

$Y=11.782+0.610X_1+0.623X_2+0.689X_3$ *(the equation of regression based on B)*

$Y=0.356X_1+0.369X_2+0.281X_3$ *(the equation of regression based on Beta)*

Conclusion

Agriculture is a key component of anthropogenic land use and land cover changes that influence regional climate (Ahmed et al., 2015). Land use and land cover change is an important factor responsible for observed global environmental changes (Pongtraz, 2010; Ellis, 2011). In sum, land use change provides many economic and social benefits, but comes at a substantial economic and environmental cost to society. Land conservation is a critical element in achieving long–term economic growth and sustainable development. Land use policy, however, must strike a balance between private property rights and the public interest (Wu, 2008).

This study aimed to determine the factors affecting agricultural land use changes in the city of Varamin from the perspective of farmers and agricultural experts in Iran. One of the findings of this study were positive and significant correlation of the variable of education level of experts, economic factor, social factor, educational factor, and political factor with attitude of respondents about toward agricultural land use changes. Also, the results of multiple regression showed that the variables of economic factor, educational factor and political factor can totally explain 66.5 percent of changes of the dependent variable.

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