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## **Organic farming and consumer behavior towards organic produce in a transition country: Case of Armenia**

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### **Abstract**

Transition processes in Armenia started with the establishment of a market-driven liberal economic system including the agricultural sector. After the declaration of independence of the Republic of Armenia, the economy in general, and specifically the agricultural sector faced the need to build a radically new system of economic relations.

Armenia should create new strategy to rehabilitate the agricultural sector. There is market for organic food in Armenia and there are perspectives for foreign market developments, using effective marketing campaign. During the past few years there was an increasing interest towards organic farming and processing of organic products in the country.

This paper is mainly concentrating on the behavior of local consumers towards organic produce in comparison with agricultural products grown without use of organic farming techniques. Objective of the conducted relevant regression analysis is to forecast the consumer willingness to pay a price premium for organic produce on the base of different variables and explore the necessity to conduct a large scale research project in Armenia, the results of which can be used for further policy development.

## **Introduction**

Choosing the way of democracy, Armenia rejected the existing planned system. Transition from centralized planned economy towards market system brought new challenges and their solutions were of a big importance and urgency. After the collapse of the Soviet Union the supply mechanisms for food producing sector were weakened and export quantities of agricultural products drastically decreased. Old big factories and collective farms with huge production capacities were useless for small Armenia, which was disconnected from the existing network of raw material supplies.

Agricultural sector has a big importance for rural development and reduction of poverty and unemployment in a country. The main purpose of agriculture is to satisfy the internal demand by developing its strategic goals. Many things for Armenia started from scratch.

Development and reforms continue nowadays in agricultural sector. In early 1990's land and production means were privatized and a legislative basis was created for different forms of ownership, production management, liberalization of prices and development of infrastructure. These reforms created a strong base for further development of agriculture (Lokyan, 2006).

Nowadays more than 340.000 private farms and a big number of private companies are involved in agricultural production, in marketing and processing of agricultural products. Food and agriculture sector in 2006 provided 28% of the Gross Domestic Product, of which the share of agriculture was about 19%. The major land users in the country are private farmers who own 71.7% of privatized arable lands, 78.3% of perennial crop areas, and 48.8% of grass lands. (Avetisyan, 2006)

Organic farming has big development perspectives for Armenia in the context of producing ecologically clean and safe agricultural products. The issue is receiving higher importance when taking into account the factor that Armenia is small by its area (about 29 thousand square kilometers) and the relief does not allow to utilize the available territory for agricultural purposes in maximally efficient way. Lands used in agricultural purposes constitute only 2.135 million ha. In such conditions Armenia can hardly compete with neighboring countries in production of agricultural products in quantitative aspect. One of the ways for development of agriculture in Armenia in long run perspective is concentration on organic farming.

## **Background**

Armenia is rich of many fruits (apricots, grapes, apples, pears, peaches, plums etc), vegetables (tomatoes, potatoes etc), and medicinal and aromatic herbs. The country can hardly compete on the regional market using contemporary intensive agricultural methods because of limited lands used for agricultural purposes. One of the solutions is to concentrate and explore certain competitive advantages of a country. These competitive advantages can include the strategy of focusing on production of certain agricultural and processed products as well as introduction of new methods for farming to meet the local and regional demand. Up to recent times the main accent in agriculture was being made on extensive use of modern intensive land-utilization technologies, big

use of GMOs, but nowadays more agricultural enterprises are trying to apply the organic farming techniques, which has also become a long run strategy for the development of agricultural sector in many countries and Armenia is not an exception.

Organic farming proposes crop production through use of organic fertilizer, crop rotation and biological methods for prevention and in case of their occurrence the elimination of diseases and pests. The overuse of pesticides, fungicides, herbicides, and nitrogen and mineral fertilizers has become reasons for concern of public health and environmental pollution. One of the solutions is the organic farming.

Before the start of transition, when Armenia was a part of huge Soviet country, the country was notable for intensive use of agricultural lands with extensive use of heavy metal fertilizer. Since early 1990s, when Armenia, along with other countries in the region, declared about its independence the land was distributed to private farmers with average land area of 1.2ha. Because of deep recession (partial blockade of borders, instable political situation, huge inflation, unprecedented rise of poverty, inability to launch big capacity factories because of lack of raw materials, inability of governing bodies to develop new policies and development strategies adjusted to a liberalized country), when the country started its first steps towards the market economy, agriculture was one of the most suffering areas. Agricultural crop areas decreased from 516 thousand ha in 1991 to 313 thousand ha in 2000 and 382 thousand ha in 2005. According to year 2004 statistics of Armenian Ministry of Agriculture the use of nitrogen in the country decreased from 25.000 tones in 1992 to 5.000 in 2001. In early years of transition most of the farmers switched to production of cereals. Because the collective farms disbanded and land was distributed to big number of individual farmers, everyone started to cultivate his/her own land without having basic knowledge about agronomy. Just to feed their families, farmers were growing cereals on the same plot, without use of basic cultivation techniques: crop rotation, fallow, buffer stripes,

The introduction of organic agriculture in Armenia is beneficial because of convergence of main two factors:

1. The heavy use of non-organic fertilizer, chemical means of crop protection in Soviet times brought to biological imbalance and soil deterioration. Transition processes and recession of economy resulted to big reduction of human intervention in agriculture during last 15 years and somehow reestablished the biological balance.
2. Inability to restart operations of many Soviet factories resulted in unprecedented increase of unemployment in the country. Although the situation has improved now, leaving only 8.4% of unemployment in 2006, the labor force is still remaining very cheap. Organic farming is a labor intensive field in agriculture and it can advantage of cheap labor force in the country, at the same time reducing unemployment and poverty rates.

There are also many export opportunities for Armenian organic produce especially in big cities of Russia (Moscow, Saint Petersburg) and the Ukraine (Kyiv, Odessa, Dnipropetrovsk).

Ukraine can become a special partner for export of Armenian organic produce to Europe, because it is a Slavonic country, which pursues an active Euro integration policy and implementing real steps towards joining the European Union. If Armenian producers

will get an access to Ukrainian market, then in long run perspective they will have a stable market in one of the countries of EU, the population of which is about one-third of Russian population (nearly 50 million people), concentrated in a small geographic area.

Export to the Ukraine can be limited first of all because this country itself has very developed agricultural sector and if the Ukrainian farmers realize the advantages of organic farming, Armenian produce will be limited in their penetrations. Some factors, which can work in favor of Armenian producers in the Ukrainian market, can be: the first mover advantage, big Diaspora (about 100.000 people), high image of Armenian fruits and vegetables remaining from Soviet times.

In spite of big export perspectives the first steps should be done to identify the potential consumers of organic products inside Armenia (especially in capital city Yerevan) and at first satisfaction of their needs, which will become a pilot project for the whole agricultural sector. Many researches have been conducted, and numerous forums and conferences were organized in Armenia about the advantages and disadvantages of introduction of organic farming techniques in the country.

One of the researches was a pilot project organized by SHEN NGO aiming at stimulating fruit and vegetable producing farmers to adopt organic production standards. About 25 farmers in different regions of Armenia (Tavush, Sisian, Gegharquniq and Armavir) started practicing organic farming techniques on their plots. Objectives of the research conducted by SHEN NGO also included the market assessment for organically grown produce in Yerevan to define strategies for future development of the sector. A survey was conducted. The sampling plan was developed using Purposive Sampling (Lincoln and Cuba, 1985), aiming at selecting sectors and people from whom the most could be learned. The target area was chosen to the downtown of capital city Yerevan. Interviews were carried out among 107 employees of international organizations, foundations, international programs and projects who were considered high income and high educated people. These people were contacted randomly.

## Data

The primary objective of this paper is, on the base of given data, conduct regression analyses and reveal those factors that can affect and forecast the willingness to pay a price premium for organic produce in comparison with agricultural products produced without organic methods, in capital city Yerevan.

The following factors were taken into account as independent variables (explanatory variables) to forecast the willingness to pay a price premium for organic products:

1. **Gender.** The gender distribution between males and females was considered as satisfactory – 53% to 47% respectively and gender is not expected to be as a decisive factor in willingness to pay a price premium for organically produced agricultural products though some preference is given to females, because they are expected to have more concern about the health of their family and children and therefore will pay more for organic products. The gender distribution of the respondents is presented in Table 1 (Appendix #1).

2. **Age.** It is expected that the analyses will show the increased willingness to pay premiums for organic products among the 25-35 and 35-50 age groups because these groups of people are the highest income earning population in the society and they are more concerned about health. Usually people in these age groups have children of 5–20 years old, who are still living with their parents. So the parents are also concerned with the health of their children and this factor may also increase their willingness to pay high price premiums for organic produce. Most probably population in >50 age group will not show big interest first of all because they are still keeping the knowledge of Soviet era, while the organic farming techniques became widely spread only in last few years. The population below 25 years old are involved in education process, not big income receivers, are still under custody of parents and their interest in organic produce will most probably be the minimal of the whole population.

The age distribution of the respondents is presented in Table 1 (Appendix #1).

3. **Average family monthly income.** (for foreign exchange rates refer to Table 6 in Appendix #1). Organic products are usually more expensive first of all because their production is more labor intensive. This is the reason why the target market for the organic produce is considered to be the population, which is holding the biggest share of income in the society. This level of population is consuming the luxury products, is more concerned with personal health and will, most probably, express higher willingness to pay a higher price premium for organically produced agricultural products. The major determinant of purchasing behavior for families with lower income is usually the price of a product and the factors of food safety are of the secondary importance and it is expected that this level of population will express less readiness to pay a price premium for organic food. Distribution of respondents according to average family monthly income is presented in Table 2 (Appendix #1).

4. **Education.** Expectations are based on the assumption that people with higher education will be more aware about importance of organic food in context of food safety and will be more concerned with their health. So it is assumed that people with higher and MS/PhD education will express bigger willingness to buy organic produce and pay higher premiums for it.

Distribution of respondents according to education is presented Table 3 (Appendix #1).

5. **Whether the respondent tried organic produce.** The factor of trial is expected to have a high impact on the readiness of consumers to pay price premiums for organically produced products. Until recently the information about the organic technologies was not wide spread and organic produce was not available, but nowadays in Armenia many non governmental organizations and the Ministry of Agriculture are implementing many projects directed at spreading information about organic produce and encouraging population to try it. Recently a new organic store was opened in downtown of Yerevan and now the products are available to everyone who wishes. Probably people who did not try organic products in Armenia will not pay high price premiums.

Distribution of respondents according to trial of organic produce is presented in Table 4 (Appendix #1).

As the dependent variable the **willingness of respondents to pay a price premium for organic produce** is chosen. Distribution of respondents according to willingness to pay a price premium is presented Table 5 (Appendix #1). As it can be seen the available information does not have a normal distribution, because the ranges of percentage (willingness to pay a price premium) are not equal. Author suggested here a method to convert the available data into a normal distribution, which is described below. Let  $Z \sim N(1, 0.04)$ , which means that

a random variable  $Z$  is distributed normally with mean 1 and variance 0.04.

Let  $w_p(\bar{p})$  be the average percentage from every range of willingness to pay more.

Multiplying  $Z$  by  $w_p(\bar{p})$ , the given not normally distributed data will be transformed to a normal distribution.

*	$w_p(\bar{p})$	
<10%	5%	$5\% * Z + \varepsilon$ (random error)
10-20%	15%	$15\% * Z + \varepsilon$
20-30%	25%	$25\% * Z + \varepsilon$
30-50%	40%	$40\% * Z + \varepsilon$
50-75%	62.5%	$62.5\% * Z + \varepsilon$
75-100%	87.5%	$87.5\% * Z + \varepsilon$

\* Information in the first column is taken from Table 5 in Appendix #1

### **Limitations:**

The regression analysis conducted by the author is implemented on the base of data from the pilot project and because the sample size defined and provided by the data was small, the analysis cannot be highly representative and be used for policy development. Results of the analysis are aimed to validate the upper mentioned forecasts and indicate the need for future wide-scale data collection and analyses in this field, which will be applied for general policy development.

There is still no a layer of population in Armenia, which is actually consuming the organic products because fruits, vegetables and other products are not differentiated in any supermarket or bazaar according to growing methods (whether it is organic or not) and there is no special labeling. Only recently a separate store opened in downtown of Yerevan, which is specializing only on sales of organic produce. This is the reason why the surveys were conducted not on the base of consumption, but on the base of possible preferences of potential consumers. This factor can also reduce the data representativeness degree.

### **Analysis Results and Discussions**

In this part of the paper the major findings and results are presented.

Refer to Table 1 in Appendix #2.

The first thing that can be seen from the results is that only 18% of variation in the dependent variable is explained by the variations in our independent variables,  $R^2 = 0.18$ . This can be attributed to the fact that there are few important variables missing in our

model, for example profession of potential consumers, price of a product, number of family members.

As the table shows, none of the explanatory variables appear to be statistically significant at 95% confidence level. This is supported by the fact that all the “t” statistics associated with our explanatory variables are not greater than 2 in absolute value.

Below the effects of explanatory variables are presented.

1. **Gender.** Here “males” was chosen as the reference group to evaluate the potential consumer behavior of the other group – “females”. As it is seen from the table, females’ willingness to pay a price premium for organic produce is almost 5% less than males’ willingness. Although in previous assumptions the gender was not considered as a crucial factor, the expectations that females will pay more have not justified. Our findings can be explained by the fact that males are main income earners and income keepers (at least in Armenia) and these factors can be attributed to the results.
2. **Age.** In this case the population <25 is considered as the reference group to evaluate the potential consumer behavior of other groups. Like it was expected, people of average age expressed biggest willingness to pay more. People in 25-35 age category are ready to pay 1.9% more than people in reference group. This is scientifically correct because at this age people already complete their education, start working and earning some income, but it is still low to encourage this age group to pay big price premiums. The situation is different for population in 35-50 age category, who are willing to pay 8.24% higher price premium. These are the biggest income earners in the society; they are mature enough to be concerned with the health of their family and their children. People of age 50+ are willing to pay 5.2% more price premium. This is confirming the previous assumptions that this age group is probably keeping the Soviet era knowledge, many of them are already retired and are not on the top of news about modern organic farming techniques and benefits of organically grown products.
3. **Average family monthly income.** (for foreign exchange rates refer to Table 6 in Appendix #1). Results in this section were somewhat contradictory to the previous assumptions. Here <50.000 AMD income group is chosen as the reference group. The fact that people with average family monthly income 50.000-100.000 are willing to pay 16.97% more price premium is logical and complying with the previous assumption that higher income population is more concerned about health and willing to pay higher price premium for organic produce. The fact that people with 100.000-200.000 and 200.000+ average monthly income are willing to pay only 13% and 14.78% more price premiums is still logical, but contradictory to the first figure – 16.97%. Results show that starting from certain level of income willingness to pay a price premium is decreasing. This can be explained by the fact that Armenia is a transition country and does not still have a stabilized economic system. This means that population with higher income does not always presume and include people with higher educational level or higher understanding of organic food benefits.
4. **Education.** Because there were only four respondents having secondary education, it was statistically more correct to choose respondents with higher education as the reference group. According to this criterion, findings are very

- logical and scientifically correct, verifying the previous expectations that people with higher education will express willingness to pay a higher price premium. As the table shows people with only secondary education are willing to pay 10.4% less price premium in comparison with the reference group. Respondents who graduated from a technical college and respondents with not complete higher education are willing to pay 15.61% and 3.65% respectively less prices premiums. Finally people with the highest educational level, who have MS or PhD degrees, are ready to pay 1.49% more price premiums. The tendency of higher educated people to pay higher premiums can be explained with their higher awareness and understanding of organic food consumption importance.
5. **Whether the respondent tried organic produce.** Reference group here are people who did not tried organic food. In contrast to expectations there is no a significant behavior difference according to the fact whether a person ever tried organic food or not. This can be explained by the fact that there is no clear labeling or differentiation of organically grown products in grocery stores and consumers does not always clearly realize what kind of products they are buying.

Refer to Table 2 in Appendix #2.

Because the collected data was left-censored it would be statistically correct to use the “Tobit Model” for consumer behavior evaluations. In our case we are using left-censoring because of being restricted by 0 value, which means that consumers are willing to pay not more for organic produce, but not less either. The results according to Tobit estimates are presented in Table 2 and are not significantly different from the estimations in Table 1, which means that results and discussions above are satisfactory, in spite of censoring factor.

## **Conclusions**

The results of the research can be evaluated as satisfactory, because the main findings are scientifically correct. Although we get scientifically correct results, there is need for further development to make the results also statistically significant.

Main objective of this research was met, which was the implementation of regression analysis and forecast of the consumer willingness to pay a price premium for organically grown agricultural products on the base of different variables. This research was only a part of a pilot project and cannot be used for policy development, but it confirmed the need to conduct a large scale research project in Armenia.

Transition process and the first steps towards market economy are accompanied with many difficulties for Armenian agriculture. Now it is important to assess different opportunities of future development, explore competitive advantages and define those areas where the agricultural sector can concentrate in order to find its niche in regional economic movements in long run perspective. One of the solutions is organic farming.

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## APPENDIX #1

**Table 1: Distribution of the sample according to age and sex variables**

Gender	Age of the respondent				Total
	< 25 years old	25-35 years old	35-50 years old	>50 years old	
Male	9	14	27	7	<b>57</b>
Female	15	12	17	6	<b>50</b>
<b>Total</b>	<b>24</b>	<b>26</b>	<b>44</b>	<b>13</b>	<b>107</b>

Source: Urutyanyan 2006

**Table 2: Distribution of the sample surveyed according to average family monthly income**

Average family monthly income (AMD)	Frequency	Percent
< 50,000	3	2.8
51,000-100,000	14	13.1
101,000-200,000	37	34.6
> 201,000	53	49.5
<b>Total</b>	<b>107</b>	<b>100.0</b>

Source: Urutyanyan 2006

**Table 3: Distribution of the sample surveyed according to education**

Education	Frequency	Percent
Secondary	4	3.7
Technical college	4	3.7
Non complete higher	14	13.6
Higher education	61	56.8
MS/PhD	24	22.2
<b>Total</b>	<b>107</b>	<b>100.0</b>

Source: Urutyanyan 2006

**Table 4: Distribution of the sample surveyed according to trial of organic produce in Armenia**

	Frequency	Percent
<b>NO</b>	59	55.5
<b>YES</b>	48	44.5
<b>Total</b>	<b>107</b>	<b>100.0</b>

Source: Urutyanyan 2006

**Table 5: Distribution of the sample surveyed according to willingness to pay a price premium for organic produce.**

		Frequency	Percent
	<b>NO</b>	13	12.1
<b>YES</b>	<10%	11	10.3
<b>YES</b>	10-20%	48	44.9
<b>YES</b>	20-30%	16	15.0
<b>YES</b>	30-50%	17	15.9
<b>YES</b>	50-75%	1	0.9
<b>YES</b>	75-100%	1	0.9
	<b>Total</b>	107	100.0

Source: Urutyanyan 2006

**Table 6: Foreign Exchange Rates (as of 09.01.07)**

ISO code	1 USD =	1 UAH =
AMD	365.11	72.29

Source: Central Bank of Armenia

## APPENDIX #2

**Table 1\*: Regression results**

Number of obs	=	107
R-squared	=	0.1806
Adj R-squared	=	0.036
Root MSE	=	14.889

will_to_pay_x	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]	
female	-4.98907	3.461548	-1.44	0.154	-11.8965	1.918344
age 25-35	1.902556	5.132314	0.37	0.712	-8.33882	12.14393
age 35-50	8.248291	4.684965	1.76	0.083	-1.10041	17.59699
age 50-more	5.201269	6.576307	0.79	0.432	-7.92155	18.32409
income 50-100	16.97993	12.97887	1.31	0.195	-8.91902	42.87887
income 100-200	13.01693	12.25714	1.06	0.292	-11.4418	37.47566
income 200-more	14.78998	12.44319	1.19	0.239	-10.04	39.61997
secondary education	-10.4011	9.782579	-1.06	0.291	-29.9219	9.119772
tech. college	-15.61	9.653356	-1.62	0.11	-34.8729	3.653006
not complete high	-3.6538	5.55529	-0.66	0.513	-14.7392	7.431614
PhD/ms	1.499814	4.313826	0.35	0.729	-7.10829	10.10792
tred organic	-0.03883	3.612952	-0.01	0.991	-7.24836	7.170702
_cons	3.742765	12.81388	0.29	0.771	-21.8269	29.31246

Source: Deduced by author

\* Miscellaneous changes were made on the table after the original deduction to make it more user-friendly.

**Table 2\*: Regression results (TOBIT model)**

<b>Tobit estimates</b>		Number of obs =	107
		LR chi2 =	15.73
		Prob > chi2 =	0.204
Log likelihood =	-304.16643	Pseudo R2 =	0.0252

will_to_pay_x	Coef.	Std. Err.	t	P>t	[95% Interval]	
female	-5.621347	3.576365	-1.57	0.121	-12.756	1.513306
age 25-35	2.954598	5.276005	0.56	0.577	-7.57074	13.47994
age 35-50	9.073477	4.835179	1.88	0.065	-0.57244	18.7194
age 50-more	5.185341	6.79654	0.76	0.448	-8.37339	18.74407
income 50-100	21.32228	14.94332	1.43	0.158	-8.48884	51.13339
income 100-200	18.51846	14.2282	1.3	0.197	-9.86601	46.90294
income 200-more	19.70506	14.40476	1.37	0.176	-9.03165	48.44176
secondary education	-11.44826	10.78352	-1.06	0.292	-32.9608	10.06428
tech. college	-18.135	10.20349	-1.78	0.08	-38.4904	2.220405
not complete high	-3.06698	5.742028	-0.53	0.595	-14.522	8.388053
PhD/ms	1.460003	4.434427	0.33	0.743	-7.38644	10.30644
tred organic	-0.1765106	3.722968	-0.05	0.962	-7.60363	7.250608
_cons	-2.416513	14.71777	-0.16	0.87	-31.7777	26.94464

Source: Deduced by author

\* Miscellaneous changes were made on the table after the original deduction to make it more user-friendly.

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