Petroleum-Gas University of Ploiesti BULLETIN	Vol. LXIII No. 3/2011	37 - 49	Economic Sciences Series

Investment in Sweet and Sour Cherry Production and New Processing Programs in terms of Serbian Agriculture Competitiveness[1]

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Abstract

Based on the average indicators for the five-year period 2006-2010, the paper analyses the production, processing and sale of sweet and sour cherries in Serbia. Moreover, the following are also identified: the production volume, average yields, regional production dispersion, efficiency of invested capital in establishment of cherries plantations, cost price structure, horizontal and vertical linkage of participants within the producer to consumers chain, possibilities of investment in new processing programs, based on existing practice in Serbia. According to determined indicators, some suggestions are made with a view to improving the competitiveness of this agriculture sector.

Production, processing and sale of cherries in Republic of Serbia faces many problems, such as: land fragmentation, low technical and technological level, insufficient cooperation between producers, uncertain sale, slow implementation of standards etc. These problems are primarily the result of low investments during a long period. The activities of all stakeholders (producers, processors, exporters, consumers etc.) in development of market chains should be focused on: adoption and implementation of standards that allow orientation to products with added value (over an integral and organic production); protection of products with geographical indications; elimination of black market; development of physical and market infrastructure, as well as political and legal framework; and creation of business environment suitable for investment in mentioned production.

Key words: *sweet cherry, sour cherry, economic indicators, production, processing, sale*

JEL Classification: *Q10, Q13, Q19*

Introduction

For a more competitive presence on the global market, sweet and sour cherries producers have to choose good seedlings, or low lush and high yield sorts and bases, as well as possibilities for

[1] The paper is part of the project researches 179028 – *Serbian rural labor market and rural economy – income diversification and poverty reduction*, and III 46006 - *Sustainable agriculture and rural development in function of Republic of Serbia strategic goals achievement within the Danube region*, financed by the Ministry of Education and Science of Republic of Serbia.

application of new technology. The Republic of Serbia has very favorable natural and climatic conditions for sweet and sour cherries growing. The sweet cherry is an early ripening fruit, which grows well in hilly areas and areas high above sea level. It has an expressive seasonal character of consumption. It is mostly used as fresh fruit and less as processed products. The sour cherry is an important and highly perspective Serbian fruit, primarily from the aspect of export on the international market. It belongs to a group of high-quality delicacy fruit. It has significant nutritional, medicinal, dietary and technological value. It is used as fresh fruit, or as raw material in processing industry, mostly in juices, jams, jelly, yoghurts, marmalade, liqueurs, brandy, compotes, as well as raw material in confectionery industry (Cerović, et al., 2005).

In the world production of sweet cherry (1,569,674,000 t) the highest share is held by Turkey 22% (338,361,000 t), followed by USA 14% (225,073,000 t), Iran 13% (198,768,000 t), Italy 9% (134,407,000 t) etc. Individual participation of other countries is below 5% and in total amounts around 42% (673,065,000 t). Serbia is ranked sixteenth with about 2% of the total world production (FAO, 2011). The largest areas under sour cherries in the world are in Europe (80%) and on this continent over 65% of the total world production (1,215,748,000 t) is produced. Major producers are Poland, with the share of 16% (201,681,000 t), Turkey 15% (185,435,000 t), Russian Federation 13% (157,000,000 t), Ukraine 11% (129,200,000 t), Iran 9% (106,461,000 t) and United States 8% (97,250,000 t). Serbia is ranked seventh in the world in the production of sour cherries, with a share of around 7%. Hungary is ranked eighth 6%, while all the other countries participate together with only 15% (Sredojević, 2011).

Materials and Methods

This paper used the data of the Statistical Office of the Republic of Serbia from the following publications: Statistical Yearbooks and Bulletins for observed years and months; Customs Directorate and other relevant institutions reports; questionnaries and interviews with sweet and sour cherries producers and processors and cooling facilities owners. Moreover, there is the data from the websites of the following institutions and organizations: FAO; Ministry of Agriculture of Republic of Serbia; Agriculture Market Information System of Serbia (STIPS); respective Economic registries; the National Association of Fruit and Vegetable Producers of Serbia; the Association of cooler owners; certain Municipalities in Serbia; etc. The working method was based on statistical and calculating methods, and all the results are expressed through natural and value indicators, as indices, balance sheets, financial results, cost prices etc.

Results and Discussion

Production of Sweet and Sour Cherry in Serbia

Out of the total agricultural land in Serbia (5,058,000 ha) orchards occupy 240,000 ha, or 4.74%, while their share within arable land is 5.63% (Statistical Office of the Republic of Serbia, 2011). Serbia produces 1,403,170t of various fruits which represent a share of 1.12% of total world fruit production, or around 6.6% of EU fruit production. The biggest share within fruit production is held by raspberry with 15.20% of total world production and export. In the structure of fruit trees in Serbia, the highest share is traditionally held by plums (50%), followed by apples (18%) and sour cherries (over 7%). The sweet cherry represents a perspective fruit species, but significantly lags behind the sour cherry production. Today's results achieved in fruit production are important, but still under the national possibilities. Serbian potentials (human, climatic, land, orographic and hydrological) together with the proper and full implementation of scientific achievements in the field of fruit growing could provide much higher efficiency (Sredojević, *et al.,* 2009).

The average volume of sweet cherry production in Serbia, within a five-year period (2006-2010), was around 29,228t, and mainly produced in Central Serbia (81.51%) and significantly less in Vojvodina (18.49%). Production is located mainly on family farms (99.91%) and less than 1% of the production belongs to companies and collective farms. From the aspect of administrative districts in Serbia (25 districts excluding Kosovo and Metohija), the leading role in sweet cherry production belongs to the district of Belgrade city (19.64%). By this area, and the Ritopek local community representatively, Serbian sweet cherry is well known in Europe. The mentioned district is followed by Mačvanski District (7.82%), Nišavski District (5.26%), Braničevski District (5.22%) and Borski District (5.02%). The average number of sweet cherry trees in the observed period was around 1.8 million. The production volume, caused by the high demand and secure realization of fresh fruits, was rapidly growing in the previous years. The average yield per sweet cherry trunk is also increasing, and in 2010 was 16 kg/trunk, which is over 48% more than in 2006. The yield of sweet cherry in Serbia is around 3.3 t/ha, while the European average yield is 4.3 t/ha. Great possibility for sweet cherry production efficiency improvement in Serbian conditions will come by the introduction of new sorts that are very well accepted by consumers. Offered assortment mostly consists of: *Burlat, Stella, Van, Bing, Sunburst,* as well as *Hedelfinger and Germersdorf*, popularly known as *Erc* and *Karminka*. In lesser volume *Early Lyon* sort, otherwise known as *Doctor,* is produced (Nikolić, Milatović, 2011). At old sweet cherry plantations in Serbia, the space within one row or between rows is quite large. Often one might find sweet cherry trees isolated, as clumps of trees, or as trees within mixed plantations. Recently, attention was focused on low lush bases in the growing systems with smaller inter-row and between row distances. This fruit is successfully grown on almost all kinds of soils, beside too humid and heavy soils (Gajić, e*t al.,* 2008).

In terms of position and soil conditions, sour cherry is a very modest fruit species, which could be successfully grown in all parts of the country. In terms of climatic conditions, it endures higher above sea levels, as well as lower winter temperatures. It best thrives on slopes and mild slopes turned to south, southeast and east. Dibble space in row and between rows depends on sort, bases, growing system, soil fertility, way of harvest etc. The trunk of precious sorts of sour cherries could live up to 25 years. The average production volume of sour cherries in Serbia in the last five years period was around 89,746 t, out of which 72.86% was located in Central Serbia, and 27.14% in Vojvodina. Within the total production, family farms are participating with the largest part (90.85%), while 9.15% belongs to companies and collective farms. In terms of territorial distribution (administrative districts of Serbia), sour cherries are mostly grown in the District of Belgrade city (11.53%), and then in Nišavski District (8.80%), Jablanički District (7.35%), Šumadijski District (7.29%) and West-Bački District (7.00%). In addition, sour cherry is largely grown in Mačvanski District, Toplički District and Podunavski District. It is grown at least within Zlatiborski District, Moravički District, Pirotski district and Raški District. The average number of sour cherry trunks in Serbia, during the analyzed period, was around 8.7 million with a slight increase tendency by average annual rate of 1.6%. The total production volume in 2010, in contrast to 2006, increased by 40%. The sour cherry yield in Serbia is relatively small (2.5 t/ha), as compared to European average (4.2 t/ha). The average yield per trunk constantly increased during the analyzed period, so in 2010 it was 10.30 kg/trunk, which is 45% more than in 2006. The current assortment of sour cherries is directed mainly to the sorts that are used for industrial processing. The most represented sorts in Serbia are *Oblačinska* and spontaneously spread *Cigančica*. Other sorts represented are *Hajmanova, Reksel* and *Šumadinka* that are characterized with massive fruit, grafted on wild sweet cherry, while the vegetative bases are less represented. Most often formed type of crown is pyramidal crown, rarely half-flat vase and very rare palmette and slender spindle (Nikolić, Milatović, 2011). Recently, within the production of new growing systems, based on the selection of appropriate combination of sorts and bases, the planting space and breeding form were introduced.

Sales prices for sweet and sour cherries are formed directly between producers and purchase companies. For the producer, the framework for economically acceptable purchase price

represents the cost price, or the production costs per unit of yield (Milić, Sredojević, 2004). The cost price depends of natural inputs expenditure during the regular production (volume of fertilizers and chemicals for plant protection, use of mechanization and labor, packaging material etc.) and their prices.

Table 1. Calculation of sweet cherry and Oblačinska sour cherry production per 1 ha, 2010 (in EUR)

Economic Indicators	Sweet cherry	Sour cherry
A. PRODUCTION VALUE	12,222	3,890
B. PRODUCTION COSTS		
- Preparation of soil (disking, rototilling etc.)	298	131
- Fertilization (NPK, KAN, foliar fertilizers)	431	229
- Precaution treatment (cutting)	533	200
- Chemical protection (appliance of herbicides, fungicides, insecticides etc.)	596	362
- Picking (manual)	3,111	1,478
Total (B)	4,969	2,400
C. SALE COSTS		
- packing, finishing, storing, transport	122	67
D. TOTAL COSTS (B+C)	5,091	2,467
E. FINANCIAL RESULT (A–D)	7,131	1,423
F. Cost price of 1 kg of sweet and sour cherry	0.36	0.22

Source: according to the local community of sweet cherry producers from Ritopek and sour cherry producers from Šabac municipality calculation

Considering that the level of inputs used is affected by the terrain configuration where plantation is established, the condition of plantation, the phase of exploitation period, the number of trees per ha, the distance between plantation and place of inputs supply etc., the cost price varies per unit of yield or surface under the sweet and sour cherry. Surely, the producer's interest is that costs have to be as low as possible, while sales (purchase) price has to be much higher. The higher difference means more profitable production for the producer. It depends on many factors: due to climatic impacts, the yield can vary significantly, which directly reflects on the cost and purchase price; inputs and outputs price, parity, current supply and demand, competition, currency stability could also, directly or indirectly, affect sweet and sour cherries cost and purchase price difference.

According to the data given in Table 1, one can notice that the difference between cost and purchase price of sweet cherry is greater than in the case of sour cherry, so looking either per unit of area or per unit of yield, production of sweet cherries is much more profitable. Based on the data from interviewed producers during the 2010, at both fruit species large share in the structure of cost is the cost of manual picking. In the structure of sweet and sour cherries cost, the mentioned costs participated with about 60%. Additionally, tardy picking could lead to major losses. Since the purchase prices are different per classes of picked fruits, great savings in production costs, and therefore lower overall costs, producers can achieve by procuring adequate packaging material and with timely deliveries to purchasers. Due to poor packaging, fruit defects often appear, which can lead to risk that the great parts of the yield will be purchased as a lower class products.

Producers of sweet cherry in Serbia are now in much better economic position. Due to high demand, especially from customers from Russia, production of sweet cherry is expanding. The purchase price increases with each year. In 2009 it varied in the interval of 70 -100 RSD/kg, while in 2010 it reached more than 150 RSD/kg. In recent years, new plantations of sweet cherries are being established on low lush bases in dense fit of planting. Compared to sweet cherries, sour cherry producers achieve much lower economic results because of quite low purchase price. Thus, the purchase price of sour cherries in 2010 was around 45 RSD/kg.

Profitability of Sweet and Sour Cherry Production in Serbia

Generally, sour and sweet cherries are profitable fruit species since they enter exploitation period very quickly, which depends on sort, base, climate and other factors. Out of all climatic conditions for sweet cherry growing, the temperature is of utmost importance, above all absolute minimal values during the winter phase of inaction, and at the beginning and end of the vegetation period (Apáti, 2008). As the establishment of cherries plantations is a long-term investment, above all there is a need for appropriate analysis of economic feasibility of such investment. According to the average values of input-output parameters, during the period 2005-2010 in Serbia, the average investments in sweet cherry plantations are in range of 7,000 to 9,000 EUR/ha (soil preparation and planting, in so called zero year and five years of care in the rearing period), while for the sour cherry the same investments are in the range of 5,500 to 7,000 EUR/ha (three years rearing period). In Table 2 below, the average indicators of economic efficiency for the establishment and exploitation of standard and intensive growing system of sweet cherry, as well as *Oblačinska* sour cherry, the dominant sort in Serbia, are given. The total investments in the plantation establishment represent the sum of all financial expenditures plus certain amount of compound interest per some years of plantation rearing, calculated at the end of the establishment period, or at the beginning of the exploitation period (Milić, *et al.,* 2008). These investments include: costs of mechanization, cost of seedlings and other inputs, labor wages, facilities and roads construction, fence setting etc., which depends on intensity of chosen growing system. Moreover, from total investments gain is subtracted from the so-called *small yield* in the last years of rearing. Besides these factors, the total value, the structure of investment, and a value of certain indicators is affected by: sources of financing (own or borrowed capital, or combined as commonly spread model in practice), interest rate, repayment period etc. (Sredojević, 1998). In addition, before plantation, the establishment special feasibility study is prepared. It is also highly recommended that each producer should keep books and accounting records, so production could be based on available production capacities and gained input and output parameters carefully planned.

Table 2. Economic indicators of establishment and exploitation of sweet and sour cherry orchards, the average value for the period 2005-2010 (in RSD)

Indicators		Sweet cherry		Sour cherry
		Standard system	Intensive system	
I	***PERIOD OF ESTABLISHMENT***			
1.	Establishment period (years)	5	3	3
2.	Total investments for orchard establishment (per ha)	1,000,000	1,500,000	800,000
II	***PERIOD OF EXPLOATATION*** (average annual data)			
1.	Exploitation period (years)	18	20	20
2.	Yield (kg/ha)	14,000	20,000	12,000
3.	Selling price per 1 kg	55	75	25
4.	Gross income per ha	770,000	1,500,000	300,000
5.	Direct production costs per ha	220,000	450,000	160,000
6.	Gross profit per ha	550,000	1,050,000	140,000
7.	Gross profit per kg	39	53	12
8.	Amortization	19,000	25,000	16,000
9.	Interest on working capital	5,000	7,000	4,000
10.	Tax on gross profit per ha	28,000	50,000	7,000
11.	Cost price per 1 kg	20	27	16
12.	Net profit per ha	496,000	968,000	113,000
13.	Net profit per kg	35	48	9

Source: Author's calculation based on average values in Serbia for five-year period

The breakeven point for the financial assets invested in the establishment of standard sweet cherry plantation is in the second or third year of regular exploitation (in seventh or eighth year after planting), and in the intensive growing system in the second year of regular exploitation (in the sixth year after planting). During the last five years in Serbia, due to the high demand and favorable purchase price, the production of sweet cherry was very profitable. Producers at standard growing system can reach a net profit per hectare in the sum of about 5,000 EUR and at more intensive production, much more. So for example, during the period 2009-2011 producers from Ritopek local community (District of Belgrade) achieved gross profit in the range of 8,000-10,000 EUR/ha. These calculations depend on the sort, growing form, dibbling density, technology, technical equipment, growing intensity, market factors etc. If realization of fruits in the long run is secure and sales (purchase) prices are acceptable (above cost price), the establishment of plantations is economically justified (Sredojević, 1998). Profitability of Oblačinska sour cherry is satisfactory and during the mentioned period positive economic effects (in average amount of 1,200 EUR/ha) were achieved. The breakeven point on invested capital in the establishment (rearing) of Oblačinska sour cherry plantations, on average at stable market conditions, is reached in the second or third year of regular exploitation (the fifth or sixth year after planting). Although, in the period under discussion, sour cherry producers in Serbia thrived to operate with profit, according to the fruit growing experts, fruit production in the world is considered successful if net profit of over 2,000 EUR per hectare is achieved (Nikolić, 2010). Some of the growing forms and their modifications could be considered highly intensive and highly profitable only in conditions of good growing technology, or on application of all necessary agricultural and pomotechnics operations. Such plantations could not be established without irrigation systems, anti-hail nets, forecasting services etc. Advanced knowledge and high investments, thus quickly become justified and stimulating for further intensification of fruit production (Veličković, *et al.,* 2009). Therefore, for the determination of plantations profitability for different areas, it is necessary, besides the difference in seedlings number per area unit, to include all other production capacities differences (mechanization, facilities etc.). This requires preparation of specific business plan or feasibility study, with detailed analysis of terrain on which plantation will be established, market conditions, production potential and possibilities etc. Such studies are most often created, in particular situations, for instance when applying for credit.

The average annual fruit consumption in Serbia per capita is low in comparison to the European countries. Encouraging is that there is a trend of consumption increase, so consumption increased from 45 kg of fruit per capita in 2006 to 62 kg in 2010. Consumption of cherries per capita in Serbia is around 2.3 kg, while in Greece and Romania is 3.9 kg, or in Austria around 3.6 kg, Turkey around 3.2 kg etc. (FAO, 2010). Sweet cherry has always been described in Serbia as a high-valued fruit (Milić, Radojević, 2003), and it is mainly used as fresh fruit. The sour cherry is one of the most important fruit in Serbia, generally used for industrial processing. Its aromatic fruits are very suitable for making various products (compote, juices, schnapps, wine, confectionery industry etc.). The largest part of achieved yield is used as a frozen or canned sour cherry (with or without stone), as well as for juice production. Besides that, some sorts are suitable for use as fresh fruit.

In Serbia, there are several factories for fruit and vegetables processing, but less than 50% of installed capacities is in operation and only few factories have implemented, or still are in the phase of implementation of HACCP and ISO 9001 standards. Furthermore, there are around 20 factories for production of juices and concentrates. There is a significant number of processing facilities out of function, or with lower quality equipment, while only few companies have installed a high-tech processing technology. The problem is that existing facilities are inadequate, outdated, without air conditioning, and making large losses. In order to improve the processing and packing activities of sweet and sour cherries, it is necessary to: establish the obligation of register keeping of all producers and processors; financially support the construction of coolers, as well as the construction of new and reconstruction of existing

facilities; procure fresh fruits cleaning, sorting, calibration and packaging equipment; more firmly support the implementation of HACCP and ISO standards; better harmonize national standards for the calibration and classification with OECD and EU standards, as well as regulations for fresh cherries and their products quality. Certain companies have successfully processed cherries and they are currently in the phase of new programs implementation (Table 3). Mentioned companies are export oriented with successful realization of products and strong cooperation with foreign retail chains.

Table 3. Established programs, implemented standards and countries where some companies from Serbia export sweet and sour cherry, up to 2011.

Enterprises	Established programs	Implemented standards and countries as a final export destination
LIMITED LIABILITY COMPANY, L.L.C., Šabac, the most technologically advanced factory for fruit processing on the Balkan. Industrial complex on 10,500 m^2, built on area of 10 ha.	Production of fruit is around 100,000 t per year. Out of that sour cherry program includes: 1) Sour cherry (without stone/Roland quality) in packages of: 2 x 2.5 kg; 4 x 2.5 kg; 10 x 1 kg, depending of agreement; 2) Sour cherry (with stone/Roland quality) in packages: 2 x 2.5 kg; 4x2.5 kg; 10x1 kg, depending of agreement; 3) Sour cherry (with or without stone/Block quality) in packages: 10x1 kg, 14x1 kg depending of agreement; 4) Sour cherry (with stone/Fresh cooled) – package is depending of agreement.	1) ISO 9001:2008 standard - Quality Management System; 2) HACCP system - Hazard Analysis and Critical Control Points; 3) BRC standard - British Retail Consortium Standard; 4) Kosher Standard. *Export destinations:* Netherlands, Austria, Germany, France, Italy, Croatia and Russian Federation.
VINO ŽUPA A.D., Aleksandrovac, regional company which includes companies „Povardarie" Negotin, located on the river Vardar in Macedonia, „Hepok" and „Amko commerce" in Sarajevo. It has two coolers, in Aleksandrovac and Brus, with storage capacity of 7,000 t of frozen fruits.	Its production program has over 500 products, considering production, processing of fruits and grape, storage and distribution of manufactured products. It is leader in production of wine and fruit juices in Serbia and surrounding countries. Sour cherry program includes: 1) Sour cherry with stone „SK"; 2) Sour cherry without stone „BK"; 3) Many products based on processed sour cherry.	1) JUS ISO 9001/2001; 2) Recommended International Code of Practice General Principles of Food Hygiene - CAC/RCP 1-1969, rev. 4/2003; 3) ISO 9001:2001 and HACCP Standard for coolers. *Export destinations:* Montenegro, Bosnia and Herzegovina, Croatia, many EU countries, Russian Federation, USA, Australia etc.
VENUS D.O.O., Knjaževac, has facilities for hot processing, receiving, freezing and packaging of fruits and cooler with total capacity of 800 t. Production of low calorie fruit pulp is in plan, as well as production of canned fruit and jam for diabetics.	Company is dealing with repurchase and processing of fresh fruits within Serbia, as well with exporter from Serbia. Sour cherry program includes: 1) Roland quality in package of 10 kg; 2) Rotative (without stone) done from fresh I class sour cherry in package of 10 kg; 3) Press-block sour cherry in package of 10 kg; 4) Sour cherry packed in ″Natron″ bags of 20 kg; 5) Sour cherry (with stone) in package of 10 kg; 6) Cooled sour cherry as bulk product.	ISO 9001:2000 and HACCP standards are in the process of implementation. *Export destinations:* Austria, Germany, Netherlands, Greece, Hungary and Croatia.
FORTIS COMPANY, Belgrade (with production capacities in Bojnik, in south Serbia, on 6,000 m^2).	Production and supply of frozen fruits and vegetables (around 7,100 t of frozen fruits and 1,000 t of vegetables). Sour cherry has a significant share within program.	1) Codex Alimentarius CAC/RCP 1-1969, Rev. 4/2003; 2) HACCP; 3) IFS concept. *Exported destinations:* surrounding countries and some EU countries.
DESING D.O.O., Belgrade	Fruit processed products in package 1-20 kg. Termoseal PE 3,000 t/year.	1) ISO 22000:2005; 2) ISO 9001:2008; 3) 14001:2004. *Export destinations:* France, Croatia, Macedonia and Hungary.

Table 3 (cont.)

STRELA, Leskovac	Facilities for repurchase, processing and distribution of wild (forest) and agricultural products. Packaging of sour cherry is in program (V without stone - 10 kg and V with stone - 10 kg, VP – 10 or 20 kg), as well as processed sour cherry products.	*Export destinations:* surrounding countries and some EU countries.
BURLATPRO D.O.O, Ritopek, trading company	It deals with repurchase, packing and sale of fresh fruits all over Europe, including special program for sweet cherry.	*Export destinations*: many EU countries. Sweet cherry program is realized also in Russian Federation.

Source: Internal data of authors based on interview with entrepreneurs, 2011

In last five years, Serbia achieved on average positive balance in foreign trade exchange with sweet cherries. The average difference between export and import was 2,106,535 kg, or expressed in value 1,878,322 EUR (Table 4). Results show that, in previous years, Serbia became competitive by the price and quality of produced sweet cherries on international market.

Table 4. Foreign trade exchange of Serbia with sweet and sour cherry for period 2006-2010

Year	Import			Export		
	Kg	**US $**	**EUR**	**kg**	**US $**	**EUR**
Sweet cherry						
Average (2006-2010)	19,552	27,343	19,819	2,126,086	2,715,478	1,898,141
Balance	-	-	-	+ 2,106,535	+ 2,688,135	+ 1,878,322
Sour cherry						
Average (2006-2010)	169,375	85,128	63,763	7,167,211	3,292,073	2,430,817
Balance	-	-	-	+ 6,997,836	+ 3,206,945	+ 2,367,054

Source: Statistical Office of the Republic of Serbia, Foreign trade administration

Sweet cherry is exported from Serbia mainly to the Russian Federation and Belarus, while the export of sour cherry is oriented to several countries - Ukraine, Moldova, Russia, some EU countries, surrounding countries etc. In the foreign trade exchange with sour cherry, during the period 2006-2010, Serbia also achieved positive balance. Besides the export of fresh cherries, a large share of Serbia foreign trade exchange has processed products of mentioned fruits: compotes, jams, juices, syrups, jellies, schnapps, liqueurs etc.

Table 5. Export and import of fruit jams and jellies of sweet and sour cherries, world leaders

Main exporters	Volume (in t)	Main importers	Volume (in t)
China	93,000	Russian Federation	146,000
Netherlands	83,000	France	104,000
France	81,000	Germany	81,000
Chile	74,000	United States	79,000
Italy	72,000	United Kingdom	54,000
Republic of Moldova	8,200	Kazakhstan	12,000
Uzbekistan	5,400		
Bosnia and Herzegovina	3,000		
Serbia	3,000		

Source: FAO, 2011.

The value of exported processed cherries' products from Serbia in 2010 was around 7,976,664 EUR, and by adding the value of exported fresh cherries in the same year (3,229,051 EUR), the total value of exported cherries (fresh and processed), was over 11 million EUR.

According to the data of Statistical Office from 2011 and Customs Administration, in 2010 from Serbia: 451,780 kg of fresh sour cherries amounting to a total of 233,134 EUR was exported to

Russia, Belarus and Austria; 1,493,587 kg of frozen sour cherries amounting to 682,332 EUR to Germany, Italy and Netherlands; canned sour cherries mainly on Russian market in quantum of 582,683 kg with total value of 832,622 EUR; cherries' jam and jelly in Belarus (2,085 kg with total value of 700 EUR); cherries with the alcohol in Croatia, Germany and France and sour cherry juice in quantum of 3,691,544 kg with total value of 6,203,856 EUR in Germany, Russia, Austria, Netherlands and France.

Need for Cooperation and Possible Marketing Chain in Cherries Production

The association of producers and processors should represent the interests of all stakeholders in the chain, achieved through general advice, pricing policy, promotion etc. The main reasons for cooperation are: legal support and security; information on inputs; more rational production processes managing; easier handling and storage of final products; faster and more efficient product realization; financial support (credits, grants etc.); better infrastructure; better capacity utilization; education on quality improvement (standards etc.); higher productivity; lower losses and higher production efficiency; better profitability; etc. Besides the above-mentioned reasons for cooperation, in order to save and better utilize capacities, it is important to underline that many institutions are likely to cooperate with organized and associated producers. For example, the financial assets in common investments (modern facilities, such as coolers) will be more accessible to an association than to a single producer. So, if small cherries' producers want to seriously compete with large producers, success can be achieved only through their association. Small land parcels, often the case in Serbia, for small producers are bottleneck in the achievement of the required quantum of cherries (if they want to meet the customers' needs). Therefore, the associated producers have the ability to organize larger production under uniform standards. Only thus they can provide continuity and survive market competition. For the single producer there is a higher risk to fail, while united in common business they have greater chance to successfully realize all activities (Sredojević, 2011).

One of the possible ways for Serbia to be competitive on the global cherries' market is in horizontal and vertical integration within marketing channels. Horizontal integration enables economy of scale, while vertical integration provides many, more efficient marketing systems (multi-channeled distribution, packaging, transportation, direct sale and inputs production). Within cherries, as within other fruits, the quantum of production depends on natural factors (type of soil, climate, water supply, pests etc.) which means unpredictable yield. The variability of fresh fruits' quality hinders its distribution in fresh state. This problem is especially difficult with sweet cherry, as it is mostly realized in Serbia as fresh fruit, so organized marketing channels have to be much more efficient through vertical integration.

The marketing chain of cherries in Serbia has many links, such as: producers, purchasing centers, coolers and processing facilities, industrial capacities, wholesale and retail facilities, export and trading companies etc. The processing capacities, after socialism, were divided into smaller units and privatized, so currently coolers and processing facilities are less accessible to individual producers. To avoid unfair competition and ensure success to all stakeholders, the state has to impose universal marketing channels. Cooperation among all participants within specific marketing system can significantly increase the profitability of fruit production.

Cherries are produced in Serbia in various ways. A larger part is purchased by cooler owners, trade companies, processing companies, but a great part is sold in local or city green markets. The production of sour and sweet cherries by implemented standards requires compliance to regulations in all production phases, starting from proper choice of sort, through application of adequate agro-technics, picking, sorting, processing, packaging etc. Supermarkets claim product quality, quantity and continuous delivery. Quality implies production and packaging by implemented standards, as well as application of modern infrastructure for cooling, storing, processing and transport.

Unfortunately, the payment system during the purchase is not well regulated. Although some of the purchased volumes are paid in cash on the day of delivery, most deliveries are on deferred payment that causes distrust in producers. With consistent payment policy, imposed by the state, for fresh and processed fruit, frauds and tax evasions should be minimized. Aiming at regulated payments, each producer should have a bank account. Purchasers (buyers) are currently intermediaries within marketing channel of cherries. They make the link between small producers and owners of coolers/processing facilities. Buyers of fresh cherries organize the purchase and transportation of fruit to the final destination. According to experts' unofficial estimates, they provide up to 75% of fresh fruits for coolers owners of in Serbia, taking compensation (fee) for their services. This fragmented process results in the inability to control the origin of the cherries and other fruits, as well as in the prevention of possible speculations and improper payments to producers.

The first solution is to integrate purchasing centres, coolers and processing facilities into the system, or into producers' association (they would have more control over the realization of their products), according to the model of vertical integration. Existing transportation costs from producer to cooler will be reduced. The quality control and safety of cherries will be improved, and this production would be more profitable for all producers. Such vertical integration will shorten marketing channels.

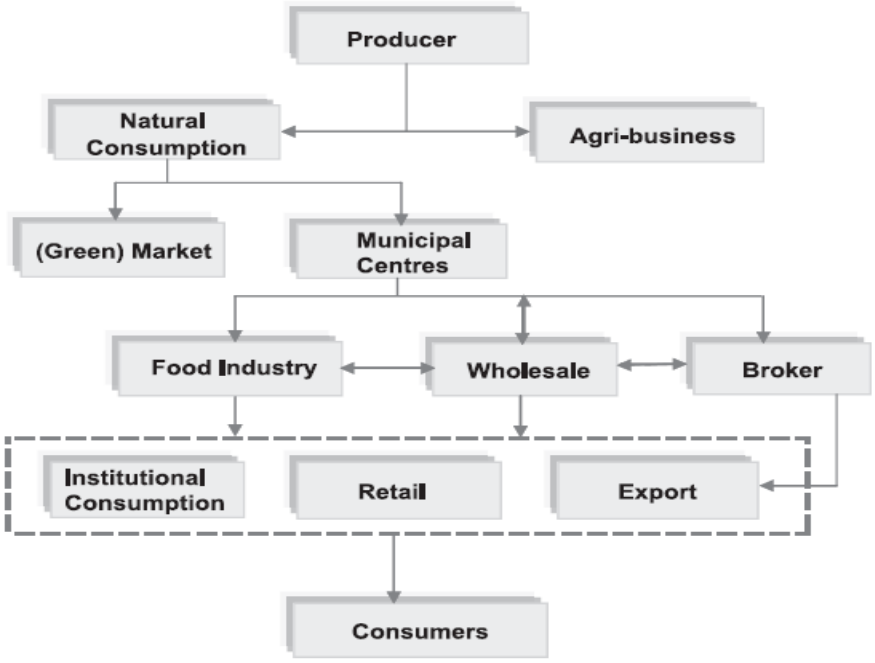

Fig. 1. Proposed marketing channel chain for sweet and sour sherry in Serbia

Source: presentation of authors

The second solution is the organization of purchasing centres at municipal level. Municipality centres will be equipped with storages and equipment for sorting and packing and in accordance with required standards distribution of cherries to wholesale and retail chains, processing centres etc will be made. Large, integrated municipal centres can develop their own brands, guaranteeing quality and standards of cherries. The nutritional value of these fruits and their processed products (as well as their final financial value) depends on their quality and characteristics, sorting, packaging, storage conditions, used way and duration of transport, as

well as treatment and exposure in retail stores. In processing industry increasing trend of standards implementation, such as HACCP, ISO 9001, ISO 9002, ISO 14000, ISO 21000 etc. is present. Some companies follow new trends in digital processing technology with an aim to increase competitiveness in all forms of cherries usage, including jams, jellies, beverages, schnapps, chocolates, candies, cookies, cakes, juices, syrups, flavourings, drugs and creams. For customers, the undamaged product is very important. Proper product protection for quality preservation and during delivery within the production chain from farm to table is expressed with good packaging (Sredojević, 2011). Packaging is particularly significant at sensitive products, such as cherries, since in these cases it is not a luxury but a necessity, and the ideal solution for producer to avoid losses during fruit storage and transportation. Besides security and protection, the packaged product is suitable for presentation and sale in stores and at green markets. Experiences from developed countries indicate that the present supply centres of fruits and vegetables for the urban population, pretty soon will move from green markets to hyper or supermarkets.In order for producers of sweet and sour cherries to be able to successfully sell their products in the modern marketplaces, they need to work on their production improvement and standards setting. Product quality is crucial in the offer to the supermarkets. The introduction of good agricultural practices within production process is carried out and controlled by extension service sector. An important precondition that must be met is the continuity of supply, as well as product quality and safety in transport, i.e. the use of modern packaging. To sell cherries abroad, manufacturers and/or cooperatives managers must meet many demands: products quality, packaging, phyto-sanitary inspection, contracted quantities, and delivery deadlines etc. In addition to signing contracts with some of the exporting firms or establishing direct contacts with foreign partners, there is the possibility to supply such agricultural products through the GTN system (Global Trade Network). GTN system connects entrepreneurs of all South-East European countries with entrepreneurs from around the world, whereby the system of connecting is based on the fact that the first contact is made through the Department for market information.

Market intermediaries are participants in the process, that are assisting the company in the activities of marketing communications, sales and business distribution of product to end-consumers. These are: resellers, physical distribution businesses, agencies for marketing services and financial intermediaries. Resellers are the companies located in the distribution channel that help the company to find buyers and sell goods. The survival of certain marketing channels is largely determined by consumers. The goal of any channel is to meet the consumers' needs through acceptable quality, safety, presentation and price.

All agents within the sweet and sour cherries marketing channel need to be aware of the end user requirements and respond to them. Consumers demand fast service and product quality. All participants in marketing channels have to work together in a vertically integrated supply chain in order to: generate higher profits, achieve better positioning in the market and meet consumer demands for cherries, and products obtained by their processing as well. The complex of work conditions, changing business environment, competitors' pressure, and huge fluctuations in demand, force the development of an integrated system. Current action must be directed towards the establishment of an optimal balance between producers and trade institutions, as well as increase of interest of all parties into the marketing integration process. Growth, profitability and competitiveness of sector must be improved through investments in all stages (production, processing and marketing) and changes in export structure. The product packaging, design, and transportation should be especially upgraded for export markets.

Conclusion

Serbia has very favorable agro-ecological conditions for production of sweet and sour cherry and good perspectives for their export. Based on conducted analysis, it could be concluded that

both sweet and sour cherry are profitable fruit species for producers in Serbia. In order to improve their production and sale, it is necessary to take appropriate organizational measures, as in primary production, as well as within processing activities and product realization.

It is necessary to create production zones and form registries of sweet and sour cherries producers, to encourage the implementation of good agricultural practices within production, processing and products realization, to promote the association of small producers with the provision of financial and institutional support, to invest in modern technology (from primary production to processing and packaging) and to continue with European standards implementation, to analyze the markets for better positioning of Serbian producers and processors, to implement better investment support for establishment of new modern plantations under improved sorts, to invest in processing capacities and to develop new processing programs, to support financially and organizationally all producers and processors of cherries on the most important world fairs, to promote the cherry-based products and to support the joint presence of national companies on foreign markets etc. By the elimination or reduction of the above-mentioned problems, accompanied by higher investment, achieved economic effects in this sector of agriculture would be even better. Only through quality, quantity and continuity, producers, processors and exporters will gain higher profits, which will as well improve the observed production.

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Investițiile în programe de producție şi procesare a cireşelor dulci şi amare în termenii competitivității agricole sârbe

Rezumat

Bazată pe indicatorii medii ai ultimilor cinci ani: 2006-2010, articolul analizează produc□ia, procesarea şi vânzarea cireşelor dulci şi amare în Serbia. În plus, următorii factori sunt de asemenea analizați: volumul producției, producția medie, dispersia producției regionale, eficiența capitalului investit în realizarea plantațiilor de cireşe, structura prețurilor, legăturile orizontale şi verticale dintre producători şi consumatori, posibilitățile de investiție în noi programe de procesare, în funcție de practica existentă în Serbia. Conform indicatorilor determinați, autorii formulează câteva sugestii în vederea perfecționării competitivității acestui sector agricol.

Produc□ia, procesarea şi vânzarea cireşelor în Republica Serbia se confruntă cu multe aspecte problematice, precum: fragmentarea pământului, nivelul tehnic şi tehnologic scăzut, cooperarea insuficientă dintre producători, vânzările instabile, implementarea lentă a standardelor etc. Aceste probleme sunt în principal rezultatul investițiilor insuficiente pe termen lung. Activitățile tuturor păr□ilor implicate (producători, procesatori, exportatori, consumatori etc.) în dezvoltarea pie□ei ar trebui concentrate pe următoarele aspecte: adoptarea şi implementarea standardelor care permit orientarea către produsele cu valoare adăugată (în detrimentul producției integrale şi organice), protecția produselor care dețin specificații geografice, eliminarea pieței negre, dezvoltarea infrastructurii logistice şi de piață, precum şi a cadrului politic şi legal şi crearea unui mediu de afaceri adecvat investiției în producția menționată.