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ANALYSIS OF PURCHASE AND PLACEMENT OF NON-WOOD FOREST PRODUCTS IN SOUTHERN SERBIA

Ljiljana KECA*, Milica MARCETA, Danijel MLADENOVIC

Faculty of Forestry, University of Belgrade, 1, Kneza Višeslava Street, Belgrade, Serbia
(Corresponding authors: ljiljana.keca@sfb.bg.ac.rs , milicamarceta@ymail.com)

Abstract

The long represented viewpoint that forests do not have economic value if it is not used for timber production, takes a new dimension. Namely, the more often mentioned so-called "other" forestry products and services have increasingly important role in market economies of many countries. In light of this, it is possible to single out non-wood forest products (NWFPs) which appear as a raw material for a range of finished products used in the pharmaceutical industry, food industry, etc. The area of Southern Serbia has a wealth of natural resources, but also a long tradition in the collection of wild medicinal herbs, berries and mushrooms. In this way, there is a real basis for the development of NWFPs sector in Southern Serbia. In order to gain insight into the dynamics of NWFPs commercialization in this area was carried out a survey of seven enterprises involved in their purchasing, processing and selling. The aim of the research is focused on monitoring the quantities of purchased and placed NWFPs in the period from 2004 to 2011. The purpose of the research is to indicate the potential for development of entrepreneurship based on NWFPs in Southern Serbia. The main research methods are modeling and trend analysis, while applied techniques are structured interview, SWOT analysis and its hybrid variant so called A'WOT analysis, which is a combination Analytic Hierarchy Process (AHP) and the classic SWOT analysis.
Key words: non-wood forest products, Southern Serbia, enterprises, trends, SWOT

Introduction

Although there is no universally accepted definition of non-wood forest products (NWFPs), it is widely accepted view that these are all products from forests, other than wood (Ahenkan et al., 2011). Over time, NWFPs had different names, such as "minor", "secondary" and "small forest products". In many cases, these products are neither small nor minor and many of them have a long tradition of human use as well as timber products (Chamberlain et al., 1998). In recent years, domestic and international demand for NWFPs is growing and the forest sector is getting a new awareness of their importance. As a result, the NWFPs could be the main vehicle for economic growth, especially when there are no other resources (Greene et al., 2000).

Thanks to the variety of plant species and well natural predispositions, the area of Southern Serbia has been identified as highly suitable for the development of NWFPs based sector and organic production. However, in this region, despite the evident potential, are not sufficiently developed picking berries, herbs and other kinds of NWFPs. As a reason for this can be cited lack of awareness of the population about their commercial importance, methods of gathering them in nature, and processing technologies.

Figure 1. Locations and number of interviewed enterprises

The study covered the period from 2004 to 2011. For this purpose managers of seven enterprises were interviewed in towns located in Southern Serbia: Vladičin Han, Surdulica, Crna Trava and Vranje (Figure1). The aim of the research was focused on examining the quantities of NWFPs purchased and placed in the scope of the study sample of seven enterprises for a period from 2004 to 2011. The purpose of the research is, based on accurate data, to examine the possibilities for development of entrepreneurship based on NWFPs in the South Serbia region. It is focused on companies engaged in purchasing, processing and selling of NWFPs, purchased and marketed quantities and their prices on the domestic market.

Material and methods

The study implements both general and special research methods. The primary methods were modelling, the trend analysis, and regression and correlation analyses. Long-term development trends, expressed as a function of time, called the secular trend or tendency (Stojkovic, 2001). In this paper, the trend is used to determine trends in the purchase and sale of certain types of NWFPs. To verify the obtained regression models are used the coefficient of determination (R^2), the correlation coefficient (R), t-statistics obtained from the parameters and F-statistics (Rankovic, 2009).

The paper used classical methods of reasoning: analysis, synthesis, induction and deduction. For the forming of the database is used a research technique such as structured interview. For the purpose of the research and data collecting a standardized questionnaire was created. Face to face interviews were conducted and in other cases questionnaires were sent by e-mail. From the questionnaire, for further analysis, were used those parts relating to information on quantities purchased and granted product and their selling prices. The other techniques that have been applied are SWOT and its hybrid variant, the so-called A'WOT, which is a combination of Analytic Hierarchy Process (AHP) and the classic SWOT analysis (Nedeljkovic et al., 2010). The basis for the application of AHP set by Thomas Saaty (Saaty, 1980) through idea and mathematical solutions. The application of this method was more in detail described by Jandric and Srđevic (2000). Over constructed SWOT matrix were identified strengths and weaknesses of interviewed enterprises, as well as external factors in the form of opportunities and threats. Through the A'WOT analysis, as synthesized form of SWOT and AHP, it is possible to form a hierarchy of priorities of elements included in the SWOT matrix and their mutual comparability (Kurttila et al., 2000; Pesonen et al., 2001).

The paper uses primary data and analyzes four major types of products that have had the biggest purchase and sale of the observed time interval. These are boletus, chanterelles,

blueberries and raspberries.

Results and discussion

All of interviewed enterprises are privately owned. All of them are mainly engaged in the purchase and sale of mushrooms and berries. Of all the products, for further analysis were extracted four that had the largest purchase and sale, such as boletus, chanterelles, blueberries and raspberries.

Unlike the purchase of raspberries and blueberries, which had a mild fall, purchase of boletus and chanterelles had a greater decline in purchase (Table 1). This can be attributed to lower yields in a given year and thus reduced demand and purchasing. Raspberries (117.6 t) and blueberries (110.3 t) had the highest average annual purchase.

Table 1. Structure and quantity of purchased raw products, for the period 2004-2011

Product	Quantity (in *t*)							
	2004	2005	2006	2007	2008	2009	2010	2011
Boletus (Boletus edulis)	23.5	29.5	41.3	52.5	41.2	45	33.3	17.8
Chanterelles (Cantharellus cibarius)	23.8	28.7	23.4	21.3	27.6	32.6	32.2	1.9
Blueberry (Vaccinium myrtillus)	65	76	139	148	156	115	84	99.5
Raspberry (Rubus idaeus)	90	92	154	156	144	136	86	83

Source: collected data

For trend analysis of all products, second degree polynomial trend is used. Purchase of boletus had a growing trend until 2007 followed by a period of stagnation until 2011 (Diagram 1). In the purchase of chanterelles it was found alternated sub-periods of growth and decline. In the last year of the observed interval, purchase of chanterelle drastically decreased as a result of weak yields in a given year (as well as boletus). Purchase of blueberries had a growing trend until 2008, followed by stagnation, with a slight increase in 2011. Purchase of raspberries had a growing trend until 2006 after which trend decreased.

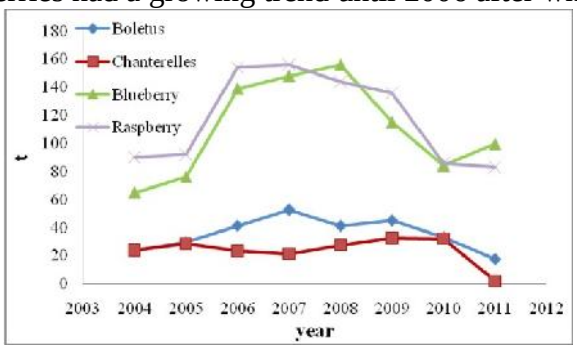


Diagram 1. Purchase of NWFPs in the raw state for seven interviewed enterprises

All of the products have a positive growth rate, which is the most pronounced in the purchase of chanterelles and amounts to 18.9% (Table 2). Also, it was found that all of the products have a very strong correlation connection, except chanterelles whose correlation connection is medium R=0.435. By testing significance of the obtained correlation coefficients can be seen that all of statistical elements are significant at the significance level α=0.05.

Table 2. Basic elements of regression analysis trend of purchased NWFPs in the raw state

Boletus Y=- 609236699+606969x-151x²							
Parameter			***t***			***R*** **= 0.9074**	***F*** **= 11.6497**
a = -609236699	***b*** = 606969	***c*** = -151	***t(a)*** = -4.82567	***t(b)*** = 4.825739	***t(c)*** = -4.82579	average exponential growth rate = **1.6%**	
Chanterelles Y= -121292205+120852·x-30·x²							
Parameter			***t***			***R*** **= 0.4353**	***F*** **= 0.5845**
a = -112292206	***b*** = 120852	***c*** = -30	***t (a)*** = -1.0596	***t(b)*** = 1.0597	***t(c)*** = -1.0598	average exponential growth rate = **18.9%**	
Blueberry Y= - 52092932+518949·x -1292·x²							
Parameter			***t***			***R*** **= 0.8238**	***F*** **= 5.2799**
a = - 52092932	***b*** = 518949	***c*** = -1292	***t(a)*** = - 3.2188	***t(b)*** = 3.21866	***t(c)*** = - 3.2184	average exponential growth rate = **3.5%**	
Raspberry Y= - 554562438+552532·x-1376·x²							
Parameter			***t***			***R*** **= 0.8775**	***F*** **= 8.3664**
a = -554562438	***b*** = 552532	***c*** = -1376	***t(a)*** = - 4.0485	***t(b)*** = 4.04904	***t(c)*** = - 4.0493	average exponential growth rate = **1.6%**	

Source: author's calculation

Enterprises perform purification of purchased raw materials and sell it as partially processed product. All of the products have a regressive movement to a greater or lesser intensity (Table 3). The largest average annual placement in the period from 2004 to 2011 had raspberries (90.2 t) and blueberries (77.6 t). More drastic drop in sales was recorded in the last year in placement of chanterelles and boletus (Table 3).

Table 3. Quantities and types of final products placed in the domestic market

Product	Quantity (in *t*)							
	2004	2005	2006	2007	2008	2009	2010	2011
Boletus (Boletus edulis)	18.5	23.5	37.2	47	30.7	40.6	31.1	14
Chanterelles (Cantharellus cibarius)	22.4	27.3	22	20	26.3	31.3	31	1.5
Blueberry (Vaccinium myrtillus)	45	55	93	112	105	95	56	61
Raspberry (Rubus idaeus)	65	65	125	125	113	105	61	62.5

Source: collected data

For trend analysis of all products, second degree polynomial trend is used. For all of products stagnation was recorded especially in the last years of the period (Diagram 2).

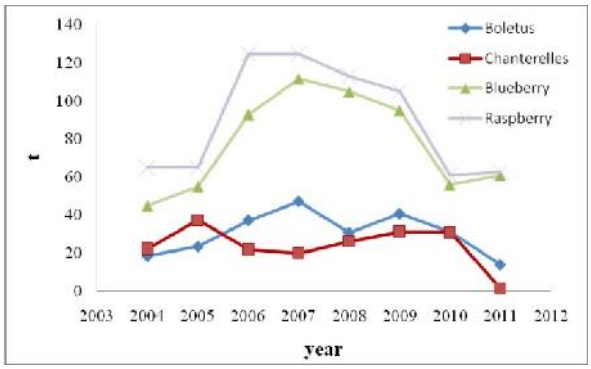


Diagram 2. Placement of NWFPs for seven interviewed enterprises

All of the products have a positive growth rate, which is the most pronounced in the purchase of chanterelles and amounts to 22% (Table 4). Also, it was found that all of the products have a very strong correlation connection, except chanterelles whose correlation connection is medium (R=0.377) and the parameters are not statistically significant; due to that results related to the placement of chanterelles should be taken with caution.

Table 4. Basic elements of regression analysis trend of products placed on the domestic market

Boletus Y= - 469389947+467631·x-116·x^2							
Parameter			***t***			***R*** **= 0.8306**	***F*** **= 5.5627**
a = - 469389947	***b*** = 467631	***c*** = - 116	***t(a)*** = - 3.3341	***t(b)*** = 3.3340	***t(c)*** = - 3.3340	average exponential growth rate = **0.8%**	
Chanterelles Y= - 95120645+94812·x-23·x^2							
Parameter			***t***			***R*** **= 0.3776**	***F*** **= 0.4157**
a = - 95120645	***b*** = 94812	***c*** = -23	***t(a)*** = - 0.6523	***t(b)*** = 0.65262	***t(c)***= - 0.6529	average exponential growth rate = **22.0%**	
Blueberry Y= - 298645284+297516·x-740·x^2							
Parameter			***t***			***R*** **= 0.8846**	***F*** **= 8.9962**
a = - 298645284	***b*** = 297516	***c*** = -740	***t(a)*** = - 4.2224	***t(b)*** = 4.2222	***t(c)*** = - 4.2220	average exponential growth rate = **2.6%**	
Raspberry Y= - 376698347+375318·x-934·x^2							
Parameter			***t***			***R*** **= 0.8533**	***F*** **= 6.6938**
a = - 376698347	***b*** = 375318	***c*** = -934	***t(a)*** = - 3.6248	***t(b)*** = 3.6251	***t(c)*** = - 3.6253	average exponential growth rate = **1.4%**	

Source: author's calculation

Wealth of natural resources and the availability of raw materials, the production of high quality products and competitive prices are the most significant strengths of interviewed enterprises (Table 5). Weaknesses are the lack of processing facilities and outdated equipment with non-specialized manpower and products features (perishable products). Opportunities are manifested through the growing demand for the products of natural origin and orientation to organic production. In addition, in order to encourage the export of these products, opportunities could be forming association of small entrepreneurs and production in

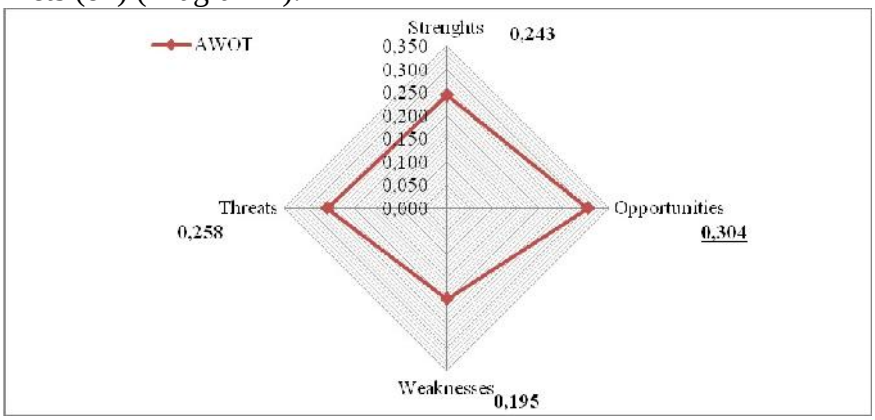
accordance with the standards. The threats are underdevelopment of domestic markets for NWFPs, variability of yields in nature which influence the volume of purchase and placement, as well as the market prices in a given year. Also, it is necessary to point out to the competition and the current economic crisis.

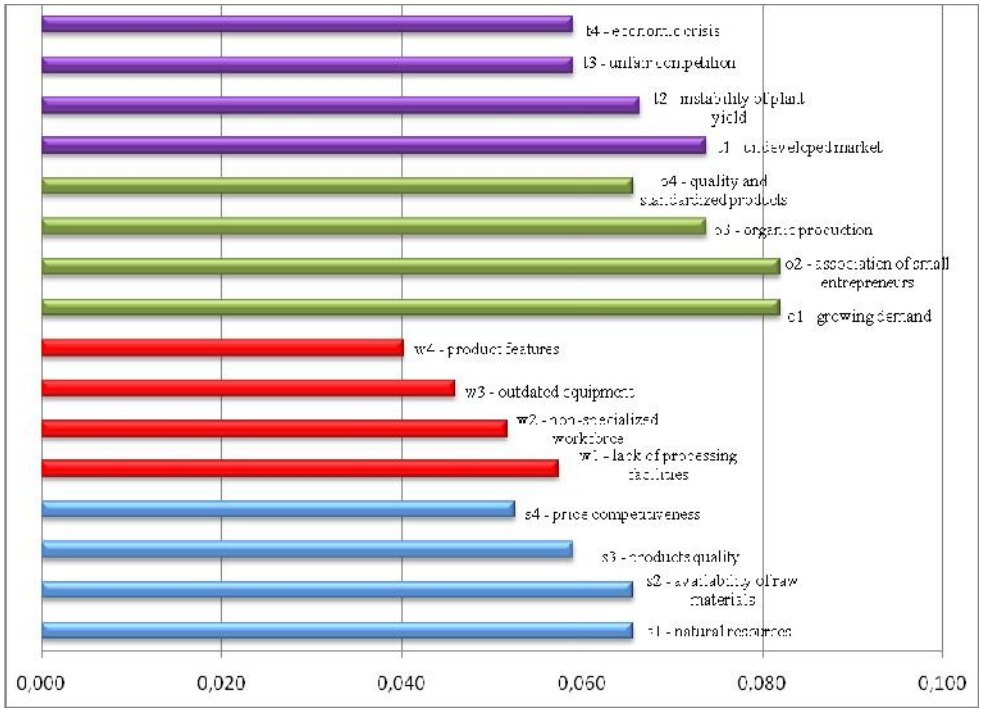
Table 5. SWOT analysis

S (strengths)	**W (weakness)**	**O (opportunities)**	**T (threats)**
s1 - natural resources	w1 - lack of processing facilities	o1 - growing demand	t1 - undeveloped market
s2 - availability of raw materials	w2 - non-specialized workforce	o2 - association of small entrepreneurs	t2 - instability of plant yield
s3 - products quality	w3 - outdated equipment	o3 - organic production	t3 - unfair competition
s4 - price competitiveness	w4 - product features	o4 - quality and standardized products	t4 - economic crisis

Source: by author

On the diagram 3, it is shown the extent to which chance, compared to the other elements of SWOT analysis are extracted, which confirms their greatest distance from the coordinate centre. The most valued elements in the SWOT matrix are opportunities, with a value of 0.304 suggesting the existence of preconditions and opportunities for the development of NWFPs sector in the South Serbia (Diagram 3). The most important elements are the growing global demand for the products of natural origin (o1) and forming the association of small entrepreneurs with the aim of encouraging exports primarily to the wider regional and whole European markets (o2) (Diagram 4).





Diagrams 3 and 4. A’WOT analysis

Compared to wood, the use of NWFPs is possible without major damage to the forest and its environmental impacts (Ros-Tonen, 2003). Southern Serbia is a mountainous region, with an economy based on natural resources which opens the possibility to develop entrepreneurship based on NWFPs. The lack of processing capacity of enterprises greatly reduces the economic impact that can be achieved by increasing degree of product finalization (Keča et al., 2012a). In the case of the interviewed enterprises there is a lack of processing capacity, because of the products are sold in the unprocessed state. Also, there is a lack of marketing activity, in order to successfully implement the commercialization of these products groups (Keča et al., 2012b).

Based on research conducted in Switzerland it was found that in the second place of demand of NWFPs are mushrooms and berries (Seeland et al., 2007). The interviewed enterprises mostly purchase and sell these two types of products. However, there are not enough marketing activities and state support that would contribute to the development of a sector based on NWFPs.

The current prices of these products are: boletus 2.3 €·kg^{-1}, chanterelles 5.9 €·kg^{-1}, blueberry 1.8 €·kg^{-1} and raspberries 1.5 €·kg^{-1}. Prices depend on the relationship of supply and demand, operating costs, and the current amount of raw material on the market. The interviewed enterprises price products by the method of "cost-plus", where the starting point is to cover the cost with a certain percentage of margin. All of the interviewed enterprises are confident in their price competitiveness in the domestic market. Competitive prices are achieved by low labor costs and availability of raw materials. While producers have access to markets, their most important challenge is to increase the quality and quantity of production at competitive prices (Belcher et al., 2007). However, it is necessary to organize staff training in order to better productivity and quality of work (Nedeljkovic et al., 2010). Relatively low labour costs represent a comparative advantage for Serbia in relation to the EU markets and others international markets too (Salmi et al., 2006). The interviewed enterprises purchase and sell products, which are classified as typical NWFPs. All of interviewed enterprises purchase NWFPs in their raw state and perform their resale as unprocessed products. Products are sold on the domestic market and not exported yet. Because of it, is necessary the support and encouragement of state institutions for the development of innovative activities of entrepreneurs and providing support for product placement outside of Serbia. In order to increase profits it should be developed greater range of products and produced final products with high level of finalization, as well as investing in the "on-line" sale. Systems such as "quick" sales or e-commerce have a great importance for all categories of products, especially for perishable products (Pettenella et al., 2006).

Conclusion

By analyzing data obtained by interviewing seven enterprises can be formulated the following conclusions:

- the highest increase in purchases had chanterelle (18.9%) during the period from 2004 to 2011, while the purchase of other products was lower: boletus 1.6%, blueberries 3.5% and raspberries 1.6%;
- the highest growth was achieved in the sale of chanterelles with growth of 22% and significantly lower growth in sales of boletus 0.8%, blueberries 2.6% and raspberry 1.4%;
- enterprises are not export-oriented;
- the highest average annual purchase had raspberries (117.6 t) and blueberries (110.3 t);
- the largest average annual placement had raspberries (90.2 t) and blueberries (77.6 t);

- the highest current price of 5.85 €·kg^{-1} has chanterelle, then boletus 2.25 €·kg^{-1}, blueberry 1.80 €·kg^{-1} and raspberry 1.49 €·kg^{-1};
- strengths of the interviewed enterprises are: wealth of natural resources, availability of raw materials, production of high quality and price competitiveness;
- their weaknesses are: outdated processing facilities and equipment, with a non-specialized labor and products which are categorized as "perishable products";
- opportunities are manifested through the growing demand for the products of natural origin, formation of associations of small entrepreneurs and production in accordance with the standards. Opportunities are, according to the results of A'WOT analysis, the most valued element with a value of 0.304;
- threats are: insufficient development of domestic markets for NWFPs, variability of yields in nature which influence the volume of purchase and placement, as well as market price in a given year. Also, it is necessary to point out to the competition and current economic crisis.

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