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## Factors Influencing on Minimum Offer Price of Farmers for Producing Greenhouse Organic Cucumber in Khorasan Razavi Province

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**Abstract:** This study examined factors influencing on minimum offer price of farmers for producing greenhouse organic cucumber in Khorasan Razavi Province by using linear regression and cross sectional data of 60 greenhouse cucumber producers in 2008. Results showed that 80% of farmers believed price of organic products must be 10% more than conventional products. Minimum offer price of organic cucumber is 6348.6 rial kg<sup>-1</sup>. Also, relationship between age, of farmers, cucumber insurance, average current yield of conventional cucumber, information about organic cucumber, cultivated area that allocate to organic cucumber and minimum offer price for producing greenhouse organic cucumber is positive. Relationship between farmer's job, using of agricultural advisory, agricultural experience, organic market information, participation in extension classes and minimum offer price of greenhouse organic cucumber is negative. Regard to results, creating organic products market information systems, extension and education of organic cucumber, more activate of agricultural advisory, balancing expansion of organic cucumber cultivated area and conduct of insurance toward effectiveness on decreasing of risk and increasing of production suggested.

**Key words:** Price function, insurance, extension, organic cucumber expansion, market information

### INTRODUCTION

Food security is one of the important programs of government for supplying safety, suitable and sufficient foods for all people. Rather of creating employment, market for industrial products, foreign exchange, mobility of labor toward industrial sector, raw material for industrial sector, major function of agricultural sector is supplying safety, suitable and sufficient foods. Organic farming is a type of agriculture. Objective of this system is creating consolidation, systematic and human agricultural production systems that aren't conflict to economical-environmental benefits. Organic farming can effect on conservation of environment, conservation of resources, improvement of food quality, decreasing of unnecessary and excess materials and conduct agricultural sector toward market needs.

Emergence of two waves' green revolution and biotechnology have provided food security in many developed and developing countries. But in recent years, these waves created world concerns about outcomes and effects of modern agricultural activities on environment and human's health, serious problems in agriculture and low productivity. These concerns have provided context for third wave i.e., demand for safety food. Organic farming is a good response to these concerns and has advantages that based on can take government support

for providing organic agricultural profit. Because positive effect on environment, improvement of rural welfare, increasing of farmers income and community health, organic farming is economical activity for countries. With correct performance of organic farming can supply sustainable food staffs for people (Clark *et al.*, 1999; Delate, 2002; El-Hage Scialabba and Hattam, 2002; Scialabba, 2003; Fuller *et al.*, 2005; Bengtsson *et al.*, 2005; Eyhorn *et al.*, 2007; Gabriel and Tschamtkke, 2007).

Although Iran's government towards organic farming is done different policies as promotion of farmers and agricultural specialists awareness to organic farming, decreasing of pesticide and chemical fertilizer subsidies, expansion of useful insects to decreasing the use of pesticide, subsidy payment to bio-fertilizer, organic fertilizer, biological control and support of non government organizations. But for development of this sector, there are several restrictions as lack of special organization for formal support of organic production, lack legal and regulations towards organic production, lack certifying organization based on world and European standards for certifying of organic products, lack of extension for consuming of organic products between different categories of producers and consumers, lack of administration and research supports, lack of facilities for decreasing of costs and modern labs for measuring the residue of pesticide.

In recent year, greenhouse cultivating has been developed in Iran Khorasan Razavi Province is one of the most important provinces of greenhouse products-especially cucumber-producers. With regard to conditions of greenhouse cucumber production, producers use of chemical poisons with high dose and frequency for decreasing of losses of product so that households feel residue of it on consumption cucumber (for example taste) and consist different problems specially histamines. With regard to this, expansion and extension GOC has considered by Jihad-Agriculture Organization (JAO). By evaluation of producers requirement and attitudes, can response to pre-requirements movement of producers toward GOC as well as current concerns in consumers level for outcomes of residue poisons in cucumber. On the other hand, organic cucumber price is one of challenges against producers and policy makers so that offer price must be responder of investment and encourage of farmers to movement toward organic production (guarantee of their profit). Rather, promote consume incentives in consumers level and create demand for it in community.

Economists in particular tend to be special about government policy intervention in general as well as measures specially designed for organic farming. Sound reasons for policies supporting organic farming are therefore increasingly important. Two major lines of argument for reason to support organic farming exist: farming can either be supported because it produces public goods and helps to achieve policy objectives like animal welfare (Håring *et al.*, 2001), or it can be seen as a market opportunity and organic market to conquer (Kalden, 2001). It is, of course, also possible to combine both views. Cooper (1997) concluded that using traditional contingent valuation method analysis results to determine minimum incentive payments to attain a given level of adoption is likely to result in overpayment. Lohr and Salomonsson (2000) showed that farmers requiring higher subsidies managed larger and less-diversified farms. Access to more market outlets and information sources substituted for subsidy level in the farmers' utility function. Lohr and Salomonsson (2000) believed that services rather than subsidies may be used to encourage conversion to organic agriculture. Pietola and Oude Lansink (2001) indicated that decreasing output prices in conventional production and increasing direct subsidies trigger the switch to organic farming. The survey on literature review showed that there isn't a unique study for determining of factors influencing on MOP or determining of MOP level of organic products.

Many consumers are prepared to pay higher prices for organically produced goods. The relationship of

premium prices may therefore make an important contribution to the profitability of organic farming (Offermann and Nieberg, 2000). Organic products are more expensive (having high price) rather than conventional products. So, determining of fare price is one of suggestion that can develop and expand organic products market in long run. Additionally, support of farmers in transition period-as financial incentives and/or extension services-will effect on encouragement to producing or increasing of organic products. Finally, regard to recognizing of Minimum Offer Price (MOP) and determining the factors influencing on MOP of organic cucumber, government can plan to price and subsidy support of producers and consumers. Rather, conduct and encourage producers toward producing of organic cucumber and consumers toward consuming organic cucumber (safety food). With regard to this, this study tried to study social-economical factors influencing on MOP of farmers for producing GOC in Khorasan Razavi Province.

## MATERIALS AND METHODS

Data collected by using a sampling survey on greenhouse cucumber producers. With regard to limitation of greenhouse cucumber producers, this study used censusing method and covered and surveyed all producers as sample. So, the data were collected in Mashhad by using an interview format in 2008. Questinary of this study consisted social-economical profile, input-output data, organic farming information and market of it, cucumber insurance, credit, minimum offer price for organic cucumber and finally supportive programs and policies. In this study, 60 questinary returned after 3 months. So, data of a sample consist of 60 greenhouse cucumber producers analyzed by using of descriptive statistics.

Finally, this study for determining factors influencing on MOP of farmers for producing GOC in Khorasan Razavi Province used linear regression (after estimation different model and the selection the best model based on model selection criteria and consistency with theory) that introduced as:

$$p_i = \alpha + \sum_{i=1}^4 \beta_i x_i + \sum_{i=1}^6 \gamma_i d_i + \mu_i \quad (1)$$

where,  $p_i$  is MOP of farmers for producing (or selling) GOC (rial  $\text{kg}^{-1}$ ),  $x_1$  is age of farmers (year),  $x_2$  is agricultural experience (year),  $x_3$  is average current yield of conventional cucumber ( $\text{kg m}^{-2}$ ),  $x_4$  cultivated area that allocate to organic cucumber or expected ( $\text{m}^2$ ),  $d_i$  farmers

Table 1: Descriptive characteristics of greenhouse cucumber production

| Variables  | Mean    |
|--|---------|
| Minimum offer price of greenhouse organic cucumber (rial kg <sup>-1</sup> )      | 6348.60 |
| Age of farmers (year)  | 40.46   |
| Agricultural experience (year)   | 16.26   |
| Average current yield of conventional cucumber (kg m <sup>-2</sup> )             | 18.53   |
| Price prediction of conventional cucumber for next year (rial kg <sup>-1</sup> ) | 4538.40 |
| Yield prediction of conventional cucumber for next year (kg m <sup>-2</sup> )    | 19.37   |
| Greenhouse cultivated area of conventional cucumber (m <sup>2</sup> )            | 2697.14 |
| Cultivated area that allocate to organic cucumber (m <sup>2</sup> )              | 1748.67 |
| Farmers job (agriculture = 1, otherwise = 0)                                     | 0.79    |
| Agricultural advisory (used = 1, unused = 0)                                     | 0.73    |
| Cucumber insurance (insured = 1, not insured = 0)                                | 0.33    |
| Information about organic cucumber (medium and high level = 1, low = 0)          | 0.75    |
| Organic market information (existence = 1, no existence = 0)                     | 0.33    |
| Participation in extension classes (participation = 1, no participation = 0)     | 0.33    |

Table 2: Estimation of minimum offer price function for organic cucumber

| Variables   | Parameters | T statistic | Elasticity |
|---|------------|-------------|------------|
| Constant ( $\alpha$ )                             | -380.58    | -0.178ns    | -          |
| Age of farmers                                    | 48.32      | 1.48ns      | 0.360      |
| Farmers job                                       | -2222.86   | -2.047***   | -0.274     |
| Agricultural experience                           | -172.47    | -4.636***   | -0.439     |
| Agricultural advisory                             | -138.28    | -0.269ns    | -0.016     |
| Cucumber insurance                                | 5083.70    | 8.420***    | 0.265      |
| Average current yield of conventional cucumber    | 288.98     | 4.174***    | 0.839      |
| Information about organic cucumber                | 610.15     | 0.980ns     | 0.071      |
| Organic market information                        | -2160.06   | -1.845**    | -0.113     |
| Participation in extension classes                | -5121.27   | -6.697***   | -0.267     |
| Cultivated area that allocate to organic cucumber | 1.22       | 4.940***    | 0.334      |
| <b>Goodness of fit</b>                            |            |             |            |
| R <sup>2</sup>                                    | 0.770      |             |            |
| $\bar{R}^2$                                       | 0.714      |             |            |
| F   | 13.75 ***  |             |            |

\*\* Significant at 5% level \*\*\* Significant at 1% level, ns: Not significant

job (agriculture = 1, otherwise = 0),  $d_2$  agricultural advisory (used = 1, unused = 0),  $d_3$  cucumber insurance (insured = 1, not insured = 0),  $d_4$  information about organic cucumber (medium and high level = 1, low = 0),  $d_5$  organic market information (existence = 1, no existence = 0),  $d_6$  participation in extension classes (participation = 1, no participation = 0), residual term and  $\alpha$ ,  $\beta_i$  ( $i = 1, 2, 3, 4$ ),  $\gamma_i$  ( $i = 1, 2, \dots, 6$ ) are parameters of MOP function to be estimated. The MOP function 1 is estimated by Ordinary Least Square (OLS) method (Gujarati, 2003).

## RESULTS AND DISCUSSION

**Sample descriptive:** Age of 20% of greenhouse cucumber producers is less than 30 years, 40% are between 30 to 45 years and 40% have 45 to 60 years. Table 1 shows that age of farmers and agricultural experience are 40.46 and 16.26 year, respectively. Most of farmers (73.3%) doing agricultural activities professionally. Family dimension of most farmers are less than 5 people. Ownership of all greenhouse cucumber producers is private. Almost of farmers (63.7%) had less than 5 cucumber product saloons. 7.1% of farmers having less than 1500 m<sup>2</sup>, 78.5% between 1500-3000 m<sup>2</sup>

and 14.3% have more than 5000 m<sup>2</sup>. Majority of farmers (60%) didn't participate in extension classes. 73.3% of farmers have utilized from agricultural supervision engineering services. All of greenhouse owner have precedent of face with risks in producing of cucumber. Only 33.3% of farmers insured their product in recent year. Average yield of cucumber is less than 15 kg m<sup>-2</sup> in 20 and 73.4% is between 15 to 25 kg m<sup>-2</sup> and in 6.7% having more than 25 kg m<sup>-2</sup>. Farmers forecasting show that average yield of 16.6% of farmers is less than 15 kg m<sup>-2</sup>. 74.8% of farmers have between 15 to 25% and 8.3% had more than 25 kg m<sup>-2</sup>.

**Farmers' attitude:** Minimum offer price of farmers for organic cucumber is 6384.60 rials kg<sup>-1</sup> (Table 1). MOP of 40% of farmers is 5000 rials kg<sup>-1</sup> and for 60% is more than 5000 rials kg<sup>-1</sup>. Also, 53.9% of farmers forecasted price less than 5000 rials kg<sup>-1</sup> and 46.1% more than 5000 rials kg<sup>-1</sup>. Degree of farmers' information about organic products in two levels low and medium were the same and equal to 46.7% and only information level of 6.7% was high. Forty percent of farmers will allocate less than 1500 m<sup>2</sup>, 40% between 1500 to 3000 m<sup>2</sup> and 20% more than 3000 m<sup>2</sup> to GOC. According to Table 2, farmers will allocate 64.8% of greenhouse area to producing

organic cucumber. Eighty percent of farmers believed that GOC price must be 10% higher than conventional cucumber and 13.3% believed to no change in price. 6.7% didn't answer to this question. Twenty percent of farmers presented that they haven't participate in extension classes about GOC yet.

**Factors influencing on minimum offer price for organic cucumber:** Table 2 shows that relationship between MOP for organic cucumber and age of farmers is positive i.e., by increasing the age of farmers, risk lover of their will decrease. So, with action to producing of organic cucumber, farmers will offer higher price for this product until achieve a security margin to coverage probable losses due to different risks. This relationship isn't statistically significant. A negative and significant relationship exist between MOP and major job of GOC producers i.e., full time GOC producers (with agriculture as major job), will offer less price for organic cucumber rather than part time farmers. Because in this conditions, farmers can decrease probable losses due to different risks as well as increase yield of organic cucumber and decrease production costs with optimal management of organic cucumber price. Result of this management would be decreasing of organic cucumber final price.

Results show a negative and significant relationship between agricultural experience and MOP for organic cucumber. By increasing farmers experience, MOP for organic cucumber will decrease because effect of experience is the same of management that can cause to decreasing of costs and increasing of yield. Agricultural advisory services have indirect (negative) and no significant effect on MOP for organic cucumber. This effect reveal that increasing in cooperation level of agricultural advisory services in farms, will decrease MOP for organic cucumber. Because consulting of agricultural engineering will decrease probable losses of cucumber, production costs and increase of organic cucumber yield.

Positive relationship between cucumber insurance and MOP present that insurance increase final price of product because farmers must pay insurance premium. In fact, this process shows that insurance is costly and doesn't effect on decreasing of inputs use (and inputs cost), risk aversion and increasing of output. Information of organic product and MOP has a positive and no significant relationship. By increasing the knowledge of farmers about organic product, organic cucumber price will increase because farmers would try to produce and supply a good and higher quality product and in packages consistent to nature of organic cucumber

to market. By increasing the information of organic products market, MOP of farmers for GOC will decrease. Because they try to consider market expansion and achieving to new target market especially in the world market, competition in it and produce a product with minimum cost (comparative advantage) and higher quality coincidence on preferences of foreign consumers.

Table 2 shows that farmers with participation in extension classes about organic farming will offer less price for organic cucumber. Because extension services performance is the same of agricultural advisory. Relationship between average current yield of conventional cucumber and MOP is positive and statistically significant. This relationship shows that conventional cucumber yield loss in organic production conditions will increase. So, effect of it on increasing of MOP would be positive. Finally, relationship between cultivated area that allocate to organic cucumber (willingness to allocate) and MOP is positive and statistically significant. Therefore, by increasing of cultivated area, price of organic cucumber will increase. Several reasons exist for this result: first, farmers can produce other crops in greenhouse (conventional) and supply it with higher price in market for achieving to higher profit. Second, producing of organic products will decrease yield that would explain higher price. Third, for reason the less demand of organic products and lack of diversification markets, organic product (here organic cucumber) must supply with higher price and/or government must pay subsidy to producers as credit, biological control, bio-fertilizer and organic fertilizers.

Elasticity comparison of quantitative variables (i.e., age of farmers, agricultural experience, average yield of conventional cucumber and cultivated area that allocate to organic cucumber) show that average yield of conventional cucumber has the highest positive elasticity on MOP of organic cucumber so that by increasing 1% of it, MOP will increase approximately 0.839%. After it, expected cultivated area for organic cucumber (cultivated area that allocate to organic cucumber) has highest price so that 1% increase in this variable, will increase MOP about 0.334%. In qualitative variables group with positive effect, the least elasticity belongs to age of farmers (0.306). Agricultural experience is in quantitative variables group with negative effect so that will decrease MOP about 0.439%, if this variable increases 1%. In qualitative group, this highest positive elasticity belongs to insurance (0.265). After insurance, organic product information has second rank. In qualitative group with negative effect, farmers job has the highest elasticity (-0.274). Elasticity of extension classes (-0.267), market information (-0.113) and agricultural advisory (-0.016) ranking shown in Table 2.

## CONCLUSION

This study tried to determine factors influencing on MOP for producing greenhouse organic cucumber in Khorasan Razavi Province. Results showed that 80% of farmers believed price of organic products must be 10% more than conventional products. Minimum offer price of organic cucumber is 6348.6 rial kg<sup>-1</sup>. Also, relationship between age, of farmers, cucumber insurance, average current yield of conventional cucumber, information about organic cucumber, cultivated area that allocate to organic cucumber and minimum offer price for producing greenhouse organic cucumber is positive. Relationship between farmer's job, using of agricultural advisory, agricultural experience, organic market information, participation in extension classes and minimum offer price of greenhouse organic cucumber is negative. With regard to results, creating organic products market information systems, extension and education of organic cucumber, more activate of agricultural advisory, balancing expansion of organic cucumber cultivated area, and conduct of insurance toward effectiveness on decreasing of risk and increasing of production suggested.

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