

## DEMOGRAPHIC CHANGES OF FERTILITY AND LIFE EXPECTANCY IMPACT ON FOOD CONSUMPTION TENDENCIES

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### Abstract

Organic food means food produced according to international standards, using technology that completely fit the regulations for the protection of nature i.e. without using or limited use of artificial fertilizers. These organic crops grow on healthy - uncontaminated land or land previously cleaned of all toxins. Because of the positive impact of this kind of production on individuals and society in general, market of organic products seen continuous growth. Confirmation for the positive contribution of organic production is continuous increase of life expectancy of the population. This is logical because organically produced food improves the health of the population, while the organic method of production means a cleaner environment, which consequently leads to of their life increase.

For the purpose of this paper, the data has been taken from the Ministry of Agriculture, Forestry and Water Economy of Macedonia, Organic Europe, European section of the Organic World website, Research Institute for Organic Agriculture (FiBL) and the Agricultural Market Information Company (AMI). In this paper are put out some theoretical aspect about the consumers' preference for organic production. Also, organic production dynamics (land under organic production, organic producers and organic market), birth rate and life expectancy are shown in tables and figures. Based on this data, we performed trends analysis.

The data show that the area under organic production in Macedonia has increased over 130 times in last ten years, from 192 hectares in 2004 to 26.431 hectares in 2012. In the European Union, the area was duplicated, from 6.353.105 hectares in 2004 to 11.151.991 hectares in 2012. The life expectancy in the European Union, as well in Macedonia is increasing. In the European Union, the average life was 73 years in 1980 and reached 80

in 2012. In Macedonia, it was 67 years in 1980 and 75 years in 2012. The birth rate in the European Union was 13.9 or almost 14 live birth per 1.000 inhabitants in 1980 and 10.4 in 2012. In Macedonia the birth rate was 21.6 in 1980 and 10.9 in 2012, which means double reduction. Predictions for the future are showing increase of the area under organic production and the life expectancy, on one hand, but also decreasing in the birth rate, on the other hand.

The preference of organic production means cleaner environment, healthier life and better place for living, which among other things, contributes to longer life expectancy. The trend of increased life expectancy follows the trend of increased organic production (land under organic production, organic producers, and organic market). This means that the consumers are more and more preferring organic food. A growing majority of consumers in Macedonia know what organic agriculture is and know the value of organic food, but in this area there is much more that can be done, like: raising the consumers' awareness through appropriate campaigns, promotions and other informational tools, more organized export of organic products, and promotion of Macedonian organic food in international trade fairs and similar events.

**Key words:** Organic production, Life expectancy, Birth rate, Correlative analysis, Macedonia, European Union.

### 1. Introduction

Demographic changes, particularly manifested in the Republic Macedonia and its environment are expressed by the population birth rate decreasing and life expectancy increasing. Although life expectancy

leads to an increase in the elderly population with retained feelings of the past youthful life, however, many entities do not pay enough attention to the characteristics of these people. In other words, the fact that elderly people maintain their youthful lifestyle and behavior is often forget. Due to greater physical activity and a better standard of living than the previous generations, today's older people are able to live their lives in full swing.

Against this trend, the more evident trend is the aging of children, because of the greater availability of technology and media, and therefore following programs inappropriate for their age. Here, as a special group teenage world is included, which on the one hand is constantly looking for new youthful world, and on the other hand, it has increased feeling of insecurity and need for belonging.

Taking into account these facts, in order to successfully formulate a strategy for consumer propensity on food, special attention should be paid to the analysis of the data on births and life expectancy of people who are the main consumers of food.

## 2. Development trends of natality and the birth rate as a useful information for formulating consumption strategy of food in a longer period

According to statistics, the development situation of natality in the Republic of Macedonia and in many countries in the near and distant neighborhood, in the last thirty years show a downward tendency. This is shown in Table 1 and Figure 1.

Table review shows that the number of live births in the Republic of Macedonia, year by year is declining, thereby the birth rate is decreasing, or the number of live births per 1000 inhabitants is reducing.

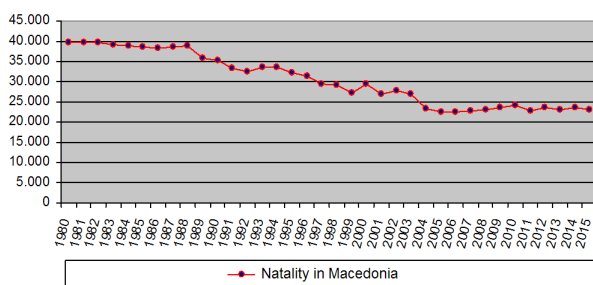


Figure 1. Trends of natality in Macedonia

Declines in natality in the Republic of Macedonia are obvious. That is influenced by numerous factors, which can be divided into three groups: biological, social-economic, and psychological. The action of these factors may be direct and indirect, i.e. long-term and short-term, but with a reflection on further developing trend in natality. This is shown by the following in Table 2:

Table 1. Trends of natality of the population in Macedonia [1]

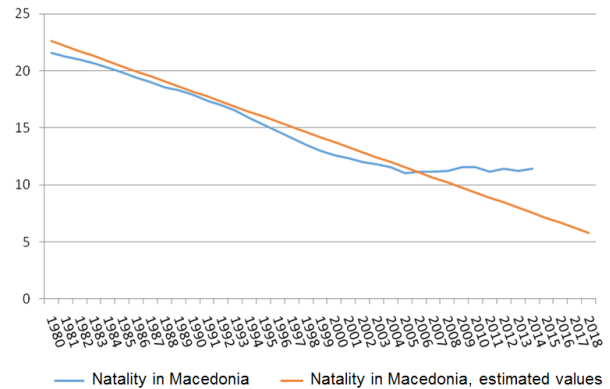
Year	Live births in Macedonia	Base indices. Base 1980 1980 = 100
1980	39,784	100%
1981	39,488	99%
1982	39,789	100%
1983	39,210	99%
1984	38,861	98%
1985	38,722	97%
1986	38,234	96%
1987	38,572	97%
1988	37,879	95%
1989	35,927	90%
1990	35,401	89%
1991	34,830	88%
1992	33,238	84%
1993	32,374	81%
1994	33,487	84%
1995	32,154	81%
1996	31,403	79%
1997	29,478	74%
1998	29,244	74%
1999	27,309	69%
2000	29,308	74%
2001	27,010	68%
2002	27,761	70%
2003	27,011	68%
2004	23,361	59%
2005	22,482	57%
2006	22,585	57%
2007	22,688	57%
2008	22,945	58%
2009	23,684	60%
2010	24,296	61%
2011	22,770	57%
2012	23,568	59%
2013	23,158	58%
2014	23,596	59%
2015	23,075	58%

**Table 2. Movement in the birth rate of the population in the Republic of Macedonia with a regression line of linear and parabolic trend**

Year	Birth rate (No of live births/ 1,000 inhabitants)	Birth rate estimated values (Linear trend)	Birth rate estimated values (Parabolic trend)
1980	21,6	22,6	22,7
1981	21,3	22,2	22,0
1982	21	21,7	21,4
1983	20,7	21,3	20,8
1984	20,3	20,8	20,2
1985	19,9	20,4	19,7
1986	19,4	20,0	19,1
1987	19	19,5	18,6
1988	18,6	19,1	18,1
1989	18,3	18,6	17,6
1990	17,9	18,2	17,1
1991	17,4	17,7	16,6
1992	17	17,3	16,2
1993	16,5	16,9	15,8
1994	15,9	16,4	15,4
1995	15,3	16,0	15,0
1996	14,7	15,5	14,6
1997	14,1	15,1	14,2
1998	13,5	14,6	13,9
1999	13	14,2	13,5
2000	12,6	13,8	13,2
2001	12,3	13,3	12,9
2002	12	12,9	12,7
2003	11,8	12,4	12,4
2004	11,5	12,0	12,2
2005	11	11,5	11,9
2006	11,1	11,1	11,7
2007	11,1	10,7	11,5
2008	11,2	10,2	11,4
2009	11,5	9,8	11,2
2010	11,5	9,3	11,1
2011	11,1	8,9	11,0
2012	11,4	8,4	10,8
2013	11,2	8,0	10,8
2014	11,4	7,6	10,7
2015	11,3	7,1	10,7
2016		10,6	10,6
2017		10,6	10,6
2018		10,6	10,6
2019		10,6	10,6
2020		10,6	10,6

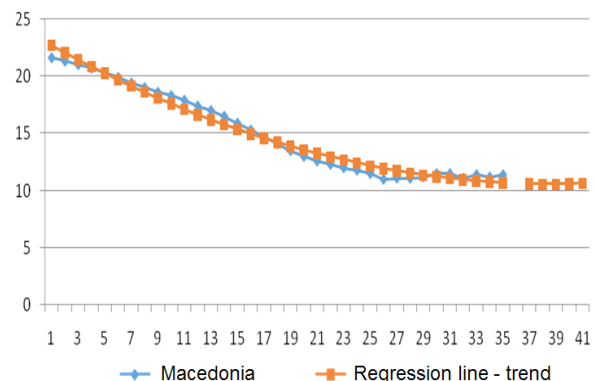
Tabular and graphical review show that the birth rate or the number of live births per 1,000 inhabitants in the Republic of Macedonia from year to year decreases.

Greater reduction was observed until 2009, and since then there is brief stabilization. This is shown by the following Figure 2:



**Figure 2. Movement of the birth rate in the Republic of Macedonia on linear trend**

The parabolic trend will be used for a better picture of the situation of the birth rate and its predictions for the movement in the future (Figure 3).



**Figure 3. Movement of the birth rate in the Republic of Macedonia on parabolic trend**

Calculations by the parabolic trend show stabilization of the birth rate in the Republic of Macedonia. Decline in fertility in the Republic of Macedonia is obvious. Its development is influenced by numerous factors, which can be divided into three groups: biological, social-economic, and psychological. The action of these factors may be directly and indirectly, i.e. long-term and short-term.

### 2.1 Development trends of life expectancy as an information for formulating consumption strategy of food with emphasis on organic production in the future period

Following the trends of life, and therefore the average life expectancy, provides useful information for

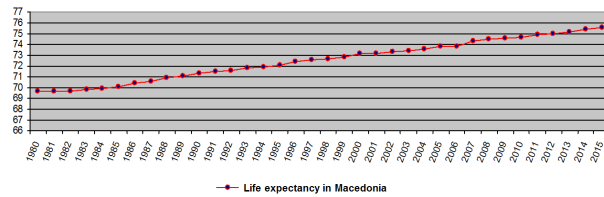
formulating consumption strategy of food that will be in accordance with the requirements and needs of the consumers [2].

The average life expectancy in the Republic of Macedonia in the last thirty years is gradually increasing. This is presented in Table 3 and Figure 3.

**Table 3. Average life expectancy in Macedonia**

Years	Life expectancy in Macedonia	Base indices. Base 1980 = 100
1980	69.7	100%
1981	69.7	100%
1982	69.7	100%
1983	69.8	100%
1984	69.9	100%
1985	70.1	101%
1986	70.4	101%
1987	70.6	101%
1988	70.9	102%
1989	71.1	102%
1990	71.3	102%
1991	71.5	103%
1992	71.6	103%
1993	71.8	103%
1994	71.9	103%
1995	72.1	103%
1996	72.4	104%
1997	72.6	104%
1998	72.7	104%
1999	72.8	104%
2000	73.2	105%
2001	73.2	105%
2002	73.3	105%
2003	73.4	105%
2004	73.6	106%
2005	73.8	106%
2006	73.8	106%
2007	74.3	107%
2008	74.5	107%
2009	74.6	107%
2010	74.7	107%
2011	74.9	107%
2012	75.0	108%
2013	75.2	108%
2014	75.4	108%
2015	75.6	108%

Graphic display on life expectancy in Macedonia is shown in Figure 4.



**Figure 4. Average life expectancy in Macedonia**

From the tabular and graphic display can be seen a gradual increase in the average life of the Republic of Macedonia. However, there is an annual difference from 3 to 5 years between the annual average living of Macedonia and the EU countries.

**2.2 Modern food production and its impact on the demographic change of population**

Demographic characteristics of the population combined with their activities provide valuable information for the future consumption needs of food. In recent years a number of studies have been taken in order to identify the main drivers of the changes in the consumer’s behavior in the 21<sup>st</sup> century. A group of drivers indicates demographic changes [3] expressed through rejuvenation of the elderly, aging of children (under 14 years), and aging of children (teenagers).

Organic production in Macedonia is still in its infancy, although the data show a gradual increase in the area under organic production. Of the total land with conventional agricultural production in Macedonia, the organic production participate with 2.5% of the arable land. The organic production in Macedonia has great natural potential due to the extensive traditional agriculture, mainly in mountainous areas with suitable environmental conditions for sustainable development of organic production.

**Table 4. Organic production in the Republic of Macedonia [4]**

Year	Republic of Macedonia	
	Area in ha	Producers
2005	266	50
2006	509	102
2007	714	150
2008	1.029	226
2009	1.373	321
2010	5.228	562
2011	6.581	780
2012	4.663	576
2013	3.168	400
2014	2.359	344
2015	2.632	481

From the Table 4 it is evident that the area under organic production in Macedonia in 2005 amounted to only 266 ha, but in the next period is rapidly increasing, so in 2011 it reached its peak of 6.581 ha, representing an increase of almost 24 times.

After this year, there was a gradual decline, so in 2013 the area under organic production amounted to 3.168 ha, while in 2015 2.632 ha, which means that the area under organic production increased 10 times more than in 2005.

From the Table 4, movement of the organic products in Macedonia can be seen that their number varies in direct proportion to the area under organic production. Thus, the initial number of 50 producers in 2005 reached its maximum in 2011 (780 producers), and after this year to gradually reduce their number (400 producers in 2013, i.e. 481 producers in 2015). This means that the number of organic producers in 2015 increased by almost 10 times, compared to 2005.

The awareness of the modern consumer of food is at a much higher level than it was in the past. Today, customers want proof that the food they buy fully meets the requirements and standards for food safety.

To ensure proper preventive care and food safety, HACCP (Hazard Analysis and Critical Control Points) is used, which is a system of follow-up activities, and with which on the basis of risk analysis and preventive measures the production of wholesome and hygienic appropriate food products of high quality is ensured. It is a tool to assess hazards and establish control systems in food production, i.e. a system whereby identification, assessment and control of hazards that are significant for food safety, are performed [5].

Quality control of food is followed by an organized system. All activities relating to controlling can be reduced to four basic functions [6]: planning, controlling, managing and organizing.

According to the ISO 14001 standard, the management system is a set of interrelated elements by which is established the policy and the defined goals of the organization, because of their achievement. Every organization should have its own management system which will be used to manage the production, marketing, finance, quality, environment, resources, energy, etc., which will provide a consistently achievement of the defined goals and continuous improvement of the overall efficiency of the organization.

According to the ISO 14001 standard, the system for environmental management - EMS is part of the overall management system in the organization which serves for development and implementation of the environmental policy and the management with the aspects of the environment, or more precisely which are activities, operations or processes in the organiza-

tion that can influence the quality of the environment. This means that the environmental impacts are the changes in the environment, resulting from the activities, operations or processes in the organization. The goal of the management system with the environment is to provide control and reduce of the impact of the work of any organization, company, corporation, firm, enterprise, department, etc., on the environment and continuous improvement on the efficiency of the environmental protection [7].

Today, the proper nutrition is a basic condition for the proper development of the organism, but we can say that the equal importance have efforts for diseases prevention, and faster healing and recovery if they arise. For full surveillance, the food should be correctly and safely stored. In actual procedures of food verification, the Food and Veterinary Agency (FVA) implements control and instructions for performing official request for wholesomeness of food. The benefits of proper consumption of food, from the application of the management control, are the basic principles of ISO 22000. ISO 22000 standard is designed to help businesses to control their risks to the safety of food, to ensure that the food during the consumption is safe.

The purpose and the method of quality control of food is to ensure a high level of protection of human health and consumer interests regarding the food, especially taking into account the diversity of food supply. For drafting or harmonization of food regulations, the constant international standards as well as those whose completion and adoption is imminent, should be taken into account.

### 3. Conclusions

- Demographic changes in the Republic of Macedonia are especially manifested by reducing the birth rate of the population and rising life expectancy. With it certainly are changed the consumer needs for food in such populations on the one hand, weak birth rate on the other hand, extended average life of living.
- The birth rate of the population in the Republic of Macedonia in 1990 decreased by 21% compared to 1980, and in 2000 by 36% compared to 1980, in 2010 by 39% and in 2015 by 42% compared to 1980.
- On the other hand, life expectancy in the Republic of Macedonia, year by year increases. Thus, in 1980, the average life expectancy in the Republic of Macedonia totaled 70 years and in 2010 was 75, while in 2015, 75.6 years.
- In accordance with the predictions, it is expected that in the following period the average life expectancy will increase.
- While the factors influencing natality relied on biological, economic - social and psychological grounds, then

again the factors of influence to increase the average life expectancy are based primarily on diet, use of control of food based on appropriate standards, then the standard of living, available health care, information awareness, etc.

- On the one hand the areas of organic food production from year to year increase, and the concern about healthy food consumption, well-controlled and protected is increasing.

#### 4. References

- [1] State Statistical Office of the Republic Macedonia. *Statistical Yearbooks of the Republic of Macedonia 1990-2011*. <URL:[http://www.stat.gov.mk/Default\\_en.aspx](http://www.stat.gov.mk/Default_en.aspx). Accessed 23 may 2016.
- [2] Miceski T. (2007). Practice in Statistics (in Macedonian). Faculty of Economics, UGD, Macedonia, pp. 93.
- [3] Gilligan C., Wilson S. M. R. (2003). *Strategic marketing planning*. Butterworth-Heinemann, Burlington, USA, pp.278-282.
- [4] Organic Europe. *European section of the organic world website*. <URL:<http://www.organic-europe.net/home-europe.html>. Accessed 23 may 2016.
- [5] Mortimore S., Wallace C. (2013). *HACCP: A Practical Approach* (3rd Ed.). Springer, New York, USA.
- [6] Dopson R. L. (2010). *Food and Beverage Cost Control* (5<sup>th</sup> Ed.). Wiley, Hoboken, New Jersey, USA.
- [7] Salvati L., Marco Z. (2008). *Natural resource depletion and economic performance of local districts: suggestions from a within-country analysis*. Journal of Sustainable Development and World Ecology, 15, (6), pp. 518-523.