

Ivana Ilić<sup>1</sup>  
University of Niš,  
Faculty of Economics Niš

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## ANALYSIS OF CONSUMPTION OF ORGANIC PRODUCTS IN NIŠAVA DISTRICT<sup>2</sup>

### Abstract

*Current living conditions have imposed the imperative need for transition to organic way of production due to enormous environmental pollution and excessive exploration of natural resources by traditional way of production. Organic production combine tradition, innovations and science in order to improve environment, develop fair relationships and good life quality for everyone involved. The aim of this work was to analyze the consumption of organic products in Nis district by using multivariate analyze method. Technics of multivariate analyze determine the types of organic products represented in consumption of Nis district population, way of supplying with this products, influence of media and world economic crisis to their consumption. The results obtained in this study indicate the existence of significant growth and development of organic production and consumption of organic products.*

**Key words:** organic production, organic ariculture, consumption, multivariate analysis

**JEL classification:** Q11, C38

## АНАЛИЗА ПОТРОШЊЕ ОРГАНСКИХ ПРОИЗВОДА У НИШАВСКОМ ОКРУГУ

### Апстракт

*Савремени услови живота императивно су наметнули прелазак на органски начин производње због све већег загађења животне средине и претеране искоришћености природних ресурса традиционалним начином производње. Органска производња комбинује традицију, иновације и науку како би побољшала окружење, развила фер односе и добар квалитет живота за све укључене. Циљ овог рада је био да се анализира потрошња органских производа у Нишавском округу применом метода мултиваријационе анализе. Техникама мултиваријационе анализе одређене су врсте органских производа заступљене у потрошњи становника Нишавског округа, начин снабдевања овим производима, утицај медија и светске економске кризе на њихову потрошњу.*

<sup>1</sup> ivanica1404@yahoo.com

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*Резултати до којих се дошло путем истраживања указују на постојање тренда раста развоја органске производње и повећања потрошње органских производа.*

**Кључне речи:** *organski proizvodi, organska poljoprivreda, potrošnja, multivarijaciona analiza*

## Introduction

Agricultural production in the world has passed a long way of development. Organic farming is a very old method, used by people in ancient times for their life in the jungles. It was created in response to the increasing environmental degradation and increasing appreciation of health of the population, through the idea of growing plants with reduced use of chemicals, controlled use of fertilizers, use of crop rotation, deep plowing, and the like. Its main task is to provide sufficient quantities of food and raw materials for current human population.

In order to emphasize the importance of a healthy lifestyle, especially the importance of healthy food and organic production, the survey was conducted on the territory of Nišava district. The research was conducted on a random sample of 98 respondents of different gender, age, and educational structure, using the questionnaire on the consumption of organic products in Nišava district. All data was included in a database, and its analysis was performed with the help of SPSS program.

The aim of the work is to analyze the consumption of organic products in Nišava district based on multivariate analysis methods. The work will aim at determining interdependence between the awareness of Nišava district inhabitants of organic products and their use in everyday life. In addition, the above-mentioned analysis methods will be used to determine the most consumed organic products among the population in Nišava district, the ability to purchase these products, as well as the influence of the media, the world economic crisis, and the social position of respondents on their use. Also, using  $\chi^2$  test will be testing the significance of differences between the selected categorical variables.

## Theoretical background of organic method of production within the agricultural sector

In modern life conditions, the concept of organic production is equated with the concept of organic farming. Certainly, the two terms are not synonymous, and it is necessary to make a distinction between them and fully delineate them. In this regard, it should be noted that organic production is broader, i.e. more comprehensive concept than organic farming. Organic farming is a term that means the production of food in a safe manner, while organic production relates to the production of all products in accordance with the prescribed legal measures and the preservation of the natural environment.

Organic production is a production system that, in accordance with the law and regulations, responds to site-specific conditions by integrating cultural, biological, and

mechanical practices that foster cycling of resources, promote ecological balance, and conserve biodiversity (USDA – NOP National Organic Program).

Organic production is not only avoidance of conventional chemical inputs, nor is it a replacement of natural by synthetic inputs. The primary concern of organic production is the health system that interacts with the practice of managing this production method. Organic producers implement a wide range of strategies for the development and maintenance of biological diversity and renewal of soil fertility. In fact, organic production does not exclude chemical treatment, but, instead of harmful agents, relies on the use of agents after which it is possible to use products without consequences for human health (Angelovski et al., 2012).

Organic production is fully controlled production, with production conditions being defined by the IFOAM regulations, based on which rules must be adapted to the specific conditions of each country in which this type of production is carried out. Basic guidelines for organic production are the use of materials and practices that enhance the ecological balance of natural systems and that integrate the parts of the farming system into an ecological whole (Mirecki et al., 2011).

Organic farming is a production system that maintains the health of land, ecosystems, and people. It relies on ecological processes, biodiversity, and cycles adapted to local conditions, rather than use of inputs with adverse effects. Organic farming combines tradition, innovation, and science to use a common environment, and promotes fair relationships and a good quality of life for all involved (IFOAM – International Federation of Organic Agriculture Movements). As defined by FAO (United Nations Food and Agriculture Organization) and the World Health Organization, organic farming is a production management system that promotes the recovery of ecosystems, including biodiversity and biological cycles, and emphasizes the use of methods that largely exclude the use of off-farm inputs.

Based on the above definitions of organic farming, it can be concluded that the basic elements of each of them are as follows: organic agriculture is a production system; it contributes to the conservation of biodiversity, land, water; it avoids the use of hazardous substances in the production process; it improves human health and influences the maintenance of ecological balance.

For more successful organic farming, organic farmers use thousand-year-old techniques, such as crop rotation, composting animal manure and green manure crops, which are economically viable in today's world. Besides applying traditional techniques used in agriculture, modern scientific knowledge in this field is also used, which affects the creation of a healthy balance between nature and agriculture. Using these cultivation techniques will help to conserve the natural environment, achieve good yields, and preserve health and safety of the people who live and work in that area (Vittersø & Tangeland, 2015)

Organic farming is a solution to all the negative influences of conventional ways of food production and over-exploitation of resources, as well as of disturbed balance in ecosystems. Accordingly, organic farming is designed to protect all existing resources, is not harmful to the environment, is technically enforceable, socially acceptable, and economically viable (Ghimire, 2002).

## The presence of organic farming in the world and Serbia

The rapid development of organic production has been evident worldwide for years. Institute of Organic Agriculture (FiBL) is engaged in the monitoring of the growth and existence of organic farming in the world, with its latest report issued in 2015 in cooperation with IFOAM.

The report covers 170 countries, where 2 million farmers deal with organic farming on more than 43.1 million hectares of agricultural land. Therefore, it is a relatively small area, with only 1%, in relation to the total agricultural land in the world (FiBL, 2015). At the same time, the growth rates of areas and number of organic producers are significant. From the period when FiBL started recording statistics on the development of organic farming (1999), organic farmland areas tripled.

Regions with the largest areas of organic agricultural land are Oceania (17.3 million hectares), followed by Europe (11.5 million hectares), and Latin America (6.6 million hectares). Asia, Africa, and North America have a much smaller share of organic agricultural land. Oceania has 40% of global organic farmland. Europe is characterized by a continuous growth of organic areas in recent years. In the last couple of years, areas under this production system have significantly increased in Oceania, whereas Europe and Latin America recorded decrease (FiBL, 2015).

At this point, 1% of agricultural land is organic. The largest share of these areas is found in Oceania (4.1%), followed by Europe (2.4%), while in other regions the share is less than 1%. The European Union records a 5.7% share of organic land in total agricultural land. Of course, there are countries that have a much larger share of organic land: Falkland Islands (36.3%), Liechtenstein (31%), Austria (19.5%). There are only ten countries in the world with more than 10% of organic farmland area. Countries with the largest organic farmland areas are Australia, Argentina, and the United States of America (FiBL, 2015).

The latest FiBL/IFOAM report of 2015 has registered 2 million organic producers in 2013, 200,000 more than in 2011. Asia records the highest percentage share of these producers with as much as 36%, followed by Africa with 29%, Latin America with 16%, Europe with 17%, while Oceania and North America had only 1%. Regardless of the fact that Oceania has the highest percentage of organic farmland, India, Uganda, and Mexico have the largest number of organic producers. Almost 80% of producers come from developing countries and emerging markets.

Market research company, Organic Monitor, estimated the global organic production market in 2013 to 72 billion dollars or 66 billion euros. The leading market is the USA with 24.3 billion euros, followed by Europe, where Germany is the leading country with 7.6 billion euros (FiBL, 2015). The greatest demand for organic food is concentrated in the USA and Europe, which reflects an imbalance between production and consumption. Countries with the highest per capita consumption of organic product group are Switzerland and Denmark.

Over the years, organic farmland areas in Serbia have increased with light intensity. Organic production in 2014 covered the area of 9430 hectares, which is approximately 0.28% of the total utilized agricultural area (Ministry of Agriculture and Environmental Protection, 2015). In 2014, organic farmland area increased by approximately 12.7% compared to the previous year, i.e. about one thousand hectares.

Organic field crops are the most common, amounting to 72% and including meadows and pastures, followed by fruit growing with 25%, while vegetables are grown on 3% of the total organic farmland (Kalentić, 2014). Livestock organic production faces a number of problems, such as the lack of certified nutrients, specific growing conditions, and low profitability of this type of production, which is why it is in initial development stages. After years of stagnation in the development, organic livestock is starting to record intense growth. This fact is confirmed by the trend of increasing number of small animals, number of cattle, and number of poultry (Kalentić et al., 2014).

## **Prospects of organic agriculture in the world and Serbia**

In recent years, production and processing of organic products is becoming more popular and economically important. The measures and procedures used in conventional production are aimed at productivity, without paying attention to the impact on the environment and sustainable development. Given that these procedures cast doubts on the future level of production by destroying the conditions that contribute to long-term maintenance of fertility, increasing interest in organic production is understandable. Starting organic production is certainly not cheap investment, but, in the long term, it can be very profitable. The final product of organic production is by 30 to 50 percent more expensive than conventional products (FAO, 2011).

Perceiving the presence of this type of production, it is recognized that the opportunities are not sufficiently utilized. More intense development of organic production is becoming a trend, as existing demands for organic products are not met. Due to the imbalance between the supply and demand for these products, both in the world and in our country, attempts should be made to intensify organic production and use this chance for better economic development (Shehrawat et al., 2015).

Organic production globally is recording an upward trend. In developed countries, such as the United States, the current offer of organic products is not enough to satisfy the demand that exists in this part of the world. Serbia should join the world trends and take its place among the distinctive organic producers. Turning to this economic activity would bring Serbia stable and constant development (FiBL, 2015).

The primary and important role of organic production lies in the development of rural areas, as it enables the diversification of activities, attracts financial resources, and stands for an integral part of the agriculture and rural development strategy (National Action Plan for Organic Production Development in Serbia). Aspects that reflect the importance of organic production are the protection of natural resources from pollution due to non-use of chemicals, conservation of biodiversity through the protection and long-term maintenance and increasing of soil fertility (Bengtsson et al., 2005). According to economic indicators, organic production is becoming increasingly important nowadays. Trade in organic products in the last four years has increased substantially, while prices of organic products remain high, as a special motivation for producers.

The importance of organic farming certainly lies in sustainable development, reflected in the long-term well-being of society through the provision of sufficiently stable and safe production of food and other products, while preserving the quality of the environment and natural resources on which production is based. Special emphasis

is placed on producing high-quality products. It can be concluded that this system of production contributes to economically viable, environmentally sound, and socially acceptable production sector (Subić, 2010).

## Research results and discussion

In order to emphasize the importance of a healthy lifestyle, especially the importance of healthy food and organic production, the survey was conducted on the territory of Nišava district. Nišava district is located in the southeastern part of the Republic of Serbia, and is made of eleven municipalities. This district numbers about 373,404 inhabitants according to the last census conducted in 2011, and is the second largest district in Serbia (SORS, 2013). The research was conducted on a random sample of 98 respondents of different gender, age, and educational structure, using the questionnaire on the consumption of organic products in Nišava district. All data was included in a database, and its analysis was performed with the help of SPSS program.

The first part of the questionnaire focused on determining the gender, age, status, education, and monthly income of respondents. The research included 98 (100%) respondents, of which 95 gave the answer to this question, there being 55 (56.1%) women and 40 (40.8%) men. Three respondents did not declare themselves, which made 3.1% of total number of respondents.

By age, the youngest respondent was 19 years old, while the oldest was 81 years old. The average age was 41.36 years, and standard deviation, as a measure of variability in respect of this value, was 16.791. All respondents were classified into several groups according to age. Most respondents were in the age group of up to 25 years of age, 31 of them, or 32.6%, followed by group of up to 55 years with 19 respondents, or 20%. The least number of respondents was in the group of respondents older than 75, only three of them, or 3.2%.

Status of the respondents was the characteristic according to which the category of permanent employees numbered 41 respondents (44.6%), while the least number, only one respondent, was found in the category of temporarily employed. The number of the unemployed respondents was half as small as the number of permanently employed, and included 20 respondents, or 21.7%. The following was the category of students with 17 (18.5%) respondents, while the remainder included pensioners, i.e. 14.1% of respondents. According to educational background, respondents were divided into three groups. 58 (61.7%) respondents had university degree, 24 (25.5%) of them had secondary education, while 12 (12.8%) respondents had college degree.

When asked “Do you have your own source of income?”, 64 respondents, or 65.3% of the total of 98 (100%), gave a positive answer. Three respondents did not declare themselves, and 31 (31.6%) respondents did not have their own source of income. The next question concerned the monthly income per household, and respondents were offered four categories. 26 respondents, or 27.4% of the total number, had up to 40,000 RSD of monthly income per household. 31 (32.6%) respondents belonged to the category of 40,001 to 70,000 RSD, followed by 70,001 to 100,000 RSD of monthly income per household recorded with respect to 22 (23.2%) respondents. Income of over 100,000 RSD per household per month was the case with 16 respondents, or 16.8%.

The second part of the questionnaire contained questions for obtaining relevant information essential to the determination of the consumption of organic products on the territory of Nišava district. In order to be able to investigate anything about organic products, it was necessary to determine whether the respondents knew what organic products are and how they define them. Out of a total of 98 (100%) respondents, over 93 (94.9%) respondents heard of organic products, while only two respondents never heard of the existence of organic products.

The largest number of respondents (38%) defined organic products as those that contribute to human health and the preservation of the human environment. About 30% of those who answered this question on organic products said that these were products produced under strictly controlled and legally regulated production methods. Approximately the same percentage of respondents defined them as products with no genetically modified organisms. Only 3% said that these were high-tech quality products.

The part which examined the awareness of organic products was followed by a set of questions regarding the purchase of organic products, the frequency of purchase, product type, and mode of supply. Of the total number of respondents, 65.3% bought organic products, while 26.5% of them did not.

According to the frequency of purchase, the respondents could opt for one of the four categories. The first category, which referred to purchasing several times a week, included 18 respondents, or 26.7%. The most respondents were found in the category referring to purchasing once a week, i.e. 23 (34.3%) out of 64 who responded to this question. It was followed by the category referring to making purchase once a month with 23.9%, and purchasing several times a year, with 14.9% of respondents who gave this answer. Out of 98 respondents, 34 of them did not answer this question.

One of the starting hypotheses in this study was that older population was less informed about organic products and organic production. In order to test this hypothesis, an analysis that focused on the age of respondents and their familiarity with organic products was conducted. The results of the analysis showed that all respondents older than 65 were familiar with organic products, while two respondents under the age of 25 responded that they had not heard of organic products. In terms of percentage, 97.9% of the total number of respondents, regardless of the age category they belonged to, heard about organic products. Furthermore,  $\chi^2$  test showed that there was no link between categorical variables, the age structure of respondents and awareness of organic products. Out of the total number of respondents who answered this question, 95 of them, most of the respondents found themselves in a group of up to 25 of age, i.e. 32%.

What followed was the analysis relating to the monthly income per household and frequency of purchase of organic products. The highest frequency of purchase occurring several times a week was recorded among the respondents whose monthly income per household was up to 40,000 dinars. Out of 21 respondents belonging to the category of respondents with monthly income per household of up to 40,000 RSD, only two of them, i.e. 9.5%, bought organic products several times a year. The next category with a monthly income per household of up to 70,000 RSD was characterized by the frequency of purchase of organic products once a week. This fact came from the result based on which as many as 10 out of 21 respondents replied that they bought organic products once a week. 35.8% of respondents with monthly income of up to 100,000 RSD usually bought organic products once a month. The least number of respondents was found in the

category with a monthly income of over 100,000 dinars, where the percentage share of frequency of purchase was the same as regards the purchase occurring several times a week and once a week. This question was answered by 67 respondents, out of which 34.3% bought organic products once a week. It can be concluded based on the results that the amount of monthly income does not affect the purchase of organic products.

Based on the answers of 63% of respondents, the type of product with the largest share in the purchase of organic products was food. Organic cosmetics and clothes were bought by significantly smaller number of respondents, which may be due to the absence of these products on our market as well as the high price of the purchase in other countries. As regards food, fruit and vegetables produced organically are purchased the most, followed by milk and dairy products. Out of 63 respondents, 35% gave preference to fruit and vegetables as the most important type of organic food. This fact confirms that, regardless of the age structure and average monthly income per household, residents of Nišava district try to lead a healthy life. A large share of fruit and vegetables, as the type of commonly purchased food, was the result of organic production of this food in Nišava district. Respondents most often purchase organic products in supermarkets, as evidenced by 26% of respondents who gave this response. The second mode of supply is purchasing directly from the producer, followed by purchase in specialized stores and green markets.

The question referring to the essential characteristics of organic products contained five categories, which the respondents were supposed to rank with the scores from 1 to 5, where score 5 indicated the most important characteristic. Seventy respondents performed the ranking, and rated quality as the most important, followed by taste and color of the product. Shape and design, as the characteristics of organic products, were the least important for the respondents. For a more detailed analysis of this question, factor analysis was applied, based on the correlation matrix determining correlation between these characteristics (variables).

*Table 1. Correlation matrix of the characteristics of organic products*

	Taste and color	Shape/desing	Quality	Price	Impact on human health and environmental protection
Taste and color	1.000	-.061	-.270	-.151	-.329
Shape/desing	-.061	1.000	-.200	-.109	-.382
Quality	-.270	-.200	1.000	-.365	-.129
Price	-.151	-.109	-.365	1.000	-.271
Impact on human health and environmental protection	-.329	-.382	-.129	-.271	1.000

*Source: Autor presentation*

Correlation matrix points to the conclusion that the greatest degree of correlation exists between the same variables, i.e. taste and color and taste and color, which applies to each of the product characteristics. Taste and color, as a characteristic, to a somewhat lesser degree correlates with the impact on human health and environmental protection, with even lower degree of correlation with quality and price. The lowest degree of correlation exists between taste and color and shape and design. To determine the number of factors, Eigenvalue criterion was applied.



Based on the results shown in Table 2, it can be seen that three components have eigenvalue greater than 1, which means that the rated characteristics of organic products can be classified into three factors. These factors explain 78.926% of the total variance in the answers. The first factor is constituted by characteristics of shape and design and the impact on human health and environmental protection, the second factor consists of quality and price, and the third refers to taste and color.

Table 2. The results the factor analysis

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
<b>1</b>	<b>1.576</b>	31.527	31.527
<b>2</b>	<b>1.268</b>	25.368	56.895
<b>3</b>	<b>1.102</b>	22.031	<b>78.926</b>
4	.972	19.434	98.361
5	.082	1.639	100.000

Source: Autor presentation

Factor loadings of the rated characteristics of organic products are shown in Table 3. The squared values of factor loadings represent the share of variability of the rated characteristics explained with the given factor.

Table 3. Factor load

Characteristics	Factor		
	1	2	3
Taste and color	0.497	0.213	<b>-0.813</b>
Shape/ desing	<b>0.536</b>	0.404	0.385
Quality	-0.545	<b>0.627</b>	0.286
Price	0.458	<b>-0.680</b>	0.395
Impact on human health and environmental protection	<b>-0.732</b>	-0.452	-0.236

Source: Autor presentation

The last part of the questionnaire was aimed at examining the attitudes of consumers on the importance of organic products for human health, prices, consumer trust in the information broadcast by the media, and the impact of the global economic crisis. Almost 84% of respondents believed that organic products were healthier for use than conventional products, and gave them preference in consumption. Those who gave negative answer to this question justified their attitude by misrepresentation of information on the usefulness of organic products in the media. To the question “Is the price of organic products in your view high?” 69 respondents gave an affirmative answer. However, 25% of the total number of respondents answered that the price was not high, because it was justified by the high quality of products. Although the price of organic products is considered high by a large number of respondents, 63% of the respondents would continue to purchase these products regardless of the price increase trends in the future. 60% of the respondents who participated in the survey had trust in information about organic products which is published in the media. The remaining respondents did not trust the information presented in the media because they considered it a marketing trick for increasing sales of organic products.

In order to raise consumer trust in organic products, certain measures were proposed, which respondents ranked according to importance. The respondents attached greatest significance to the measure relating to the improvement of the regulatory norms by the government, followed by the scientific evidence on the packaging, and sustainable investment by brand. Promoting products through celebrity endorsement is the least important for the respondents. This question offered the possibility to the respondents themselves to write the measure which they considered important for raising trust in organic products. The measures entered by respondents were: recommendations of friends, quality credibility, and increasing the awareness of producers in terms of optimal use of stimuli allowed in organic production.

For a more detailed analysis, cluster analysis was applied, which classifies a larger number of variables into groups – clusters. These few ranking measures were grouped into three clusters. The first cluster consisted of respondents that attached the greatest importance to sustainable investment by brand. The second cluster was made by respondents that gave importance to the improvement in regulatory norms by the Government and the scientific evidence on the packaging. The third cluster included respondents that highly valued the promotion of products through celebrity endorsement and some other measures (Table 4).

*Table 4: Number of respondents per cluster*

Cluster	Frequency
1	29
2	48
3	17
Total	94
Without answer	4
Total	98

*Source: Autor presentation*

To determine the age structure of the respondents in the clusters, another analysis was performed, which showed that the largest number of respondents of up to 25 years of age belonged to the second cluster, while older respondents with over 55 years of age were evenly distributed in clusters. Furthermore, it was noted that there was no correlation between the age and belonging to a cluster, as belonging to a cluster was determined only on the basis of importance of these measures.

The last question in the questionnaire concerned the impact of the global economic crisis on the consumption of organic products. 93 respondents responded to this question, representing 95% of the total number of those involved in the survey. About 70% of respondents believed that the consumption of organic products in the period of economic crisis decreased. 23% of respondents claimed that consumption remained the same, while only 2% said that consumption increased during the crisis.

## Conclusion

According to the set goal and research on the consumption of organic products in Nišava district, application of multivariate analysis techniques produced certain conclusions. Processing the collected data through multiple correlation analysis pointed to the conclusion

that there is no correlation between the age of respondents and their awareness of organic products. Moreover, older population has more information about organic products as they seek to take care of their health by consuming healthy food.

Furthermore, it was found that the monthly income per household is not a limiting factor for the inhabitants of Nišava district when buying organic products. Type of organic products that is commonly purchased is food, with a large share of fruit and vegetables. The purchase of organic products is mainly carried out in supermarkets, and the characteristic of organic products that is highly valued by respondents is quality. A large number of respondents believe in the fact that organic products are healthier. The price of organic products for residents of Nišava district is high, but they will in most cases continue buying these products despite the upward price trend over time.

Organic product consumer trust in the information published in the media exists, and measures that are, in the opinion of respondents, best to raise trust in organic products are improvement of the regulatory norms by the Government and the scientific evidence on the packaging. The global economic crisis has a strong effect on reducing the consumption of organic products according to the respondents' answers. The consequence of the reduction is lower consumer purchasing power due to reduced monthly income per household given the deteriorated economic situation in the country.

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