

Analysis and Planning of Apple Production As Factor of Rural Development Support*

Ivanović Lana**, Institute of Agricultural Economics, Belgrade

Jeločnik Marko, Institute of Agricultural Economics, Belgrade

UDC: 338.492 JEL: Q1, Q18

ABSTRACT – Apple production has great importance for agriculture of Republic of Serbia, as for processing industry and other followed industries. For this kind of production excellent conditions exist, but also specific problems in production organization, products selling and financing of plantation establishment are presented. Regardless to insufficient use of available natural resources in apple production, it has great potential for export and development of small processing capacities, so it might be relevant factor in stimulation of rural development.

Analysis showed that areas under apple are growing in Serbia, as total quantum of apple production. That is caused by increment of apple trees number and with increment of yield per one tree. By using of trend method is estimated that in next period can be expected further growth of apple production in Serbia, what is confirming importance of this fruit species for rural development. In manuscript, group of measures that can notably stimulate and improve this kind of production, are also mentioned.

KEY WORDS: *apple, production, planning, rural development*

Introduction

Apple is the most important fruit species in the world and besides plum one of the most significant fruit species which is grown on the territory of Republic of Serbia. It could be said that in Serbia basically are predominate dessert sorts of apple. The most spread, in other words leading sorts are Jonagold, Gold delicious, Melrose and Idared. They are also economically the most valuable sorts.

Because of its precious characteristics, apple is widely used in food industry. Among numerous products, as most important could be labeled juice, marmalade, jam, cider, etc.

Development of fruit production in whole, as apple production too, has great influence on development of input industry, like they are productions of preparation for herbal protection, mineral fertilizers, agricultural mechanization, packing materials, building of storage facilities, etc. Parallel with modernization and intensification of apple production, it is necessary to improve and develop all following industries (input industries and

* Paper work is part of researching on project MNTR -159004 - “Accession of Serbian economy into EU – planning and financing of regional and rural development, as companies development policy“, financed by Ministry of science and environmental protection of Republic of Serbia.

** Address: Volgina 15 street, 11060 Belgrade, Serbia, e-mail: lana_i@mail.iep.bg.ac.rs



processing industry), how will on that way affects on increment of Serbian fruit competitiveness level on international market.

Good climate and soil conditions in Serbia are excellent precondition for development of this production. However, disregarding those conditions, apple production is not developed in adequate measure. Areas under apple plantations are small sized (atomized), great number of tree trunks still are grown in farmsteads where are achieved low yields. Also significant part of plantations is old and already amortized.

During production process, the biggest problems are high input prices, lack of labor, obsolete mechanization, old plantations, old-fashioned (inadequate) sorts, etc. During the sale producers are faced of with next significant problems: low prices and impossibility of total produced volume selling at once. Because of introduction of new breeding technologies and new, more productive sorts, it comes to gradual development of apple production, what enables, as higher production of more qualitative fruits per area unit, as increment of total apple production in Serbia.

Apple represents one of the agricultural products which have great export perspective for Serbian agriculturalists and on that way possible significant role in rural development encouragement. Because of that it is necessary to analyze previous production volume and present state in Serbian apple production, as to forecast production quantum in closer future. For getting of better picture about situation in domestic apple production and chance that improvement of this agricultural branch induces rural development, it has to be parallel introspected all characteristics of European and world apple production, as to predict trends of its further development.

Objective and aim of reseraching

Researching objective in paper work is previous and in next period expected apple production in the world, Europe and Serbia. Objective is also an analysis of factors which affect on production volume of apple in observed territories.

Starting from researching objective and importance of apple as fruit species, next researching goals are defined:

- Analysis of present condition in apple production in the world and Serbia,
- Determination and comparison of apple production trends,
- Analysis of influence of natural and socio-economic conditions on apple production,
- Introspection of possibilities that apple production become a carrier of rural development in Serbia.

Data resources and working method

In paper work are used two basic resources for areas under apple, average yields, achieved production, etc. First resource is available statistical data of Republic of Serbia, while as second resource is used FAO's statistical documentation for observed years.

Focusing on methods which are used in analysis of statistical data, next can be separated:

- Tables,



- Graphs,
- Trend,
- Index and
- Comparative analysis.

Researching results

General data about apple production and selling

Apple is produced in many countries, almost on all continents, at most spread on north hemisphere. In 2007., in the world is produced 64.255.520 t of apple. The biggest planetary producers are China, USA, Iran and Turkey. Italy is European leader in apple production.

Serbia is one of the minor European and world producers, with participation of 0,36% in total world production and 1,55% in total European production.

Yearly consumption of apple per capita, on the world level in 2003., was around 8 kg. Consumption on European level was higher, about 20 kg per capita, while in Serbia and Montenegro, during the same year, was achieved consumption per capita of 22 kg.

During 2007., in the world were under the apple plantations 4.921.767 hectares, what is little more than 10% of total world areas under fruits (without cantaloupes and water melons).

Total import of apples in 2006. on the world level was 6.967.882 t (<http://faostat.fao.org>). The biggest importer is Russian Federation, which participates in total world import with 11,66%, then, Deutschland with participation of 10,02% (the biggest importer within EU). Significant importers are United Kingdom (7,63%) and Holland (5,24%) too.

Apple export on the world level in 2006. was 7.166.752 t. China is the largest world exporter, with participation of 11,22% in total world export, then comes Chile with 10,12%. Italy is most important European exporter (ranked as third exporter in the world), with participation of 9,95%. France, also, takes significant place as exporter. It participates with 9,54% in total world apple export.

Serbia is at once apple importer and exporter. Last years the biggest importer of Serbian apples was Russian Federation. According Vlahović (2003.), regionally observed the largest production is achieving in North-Bačka region (in municipalities of Bačka Topola, Mali Idoš, Subotica), which gives 12% of total domestic production. Also, significant are Belgrade city, South-Banat, Podunavski and Sremski regions, which commonly give up to 50% of national apple production. Absolutely, the highest production has Subotica municipality. The most concentrated production is in central part of Republic, almost 66%. Large number of sorts is grown, from autochthonous (each year less and less) to the economically most effective sorts“.

Apple production trend

In average, for the period of 1998-2007., surfaces under apple were 5,1 million of ha (Table 1.). Areas under apple plantations in the world, besides variation per analyzed years, were decreased during observed period, from 5,8 million ha in starting year to 4,9 million ha in 2007., in other words reduction amounted 14,66%. Similar tendency is noticed in Europe



too, with comment that decreasing trend of areas is little more expressed (index 83,23). Surfaces under apple in Serbia were increased for 37,04%.

Table 1. Areas under apple plantations in period 1998 - 2007.

Year	World		Europe		Serbia*	
	Area (ha)	Base index (1998=100)	Area (ha)	Base index (1998=100)	Area (ha)	Base index (1998=100)
1998.	5.767.416	100,00	1.584.995	100,00	27.000	100,00
1999.	5.587.710	96,88	1.578.036	99,56	27.000	100,00
2000.	5.386.836	93,40	1.581.532	99,78	27.000	100,00
2001.	5.138.881	89,10	1.526.357	96,30	27.000	100,00
2002.	4.878.245	84,58	1.421.804	89,70	20.000	74,07
2003.	4.781.818	82,91	1.358.743	85,73	32.000	118,52
2004.	4.761.005	82,55	1.356.021	85,55	27.000	100,00
2005.	4.802.133	83,26	1.323.931	83,53	27.000	100,00
2006.	4.786.350	82,99	1.257.517	79,34	35.000	129,63
2007.	4.921.767	85,34	1.319.129	83,23	37.000	137,04
Average 1998-2007.	5.081.216	/	1.430.807	/	28.600	/

Notice: * In period 1998-2005. are shown data for Serbia and Montenegro, and for 2006. and 2007. only for Serbia.

Resource: <http://faostat.fao.org>

Europe, with average surfaces under apple from 1,4 million ha, participates with 28,16% in total world surfaces under apple plantations. Serbia with average areas from 28.600 ha has participation from 1,99% in total European areas under apple.

Table 2.. Total apple production in period 1998-2007.

Year	World*		Europe*		Serbia**	
	Production (in t)	Base index (1998=100)	Production (in t)	Base index (1998=100)	Production (in t)	Base index (1998=100)
1998.	56.651.712	100,00	15.832.629	100,00	177.446	100,00
1999.	57.904.585	102,21	15.366.265	97,05	196.474	110,72
2000.	59.054.808	104,24	17.733.553	112,01	197.490	100,52
2001.	57.584.159	101,65	16.441.403	103,85	135.374	68,55
2002.	55.952.172	98,77	16.265.946	102,74	95.584	53,87
2003.	58.377.086	103,05	15.798.745	99,79	246.138	138,71
2004.	62.775.656	110,81	16.968.620	107,17	183.571	103,45
2005.	62.123.069	109,66	15.112.921	95,45	198.030	100,79
2006.	63.875.324	112,75	15.087.118	95,29	240.320	135,43
2007.	64.255.520	113,42	13.950.045	88,11	245.228	138,20
Average 1998-2007.	59.855.409	/	15.855.725	/	191.566	/

Resource: * <http://faostat.fao.org>, ** Municipalities in Serbia 1998-2008., Republic of Serbia, Republic statistical institute, Belgrade.



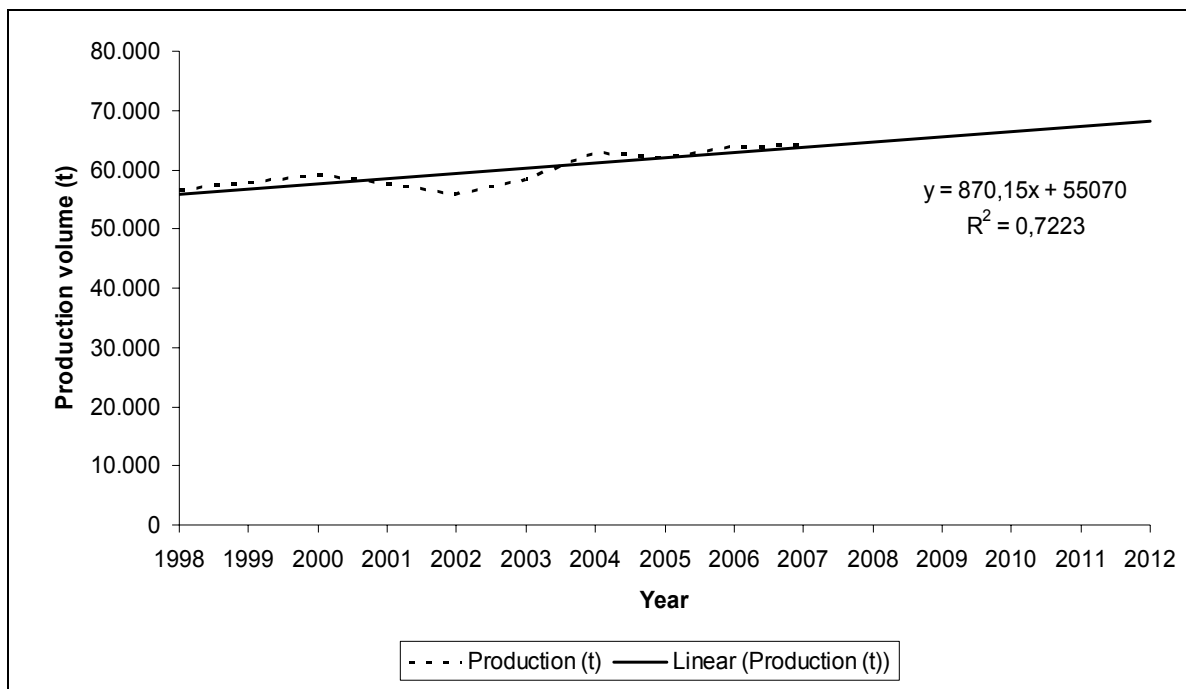
Average volume of apple production in world in period 1998-2007. was 59,9 million t, and production showed in observed period increment for 13,42% (Table 2). Apple production in Europe in same period was decreased for 11,89%, while in Republic of Serbia was significantly increased (index 138,20).

With average apple production of around 15,9 million t Europe has participation from 26,49% in total world apple production. Serbia with average production of 191.566 t participates in total European apple production with 1,21%.

For more detailed insight of apple production flow in the world, Europe and Serbia, on graphs are, besides of apple production presentation in ten analyzed years, created trend lines for the period of five years, finally with 2012. During the trend line creation, the best adjusted trend lines are used.

Apple production in the world has growing tendency. If apple production in next five years would in accordance with previous flow, in 2012. it could be expected world apple production from 68,1 million t (Graph 1).

Graph 1. Apple production volume trend for the world in period 1998-2012. (in 000 t)

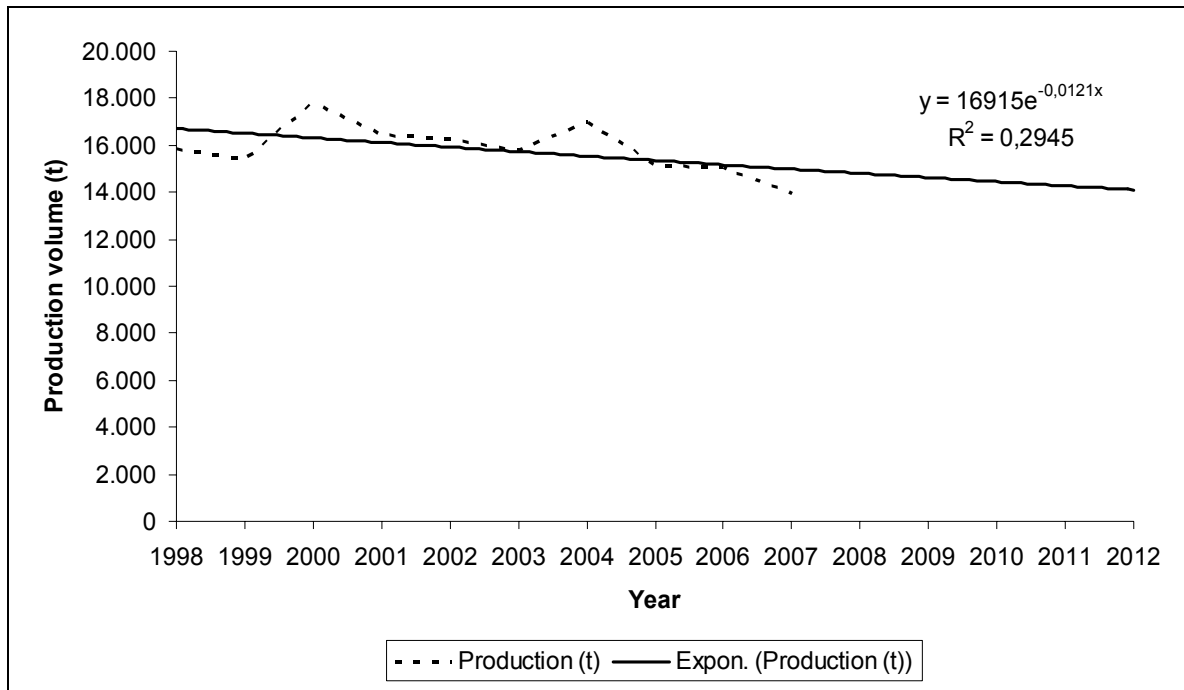


According the apple production trend line, in Europe in 2012., it could be expected production from 14,1 million t. In distinction to total world and Serbian production, where is, based on existing data, expected production increment, in Europe according trend line is evident reduction of apple production (Graph 2).

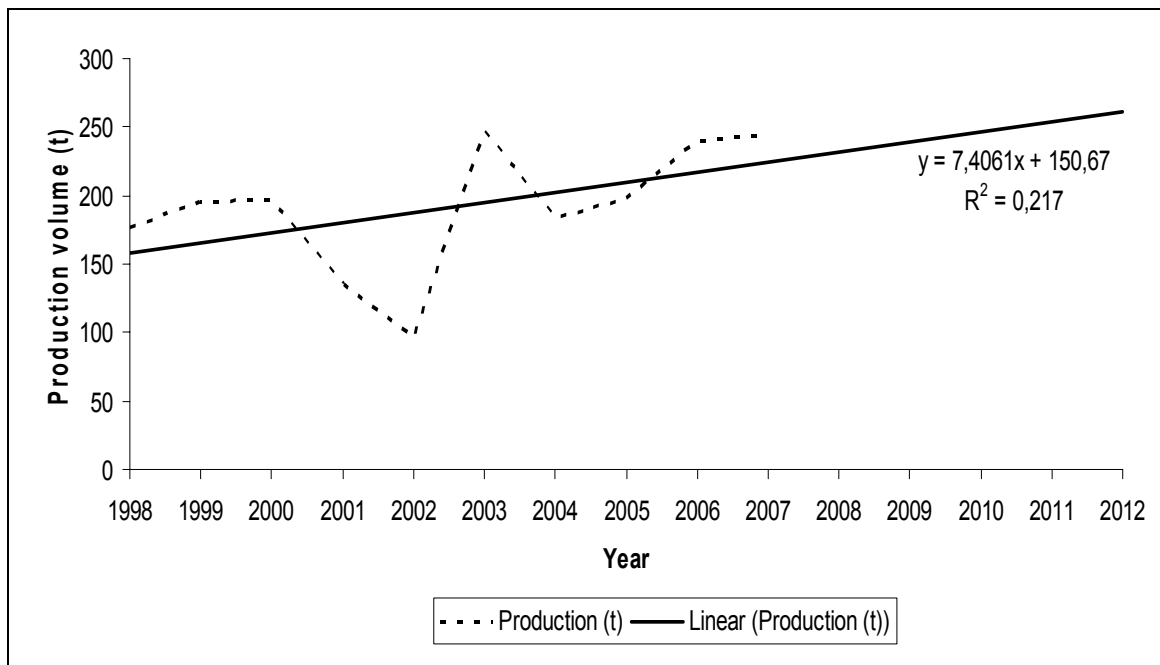
Production volume in Serbia in 2012., in accordance to the best adjusted trend line, which determination is based on previous data, will be 262.000 t. This means, that in next 5 years apple production in Serbia, if it continues previous trend, will be increased for around 17.000 t in compare to production in 2007. (Graph 3).



Graph 2. Apple production volume trend for the Europe in period 1998-2012. (in 000 t)



Graph 3. Apple production volume trend for the Serbia in period 1998-2012. (in 000 t)



Total apple production in Serbia, as is mentioned, records permanent growth. Production increment is based on higher number of fruitful tree trunks and increasing of average yield per one apple trunk. In average, in period 1998-2007. total number of apple tree trunks in Serbia was 16,5 million, from that, number of fruitful trunks was around 14,6 million.



Average yield in observed period in Serbia was 13,1 kg/trunk. Comparing starting and last year of mentioned period, yield per one trunk is increased for 32,52%, before all, as result of apple production intensifying. So, increment of yield per trunk is achieved by higher investment in production (higher usage of plant protection preparations, mineral fertilizers, irrigation, etc.). Also, individual producers in last ten years, in difference with previous period, more and more are dealt with fruit growing and apple production as professionals, looking on that not only as on additional income source.

Conclusion

Apple should have great role in development of Serbian agriculture, in same time for supporting of rural development. It comes from fact that apple is second fruit species in Serbia by its importance (behind plum), and that it has great export potentials (before all on market of Russian Federation). Beside apple could be attractive export product, it could be pulled development of processing and input industry too. On that way in rural areas development it would not be focused only on agriculture, than it would be included establishing of small family processing factories, in other words employment of significant number of population.

Analysis showed that momentarily within world and European frame, Serbia is relatively small apple producer, but at same time exist some positive tendencies which have to be maximally used in upcoming period. For example, areas under apple in world and Europe are decreasing, while in Serbia they are presenting increasing trend. While total apple production is mildly growing in world, or it is decreasing in Europe, then total production volume of this fruit species in Serbia showed significant growth in observed period. That is influenced by increment of apple trunks number, as by higher yield achieved per one trunk. Also, by using of trend method is determined that in following period it could be expected further growth of apple production in Serbia.

For additional encouraging of apple production in Serbia (rural development is included), it is necessary to introduce certain changes into the production practice, as they are new sorts, irrigation, establishing of anti-hail nets, better selling through the new established cooperative organizations, building of coolers, etc. As one of the most important factors, which could be contributed to the advancement of Serbian apple production is improvement of financing conditions, at first place for long term credit arrangements.

References

- Milić, D., Radojević, V. (2003): *Proizvodno-ekonomska i upotrebna vrednost voća i grožđa*, Novi Sad;
- Milić, D., Kalanović Bulatović Branka, Trmčić Snežana (2009): *Menadžment proizvodnje voća i grožđa*, Univerzitet u Novom Sadu, Poljoprivredni fakultet, Novi Sad;
- Opštine u Srbiji (1999 - 2008), Republički zavod za statistiku, Beograd;
- Stanković, D., Jovanović, M. (1990): *Opšte voćarstvo*, Naučna knjiga, Beograd;
- Veličković, M. (2002): *Voćarstvo*, Poljoprivredni fakultet Beograd – Zemun;
- Vlahović, B. (2003): *Tržište poljoprivredno-prehrambenih proizvoda*, Specijalni deo, knjiga II, Univerzitet u Novom Sadu, Poljoprivredni fakultet, Novi Sad;
- Vlahović, B., Stevanović, S., Tomašević, D., Zelenjak, M. (2006): *Agrarna proizvodnja u Republici Srbiji*, Monografija, Društvo agrarnih ekonomista Republike Srbije, Beograd;



www.agromreza.org.yu;
www.poljoberza.net;
www.poljoprivreda.info;
<http://faostat.fao.org>;

APSTRAKT – *Proizvodnja jabuke ima izuzetan značaj za poljoprivredu Republike Srbije, ali i za prehrambenu industriju i ostale prateće industrije. Za ovu proizvodnju postoje odlični prirodni uslovi, ali su prisutni i određeni problemi u organizaciji proizvodnje, plasmanu i finansiranju podizanja zasada. Bez obzira što se u proizvodnji jabuke još uvijek dovoljno ne koriste raspoloživi prirodni uslovi, ova proizvodnja ima odličan potencijal za izvoz i razvoj malih prerađivačkih kapaciteta, pa može biti veoma značajan faktor podsticanja ruralnog razvoja.*

Analiza je pokazala da površine pod jabukom u Srbiji rastu, kao i ukupan obim proizvodnje jabuke. To je uzrokovano povećanjem broja stabala jabuke, kao i rastom prinosa po stablu. Primjenom metode trenda utvrđeno je da se u narednom periodu može očekivati dalji rast proizvodnje jabuke u Srbiji, što potvrđuje značaj ove vrste voća za ruralni razvoj. U radu je takođe naveden i skup mjera kojima se može značajno podstaći i unaprediti ova proizvodnja.

KLJUČNE REČI: *jabuka, proizvodnja, planiranje, ruralni razvoj*

Article history: Received: 24 July 2009
Accepted: 15 August 2009