Market analysis of the fruit sector in Zlatibor County, Serbia
3. How can fruit production become more competitive?

2. Zlatibor County’s Fruit Production Sector

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Preamble

South-western Serbia’s private sector development (PSD) project is a three-year programme funded by the Government of Switzerland through the Swiss Agency for Development and Cooperation (SDC) and implemented by the Regional Development Agency “Zlatibor” (RDA Zlatibor). The project’s overall objective is to contribute to the generation of income and employment by facilitating market development in sectors with growth potential, namely: tourism, fruit production, meat processing and dairy production.

The fruit production sector has been selected for development intervention for the following reasons:

- **Relevance:** Fruit production is dealt with intensively or extensively by around 70% of rural households; 14% of households represent the dominant source of income generated from fruit production; 30% of Serbia’s total raspberry production takes place in Zlatibor County and the images of individual municipalities are fully supported by specific types of fruit (“when I say raspberries, I think Arilje”), which all serves to prove that this sector displays dynamic growth and represents a significant contribution to the regional economy.

- **Potential for intervention:** The PSD programme provides support in sectors with growth and development potential, on the one hand, while, on the other, it recognises so-called “actors of change” that have the capacity and strength to lure and “tug” others. The area’s competitive position within Serbia, but also on the international market, creates the space for various interventions to contribute to systemic change: transferring knowledge and information, spreading good production practices, promoting connectivity, intensifying the use of research and development, promoting regional products etc.

The PSD project uses the M4P (“Making market work for the poor”) approach to market development, which is widely accepted by development agencies worldwide. By supporting the current market, the PSD project seeks to achieve long-term, systemic change that will facilitate this sector’s growth and development. Through interventions in the areas noted, the project aims to achieve the effect of increasing revenues in the fruit production sector and thereby increase employment opportunities.
1.1. Private Sector Development Project (PSD) – Review

The Regional Development Agency Zlatibor is implementing a three-year PSD project (May 2009 - April 2012) in five municipalities of Zlatibor County: Arilje, Novi Varos, Prijepolje, Cajetina and the City of Užice, while funding of CHF 1.65 million is provided by the Government of Switzerland, through the Swiss Agency for Development and Cooperation (SDC).

The project’s overall objective is to reduce poverty and improve the economic position of all stakeholders in the value chain of SMEs, creating opportunities for job creation and safeguarding existing jobs through a system of multiphase interventions to support the SME sector’s growth and development. These three sectors have been selected: tourism, meat/dairy processing and fruit production, as these represent the backbone of the SME sector’s growth and development.

The project covers, alongside a review of the specific approach applied for analysis of markets and criteria for the selection of the fruit-growing sector.

The following chapter provides a brief overview of the “Private Sector Development” project (hereinafter “PSD”) and the region the project covers, alongside a review of the specific approach applied for analysis of markets and criteria for the selection of the fruit-growing sector.

1.2. Why the SDC selected Zlatibor County

Zlatibor County is located on the territory of south-western Serbia, at the three-way intersection of Republic of Serbia, Montenegro and Bosnia and Herzegovina. It is Serbia’s largest county in terms of area (6,141 km²), covering the territories of 10 municipalities: Arilje, Bajina Basta, Cajetina, Sjenica, Kosjerić, Nova Varoš, Pozega, Prijepolje and Užice. It is home to 313,396 people living in 158 settlements.

The private sector development (PSD) supports RDA Zlatibor in the strengthening of cooperation among all three play important roles as generators of income and employment: tourism, meat/dairy processing and fruit production. Three sectors have been selected: tourism, meat/dairy processing and fruit production, as these represent the backbone of the SME sector’s growth and development.

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industrial sectors are: the slaughter industry, meat processing and production of cooked meat products (ham, sausage, bacon etc.), milk and dairy products (cheeses and creams), natural fruit bran- dies with registered geographic origin, medicinal herbs and forest fruits (mushrooms, wild strawberries, blueberries, juniper berries etc.), while capacities also exist for the production of fruit juices, syrups, jams, marmalades, composites, preserves and the processing of vegetables.

Zlatibor County’s agricultural production, tourism and processing industry ensure the creation of added value to the aforementioned sectors.

The total population of Zlatibor County (according to the 2002 cen-
sus) is 313,396, which marks a 5.7% decrease on the population re-corded by the previous population census of 1991. It also equates to 4.3% of the total population of Serbia (7.5 million). Individual parts of the County are characterised by pronounced poverty and the country’s average unemployment rate is 31.3% (2009). Young people, lacking adequate opportunities to secure income and employment, tend to leave to seek opportunities in urban centres (Belgrade, Novi Sad). Outward migration represents a major threat to socio-economic progress in the County and deprives existing businesses of skilled labour. The average monthly salary in the dis-trict (EUR 369) is below the national average (see Table 1). Dispari-

380 towns and villages. According to its geography and soil con-
figuration, Zlatibor County is classed as a hilly-mountainous area, with forest and forest land covering 42% of territory and agricul-
tural land accounting for 5% of the total area. In the period prior to the economic restructuring of the Republic of Serbia, during the 1990’s, the main industrial activities included textile production, metallurgy, mining and production of building materials. In 2005, with exports worth £310 million, Zlatibor Coun-
ty contributed 5.96% to Serbia’s foreign trade, mainly thanks to exports of non-ferrous metals (copper and aluminium), fruits and textiles. Industry is characterised by a low level of increased value and the closures of a number of companies operating in these in-
dustries, coupled with the privatisation of large systems. This has re-
sulted in a significant increase in unemployment levels within the county. Zlatibor County boasts significant natural resources, with the dominant sectors represented by the processing indus-
ty (metals 21.2%) dominating the processing sector; followed by indus-
trial minerals (19.8%) and the production of textile products (11.2%). Zlatibor County also enjoys a high share of Serbia’s total production for certain individual products: raspberries (30%), po-
toess (10%) and plums (5%). The most developed activities in agro-

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| Table 1 - Population and some poverty parameters |

Context

Overview - Zlatibor County and selected municipalities

Serbia

Zlatibor County

Context

Overview - Zlatibor County and selected municipalities

Serbia

Zlatibor County

Context

Overview - Zlatibor County and selected municipalities

Serbia

Zlatibor County

Context
ties between the impoverished rural and urban populations are extremely high. Vojvodina and Western Serbia (of which Zlatibor County belongs) record the biggest difference2.

The high rate of outward migration - especially among young people, high unemployment rate in the county, low income - especially in rural areas - and major disparities in the development of municipalities lead to the conclusion that developmental interventions are essential to creating sustainable sources of income and employment for more people. PSD is a pioneering project in Serbia that promotes this approach based on the following four elements:

- Understanding the market system: A base of intensive research and analysis in order to develop an understanding of target markets and identify obstacles in the environment, thanks to which we will be able to observe the differences between symptoms and their root causes. This approach allows the project to provide all stakeholders (market players, municipal representatives, et al) with clear and strategic advice based on information.
- Drastic systemic change: Focusing on the causes of problems rather than the effects enables an understanding of unfavourable and/or insufficiently-functioning markets, positions and capacities of different stakeholders – both on the market and in the environment – thus enabling systemic change. With such a focus, the PSD project differs from conventional development programmes that aim to provide direct solutions to companies and thereby restrict their range of action and sustainability.
- Focus on sustainability: The directing of intervention towards systemic solutions ensures that sustainability is the central point of this approach. The project views sustainability in a broader sense, as a market opportunity for the target group to offer and use a variety of goods and services even after a period of intervention. As such, the guidance for this work includes two questions:
  1) Who will be responsible for implementing key market features in the future?
  2) How will that be made financially sustainable?
- Intervention through facilitation: Via the PSD Programme, RDA Zlatibor is continuing its strategic orientation from being a direct provider of services to SMEs to a facilitator of regional socio-economic development. This entails reflecting a strategic role as a catalyst for development processes in the county, based on market research and analysis in order to provide interested parties with strategic guidance and motivate them to assume responsibility for the implementation of certain functions. Essentially, facilitation represents the stimulating of others to take action based on their motivation and capacities. In this way, the programme supports RDA Zlatibor’s strengthening of its strategic and facilitator role in the process of EU integration.

The entire intervention process is illustrated in Review 3 in accordance with this process, the PSD project commenced Analysis activities in the selected municipalities in May 2009, aimed at achieving better understanding of the target group (youth, unemployed, women, “impoverished”) and their socio-economic context. As a result of this phase, the project selected three sectors for further intervention: tourism, fruit and meat and dairy.

Context
Using a phased approach, implying graduated intervention based on mutual support, the project has conducted in-depth market analysis of the fruit production sector (level 2 in the diagram, with results summarised in this report), in order to ascertain the structure and dynamics of the fruit production sector, as well as difficulties hindering intensive and comprehensive growth. As a result, the project defined three key areas of intervention (see Chapter 4), which will represent the project’s main focus over the next 18 months.

1.4. Why the fruit production sector was selected?

- Relevance to the local economy
  
  Fruit production is dealt with by around 70% of farms, while 14% of households represent the dominant source of income generated from fruit production. Although only 3,5% of agricultural land is dedicated to fruit production, 20% of Serbia’s total raspberry production takes place on the territory of the selected municipalities and 3% of plum production.

- Potential to generate income and employment
  
  Export-oriented fruit production: – over 90% of raspberries are exported, 76 cold storage facilities employ around 1,500 workers; 188 million organic plants are grown over a smaller area but achieve an average yield of 7,1 t/ha higher than the national average (5,1 t/ha).
  
  Potential for intervention
  
  The PSD programme provides support in sectors with growth and development potential, on the one hand, while, on the other, it recognises so-called “actors of change” that have the capacity and strength to lure and “tug” others. The area’s competitive position recognises so-called “actors of change” that have the capacity and strength to lure and “tug” others.

2. Zlatibor County’s Fruit production Sector

This chapter covers analysis of the fruit-growing market, observing basic components of the regional supply of fruit products and describing trends in fruit production over recent years, thus providing the basis to understand market dynamics and key challenges facing fruit production in the participating municipalities of Zlatibor County.

2.1. Territory devoted to fruit production

A surprising fact is that a mere 3.5% of the county’s total agricultural area is devoted to fruit production, but even that represents the second most important agricultural activity after livestock farming, throughout the Zlatibor County and the targeted area. Fruit crops occupy significant areas on the territory of the City of Užice (10,14% of total agricultural area) and in the Municipality of Aržane (16,91%). The area devoted to fruit production is much lower in other municipalities, while the municipality with the least fruit cultivation area is Nova Varoš (2,24%).

2.2. Fruit producing crops

The Zlatibor County produces: plums, apples, cherries, sour cherries and pears (the last three are not cultivated extensively, representing only isolated pockets on land plots); raspberries, strawberries, blackberries (blackberry plantations were much more widespread in the past, though lower profitability compared to raspberries contributed to the demise of raspberry production) and, in recent years, plantations of blueberries – as an alternative to raspberry (in case of a bad raspberry season, according to the producer). Thus, raspberry, apple and plum achieved dominance in the area’s fruit production sector.

At first glance (Graph 1) and considering production levels, it would appear that plum production dominates, followed by apple growing. However, this is affected by the number of trees and the area covered by plantations, as opposed to yield. If we consider yield, we can see that production of plums (7,9 kg) and apples (13,02 kg) per tree is below the national average (14,5 and 15,5 kg respective ly), indicating more extensive production. Raspberries, however, are grown over a smaller area but achieve an average yield of 7,1 t/ha higher than the national average (5,1 t/ha).

Graph 1 - Trend of raspberry, apple and plum production (T) in participating municipalities
Raspberries represent the most profitable commercial fruit crop in Zlatibor County, which is the country's biggest raspberry producing area. Some 25,810 tons of raspberries were produced in the Zlatibor County during 2009, accounting for 29.7% of total raspberry production in Serbia and 20.97% of total land area used for raspberry growing in Serbia.

2.3.1. Surface area, raspberry production and yield in Zlatibor's participating municipalities

Summarily observed, Zlatibor County is Serbia's largest producer of raspberries. However, major disparity is evident between the participating municipalities when it comes to the structure of production, yield and surface area devoted to this crop in 2009 (Overview 4).

"More than 5,000 small factories produce about 20 million kg of raspberries annually in open-air grows, providing the municipality with significant foreign funds. This area boasts the world's highest concentration of raspberry plantations, Europe's largest cold storage facility for freezing fruit (Agricultural Workers Cooperative Arilje") and it was here that the record was set for production of raspberries (44.763 kg per hectare). Here practices change the theory. Raspberry gave new life to the Arilje area, which is why the locals erected a monument to the fruit." - Development Programme of Arilje Municipality

Arilje represents a hub of raspberry production: commercial raspberry growing is carried out in every village in the municipality and, according to estimates, the average farm cultivates raspberries over 0.25 hectares.

Besides Arilje, significant raspberry producing areas are located in Uzice, where production is carried out on plantations covering 0.1 - 1 ha. There are limited possibilities for the development of raspberry production in Nova Varos, Priboj, Prijepolje and Cajetina, due to the local microclimate and land configurations. As such, the average raspberry plantation in these municipalities covers from 0.10 to 0.15 ha. According to average yield, with the exception of Priboj municipality, which has a slightly higher average yield, it is clear that this is a case of extensive production. Considering the land configuration of almost all participating municipalities, a greater surface area for planting should not be expected. As such, the proper implementation of all agro-technical measures is key to the realisation of larger scale production.

Significant growth in raspberry production levels are registered in the municipalities of Arilje and Prijepolje, while the fruit’s production is stagnating or slightly declining in other municipalities (Graph 2). If we add to this the major differences in average realised yields, one can conclude that there is no transfer of knowledge or good manufacturing practices and that Arilje does not represent a "trigger" for growth and the advancement of raspberry production in other municipalities.

The most common raspberry variety produced in the area is the Willamette type, which accounts for an estimated 95% of surface area used for raspberry cultivation. The remainder is devoted to production of the Meeker and Tulameen types. Willamette is most-likely used for freezing, while the Meeker and Tulameen varieties are used for fresh sales.

Graph 3 - Share of production in County (%) Statistical Office of the Republic of Serbia (2009)

Intensive fruit production implies the application of adequate agro-technical production measures and knowledge aimed at obtaining the best possible yield in terms of both quality and quantity. Extensive fruit production is the opposite of intensive production and relates to the absence or partial application of knowledge and agro-technical fruit production measures.
2.3.2. Cold storage facilities and workforce

Raspberry crops require a large commitment of labour. Larger cold storage facilities (number and capacity of cold storage facilities shown in Table 2 and Overview 5) have 30-40 permanent employees year round. Smaller cold storage facilities have up to 15 full-time employees, while the number of staff significantly increases during the harvest season, when the number engaged by large cold storage facilities exceeds 100 employees (handling, grading etc.). Just 1 ha of raspberry plantations requires a staff of 12 workers during the harvest season (60 kg of raspberries per day). Estimates suggest that around 5,500 non-local workers are employed in the harvest season in Arilje alone (picking, bulk buying and transportation), considering that local residents are fully engaged in these activities. The seasonal workforce mainly comes from Zlatibor’s underdeveloped municipalities, such as Priboj and Prijepolje, as well as travelling from Eastern Serbia and Romania. The trend of engaging this temporary workforce grows alongside the growth of production. The workforce in other municipalities is represented solely by household members.

2.3.3. Markets and competition

The repurchase of raspberries from producers is organised by cold storage facilities that buy an estimated 97% of raspberry crops, while the remainder finds its way to the local market. Raspberries purchased by cold storage facilities during the harvest season are sold on foreign markets as frozen produce. The most significant markets for the placing of raspberries are Germany and France, which are accessed via at least one mediator – large trading companies (wholesale firms, for example) – which then place frozen raspberries in large retail chains. The reason for this, on the one hand, are existing market divisions between major retailers operating on the European market for a long time. On the other hand, no cold storage facility in Serbia boasts sufficient quantities of frozen raspberries to meet the needs of large retail chains (value chain - Overview 6).

Part of the domestic yield of frozen raspberries is packed domestically in end-user packages, while part of the export yield is packaged abroad – though the size of the package determines the end-user. Packages range from small, weighing 0.200 kg, to cardboard boxes weighing 10-15 kg. In both cases, packages display notifications that the raspberries are sourced in Serbia, though without the branding of local manufacturers.

A higher level of raspberry processing, which would add to the product’s value, or the placement of fresh raspberries, which would replace frozen raspberries to a certain extent, is almost nonexistent. One of the main reasons for this is a lack of research and development; lack of information on foreign markets: supply and demand in terms of new products and trends, new technologies that would provide cold storage firms with an adequate basis to invest in higher levels of raspberry processing.
The Zlatibor County's main competitors in Serbia are the Morava County and the Macva County (Graph 3). The Morava County has recorded a slight decline, both in terms of production and planted area, while the Macva County has recorded slight but constant growth in levels of raspberry production and surface area devoted to this crop in the last five years – though this county achieved average yields below those of the other two districts (in 2009 the average yield in the Zlatibor County was 8.099 kg/ha, in Morava it was 7.576 kg/ha and in Macva 5.092 kg/ha).

Serbia’s main European rival is Poland, which is recording growth of raspberry production year-on-year. In the period from 2005 to ‘08, raspberry production in Poland rose by 24.58%. However, if we observe the period between 2007 and 2008, we can see that raspberry production in Poland increased by 44.68%, while in Serbia that growth totalled 9.5%, which indicates that this growth trend will see Poland soon overtake Serbia’s raspberry production volume. Increasing raspberry production in Poland ensures the country’s greater ability to supply the European market, which poses a serious threat to the production and placement of raspberries from Serbia (Graph 4). Neither Serbia nor the Zlatibor County can compete with Poland when it comes to increasing the surface area devoted to this crop, due to natural limitations. However, accordingly, Serbia can endeavour to increase yields and introduce new varieties (extending the fresh raspberry season) to existing raspberry areas through greater application of knowledge and the improvement of production practices.

In 2009, exports of raspberries from the Uzice region (Table 3) accounted for 32.12% of Serbia’s total raspberry exports, while in 2008 it accounted for 30.22%. Serbia’s main global competitor in the production and export of raspberries is Chile, though it should...
be noted that Chile mainly exports fresh raspberries to the markets of Western European and North America, out of season in the northern hemisphere, with which one can interpret price differences.

It is essential to note that internal imports of frozen raspberries from the Republic of Serbia to the Zlatibor County is a result of lower purchasing prices, while those same raspberries are subsequently repackaged and exported to foreign markets.

2.3.4. Challenges facing the production and sale of raspberries

Raspberries from the Zlatibor County are a competitive product on the European market. However, constant effort is required to maintain and improve its competitiveness, which can only be achieved by improving the entire sector. Raspberry production in Poland is growing and, accordingly, so its offer on the European market. This represents a direct threat to sales of Serbian raspberries. Possible solutions include:

• Increasing raspberry productivity and quality on existing surface areas, coupled with the application of knowledge and good production practices, implies the expansion and availability of advisory services for all agricultural producers – key stakeholders when it comes to raising the productivity and quality of raspberry production. Some producers are earning far higher returns than others and represent a good example for other producers.

• Value added raspberries, whether that relates to sales of fresh raspberries or any other product, would lead to an increase in processors’ profits and their competitiveness on the market. A lack of higher levels of processing indicates a low level of innovation due to a lack of information on supply and demand fluctuations for new products, new technologies and future fruit processing trends.

2.4. Apple

The Zlatibor County boasts 6.3% of all apple trees in Serbia (the average number of apple trees in Serbia in the period from 2004 to 2008 was around 15 million, with a slight growth tendency at an average rate of 1% per year) and in 2008 the Zlatibor County achieved 7.67% of total apple production.

2.4.1. Apple production and yields in selected Zlatibor municipalities

The Zlatibor County’s apple producing centre is the Municipality of Arilje, which boasts 60.63% of the total number of apple trees in this region (Overview 7), realising three-quarters of total production and achieving the highest average yield per tree, which is among the highest in Serbia – indicating intensive commercial production. Most commercial orchards in this municipality cover an area of 3-3.5 ha, though a number of registered producers boats apple orchards with an area exceeding 10 ha.

Estimates suggest that Uzice has around 300ha of apple orchards. Yield per tree is equivalent to the Zlatibor County level, but exceeds average production per tree in the Republic of Serbia. Apple production in Uzice is characterised by small orchards planted on garden plots. A relatively small number of apple trees are cultivated in Nova Varoš, Priboj, Prnjavor and Cađetina. The slightly higher number of apple trees in Prnjavor is a result of the existence of two large “state” orchards, covering an area of 18 ha and owned by ZZ “Poljoprodukt”. These four municipalities achieve a mere 6.64% of the Zlatibor County’s apple yield, while the average value of yield per
The most common apple variety in the County is Idared, a traditional variety for this area and, thus, most orchards are older – though new orchards are being planted. The new varieties that are most in demand on the market are Granny Smith, Golden Delicious, Red Delicious, Gala, Mutsu etc. These varieties are also slowly appearing in new orchards, mainly in Arilje. One obstacle to establishing orchards of new varieties is a lack of storage space, with which their quality could be preserved – as opposed to the Idared variety, which are either immediately repurchased upon harvesting and/or display good characteristics for storage in basic conditions. An additional challenge for producers is a lack of storage space, with which their quality could be preserved – as opposed to the Idared variety, which are either immediately repurchased upon harvesting and/or display good characteristics for storage in basic conditions. An additional challenge for producers is the financial resources necessary to establish new orchards, as well as the 5-year period required for trees to reach full maturity and for the investment to be worthwhile.

Observed summarily, the number of productive trees in the Zlatibor County is increasing year-on-year, regardless of the fact that individual municipalities (Cajetina and Prijepolje) are experiencing a tendency of decline (Cajetina by 5.35%, Prijepolje by as much as 17.49%) as a result of clearing orchards due to their age. Observing apple production in Zlatibor County, we see that it is characterised by growth trends (during the period from 2004 to 2007), with the exception of 2007-2008, when there was a slight decline - dry years, which supports the thesis that an inadequate number of producers are engaged in the intensive production of this fruit (Graph 5). The highest production growth levels were recorded in Uzice, almost 10-fold, and Arilje, just over 6-fold. Production growth in the municipalities of Priboj, Prijepolje, Nova Varos and Cajetina ranges from 2.5 (Priboj) to 5.5-fold (Nova Varos).

2.4.2. Markets and competition

There is no organised repurchase of apples, nor is there a predefined or single market. Every producer has their own market (value chain in Overview 8), such as green markets, wholesale markets, mega markets etc. Apples are also sold to dealers who export to Russia and in 2008 the sale price was 0.30 to 0.50 euro/kg for first class fruit. The reason for the relatively low price of apples lies in the fact that producers do not have mini cold storage units that preserve the fruit’s seasonal characteristics and raise its sale price and, as such, apples are not stored until May and June but are rather immediately offered for repurchase after harvesting and storage.

Graph 3 - Share of production in County (%) Statistic Office of the Republic of Serbia (2008)

Graph 4 - Average yield (kg/tree) Statistical Office of the Republic of Serbia

Graph 5 - Apple production trend (T) in selected municipalities Statistical Office of the Republic of Serbia
Apple export figures for the Uzice region are shown in Table 4. Apple production in the selected Zlatibor municipalities is mostly exported to Russia, which is the world's biggest importer of apples (in 2008 Russia imported 1.1 million tons of apples). The lack of storage capacity/cold storage facilities is one of the reasons why imported apples are found on the domestic market, mostly originating in FYR Macedonia, Slovenia, Italy and Greece. The most common imported varieties are Idared, Granny Smith, Jonagold, Golden Delicious, Red Delicious and Gloster. Import trends vary from year to year.

Europe's largest apple producing nations are Poland, Italy, the Netherlands and France. These countries not only achieve enviable production levels, but also average yields ranging up to 50 t/ha, which Serbia and the Zlatibor County cannot meet. Observing the export market, Serbia's main competitors are Poland (Europe's biggest producer of apples, with 2.8 million tons in 2008) and France. Poland recorded a significant increase in apple production levels in the period from 2005 to 2008 – by as much as 36.43%, followed by a sharp fall in production in 2007, due to adverse climatic conditions (dry year). In contrast, observations of the sector in France show that, following a fall of 7.95% in the period from 2005 to 2006, it has experienced stagnation, while the area of land devoted to apple production is decreasing year-on-year – falling by as much as 14.29% in the period from 2003 to 2008.

Last year saw Moldova enjoy a large supply of apples on the Russian market, thanks to yields that were 30% higher than usual. Moreover, its geographical proximity significantly reduces transportation costs, ensuring that Moldova will continue to be a major supplier of apples to the Russian market in the future. Apples from China also appear on this market, and at lower prices than those from elsewhere. Apple production in China was in 2008 was up around 15% on 2007. As such, the year-on-year increase of apple production in China will create ever greater competition for European producers on the Russian market, primarily because of transportation costs.

<table>
<thead>
<tr>
<th>Year</th>
<th>Fresh apples (ton)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>1,581,504</td>
</tr>
<tr>
<td>2009</td>
<td>1,581,504</td>
</tr>
</tbody>
</table>

Table 4 - Apple exports from the Uzice region
Regional Chamber of Commerce in Uzice

Graph 6 - Apple production trends (1000/T) in Poland, France and Serbia
National Statistical Offices (Poland, France, Serbia)
2.4.3. Challenges to the production and sale of apples

The investigation identified numerous problems facing apple producers, which led to this sector’s lack of competitiveness in terms of productivity and fruit quality. By improving knowledge and production practices, introducing innovations aimed at creating new products and adopting new production processes through the increasing of productivity and improving of quality, it is possible to improve production in the following directions:

- Fresh apples on the domestic market in the off-season period

Beside the fact that domestic consumption of apples has recorded growth in recent years – noting that values are far below European consumption – apples appearing on the market in the off-season period are mainly imported. The reason for this is insufficient storage capacity that would preserve apples until May and June, as well as the tendency to offer apples for sale immediately after harvest – a result of producers not expressing an interest in holding on to their produce and, thus, realising a better price, due to a lack of knowledge of the market and short-term contracts with buyers that present a risk to generating income and recouping investments. Domestic consumption of apples in the off-season can be increased by improving the quality of fruit produced, through proper handling during harvesting and preservation in appropriate storage facilities and conditions.

- Fresh apples for foreign markets

Recent years have seen a growth in Russian imports of fresh apples, which is one of the reasons why the Zlatibor County recorded growth in exports of fresh apples – most of which find their way to Russia’s market. However, for fresh fruit from the Zlatibor County to endure and prosper on the Russian market it is necessary to increase productivity and quality, modernise production and bring it in line with standards of quality, as export to the Russian market requires the achieving of phytosanitary demands set by Russia and defined in the Memorandum of safety of plant products originating from Serbia. According to this, every food product of vegetable origin, and therefore fruit, must be accompanied by information on pesticides used during their production and storage, stating the last date of treatment.

- Value-added apples

A lack of finances, lack of knowledge of domestic and foreign markets that represent risk for investments in processing, as well as the closing of cooperatives in the transition period (through which it is possible to achieve greater commercial fruit processing), have led to a lack of processing and products on the domestic market (jams, preserves, compotes, pears, fruit concentrates, fruit juices). The Zlatibor County exports fresh apple products intended for industrial processing and imports fruit products made from fruit originating in our regions. Aiming for the reduction of this practice is essential.

2.5. Plum

Plums, according to the number of trees and surface area devoted to this crop, represent the most abundant fruit crop in the Zlatibor County, which is home to 7.89% of total fertile trees in the country and accounts for 4.52% of total production in the country – bearing in mind that the average yield is significantly lower than the national average (14.5 kg). Production in the Zlatibor County is characterised by small orchards and extensive farming, though there are also a small number of farmers that produce plums intensively and achieve production yields of up to 40 t/ha.

2.5.1. Plum production and yields in the selected Zlatibor municipalities

The Zlatibor County’s greatest concentration of plum trees are grown in the municipality of Arilje (Overview 9), which accounts for almost half of the Zlatibor County’s total production. The average plum yield for a mature tree in Arilje is among the highest in Serbia, which indicates intensive commercial plum production, though it is estimated that there are around 800 ha of extensive plum orchards. The average surface area devoted to plum production in this municipality is 0.5-1 ha/farm, while the biggest plum orchard covers around five hectares.

In Uzice, despite the large number of trees and enviable area devoted to plum production (303 ha), which only around 100 ha are
new plantations), significantly lower production levels are achieved compared to other Zlatibor County municipalities and the national average. The root causes are old and/or diseased plantations and failure to adopt agro-technical measures. Nova Varos, Priboj, Prijepolje and Cajetina account for just 12% of total plum production in the Zlatibor County. Estimates suggest that the surface area devoted to plum production ranges from 200 ha (municipalities of Nova Varos and Priboj) to 380 ha (Prijepolje) – noting that in these areas most plum orchards cover just 0.2 to 0.3 hectares. Production in these municipalities is extensive – farmers usually apply one to two chemical treatments per year, alongside the application of basic agro-technical measures (cutting, ploughing, fertilising etc.). Old plum varieties are most commonly represented: “pozegaca” and “ranka”. New commercial plum orchards that include varieties like “stensley”, “Cacak’s fruitful” and “Cacak’s beauty” are only cultivated in Arilje.

The highest growth in plum production, around seven-fold, was recorded in the period from 2004 to 2008 in Arilje (Graph 7). This is also the only Zlatibor municipality that didn’t record a fall in production in 2007 (drought), which supports the fact that this relates to intensive production. Difficulties in the remaining municipalities, beside inadequate production practices and the age of orchards, include the high price of investing in the establishment of new orchards, but also the long period required for trees to reach fruition (7 years), which has led to the production of plums in the selected municipalities falling/stagnating.

2.5.2. Markets and competition

There is no organised bulk purchase of plums in the County, though the cold storage firms that carry out bulk buying of raspberries do occasionally buy certain amounts of plums (value chain displayed in Overview 10), thus placement problems are not so pronounced. We can view the reasons in different ways, though undoubtedly the most common problem is that plums are traditionally grown for use in the home: making sweet preserves, jams, compotes, brandies – according to estimates, as much as 90% of plums are used to make this alcoholic spirit, thereby providing households with additional income, regardless of the fact that distilling capacities are generally not registered. A few households and businesses have registered distilleries and, in addition to purchasing plums, they purchase brandy and standardise it by re-distilling, bottling and selling on the market. The remaining 10% (according to estimates from Arilje) either find their way to the local green market (fresh plums) or are sent for drying.
Market analysis of the fruit sector in Zlatibor County

The export of plums from the Uzice region is displayed in Table 5. In 2008 it accounted for 4.67% of total plum exports from Serbia.\(^1\)

Besides exports, imported fresh and dried plums also appear on the domestic market, mainly sourced from Italy, Argentina, Chile and Bosnia’s Republika Srpska. In the period from 2004 to 2009, plum imports to Serbia grew significantly, almost 13-fold in terms of quantity.\(^2\) The reason for these imports is a lack of domestic plums out of season, due to insufficient storage capacities and the aforementioned processing practices (brandy, sweet preserves, compotes, jams etc.).

Serbia’s export competitors are Poland and Hungary\(^3\). With the exception of 2007, Serbia marked the highest growth in the production of plums in the period from 2005 to 2008 – as much as 99.67%, while Poland recorded growth of 24.29% (Graph 8). During the same period, plum production in Hungary rose by 55.67%.

2.5.3. Challenges to the production and sale of plums

Observation of plum production in the selected municipalities clearly shows this is an insufficiently competitive sector, primarily in terms of fruit quality and productivity. This has led to the sector facing numerous problems, such as: old orchards and inadequate assortments, fragmented yields, low level of knowledge and poor production practices, particularly regarding the application of new technologies.

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**Table 5 - Export of plums from the Uzice region by product type**

<table>
<thead>
<tr>
<th>Year</th>
<th>Fresh plums</th>
<th>Dried plums (pieces)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T</td>
<td>S/T</td>
<td>T</td>
</tr>
<tr>
<td>2008</td>
<td>386,928</td>
<td>472.85</td>
<td>674,577</td>
</tr>
<tr>
<td>2009</td>
<td>876,710</td>
<td>370.23</td>
<td>1,207,865</td>
</tr>
</tbody>
</table>

---

1. Export from Serbia in the period 2004-2008 went up by 85% in tons, and 116% in $. The highest export item was the one for Belarus at 6.74 kg, Germany 5.7 kg and Russia 5.4 kg. However, the largest quantities of plum were exported to Russia (12.250 t in 2008), Germany and Belgium. In the Russian market, Serbia holds the first place in terms of quantity of the imported plums, and the second place in terms of export value (9.6 million $). In 2008 Serbia imported 1.953 kg of plums, and Russia exported 1.3 million kg of plums.

2. In 2008 export of plums from Serbia to Russia was 53.97% of total Serbian plum exports (export from Serbia in 2008 was 22.700 t, and Russia from our country imported 12.250 t). Poland exported 7.148 of plums in 2008 to Russia, and Hungary 4.421 t.
Zlatibor County’s Fruit production Sector

Plums are traditionally exposed to higher levels of processing

- Value-added plums
- Dry plums (prunes) for the European market

Production lead to the following challenges:

- Knowledge. Overcoming the problems and obstacles facing plum cultivation practices, as well as improving production based on market information.

- Value added plums

Plums are traditionally exposed to higher levels of processing — though such products do not end up in the market, except for jams — from whole plums, apricots, peaches, rose hip, cornel berries — and raspberries; sugar-free jams — made from plums and Italian plums; regular brandies, plum brandy, and are intended for personal consumption, due to a lack of funds to purchase raw materials.

- Healthier Food, Healthier Family

Agricultural Advisory Expert Service Uzice (PSS) provides advisory services in the field of agriculture. ICP Arilje offers the following services: agrochemical analysis of land — the basis for recommendations for the cultivation of certain crops, hosting cattle breeding to be introduced into evidence in order for users to be able to access subventions provided by the Ministry of Agriculture, Forestry and Water Management. It also has 10 meteorological stations for the automated measuring and reading of data regarding temperature, light and rainfall, which provide opportunities for forecasting plant diseases. ICP Arilje monitors and adapts new technology related to the production of berries in closed half-closed spaces. The Innovation Centre has considerable experience and knowledge in the field of fruit production. The work is focused on the territory of Arilje, where manufacturers show great interest in these services. The Arilje Cooperative, an association of local producers of fruit products, can play a major role in the distribution of knowledge and good production practices in other targeted municipalities provided they increase the number of experts employed, as they currently engage only four such experts.

- Agricultural Centre of Priboj (ACP) was founded in 2003 as an association of experts in the field of agriculture, economy and tourism. It has considerable experience and knowledge in the field of agriculture, with the aim of producing healthy food and maintaining a healthy environment. The Agriculture Centre has displayed great success in work on agriculture projects (their main source of income), as well as in the provision of expert advice through TV and radio shows, and various lectures in villages around Priboj, Nova Varos and Rudo. This area has no advisory services for agriculture and rural development, thus farmers are deprived of the professional help required during production, as the aforementioned association, despite all the efforts, lacks sufficient financial resources and capacity (two employees in the chamber, with representatives of the SME sector, entrepreneurs, etc.), can be expected.

- Office for the support of rural development: plays a significant role in supporting the development of the fruit production sector through the Ministry of Agriculture, Forestry and Water Management which, through regulations and competitions,
Zlatibor County’s Fruit production Sector

Local Government:
- Planting of fruit orchards, grapes and hops. Incentive funds are adopted regulations on the use of incentive funds to increase the development of agriculture. Every year sees the government provides adequate subventions and resources to encourage the offer consulting services in the field of agriculture. The role of regulation, supported by organizing lectures, seminars, and mentoring services for agriculture are carried out by government farms, entrepreneurs, companies, agricultural cooperatives and are offered to private individuals - heads of commercial family units, anchors, pillars, wires) . The right to use these incentive funds compensate for the cost of acquiring support equipment (pallets, wire baskets, etc.) or used to compensate the cost of buying fruit seedlings and to planting raspberries, plums and apples. The Institute has an accreditation for laboratory testing of the Accreditation Body of Serbia (accredited via 200 methods), and also has introduced quality and health safety of foods of plant and animal origin, the analysis of pesticides, chemical analysis and microbiological analysis of almost complete raspberries (listed accredited method), analyzes the correctness of general use items (packages and packaging supplies). Half the funds (55%) provided by the Ministry of Finance, and the rest earn on the market, so that employees of this institution shows great commitment and willingness to work not only in the district, but outside of it, and preparation of projects for rural development, achieving the production of fruit, whether that relates to government subsidies, local government activities related to fruit growing, by organizational training for producers in order to spread knowledge and good production practices.

The nearest institution of this kind is the Fruit Research Institute in Cacak, which has a main activity of carrying out scientific research in the field of fruit production in the study of varieties of fruit and continental fruit types, creating new varieties, applying new technologies to breeding, studying methods of protection against diseases and pests, which are based on the system of preventive measures and fruit growing, applying the technical value of fruit. A complementary activity of the Institute is nursery production. For this purpose, the Institute has a plant nursery with specialized facilities and an independent vegetative base for the production of fruit seedlings for almost all locals . It produces seedlings for almost all kinds of plants and trees that farmers alone cannot set aside. Only producers in the municipality of Arilje show an interest in using these services, because production based on acquired knowledge and proper production practices can achieve profitable fruit production.

Local offices are present in most villages and represent places where residents can exercise their rights and present their own problems. A number of associations have emerged as a result of the production of fruit, whether that relates to government subsidies, local government activities related to fruit growing, by organizing training for producers in order to spread knowledge and good production practices.

Associations on the territory of the selected municipalities there are nine registered associations that bring together fruit growing producers. A number of them have emerged as a result of previous projects that were implemented in the field of individual municipalities (Prijeponja, Nova Varis), while others ceased to exist as a result of a lack of institutional support to local gov- ernments. However, the functionality of most of these associa- tions is low and activities are mainly achieved through individ- ual initiatives. The main problem leading to a lack of high-quality associations is insufficient public awareness about the impor- tance of association. By combining forces, producers could gain large and significant benefits – from the purchase of machinery, equipment and plant material. In addition to associations of producers, there are associations of entrepreneurs, such as the Association of Entrepreneurs of Arilje, which includes a section of cold storage firms bringing together almost all the main cold storage players in Arilje. Although this section includes about 40-45 cold storage firms, there is no common, united attempt to protect local market – rather most perform alone.
The previous chapter described the fruit production market and the dynamics of fluctuations and trends in the last five years, which showed that there is a difference in the competitiveness of fruit types. “Arilje’s raspberry” is set apart because of its competitiveness on both domestic and foreign markets, thanks as much to quantity as quality and taste, while plums and apples lag behind. Fruit production faces various challenges that influence market positioning and the increasing of competitive potential. Regardless of differences in the production of raspberries, plums and apples, there are some common causes that prevent, firstly, increased competition and, secondly, conquering markets. This chapter will cover discussion of the causes impacting on productivity, the (non-)functioning of cooperatives and innovation. Other problems and causes that affect the competitiveness of the fruit sector identified during the research are presented in Annex I of this report.

3.1. Productivity and the quality of production

When observing raspberries, the question may arise: How is productivity a problem when we are the biggest exporters in Serbia? It is clearly a problem for plums and apples, but raspberries? It is true, that raspberry yields are above the national average, but one should consider that these are ‘average’ values and that leading manufacturers achieve yields that significantly exceed the average. Besides leading producers, there are those whose yield is average or below average, together with the fact that they all have access to markets, because cold storage facilities have the capacity and need to buy almost all raspberries, which indicates that there is room to improve the productivity and sales of raspberries and, thus, increase the profits of agricultural households. The root cause of the lack of productivity is a lack of knowledge and failure to apply proper production practices, which represents a prerequisite for successful fruit production. The knowledge and production practices of the majority of producers is relatively low and is mainly based on experience – family tradition that has not sufficiently changed in accordance with advances of new technologies and knowledge now used in fruit production. The problem of the quality of fruit produced and the volume of yields is directly based on a lack of knowledge among producers regarding proper fruit production techniques. Bad production practices are reflected in a lack, or inadequate implementation, of all available agro-technical measures ranging from selecting location and land for establishing an orchard, through selecting appropriate species and fruit varieties, through irrigation, weed control, pruning, feeding plants, fight diseases and pests, all the way to handling fruit during harvesting and storage.

The aforementioned problems are particularly pronounced in the municipalities of Priboj, Prijepolje and Nova Varos, where the population engages in fruit production sporadically, extensively and in an inappropriate manner, with the aim of generating additional rev-
3.2. Processing and adding value to fruit through cooperatives

Cooperatives are particularly important for rural areas that are represented by small estates and small scale production that does not yield significant income and, as such, the processing of fruit to create local products is better able to achieve greater returns for their households.

3.3. Innovation: increasing the competitiveness of the fruit production sector through the sale of fruit products with added value

During research conducted in the selected Zlatibor municipalities, we observed a lack of higher levels of fruit processing that could lead to added value products and, thus, enhance the competitiveness of the fruit production sector through the sale of fruit products with added value.

One aspect of value-added products that could replace frozen raspberries to a certain extent is the sale of fresh raspberries on foreign markets. Raspberries are mainly sold as frozen produce on the international market, while the placement of fresh raspberries is poorly represented. Deep frozen raspberries, which have been sold on foreign markets for years, are the main source of income for all cold storage companies. They have been present on the frozen raspberry market for a long time and occupy an important position. Accordingly, they do not see the need, or lack sufficient financial resources, to separate on the basis of quality, or the packing of frozen raspberries, which would expand the product range and thereby increase their competitiveness.

Thus, one of the main reasons for a lack of innovation that would lead to the creation of new processes and new products is that the frozen raspberry market for a long time and occupy an important position. Accordingly, they do not see the need, or lack sufficient financial resources, to separate on the basis of quality, or the packing of frozen raspberries, which would expand the product range and thereby increase their competitiveness.

One aspect of value-added products that could replace frozen raspberries is the sale of fresh raspberries on foreign markets, which would not only help to ensure existing market positions but also secure new ones. The placement of fresh raspberries on foreign markets is the risk of financial investments in these kinds of products.

One reason why fresh raspberries are still not sold on foreign markets is the risk of financial investments in these kinds of products. The placement of fresh raspberries on foreign markets is the risk of financial investments in these kinds of products.

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The previous chapter dealt with some of the key root causes hindering and slowing the development of the fruit production sector in the municipalities covered by the project. Improving the development of fruit production would create opportunities to generate income and employment throughout the Zlatibor County. The next chapter will see the presentation of the vision and logic of development interventions in the fruit production sector.

4.1. Vision and logic of interventions

The aim of the PSD project is to create lasting systemic changes on markets subjected to intervention, in contrast to other development initiatives that provide direct solutions by addressing symptoms. By focusing on root causes that slow the development of fruit production, areas of intervention are defined - through which

<table>
<thead>
<tr>
<th>Intervention area</th>
<th>System change</th>
<th>Change in the fruit sector</th>
<th>Income and employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention 1:</td>
<td>Better access and greater use of information, knowledge and advisory services</td>
<td>Intensive fruit production present at a higher degree</td>
<td>Better opportunities for making profits and creating jobs for young people and the unemployed</td>
</tr>
<tr>
<td>Intervention 2:</td>
<td>Better access to information in regard to financial resources of support and their effective use by cooperatives</td>
<td>Greater commercialization of traditional products made according domestic fruit recipes</td>
<td></td>
</tr>
<tr>
<td>Intervention 3:</td>
<td>Establishing market research functions with the aim to innovate the production</td>
<td>Better access to market information</td>
<td>Increasing business opportunities for producers and processors of fruit</td>
</tr>
</tbody>
</table>
the project seeks to achieve systemic change with a significant and lasting effect. By influencing the functioning of existing markets, the PSD project seeks to achieve long-term, systemic change that will enable a different approach to the primary production of fruit, the engaging of SMEs and associations in the processing sector and the fruit production sector as a whole, by increasing yields and quality of fruit as a result of the greater availability and use of advisory services aimed at disseminating knowledge and information regarding proper techniques and ways producing fruit, as well as through increased availability and use of market information for the improvement of the efficiency and quality of the production process. By implementing interventions, the project seeks to achieve a broad improvement in the fruit sector through increased employment and increasing income in the fruit production sector. The data contained in Overview 11 illustrates the PSD project’s general model of logic of intervention.

4.2. Establishing a functional model for the production of high-quality fruit products by agricultural producers aimed at achieving a more intensive level of fruit production

As observed during the research, in order to solve problems of low productivity, increase production quality, select an adequate as-is sort and monitor the economic aspects of fruit production, it is necessary to apply the knowledge of and good production practices that fruit producers are currently lacking. Production based on knowledge and the application of good production practices is the basis for the development of intensive fruit production, based on knowledge and the application of good production practices that fruit producers are currently lacking. Production sortment and monitor the economic aspects of fruit production, as well as through increased availability and use of market information for the improvement of the efficiency and quality of the production process. By implementing interventions, the project seeks to achieve a broad improvement in the fruit sector through increased employment and increasing income in the fruit production sector. The data contained in Overview 11 illustrates the PSD project’s general model of logic of intervention.

4.3. Capacity building for cooperatives

The production and sale of fruit products with added value requires major financial investments and, thus, one of the perceived problems in the fruit production sector of the selected municipalities is a lack of fund revenues. However, there is another way of organising small-scale production of fruit products with added value: cooperatives, which have a long tradition in this county, especially in rural areas, and represent a place where farmers can process and/or sell their products in the simplest way. One example of such a cooperative is “Zdravcica”, which was formed by women from rural households who produce sweet preserves, regular and sugar-free jams, compotes and winter preserves, but which is currently dysfunctional as a result of financial problems. Improving the work of this cooperative, and providing a good example of its functionality through clearly defined rules, could serve as an example for other good example and trigger others to launch a new, and revive old, cooperatives on the basis of existing opportunities. The project aims to create opportunities for the greater commercialisation of fruit products and enable a rise in profits, as well as the greater employment of agricultural producers, towards agriculture experts and simultaneously see producers proving the quality and quantity of production would built trust in the market, which is generally difficult to employ, due to their educational structure and status. The project’s objective is supported by the competition, announced by the Ministry of Agriculture, Forestry and Food, to improve the productivity of frontier farmers, to access incentive funds for rural development through the support of activities aimed at creating added value products, in which cooperatives have the same right to use funds as other companies. Activities should focus on creating better and greater access to this and all other information relating to the cooperative, which would increase the possibility of cooperative members to apply for and receive funding to support the raising and strengthening of the capacity of cooperatives. Achieving the potential of a new order necessary to build the cooperative’s capacity requires intensive cooperation with the rural development offices, local communities, municipal services and non-governmental organisations – locations where interested customers can obtain all necessary information.

4.4. Establishing market research functions as a precondition of innovation

One of the prerequisites of a successful business is market research in general, with special reference to supply and demand, which represents the basis for development necessary for improvement to fruit production and, thus, increasing the competitiveness of the sector. Any change that takes place will require change that is necessary in the fruit production sector, through the creation of new products and applying of new production process. One of the directions for development of the fruit production sector will be the potential that would help create products with added value, as a form of innovation, as well as the creation of new cooperatives, which have a long tradition in this county, especially in rural areas, and represent a place where farmers can process and/or sell their products in the simplest way. Estimating the functions of the directions of this intervention. Establishing the functions of research and development is only possible if the needs of the private sector are clearly defined and articulated. Following presentation of the report, it is necessary to establish communication with fruit producers and processors, in order to define the information necessary for the innovation and improvement of their production. On the basis of the mentioned need, work will be carried out to connect and establish models of cooperation with relevant institutions, research agencies and fruit wholesalers who are able to provide information in accordance with defined requirements.
What next?

The report on fruit production in the Zlatibor County not only analyses the current situation, problems and root causes influencing its development, as well as offering suggestions for improvement, but also represents the foundations for continuing project activities – in order for the final outcome to be the creation of a competitive fruit production sector in the Zlatibor County. The report will be presented to fruit producers and processors of fruits, representatives of agricultural advisory services, regional chambers of commerce, representatives of agricultural services within local government, public health departments, members of agricultural associations and agricultural workers cooperatives etc. The first meetings will be held with fruit producers and processors, representatives of agricultural advisory services and potential future project partners, which will result in the promotion and initiation of interventions providing activities that are flexible and driven by the situation on the market.

Old orchards

These are characterized by low yields and poor quality fruit, but aging orchards still dominate the selected municipalities. The average yield of apples and plums (maximum of 30-40t/ha in intensive plantations and only in Arilje) are far below the average yields of competitor EU countries and countries of the northern hemisphere (average 40-60t/ha). Productivity can be improved by rejuvenation of old orchards, but the low profitability of fruit production discourages farmers.

Fragmented holdings

The small size of areas set aside for fruit cultivation are a major obstacle to raising competitiveness in relation to the quantity and quality of products. They restrict the buying / selling power of farmers, preventing the possibility of reducing production costs and increasing production revenue.

Outdated assortments

The assortment of varieties in the Zlatibor County does not follow global market dynamics, which is related to the creation of new varieties of apples and plums that will improve the quality of products, fruit’s resistance to disease and parasites, and extend the seasonal characteristics of the fruit. The prevalent varieties are outdated and are not suitable for fresh consumption. Currently, domestic manufacturers compete only in relation to price, not on the quality and variety of products.

Limited production of planting materials

Fruit Producers can obtain seedlings from the fruit research Institute or from agricultural schools and colleges. However, the Zlatibor County has no private nurseries supplies producers with high quality planting materials. The purchase of planting materials at local green markets is still present.

Sensitivity to weather conditions

Late frosts, long droughts and storms are more common, due to global climate change. As a result, the quantity and quality of fruit production varies from year to year, affecting the competitiveness of Serbian products. For example, the late frost of 2008 (-4°C on 20th March) had a major influence on the production of fruit in the Zlatibor County and saw producers achieve yields that were 20-40 percent lower than expected.

Dependence on weather conditions

Very few producers use the anti-ice network, while nobody has an anti-frost system. Irrigation is also rare. Better protection against unpredictable weather conditions can be provided by the creation of an anti-ice network over orchards and the installing of a system for drip irrigation. With irrigation, the yields of even very old apple orchards can be increased by up to 40 tons per hectare and provide 90 percent top quality apples.
Low level of agro-technical knowledge, particularly in the context of applying modern technology

There is still insufficient crop protection and insufficient awareness of the adoption of new technologies in relation to fruit production. Fruit producers most often complain about the lack of experts in this field. The illiteracy rate among producers is quite high, which ensures that recommendations given by experts on the proper use of protective chemicals is insufficient to support their work.

Poor knowledge of management among farmers

Producers have a lack of knowledge on cost management skills and financial resources.

High financial investment required to establish new fruit plantations

In order to be competitive, producers must use high quality planting material, which is characterised by its high cost. In addition to high financial resources needed to invest in the establishment of orchards, producers are also discouraged by the long period (from 5-7 years) needed for new plantations to bear full fruit capacities and, thus, being to repay the investment. In addition to the fact that additional costs of buying fruit saplings can be realised through the incentive funds of the Ministry of Agriculture, Forestry and Water Management, a limiting factor for the non-full-fulfilment of conditions of competition are farmers whose farms are unrestrained and farmers who do not pay pension and disability insurance.

Lack of international quality standards that meet the demands of end customers

This standard, while on the other side they are still not obliged to apply this standard.

Quality system

Services for the introduction of systemic quality is provided by private consulting firms that provide services for the introduction of quality standards ISO 9001:2001, management of food safety and environmental ISO 14001. Processors and cold storage firms are particularly interested in the introduction of HACCP, as this is required of them by customers. When it comes to the implementation of the Global Gap standards, which apply to primary agricultural producers, there are no processors in Serbia who have introduced this system. On the one hand, the reason for this is the significant investment needed to meet prerequisites for the introduction of this standard, while on the other side they are still not obliged to apply this standard.

Lack of international quality standards that meet the demands of end customers

Inadequate storage capacities in the municipalities of Priboj, Prijepolje and Nova Varos

Inadequate storage capacities

The degree of losses of high quality fruit during storage is relatively high compared with those in developed countries. Adequate experience in ULO / CA storage technology would greatly reduce losses, improve product quality and extended the lifetime for storage. People lack knowledge about storage conditions (apparent temperature, humidity, concentration of oxygen and carbon dioxide). For example, Chile has established its own comprehensive control system for growing, packing, handling and transporting fruit. These standards are even stricter than international standards, but ensure that Chile manages to sell fresh produce to over 70 countries.

Inadequate packaging and labelling

Packaging is a very important step in the logistics chain and for the competitiveness of finished products. The EU market demands high quality, certified packaging. There are not enough domestic producers of fruit packaging material, according to EU safety standards. It is also necessary to develop small commercial packages of fruit.

Organic production

There is still a lack of knowledge and experience regarding the demands of the organic market in Serbia, which is important for the competitiveness of finished products. There is still a lack of knowledge in ULO / CA storage technology, which would greatly reduce losses, improve product quality and extend the lifetime for storage. Chile, for example, has its own comprehensive control system for growing, packing, handling and transporting fruit. These standards are even stricter than international standards, but ensure that Chile manages to sell fresh produce to over 70 countries.

Market analysis of the fruit sector in Zlatibor County

Intervention strategies

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Weak branding
Fruit from our county performs on the international market under the brand of the buyer, while it is only noted on the reverse of packaging that the product was sourced from Serbia.

Weak or non-existent links with customers
In Serbia sales take place via dealers, while long-term market links are still in their very infancy. Direct connections with foreign distributors are very rare.

Focus on a small number of markets
The leading export market for our apples and plums is the Russian Federation, while the country’s frozen raspberries are mostly sold in the countries of Western Europe. It is necessary to diversify export markets, i.e. export fruit to the countries of Africa, Asia or the Middle East. Fruit here is mainly based on inadequate knowledge of the market, thus it is necessary to gather process and place all useful market information at local, national and international levels.

Quantity, quality and continuity of production
The biggest problem of local producers is the inconsistency of production. Producers can barely provide continuity, quality and sufficient quantities of fruit to meet their customer requirements. Improving the organisation of production therefore becomes a critical issue for our producers.

Intervention strategies

Annex II: Export of raspberries, apples and plums from Serbia

Export of raspberries from Serbia

<table>
<thead>
<tr>
<th>Country</th>
<th>Export (T)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>18,530</td>
</tr>
<tr>
<td>France</td>
<td>14,217</td>
</tr>
<tr>
<td>Austria</td>
<td>6,841</td>
</tr>
<tr>
<td>Belgium</td>
<td>5,741</td>
</tr>
<tr>
<td>Other countries</td>
<td>16,273</td>
</tr>
</tbody>
</table>

Export of apples from Serbia

- Exports fell by 74,200 t in 2007 to 35,200 t in 2008
- Russian volumes stayed the same, fall of exports to Poland (by 19,600 t) and Hungary (by 16,000 t)
- Average value per unit grew by 0,32 $/kg 07 to 0,41 $/kg 08
- Largest value per unit for Russia 0,43 $/kg
- Imports to Serbia 17,000 t in 2008 (90% from FYR Macedonia).
Exports from 2004 to 2008 grew annually 85% in tons and 116% in $.

• In 2008 exports fell by 30,500 t to 22,700 t, mostly to Russia (by 4,000 t) and Bosnia (1,200 t).

• Highest export unit value for Belarus 0.97 $/kg, Germany 0.78 $/kg and Russia 0.48 $/kg.

Export of plums from Serbia

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