

UDC 338.43:63

ISSN 0352-3462



ЕКОНОМИКА ПОЉОПРИВРЕДЕ ECONOMICS OF AGRICULTURE



Vol.LXVI, №1 (1-332), 2019

BELGRADE



UDC 338.43:63

ISSN 0352-3462



ЕКОНОМИКА ПОЉОПРИВРЕДЕ ECONOMICS OF AGRICULTURE



Journal is indexed and abstracted in Emerging Sources Citation Index.

66.

“Сагласно одлуци из члана 27. став 1. тачка 4), Закона о научноистраживачкој делатности („Службени гласник РС”, бр. 110/05, 50/06-испр. и 18/10), утврђена је категоризација домаћих научних часописа

Листа часописа за друштвене науке

5. Економика пољопривреде М24”

(Часопис међународног значаја)

<http://www.nauka.gov.rs> (28. Jun 2010)

Београд, јануар-март 2019. године
Belgrade, Januar-March, 2019

Часопис

◇ ЕКОНОМИКА ПОЉОПРИВРЕДЕ ◇

Journal

◇ ECONOMICS OF AGRICULTURE ◇

Основан 1954. године / Established 1954

ИЗДАВАЧИ / PUBLISHERS

Научно друштво аграрних економиста Балкана, Београд
The Balkan Scientific Association of Agrarian Economists, Belgrade

Институт за економику пољопривреде, Београд (Србија)
Institute of Agricultural Economics, Belgrade, (Serbia)

Академија економских наука, Букурешт (Румунија)
Academy of Economic Studies, Bucharest (Romania)

EDITOR-IN-CHIEF

Prof. Drago Cvijanovic, Ph.D., University of Kragujevac,
Faculty of Hotel Management and Tourism, Vrnjci Spa, Serbia

Адреса уредништва / Editorial office

Београд, Волгина 15; тел/факс (+381)11/6972-848; E-mail: economicsofagriculture@ea.bg.ac.rs
Belgrade, Volgina 15; phone/fax (+381)11/6972-858; E-mail: epoljoprivrede@gmail.com

<http://ea.bg.ac.rs>

INTERNATIONAL EDITORIAL BOARD

Prof. Radovan Pejanovic, Ph.D., Faculty of Agriculture, Novi Sad, Serbia,

Prof. Zorica Vasiljevic, Ph.D., Faculty of Agriculture, Belgrade, Serbia,

Prof. Vladimir I. Trukhachev, Ph.D., Stavropol State Agrarian University, Stavropol, Russian Federation,

Prof. Alan Randall, Ph.D., Faculty of Agriculture, Food and Natural Resources, University of Sydney, Sydney, Australia,

Prof. Vincent Dolle, Ph.D., Mediterranean Agronomic Institute Montpellier (IAMM-CIHEAM), Montpellier, France,

Prof. Andras Nabradi, Ph.D., University of Debrecen, Debrecen, Hungary,

Prof. Eirik Romstad, Ph.D., Norwegian University of Life Sciences, Aas, Norway,

Prof. Wim Heijman, Ph.D., Wageningen University, Wageningen, The Netherlands,

Prof. Nicolae Istudor, Ph.D., Academy of Economic Studies, Bucharest, Romania,

Prof. Andrzej Kowalski, Ph.D., Institute of Agricultural and Food Economics, Warsaw, Poland,

Prof. William H. Meyers, Ph.D., College of Agriculture, Food and Natural Resources, Columbia, Missouri, USA,

Prof. Thomas Glauben, Ph.D., Leibniz – IAMO Institute, Halle, Germany,

Tomas Doucha, Ph.D., Institute of Agricultural Economics and Information, Prague, Czech Republic,

Prof. Margaret Loseby, Ph.D., State University of Tuscia, Viterbo, Italy,

Prof. Aleksandar Ostojic, Ph.D., Faculty of Agriculture Banja Luka, Republika Srpska, Bosnia and Herzegovina,

Prof. Toma Dinu, Ph.D., University of Agricultural Sciences and Veterinary Medicine, Bucharest, Romania,

Prof. Natalia Nikolaevna Balashova, Ph.D., Faculty of Economy, Volgograd State Agricultural Academy, Volgograd, Russian Federation,

Prof. Masahiko Gemma, Ph.D., Waseda University, Tokyo, Japan.

EXECUTIVE EDITORS

Prof. Dragic Zivkovic, Ph.D., Faculty of Agriculture, Belgrade, Serbia,

Prof. Branislav Vlahovic, Ph.D., Faculty of Agriculture, Novi Sad, Serbia,

Prof. Dorel Dusmanescu, Ph.D., Petroleum Gas University, Faculty of Economy, Ploiesti, Romania,

ASSOCIATE EDITORS

Prof. Zoran Rajic, Ph.D., Faculty of Agriculture, Belgrade, Serbia,

Prof. Zoran Njegovan, Ph.D., Faculty of Agriculture, Novi Sad, Serbia,

Prof. Jonel Subic, Ph.D., Institute of Agricultural Economics, Belgrade, Serbia,

Jean Vasile Andrei, Ph.D., Petroleum Gas University, Faculty of Economy, Ploiesti, Romania,

Ferhat Cejvanovic, Ph.D., Government of Brcko District, Bosnia and Herzegovina.

INTERNATIONAL EDITORIAL REVIEW BOARD

Prof. Koviljko Lovre, Ph.D., Faculty of Economy, Subotica, Serbia,

Prof. Snezana Djekic, Ph.D., Faculty of Economy, Nis, Serbia,

Prof. Veljko Radojevic, Ph.D., Azotara Pancevo, Serbia,

Prof. Pero Petrovic, Ph.D., Institute of International Politics and Economics, Belgrade, Serbia,

Prof. Vlade Zaric, Ph.D., Faculty of Agriculture, Belgrade, Serbia,

Prof. Nedeljko Tica, Ph.D., Faculty of Agriculture, Novi Sad, Serbia,

Prof. Vesna Rodic, Ph.D., Faculty of Agriculture, Novi Sad, Serbia,

Vesna Popovic, Ph.D., Institute of Agricultural Economics, Belgrade, Serbia,

Prof. Milan R. Milanovic, Megatrend University, Belgrade, Serbia,

Prof. Ivan Milojevic, Ph.D., Military Academy, University of Defence, Belgrade, Serbia,

Prof. Nikolai I Kuznetsov, Ph.D., Saratov State Agrarian University – N.I. Vavilov, Saratov, Russian Federation,

Prof. Kenneth Thomson, Ph.D., University of Aberdeen, Aberdeen, Scotland, UK,

Dan Marius Voicilas, Ph.D., Romanian Academy of Science, Institute of Agricultural Economics, Bucharest, Romania,

Prof. Claudiu Cicea, Ph.D., Academy of Economic Studies, Bucharest, Romania,

Prof. Adrian Turek Rahoveanu, Ph.D., University of Agricultural Sciences and Veterinary Medicine of Bucharest, Romania,

Marek Wigier, Ph.D., Institute of Agricultural and Food Economics, Warsaw, Poland,

Prof. Mile Pesevski, Ph.D., University “Ss Cyril and Methodius”, Faculty of Agricultural Sciences and Food, Institute of Agroecoeconomics, Skopje, Republic of Macedonia,

Prof. Blagica Sekovska, Ph.D., Faculty of Veterinary Medicine, Skopje, Republic of Macedonia,

Prof. Aleksandra Despotovic, Ph.D., Biotechnical Faculty, Podgorica, Montenegro,

Prof. Marko Ivankovic, Ph.D., Federal Agro-Mediterranean Institute, Mostar, Bosnia and Herzegovina,

Prof. Bahrija Umihanic, Ph.D., Faculty of Economy, Tuzla, Bosnia and Herzegovina,

Prof. Alexandru Stratan, Ph.D., Institute of Economy, Finance and Statistics, Chisinau, Moldova,

Prof. Mihael Toman, Ph.D., Biotechnical faculty, University of Ljubljana, Domzale, Slovenia,

Klaus Wagner, Ph.D., Federal Institute of Agricultural Economics, Vienna, Austria,

Prof. Andrea Segre, Ph.D., Faculty of Agriculture, Bologna, Italy,

Prof. Raluca Ion, Ph.D., Academy of Economic Studies, Bucharest, Romania,

Zbigniew Florianczyk, Ph.D., Institute of Agricultural and Food Economics, Warsaw, Poland,

Crina Turtoi, Ph.D., Romanian Academy of Science, Institute of Agricultural Economics, Bucharest, Romania,

Vasily Erokhin, Ph.D., Stavropol State Agrarian University, Stavropol, Russian Federation,

Prof. Ivo Grgic, Ph.D., Faculty of Economy, Zagreb, Croatia,

Prof. Stane Kavcic, Ph.D., University of Ljubljana, Biotechnical Faculty, Ljubljana, Slovenia,

Prof. Anatoli Saiganov Semenovich, Ph.D., Institute of System Research in the Agro-industrial Complex of National Academy of Sciences of Belarus, Minsk, Republic of Belarus,

Prof. Natalia Sergeevna Morozjuk, Ph.D., Odessa State Agrarian University, Odessa, Ukraine,

Goran Maksimovic, Ph.D., Faculty of Agriculture Lesak, Serbia,

Bahrija Kacar, Ph.D., Government Office for the Sustainable Development of Underdeveloped Areas of the Republic of Serbia, Novi Pazar, Serbia,

Prof. Kadrija Hodzic, Ph.D., Faculty of Economics, University of Tuzla, Tuzla, Bosnia and Herzegovina,

Rumen Popov, Ph.D., Institute of Agricultural Economics, Sofia, Bulgaria,

Prof. Carlos Saborio Viquez, Ph.D., University of Costa Rica, San Jose, Costa Rica,

Prof. Miguel Moreno Millan, Ph.D., University of Cordoba, Cordoba, Spain,

Prof. Ion Iarca, Ph.D., Petroleum and Gas University, Economic Sciences Faculty, Ploiesti, Romania,

Prof. Done Ioan, Ph.D., Petroleum and Gas University, Economic Sciences Faculty, Ploiesti, Romania,

Prof. Riza Avcioglu, Ph.D., Aegean University, Faculty of Agriculture, Izmir, Turkey,

Prof. Diran Akinleye, Ph.D., University of Lagos, Akoka, Nigeria,

Prof. Zorica Sredojevic, Ph.D., Faculty of Agriculture, Belgrade, Serbia,

Prof. Natalija Bogdanov, Ph.D., Faculty of Agriculture, Belgrade, Serbia,

Prof. Elena Stoian, Ph.D., University of Agricultural Sciences and Veterinary Medicine, Bucharest, Romania,

Prof. Victor Manole, Ph.D., Academy of Economic Studies, Bucharest, Romania,

Prof. Gabriel Popescu, Ph.D., Academy of Economic Studies, Bucharest, Romania,

Prof. Dan Boboc, Ph.D., Academy of Economic Studies, Bucharest, Romania,

Prof. Aurelia Felicia Stancioiu, Ph.D., Academy of Economic Sciences, Bucharest, Romania,

Prof. Constantinos Alexiou, Ph.D., Polytechnic School, Aristotle University, Thessaloniki, Greece,

Prof. Nicholas Apergis, Ph.D., University of Piraeus, Piraeus, Greece,

Prof. Zaklina Stojanovic, Ph.D., Faculty of Economics, Belgrade, Serbia,

Prof. Snezana Stetic, Ph.D., The College of Tourism, Belgrade, Serbia,

Prof. Dusko Jovanovic, Ph.D., Business Economics Academy, Cacak, Serbia,

Prof. Sait Engindeniz, Ph.D., Ege University, Faculty of Agriculture, Department of Agricultural Economics, Izmir, Turkey,

Prof. Tetyana Mostenska, Ph.D., National University of Food Technologies, Kyiv, Ukraine,

Corina Ene, Ph.D., Petroleum and Gas University, Economic Sciences Faculty, Ploiesti, Romania,

Anna Ivolga, Ph.D., Stavropol State Agrarian University, Stavropol, Russian Federation,

Prof. Andreja Borec, Ph.D., University of Maribor, Faculty of Agriculture and Life Sciences, Hoce, Slovenia,

Prof. Mihai Mieila, Ph.D., Faculty of Economic Sciences, Valahia University, Targoviste, Romania,

Prof. Donatella Privitera, Ph.D., Department of Educational Sciences, University of Catania, Catania, Italy,

Prof. Marco Platania, Ph.D., Department of Formational Sciences, University of Catania, Catania, Italy,

Adrian Stancu, Ph.D., Petroleum and Gas University, Economic Sciences Faculty, Ploiesti, Romania,

Prof. Natalya Bannikova Vladimirovna, Ph.D., Stavropol State Agrarian University, Russian Federation,

Prof. Darina Zaimova, Ph.D., Trakia University, Stara Zagora, Bulgaria,
Prof. Matteo Vittuari, Ph.D., Faculty of Agriculture, Bologna, Italy,
Prof. Zoran Grgic, Ph.D., Faculty of Agriculture, Zagreb, Croatia,
Vesna Milicic, Ph.D., University of Ljubljana, Biotechnical Faculty, Ljubljana, Slovenia,
Alexandr Trukhachev, Ph.D., Stavropol State Agrarian University, Russian Federation,
Prof. Dimitre Nikolov, Ph.D., Institute of Agricultural Economics, Sofia, Bulgaria,
Prof. Christina Yancheva, Ph.D., Agricultural University, Plovdiv, Bulgaria,
Dario Simicevic, Ph.D., College of Tourism, Belgrade, Serbia,
Prof. Vladislav Zekic, Ph.D., Faculty of Agriculture, Novi Sad, Serbia,
Aleksandar Rodic, Ph.D., Institute Mihailo Pupin, Belgrade, Serbia,
Prof. Sanjin Ivanovic, Ph.D., Faculty of Agriculture, Belgrade, Serbia,
Prof. Milan Pocuca, Ph.D., Business Academy, Faculty of Law, Novi Sad, Serbia,
Prof. Dragana Gnjatovic, Ph.D., Faculty of Hotel Management and Tourism, Vrnjci Spa, Serbia,
István Kapronczai, Ph.D., Research Institute of Agricultural Economics, Budapest, Hungary,
Branko Mihailovic, Ph.D., Institute of Agricultural Economics, Belgrade, Serbia,
Vesna Parausic, Ph.D., Institute of Agricultural Economics, Belgrade, Serbia,
Vlado Kovacevic, Ph.D., Ministry of Agriculture, Belgrade, Serbia,
Natasa Kljajic, Ph.D., Institute of Agricultural Economics, Belgrade, Serbia,
Vladimir Zakic, Ph.D., Faculty of Agriculture, Belgrade, Serbia,
Boris Kuzman, Ph.D., Institute of Agricultural Economics, Belgrade, Serbia,
Prof. Jovan Zubovic, Ph.D., Institute of Economic Sciences, Belgrade, Serbia,
Zoran Simonovic, Ph.D., Institute of Agricultural Economics, Belgrade, Serbia,
Prof. Zeljko Vojinovic, Ph.D., Independent university, Economic faculty, Banja Luka, Republika Srpska, Bosnia and Herzegovina,
Svetlana Roljevic, Ph.D., Institute of Agricultural Economics, Belgrade, Serbia.

CONTENT

1. A. K. M. Kanak Pervez, Md. Ektear Uddin, Ashfaq Ahmad Shah, Foyez Ahmed Prodhan, Md. Mohhiuddin Sheikh
FUZZY-LIKERT SCALE BASED ASSESSMENT OF MARKETING RISK FACED BY THE HYBRID RICE GROWERS OF BANGLADESH 9
2. Katarína Remeňová, Zuzana Skorková, Nadežda Jankelová
WINE TOURISM AS AN INCREASINGLY VALUABLE REVENUE STREAM OF A WINERY'S BUSINESS MODEL. 23
3. Milan Radović, Jelena Vitomir, Bogdan Laban, Slobodanka Jovin, Sanda Nastić, Vera Popović, Slobodan Popović
MANAGEMENT OF JOINT-STOCK COMPANIES AND FARMS BY USING FAIR VALUE OF AGRICULTURAL EQUIPMENT IN FINANCIAL STATEMENTS ON THE EXAMPLE OF IMT 533 TRACTOR. 35
4. Gordana Dobrijević, Jelena Đorđević Boljanović, Filip Đoković, Radovan Pejanović, Goran Škatarić, Ivana Damnjanović
BIOECONOMY-BASED FOOD INDUSTRY OF SERBIA: THE ROLE OF INTELLECTUAL CAPITAL. 51
5. Irena Čelić, Sandra Živanović, Nebojša Pavlović
THE EFFECTS OF WEATHER CONDITIONS ON THE HEALTH OF PEOPLE LIVING IN URBAN AND RURAL ENVIRONMENTS. 63
6. Dragan Čočkalo, Dejan Đorđević, Mila Kavalić, Cariša Bešić
IMPLEMENTATION OF CERTIFICATION SCHEMES IN THE BALKAN AGRO-FOOD SECTOR 77
7. Strahinja Bogdanović, Miroljub Hadžić
STRATEGIC MULTICRITERIA DECISION-MAKING PROCESS IN AGRICULTURE. 89
8. Kristina Petljak, Dora Naletina, Kristina Bilogrević
CONSIDERING ECOLOGICALLY SUSTAINABLE PACKAGING DURING DECISION-MAKING WHILE BUYING FOOD PRODUCTS. . . 107
9. Goran Dašić, Adriana Radosavac, Desimir Knežević, Ružica Đervida
PREFERENCES OF CUSTOMERS AND IMPROVEMENT OF PRODUCTION AND SALES OF ORGANIC PRODUCTS IN SERBIA 127

10. Rita Vilke, Zivile Gedminaite-Raudone, Drago Cvijanovic
**FUTURE DRIVERS OF RURAL PROSPERITY IN
KNOWLEDGE AGE: LITHUANIAN CASE 143**
11. Bojana Vuković, Dejan Jakšić
**THE EFFECT OF WORKING CAPITAL MANAGEMENT ON
PROFITABILITY: EVIDENCE FROM SOUTHEAST EUROPE. . . . 159**
12. Gordana Petrović, Bojan Labović, Boban Dašić
**THE INFLUENCE OF CLIMATE ELEMENTS ON THE YIELD OF
AGRICULTURAL CROPS IN THE AREA OF SUMADIJA IN SERBIA. . . 173**
13. Olta Sokoli, Reiner Doluschitz
**COOPERATIVE EVOLVEMENT THROUGH POLITICAL ERA /
EPOCH: ALBANIAN'S CASE AND COMPARISONS. 189**
14. Milena Podovac, Nataša Đorđević, Snežana Milićević
**RURAL TOURISM IN THE FUNCTION OF LIFE QUALITY
IMPROVEMENT OF RURAL POPULATION ON GOČ MOUNTAIN 205**
15. Dušan Aničić, Olgica Nestorović, Nataša Simić, Slavomir Miletić
**THE PERSPECTIVES OF SUSTAINABLE DEVELOPMENT OF
SERBIA'S AGRICULTURE IN GLOBALIZED ENVIRONMENT. . . 221**
16. Katarina Djuric, Boris Kuzman, Radivoj Prodanovic
**SUPPORT TO YOUNG FARMERS THROUGH AGRICULTURAL POLICY
MEASURES – THE EXPERIENCE OF THE EU AND SERBIA 237**
17. Goran Maksimović, Tatjana Ivanović, Aleksandra Vujko
**SELF-EMPLOYMENT OF WOMEN THROUGH ASSOCIATIONS IN
THE RURAL AREAS OF SIRINICKA ZUPA. 251**
18. Mirela Tomaš Simin, Vesna Rodić, Danica Glavaš-Trbić
**ORGANIC AGRICULTURE AS AN INDICATOR OF SUSTAINABLE
AGRICULTURAL DEVELOPMENT: SERBIA IN FOCUS. 265**
19. Bayero Sule Gani, Joseph Kayode Olayemi, Odjuvwuederhie Emmanuel Inoni
**LIVELIHOOD DIVERSIFICATION STRATEGIES AND FOOD
INSECURITY STATUS OF RURAL FARMING HOUSEHOLDS IN
NORTH-EASTERN NIGERIA 281**
20. Vanja Čosović, Vesela Vlašković, Budimir Stakić
**FINANCIAL SUPPORT TO FRUIT AND VEGETABLES GROWING
AND IMPACT ON B&H TRADE BALANCE. 297**
21. Tatjana Piljan, Tomislav Brzaković, Jasmina Šmigić-Miladinović
**ANALYSIS OF THE ATTITUDES OF THE POPULATION ON
THE NEED FOR ANIMAL INSURANCE. 309**

FUZZY-LIKERT SCALE BASED ASSESSMENT OF MARKETING RISK FACED BY THE HYBRID RICE GROWERS OF BANGLADESH

A. K. M. Kanak Pervez¹, Md. Ektear Uddin², Ashfaq Ahmad Shah³, Foyez Ahmed Prodhan⁴,
Md. Mohiuddin Sheikh⁵

*Corresponding author E-mail: kp@ru.ac.bd

ARTICLE INFO

Original Article

Received: 10 September 2018

Accepted: 18 January 2019

doi:10.5937/ekoPolj1901009K

UDC 658.8:633.18(549.3)

Keywords:

Defuzzification value, food security, fuzzy-Likert scale, hybridization, middleman

JEL: Q12, Q13, Q16

ABSTRACT

The primary concentration of this study was to assess the marketing risks faced by hybrid rice growers and explore the trajectories. With this notion, data were collected from randomly selected 300 hybrid rice growers in purposively chosen areas with the application of a structured interview schedule and conducting five focus group discussions with the farmers. The study identified seven key risks responsible for the poor marketing of hybrid rice in Bangladesh. Perceived marketing risks were assessed by farmer's opinion on likelihood and severity of each risk source through using a fuzzy-Likert scale. According to the finding 'high fluctuation of hybrid rice price' was the most serious risk in hybrid rice marketing in Bangladesh. The regression result found several socio-demographic factors of the farmers are significantly related with perceived risk. This study, therefore, suggests government taking propolicies for hybrid rice growers organized around farmers' those socio-demographic characteristics for minimizing marketing risk.

© 2019 EA. All rights reserved.

- 1 A.K.M. Kanak Pervez, Ph.D, Assistant Professor, Dept. of Agronomy & Agricultural Extension, University of Rajshahi, Bangladesh, Phone: +8801706687967, e-mail: kp@ru.ac.bd, ORCID ID (<https://orcid.org/0000-0001-7413-9337>)
- 2 Md. Ektear Uddin, Ph.D., Associate Professor, Dept. of Agricultural Extension & Rural Development, Patuakhali Science and Technology University, Dumki, Patuakhali, Bangladesh, Phone: +8801717522941, e-mail: ektearcu@gmail.com
- 3 Ashfaq Ahmad Shah, Ph.D., Assistant Professor, Development Studies Department, School of Social Sciences and Humanities (S3H), National University of Sciences & Technology (NUST), Islamabad 44000, Pakistan, email: ahmad.ashfaq1986@gmail.com
- 4 Foyez Ahmed Prodhan, M.S., Dept. of Agricultural Extension and Rural Development, Bangabandhu Sheikh Mujibur Rahman Agricultural University, Gazipur, Bangladesh, email: foyez@bsmrau.edu.bd
- 5 Md. Mohiuddin Sheikh, M.S., Ph.D Candidate, Dept. of Extension Education, Punjab Agricultural University, India, Phone: +8801718282681, e-mail: sheikhm38@gmail.com

Introduction

Bangladesh is one of the peak densely inhabited nations in the world, where around 1,237.51 people reside per square kilometer (EC, 2015). Despite very low per capita land holding (approximately 0.048 hectares, WB, 2015), the cultivable land is declining at 1 per cent per year. FAO (1993) estimated, about 0.07 hectares of arable land per person is required for a year-round vegetarian diet and excluding various land degradations, with sufficient availability of water. Therefore, it is challenging to meet future food security needs. Also, the high population growth rate makes the country vulnerable to future food security. It is assumed in 2050, the population of the country will be 1.5 times than the present population (UN, 2010). Currently, 35% of the people are living under the food consumption poverty line (Kashem & Faroque, 2011). Bangladesh is the fifth most vulnerable nation to climate change (the Daily Star, 2011) and affecting the crop production in Bangladesh. Usually, a disastrous cyclone attacks the country once every three years (GoB, 2008). Bangladesh has been experiencing around 6-20 mm sea level rise in every year (Siddique, 2015) and around 40% of productive land in the southern region will be lost in a 65 cm sea level rise by the 2080s (WB, 2013).

To face the present challenges, the country has initiated some horizontal and vertical programs for increasing food crop production, e.g., mixed farming, relay cropping, multi-storied cropping together with high yielding hybrid varieties. Hybrid rice production was initiated in Bangladesh in 1998 to increase the total rice production due to excessive demand for rice for a growing population to meet the food security. As, rice is the staple food, supplying 76% calorie intake 66 % protein (Bhuiyan et al., 2002) and 43.6% of labor force (BBS, 2010, HIES, 2009), 9.5% GDP (Alam & Islam, 2013). Initially, yield advantages of hybrid rice motivated many farmers to adopt it, but very soon the number of hybrid rice farmers and area dropped dramatically. After the introduction of hybrid rice in 1998-99, the area within nine years increased around 4263% (Rashid et al., 2011): then suddenly, popularity declined. In 2007-08 the hybrid rice area was 0.80 million hectare whereas in 2013-14 it dropped to 0.63 million hectares (Parvez, 2014) which is only around 7.05% of the total area (Krishi Dairy, 2018). Researchers have identified various risks were inhibiting the adoption of hybrid rice production in Bangladesh (McFall et al., 2013; Shah et al., 2015; Pervez, 2018). Among the risks, the marketing risks are the most significant. Due to these, many farmers are losing their significant profits and even, sometimes, their investments. Numerous intermediaries are dominating the hybrid rice market. Therefore, farmers are not getting a fair price for their produce: instead, the intermediaries are getting the lion share of benefit (Shaikh, 2008). Furthermore, market instability and failure are widespread in the case of hybrid rice. Therefore, the current study was intended to: (i) discover marketing risks in hybrid rice production in Bangladesh; (ii) score the Perceived Marketing Risk (PMR) and rank; and (iii) find out the relationship between socio-demographic characteristics and PMR.

The market-related risk in agriculture in Bangladesh

There are five separate risk factors in the field of agriculture: (i) production or yield risk; (ii) marketing risk; (iii) credit risk; (iv) personal risk; and (v) financial risk (Pervez et al., 2016). In Bangladesh, the main risks in agriculture come from price or market-related activities. The gap between the selling price from farmers and the consumers' purchasing price is exceptionally high (Abdullah & Hossain, 2013) because of the presence of intermediaries in the market. Due to lack of storage facilities and extreme poverty, peasants are bound to sell their products immediately after the harvest. Therefore, in a particular season, a specific crop floods the markets, and ultimately the price diminishes and sometimes goes below the cost of production.

On the other hand, farmers in Bangladesh generally invest in by receiving loans from *mohajons* (rural loan broker) (Pervez et al., 2016). *Mohajons* usually claim a very high interest, sometimes 1.5 or 2 times higher than the loan amount after a crop season (90-120 days); their business is locally called *dera shud* (150% interest) and *duna shud* (double repayment) (Islam et al., 2012). Sometimes farmers go to NGOs for a loan, but NGOs still need formal procedures: for example, membership of the respective NGO, pay dues and start to deposit money. Therefore, poor farmers hardly find the benefits from microcredit for crop production (Khatun et al., 2013).

Furthermore, the marketing structure and the transport facilities for farmers are also fragile, and the peasants have minimum access to the urban market. This plight creates space for the middlemen (Chowdhury, 2011; Khan, 2012). Due to the excessive presence of intermediaries in the market farmers cannot directly sell their commodities to ultimate consumers (Matin et al., 2008). Therefore, farmers go to *arotder* (rural wholesaler) to sell their product. *Arotder* also offers a little price to the farmers (Pervez et al., 2016).

Other marketing risks come from the political turmoil of the country. A general strike ('*hartal*') creates an obstacle to selling farmers' products in the market, due to violence in the streets and blockages of the road, but people in the cities are forced to spend a higher amount of money because of limited supply. Therefore, the profit again goes to middlemen mostly, and farmers lose out.

Materials and methods

Hybrid rice production in Bangladesh is geographically localized. Even in a single district, all sub-districts (Upazilla) have not entered into the hybrid rice cultivation program. Therefore, the study was conducted in purposively selected two different Upazillas namely; Khoksa and Debidwar from Kustia and Comilla districts in Bangladesh, respectively. The significant reason behind purposive selection is the number of farmers and the areas under hybrid rice cultivation in the areas has been declining with time. The familiarity of the researchers with the study areas and extension agents is also one of the reasons. A total of 1500 farmers (households) were (2014-2015) cultivating hybrid rice which was considered as the population of the study. The

list of farmers was collected from the two Upazilla agriculture offices. From the list of farmers, we used a random sampling (using the table of random numbers) of 20% of the population: therefore, the sample size of the study is 300.

The marketing risk sources (seven risks) were identified by conducting five Focus Group Discussions (FGDs) with hybrid rice farmers. Data were collected from the hybrid rice farmers by carrying out structured personal interviews, from January, 2015 to June, 2015. To assess the reliability and consistency of the instrument, Cronbach alpha was calculated from the pre-test results of the seven items. The reliability of statements showed an alpha value of more than 0.70, the accepted value (Nunnally, 1978).

Farmers' socio-demographic characteristics, e.g. age, education, annual family income, family farm size, watching /listening to agriculture-related programs on TV/radio, source of hybrid rice seeds, rice selling in the Public Procurement (PP) and loan from NGO/NGOs were taken as the independent variables of the study (Table 3). The dependent variable of the study was Perceived Marketing Risk (PMR) in hybrid rice production.

Measurement of PMR using Fuzzy-Likert Scale

The relationship among risk (R), hazard (H) and vulnerability (V) can be expressed in a mathematical equation presented by Soussan & Arriens (2004) and Kirilenko et al., (2004).

$$R = f(H \times V) \quad (1)$$

Similarly, German sociologist Ortwin Renn defined 'risk' (Renn, 2008) as the multiplication of the probability of an event occurrence and its significance level of potentially unfavorable condition. Therefore the term 'risk' can be described mathematically as:

$$\text{Risk} = \text{Probability of an event} \times \text{Significance (loss due to the event)} \quad (2)$$

To measure PMR, we used a fuzzy-Likert scale instead of the traditional Likert scale. Although the Likert scale is the most commonly used psychometric scale in the arena of survey research, we used a modified Likert scale to avoid the limitations of the traditional Likert scale. Generally, attitudes towards a statement are vast and have a multi-dimensional continuum. The Likert scale is a single-dimensional and gives only 5 to 10 different options of choice to the respondents. Thus, it is challenging to measure the real attitude of participants. Likert scale assumes equal differences between two consecutive scale points (e.g., strongly agree=5, agree=4). Social scientists like Cohen et al., (2000) have argued that this is illegitimate: to assume the same difference between two consecutive scale points.

Another significant constraint of the Likert scale is that it is based on a closed format for the responses (Hodge & Giliepie, 2003). Therefore Li (2013) argued that the scale forced the respondents to choose only from given options, whether or not they represented the respondent's true opinions. To overcome the limitation of existing Likert scale, Li

(2013) suggested a Likert scale based on fuzzy sets. The fuzzy set concept was first introduced by L.A. Zadeh (Zadeh, 1965). Although uses of fuzzy sets in engineering and mathematics have been widely successful, their use in social sciences has been quite limited. These sets have essential applications in the field of social sciences (Ragin, 2000; Smithson & Verkuilen, 2006; Rivza & Rivza, 2013; Uddin, 2012). As, a fuzzy risk matrix is a potent tool for semi-quantitative risk assessment, as proved by Markowski & Mannan (2008), to handle different process activities of hazardous events (Portik & Pokoradi, 2014).

From the definition of the risks (equation 2) we know, risks have two different sides: an uncertainty which can be measured with ‘probability’ or ‘likelihood’ and the ‘impact’ or ‘consequences’. Therefore, for obtaining better results, we applied a two-dimensional scale in our research. Five points fuzzy–Likert scale for probability measurements (Table 1) and another five point’s fuzzy–Likert scale for impact assessment (Table 2) were used (Rivza & Rivza, 2013; Pervez, 2018). Previously, in some studies, farmers were asked to rate the risk level. However, Botterill & Mazur (2004) argued that risks should be identified by its’ probability and consequences.

Table 1: A triangular fuzzy scale for evaluation risk probability

Linguistic scale	Characterization	Triangular fuzzy scale
Unlikely	Could happen only under rare conditions	(0, 0.125, 0.25)
Seldom	Could happen though unlikely (once in few years)	(0.15, 0.30, 0.45)
Occasional	Could happen once in a year	(0.35, 0.50, 0.65)
Likely	Could happen once in every season	(0.55, 0.70, 0.85)
Frequent	Could happens two or more time in every seasons	(0.75, 0.875, 1.0)

Source: Rivza and Rivza (2013), Modified; Pervez (2018)

Table 2: A triangular fuzzy scale for evaluation of the significance (impact) of risks

Linguistic scale	Characterization	Triangular fuzzy scale
Negligible	Up to 1% from the total budget	(0, 0.0075, 0.015)
Minor	1-5% from the total budget	(0.005, 0.025, 0.055)
Moderate	5-10% from the total budget	(0.045, 0.0775, 0.11)
Critical	10-25% from the total budget	(0.09, 0.195, 0.30)
Catastrophic	Above 25% from the total budget	(0.20, 0.60, 1.0)

Source: Rivza & Rivza, (2013), Modified; Pervez (2018)

Fuzzy values for probability and consequences were multiplied according to fuzzy multiplication law ($A \otimes B = (a_1 \otimes b_1, a_2 \otimes b_2, a_3 \otimes b_3)$) (Habibi et al., 2015). Thereby, we obtained new fuzzy values: but these values are not real numbers. So, we need defuzzification of the triangular fuzzy values. Among the different defuzzification methods, we used centroid methods (Ross, 2005). The defuzzification value for each item was used as the PMR score for that item (Yu & Lee, 2012; Kadir et al., 2013).

Finally, all scores for each risk source were summed to get the total PMR score of an individual farmer. The defuzzification value and the frequency distribution of the farmers' level survey on PMR sources are shown in appendix A.

Results and Discussions

The results of the descriptive analysis are summarized in table 3. According to the findings, the majority of the respondents were young to middle-aged. Older people in Bangladesh generally are not interested in taking new knowledge as an innovation (Feder et al., 1985). Quddus (2012) also found that the probability of farmer's adoption of new technologies decreased with their age in Bangladesh.

Among 300 hybrid rice farmers, only 31 were women. Although women in Bangladesh are primarily responsible for food production, the land is generally possessed or controlled by the men, and therefore women's productivity is often constrained (Sarwar, 2007). Women are also burdened with domestic duties which limit their time and energy to spend on agriculture. Furthermore, they are generally unable to take the risk of high expenditure. Rural women prefer cultivating by using indigenous knowledge for a long time because of less empowerment, less education and low-level technological know-how (Pervez et al., 2015).

Most of the hybrid rice farmers had finished only secondary education. Very few hybrid rice farmers have completed their bachelor's degree. This is because educated people in the country are not interested in taking farming as a profession.

Annual family income of the hybrid farmers is mostly medium. Farmers with low-income levels are unable to take risks. On the other hand, rural people with higher income are not interested in conducting direct farming. They provide leasing their land to the landless and marginal farmers, which is entirely risk-free farming. The rich generally make unfair agreements with the peasants (Pervez et al., 2016) and risks usually go to the peasants.

Hybrid rice farmers were classified by their family farm size, as guided by BBS (1993). Most of the farmers were under 'marginal,' 'small' and 'medium' farmer's categories: only two farmers were 'large', and there are no hybrid rice farmers under 'landless' category. Landless and marginal farmers cannot allocate their land for the hybrid rice farming because of land shortage and inability to take the risk.

Most of the farmers do not watch/ listen to the agricultural programs on TV/radio. Farmers usually cannot allocate the time for watching/ listening to this kind of applications (Pervez, 2018): some cannot adjust to the specific time of these programs, as farming is not conducted on a timetable. Others are not interested in these programs: they prefer to enjoy drama or listening to music.

Only around one-fourth of the farmer gets their hybrid rice seed from the government sources. Low infrastructure and the inability of the government to produce a large-scale hybrid rice seed bound farmers to go for expensive seed sources.

Furthermore, only a few farmers get opportunities to sell rice in public procurement (PP). Therefore, most of the hybrid rice farmers do not get a fair price for their product. Extreme corruption in PP prevents farmers to sell there as they do not have the money to bribe the officials to accept their rice (Pervez, 2018). Rice marketing channels are dominated by the middlemen in Bangladesh (Sultana, 2012). Therefore, farmers get lower prices, but in the polished rice market, the cost of rice is very high. Thus, most of the profits go to intermediaries (Pervez et al., 2017).

Around 70% of the farmers could not obtain a bank loan for farming. Generally, farmers have little access to the bank. Therefore most of the farmers go to NGOs for a credit, which is expensive because of very high-interest rates. Many researchers have argued that NGO services are not reaching the extremely poor (Khatun et al., 2013).

Table 3: Socio-demographic characteristics of hybrid rice farmers

Variable and scoring technique	Categories		SD	Mean	Mode
	n= 300	%			
Age (1 for each year)	Young (up to 34) - 55	18.33	11.50	45.41	55
	Middle aged (35-57)- 199	66.33			
	Old (more than 57)- 46	15.33			
Gender (0 for female 1 for male)	Male – 269	89.67	-	-	1
	Female- 31	10.33			
Education (1 for each year of schooling)	Low (up to 5) – 70	23.33	3.52	8.07	8
	Medium (6-12)- 215	71.67			
	High (more than 12)- 15	5.00			
Annual family Income ('0000 BDT)	Low (below 13.72) - 76	25.33	9.92	23.64	30
	Medium (13.72-33.56)- 186	62.00			
	High (above 33.56)- 61	20.33			
Farm Size (Hectare)	Landless (up to 0.02 ha)- 0	0.00	0.64	0.72	0.40
	Marginal (0.021 – 0.2 ha)- 35	11.67			
	Small (0.21-1 ha)- 204	68.00			
	Medium (1.1-3 ha) - 59	19.67			
	Large (above 3 ha)- 2	0.67			
Listening/watching agricultural program on radio/TV (0= Not listen/watch, 1= Watch/listen once in a month, 2= Once in a week, 3= More than once in a week)	Not listen/watch - 141	47.00	1.12	1.00	0
	Watch/listen once in a month- 66	22.00			
	Once in a week - 44	14.67			
	More than once in a week - 49	16.33			
Source of hybrid rice seed (0 for non-government, 1 for government source)	Non-governmental source – 215	71.67	-	-	0
	Governmental source - 85	28.33			
Rice selling in Public Procurement (PP)1, 0 for others)	Could not sell rice in PP- 205	68.33	-	-	0
	Could sell rice in PP - 95	31.67			
Bank loan (0 for no recipient, 1 for recipient)	Could not obtained bank loan - 212	70.67	-	-	0
	obtained bank loan-88	29.33			

By mean and the standard deviation, the farmers' PMR score was categorized into three (Table 4). The highest proportion of the farmers perceived under medium level risks (70%) whereas 17.33% and 12.67% of the respondents perceived the serious and little risks, respectively.

Table 4: Distribution of the respondents by marketing risk score

Categories	<i>f</i> (<i>n</i> = 300)	%	<i>M</i>	<i>SD</i>
Low risky situation	38	12.67		
Medium risky situation	210	70	0.87	0.54
High risky situation	52	17.33		

The rank order of the risk sources is represented in table 5. Among the seven risk sources 'high price fluctuation of hybrid rice' obtained the highest score. The other catastrophic risk sources were 'refusal of hybrid rice cultivation due to high seed price', 'scarcity of hybrid rice seed during seasons', 'high economic losses due to the excessive presence of middlemen in hybrid rice marketing channel' ranked second, third, and fourth, respectively.

Table 5: PMR sources and their rank order according to survey data

Sl. No.	Sources of marketing risks	Score	Rank
1	The scarcity of quality hybrid rice seeds during seasons	35.3847	3
2	Refusal of hybrid rice cultivation by farmers due to high seed price	50.0727	2
3	High price fluctuation of hybrid rice price	57.0547	1
4	High economic loss to farmers due excessive presence of middlemen in the marketing channel	33.7987	4
5	Fertilizer and pesticides market instability	30.9982	5
6	Dissonance of farmers to cultivate hybrid rice due to high irrigation cost	28.0253	7
7	Poor demand of hybrid rice due to over-production of inbred rice	28.1888	6

Bangladeshi people are habituated to take flaky and non-sticky rice in their meals. Hybrid rice is stickier than the inbred rice because of low amylose content. Therefore market demand for hybrid rice in Bangladesh is deficient. On the other hand, the price goes high when there is an extreme crisis of inbred rice, thus low market signal to farmers to cultivate or not to cultivate. The high cost of hybrid rice seeds is another crucial problem in hybrid rice marketing in Bangladesh. Lack of government support to the farmers in seed production and poor government infrastructure create seed crises during the sowing time. Finally, the price increases sharply. Millers or intermediaries are very interested in buying these types of rice because of the low price. Millers purchase hybrid rice at a meager price and then mix it with other inbred rice. They then sell polished rice in the name of inbred rice. Thus, the profit gainers usually are millers or middlemen (Pervez et al., 2016).

The regression result (Table 6) shows that the relationship between the dependent and independent variables. Education has a significant negative association with PMR. Education can broaden the outlook and make one less fearful of risk. Educated farmers

can enter the market information via different media. Therefore, education helps to reduce the perception of risks in hybrid rice production. Nadhomi et al., (2013) found a similar relationship between schooling and perceived risk in soil erosion. The farmers with higher family incomes are capable of managing the risks because of their available resources. Thus, farmers with high family income perceive low marketing risks. Income generation reduces disaster risk perception (UN, 2009). The farmers who listen to/ watch agricultural programs/news on TV/radio can get the recent market information. Therefore, they faced fewer risks in the marketing of hybrid rice. Access to PP of hybrid rice provides a fair price for hybrid rice, which enables farmers to manage marketing risks. So, 'rice selling in PP' has a significant negative relation with PMR. Furthermore, the farmers who got the loan from the bank are capable of managing risks. Thus, this variable shows a significant negative association with marketing risks. In other studies, it has been detected that public investment in farming can reduce risks (Miller, 2008). The source of hybrid rice seed shows a significant positive relation which means the farmers who got the seed from government sources perceive that they are more vulnerable to risks. This is because, government sources provide their seeds without adequate support. On the other hand, private businesses are competitive. Some companies are providing technical assistance to increase yields, which can help to develop sales. Therefore, farmers who got seed from private companies felt they could manage risks better in comparison with the farmers who got seed from government sources.

Table 6: Regression results for PMR and socio-demographic characteristics of hybrid rice farmers

<i>Variables</i>	<i>B</i>	<i>SE</i>	<i>beta</i>	<i>t</i>	<i>Sig.</i>
(Constant)	1.646	.118		13.935	.000
Age	.001	.002	.012	.311	.756
Gender	.123	.068	.069	1.808	.072
Educational level	-.041	.008	-.264	-4.827	.000
Annual family income	-.019	.003	-.339	-6.792	.000
Farm size	.021	.034	.025	.621	.535
Watching/listening agricultural programs on TV/radio	-.094	.027	-.194	-3.419	.001
Source of hybrid rice seed	.191	.067	.158	2.859	.005
Rice selling in public procurement process	-.231	.064	-.198	-3.619	.000
Loan from bank	-.147	.067	-.123	-2.200	.029

Conclusions

Although the Likert scale is the most commonly used scale in social sciences, scientists hardly criticized the shortcomings of the scale, particularly a problem where there are multidimensional continuums. The Likert scale uses close format for responses. Also, the scale applies a shaped edged difference between two scale-points which unable to explain semi-quantitative reactions. Therefore, for more precise and satisfactory assessment the research recommends fuzzy theory based Likert scale.

This study identified seven key marketing risks through discussion with hybrid rice farmers. These risks were ranked by likelihood and severity of an incidence by the farmer's assessment. By their assessment, we found that the main risk comes from the price volatility of hybrid rice. Other severe risks in hybrid rice production in Bangladesh are high seed price and the extreme scarcity of quality seed in the market during rice seasons. Thus most of the farmers discontinue hybrid rice cultivation or do not adopt hybrid rice cultivation as an innovation. This study also found that educated, income rich, large farmers who enjoy agricultural programs in mass media and sell hybrid rice in PP faced fewer risks compared to the others.

By findings, the current research recommends i) boosting farm educational program, arranging income maximization program, motivating big farmers to participate in hybrid rice cultivation. ii) Organizing low-interest crop loan program with the due interference of state extension can significantly reduce the marketing risk of hybrid rice growers of Bangladesh. iii) The Government should develop proper marketing channels with a fair price and should increase the production of hybrid rice seeds by farmers, along with technical support, to reduce the risks among the farmers. iv) The Government also should ensure proper extension and training supports along with adequate and quality seed marketing with a subsidy. v) Controlling the middlemen in the marketing channel in a proper way. vi) To increase facilities for hybrid rice research and development, the government should establishment a separate Hybrid Rice Research Institute in Bangladesh.

Conflict of interests

The authors declare no conflict of interest.

References

1. Abdullah, M. & Hossain, M.R. (2013). A new cooperative marketing strategy for agricultural products in Bangladesh, *World Review of Business Research* 3(3), 130–144.
2. Alam, M.S. & Islam, M.A. (2013). Long-term assessment of rice production scenario in Bangladesh: a macro dynamics, Bangladesh, *J. Agril. Res.* 38(2): 257-269.
3. BBS. (2010). *Statistical Year Book of Bangladesh*, Dhaka: Bangladesh Bureau of Statistics (BBS).
4. BBS. (1993). *Statistical Yearbook of Bangladesh*, Dhaka: Bangladesh Bureau of Statistics (BBS).
5. Bhuiyan, N. I., Paul D. N. R. & Jabber, M. A. (2002). Feeding the Extra Millions. *Proceedings of the BRRI-DAE Workshop on Experiences of HYV Rice Production in Bangladesh*, Bangladesh Rice Research Institute, Gazipur.
6. Botterill, L. & Mazur, N. (2004). *Risk and Risk Perception: a Literature Review*. Barton: Rural Industries Research and Development Corporation.
7. Chowdhury, M.I. (2011). *Agrarian Transition and Livelihoods of the Rural Poor: Agricultural Product Market*, Dhaka: Unnayan Onneshan.

8. Cohen, L., Manison, L. & K. Morisson. (2000). *Research Methods in Education*, London: Routledge Falmer.
9. EC (European Commission). (2015). *Bangladesh ECHO Factsheet*, Brussels: Humanitarian Aid and Civil Protection Department (ECHO).
10. FAO (Food and Agriculture Organization) (1993). *Soil Loss Accelerating Worldwide*, Rome: FAO.
11. Feder, G.R., Just, R.E. & Zilberman, D. (1985). Adoption of agricultural innovation in developing countries: a survey, *Economic Development and Cultural Change*, 33(1): 255-298.
12. GoB (Government of Bangladesh) (2008). *Cyclone Sidr In Bangladesh: Damage, Loss and Needs Assessment For Disaster Recovery and Reconstruction*, Dhaka: Government of Bangladesh (GoB), Dhaka.
13. Habibi, A., Jahantigh, F. F. & Sarafrazi, A. (2015). Fuzzy-delphi technique for forecasting and screening items, *Asian Journal of Research in Business Economic and Management* 5(2): 30-143.
14. HIES, (2009). *Household Income Expenditure Survey (HIES)*, Dhaka: Bangladesh Bureau of Statistics.
15. Hodge, D.R. & Gillespie D. 2003. Phrase completions: an alternative to Likert scales, *Social Work Research*, 27 (1):45–55.
16. Islam, M.M., Bhuiyan, M.N.K. & Harun, M.Y. (2012). Development of value chain: an effective way of profitable duck farming in haor areas of Bangladesh, *INFPD Good Practices of Family Poultry Production Note No 04*. Retrieved from <http://www.fao.org/3/a-aq631e.pdf> (July 31, 2018)
17. Kadir, M.K.A., Hines, E.L., Qaddoum, K. R., Collier, Dowler, E., Grant, W., Leeson, M.S., Iliescu, D., Subramanian, A., Richards, K., Merali Y., & Napier, R.M.(2013). *Food Security Risk Level Assessment: A Fuzzy Logic-Based Approach*, Applied Art International, 27(1): 50-61.
18. Kashem, M. A. & Faroque, M. A. A. (2011). A country scenarios of food security and governance in Bangladesh, *J. Sci. Foundation*, 9(1-2): 41-50
19. Khan, M.R.A. (2012). A proven model for achieving localized food security and farmers benefit protection, MPRA Paper No. 41383, Dhaka: Department of Agricultural Marketing.
20. Khatun M.A., Islam, M.A. & Majumder, S. (2013). why some poor women in Bangladesh do not opt for micro-credit? *Journal Bangladesh Agricultural University* 11(2): 285–292.
21. Kirilenko, A.P., Alcamo, J., Golubev, G.N., Dronin, N.M. & Endejan, M. (2004). Modeling the impact of climate changes on agriculture in Russia, *Journal of Russian Academy of Sciences*, 396(6): 819-822.
22. Krishi Diary, (2018), Dhaka: Agricultural Information Services.
23. Li, Q. (2013). A novel Likert scale based on fuzzy sets theory, *Expert Systems Application*, 40: 1609–1618.

24. Markowski A. S & Mannan, M.S. (2008). Fuzzy Risk Matrix, *Journal of Hazardous Mathematics*,156(1):152-57.
25. Matin, M.A., Baset, M.A., Alam, Q.M., Karim, M.R., Hasan, M.R. (2008). Mango marketing system in selected area of Bangladesh, *Journal of Agricultural Research*, 33 (3): 427-438.
26. McFall, W. Magnan, N. & Spielman, D.J. (2013). Hybrid rice as a pro-poor technology? evidence from Bangladesh, *Selected Paper prepared for presentation at the Agricultural & Applied Economics Association's 2013 AAEA & CAES Joint Annual Meeting*, Washington, DC, August 4-6.
27. Miller, A., Dobbins, C., Pritchett, J., Boehlje, M. & Ehmke. C. (2004), *Risk management for farmers*, Rome: Food and Agriculture Organization.
28. Miller, C. 2008. *Risk mitigation and management for agricultural investment: investment and resource mobilization*, Rome: Food and Agricultural Organization.
29. Nadhomi, D.L., Tenywa, J.S., Musali, P., & Nakileza, B.R. (2013). Farmers' perception of erosion risk and its implication on the adoption of soil and water conservation practices. *International Journal of Advance Agricultural Science and Technology*, 2(1):28-44.
30. Nunnally, J. C. (1978). *Psychometric theory*, New York: McGraw-Hill.
31. Parvez, S. (2014 October, 3). Hybrid rice wins back popularity, *The Daily Star*.
32. Pervez, A.K.M.K. (2018). *A study of risk management strategy for hybrid rice production in Bangladesh*, Thesis diss., China Agricultural University.
33. Pervez, A.K.M.K., Gao, Q. & Uddin, M.E. (2015). Rural women's awareness on indigenous technical knowledge: case of northern Bangladesh, *Anthropologist*, 21(3): 415-426.
34. Pervez, A.K.M.K., Gao, Q. & Uddin. M.E. (2016). The management of agricultural risk in Bangladesh: a proposed process, *Asian Journal of Agricultural Extension Economics & Sociology*, 12(1): 1-13.
35. Pervez, A.K.M.K., Gao, Q., Zeng, Y., & Uddin, M.E. (2017). Hybrid rice: Bangladesh's failure and china's success, *Journal of Agriculture and Ecology Research International*, 10(1): 1-10.
36. Portik, T. & Pokoradi, L. (2014). The summarized weighted mean of maxima and its application at the end of risk assessment process, *Acta Polyt. Hungarica*, 11(3): 167-180.
37. Quddus, M.A. (2012). Adoption of dairy farming technologies by small farm holders: practices and constraints, *Bangladesh Journal Animal Science*, 41(2): 124-135.
38. Ragin, C.C. (2000). *Fuzzy-set in social science*, London: the University of Chicago Press Ltd.
39. Rashid, H.A., Julfikar, A.W. & Ali, S. (2011). *History, impact and current status of hybrid rice research, development and delivery in Bangladesh*, Dhaka: Agricultural Advisory Society (AAS).

40. Renn, O. (2008). Concept of risk: an interdisciplinary review. *Paper presented in the ISA Conference*, Barcelona, September, 3-10.
41. Rivza, S. Z. & Rivza, P. (2013). Fuzzy-ANP based research on the risk assessment of biogas production from agricultural biomass, *Paper presented in the international symposium on the analytical hierarchy process*, Kualalumpur, June 23-26.
42. Ross, T.J. (2005). *Fuzzy logic with engineering applications*, New York: Wiley & Sons Ltd.
43. Sarwar, M.G., Islam, R., & Monzoor, S. (2007). Women's rights to land in Bangladesh: roles, limitations and transformation, Dhaka: Unnayan Onneshan – The Innovators.
44. Shah, M.M. I., Grant, W. J. & Stockmayer, S. (2015), Farmers' perception of risk in cultivating hybrid rice in Bangladesh, *S. Afr. J. Agric. Ext.*, 4(2):17-29.
45. Shaikh, M.A.Q. (2015, November, 15). Bangladesh Agriculture: Challenges Ahead", *the Daily Star*.
46. Siddique, A.B. (2015, October, 30). Sea level rising by 6-20mm each year, *Dhaka Tribune*.
47. Smithson, M. & Verkuilen, J. (2006). Fuzzy set theory: applications in the social sciences, quantitative applications in the social sciences, CA: Sage, Belmont.
48. Soussan, J. & Arriens, W.L. (2004). Poverty and water security: understanding how water affects the poor, Manila: Asian Development Bank.
49. Sultana, A. (2012). Rice marketing in Bangladesh: from the perspective of village study at cox's bazar district, *African Journal of Agricultural Research*, 7(45): 5995 -6004.
50. The Daily Star, (2011, the Daily Star). *Climate and hunger: Bangladesh fifth most vulnerable country*.
51. Uddin, M.F. 2012. Application of fuzzy logic in sociological research: an instance of potential payoff, *Bangladesh e-Journal of Sociology*, 9(2):7-18.
52. UN (2009). *Disaster risk reduction in the United Nations: roles, mandates and areas of work of key United Nations entities*, Washington DC: UN.
53. UN (2010). *World population prospects: the 2008 revision*, Washington DC: UN.
54. WB (2013). *Warming climate to hit Bangladesh hard with sea level rise, more floods and cyclones*, World Bank press release, June 19, Washington D.C., USA.
55. WB (2015). The World Bank data: Bangladesh", Available at <http://data.worldbank.org/country/bangladesh> (accessed 15 October, 2017)
56. Yu, J. & Lee. S. (2012). A conflict-risk assessment model for urban regeneration projects using fuzzy-FMEA. *KSCE Journal of Civil Engineering*, 16 (7): 1093-1103.
57. Zadeh, L.A. (1965). Fuzzy Sets, *Information and Control* 8: 338-353.

Appendix A: Frequency Distribution (n) of Farmers' Level Survey on Marketing Risk Factors

Linguistic scale	U	U	U	U	U	S	S	S	O	O	O	L	L	L	F	F	F	Total Score								
	N	M	Mo	C	Ca	N	M	Mo	C	Ca	N	M	Mo	C	Ca	N	M	Mo	C	Ca						
<i>Difuzzification</i> value	0.0019	0.0069	0.0138	0.0375	0.125	0.0034	0.0128	0.0281	0.074	0.24	0.0049	0.0188	0.0436	0.1133	0.36	.0064	0.0248	0.0591	0.1522	0.48	0.0075	0.0294	0.0719	0.1838	0.5750	
Risk sources																										
1. The scarcity of hybrid rice seeds during seasons	20	20	14	7	3	12	29	8	4	1	9	21	15	10	9	6	10	19	23	12	1	5	8	9	25	35.3847
2. Refusal of hybrid rice cultivation by farmers due to high seed price	12	2	1	2	1	4	2	4	8	0	3	6	9	10	6	2	8	31	47	8	4	7	34	56	33	50.0727
3. High price fluctuation of hybrid rice price	39	2	1	2	1	21	1	8	11	3	6	1	11	7	11	4	6	15	30	16	1	5	15	33	50	57.0547
4. High economic loss to farmers due excessive presence of middlemen in the marketing channel	6	2	4	3	5	2	13	3	8	1	5	17	51	29	6	1	6	31	48	7	1	0	13	30	8	33.7987
5. Fertilizer and pesticides market instability	4	1	5	2	4	13	14	5	5	1	10	22	23	4	0	10	16	38	18	4	0	14	34	35	18	30.9982
6. Dissonance of farmers to cultivate hybrid rice due to high irrigation cost	10	3	2	1	1	7	25	11	5	3	15	19	28	8	1	13	18	34	27	6	1	8	19	22	13	28.0253
7. Poor demand of hybrid rice due to over-production of inbred rice	12	8	7	4	2	12	22	8	3	5	9	17	28	9	3	16	10	30	21	5	14	8	15	15	17	28.1888

N.B. U= Unlikely, S= Seldom, O= Occasional, L= Likely, F= Frequent, N= Negligible, M= Moderate, Mo= Minor, Ca= Catastrophic

WINE TOURISM AS AN INCREASINGLY VALUABLE REVENUE STREAM OF A WINERY'S BUSINESS MODEL

Katarína Remeňová¹, Zuzana Skorková², Nadežda Jankelová³

*Corresponding author E-mail: katarina.remenova@euba.sk

ARTICLE INFO

Original Article

Received: 01 January 2019

Accepted: 11 March 2019

doi:10.5937/ekoPolj1901023R

UDC 338.48-53:63]:330.35

Keywords:

*wine tourism, revenue model,
revenue streams, winery's
revenue, business model*

JEL: Q1, M2

ABSTRACT

Nowadays, wine tourism belongs to the key business activities of a winery. It represents a diversification tool of a typical production company. The research paper aims to explore the relationship between wine tourism and business model parameters according to financial and production performance of a winery. The results of the parametric Independent sample t-test reveal that there is no difference in revenue, profit or gross margin between two groups of wineries with or without wine tourism activities. But the analysis gave proof about the difference in a number of revenue streams, key, and additional business activities. The effect size r for t- test was also calculated. Measuring the association between key performance indicators and wine tourism activities reveals the dependency with the number of revenue streams of a winery. Additional business activities are the most relevant parameter to perform better results in wine tourism.

© 2019 EA. All rights reserved.

Introduction

Worldwide statistics indicate the size of the vineyards at 7.6 mha. 50% of the area is managed by the following five key countries only - Spain 14%, China 11%, France 10%, Italy 9%, Turkey 7%. The leading position in the ranch of grapes producers has Europe, as it is shown by other statistics of production (39% from Europe). Another third is grown in Asia, and 18% is coming from America. The average wine consumption is currently 242 mhl, with most wine consumers from the US, France, Germany, and Italy (STATE OF THE VITIVINICULTURE WORLD MARKET, 2017)".

-
- 1 Katarína Remeňová, Ing., PhD., MBA, Assistant Professor, University of Economics in Bratislava, Dolnozemska cesta 1, 852 35 Bratislava, Slovakia, Phone: +421 2 67295632, E-Mail: katarina.remenova@euba.sk,
 - 2 Zuzana Skorková, Ing., PhD., Assistant Professor, University of Economics in Bratislava, Dolnozemska cesta 1, 852 35 Bratislava, Slovakia, E-Mail: zuzana.skorkova@euba.sk
 - 3 Nadežda Jankelová, Ing., PhD.doc., Associate Professor, University of Economics in Bratislava, Dolnozemska cesta 1, 852 35 Bratislava, Slovakia, E-Mail: nadezda.jankelova@euba.sk

Despite the popularity of wine tourism among customers, it is a research field rather undeveloped. Some research studies provide information on wine tourism activities and destinations or wine tourism characteristics (Alebaki, 2015). In spite of the interest of the customer, this source of income is secondary to wineries (Sevil, Yuncu, 2010). Globally, the wineries state that, on average, 19.5% of their revenue comes directly from wine tourism. The most common reason why wineries are not involved in wine tourism is the lack of infrastructure to host wine tours, and it would disrupt existing business operations, insufficient economic benefits, lack of knowledge about wine trails, or lack of supply to cope with possible demand (Carlsen & Charters, 2006).

Literature overview

Wine tourism represents a crucial complementary activity for a production enterprise such as a winery, thereby completing the specific character of value proposition of a winery. Winery's value is due to wine tourism overflowing through producing industry into the hospitality industry, with the key role of advertising.

Wine tourism refers to group tourism activities, which contain wine tasting and purchasing of wine in wine cellars, visiting wineries, vineyards, and restaurants, including organized wine tours, wine festivals or other special events tailored to company's needs. Last, but not least it supports local rural tourism (Carrà et al., 2016; Mitchell et al., 2012; Santeramo et al., 2017; Bel et al., 2015). The breakthrough in perceiving wine tourism as the importance of wine in making leisure choice brought the study of prof. Coriglianio at Bocconi University. What encouraged the opening of wine routes and, „open cellars” (Mitchell et al., 2002).

Wine tourism is undoubtedly a vital revenue stream of the business model of a winery, which represents a key sales channel in some tourist areas (Rüdiger & Hanf, 2017). Also it appears as a significant component of the regional and rural tourism (Asero, Patti, 2011; Skrbic et al. 2015; Krasavac Chronos et al. 2018), which acts as an attractiveness factor for rural destinations (Meler, 2015) and contributes to the total economic development and employment of a region (Lekić et al., 2018). Also, it is important resource for local economies (Afonso et al., 2018). Business model represents a platform for creating and delivering product value for customers and consists of three key flows – value stream, revenue stream and logistical stream (Osterwalder, Pigneur, 2010). The value for winery's customer is created by a system of activities – key business activities and additional business activities (Zott, Amitt, 2010). The key business activities are the core of the business model, while in the wine industry it comprises production and sale of wine. Additional business activities of wineries include wine tourism activities, events or sale of accessory goods.

To maintain a long-term relationship with customers (Byrd et al., 2016), customer – centric wineries are building loyalty systems with them, providing experiences (Thanh, Kirova, 2018) through providing wine tasting, which is one of the key activities of wine tourism.

The broad definition of wine tourism is shaping the specification of the wine tourism customer with his / her specific attributes and expectations (Rüdiger et al., 2015), which is used for predicting and promoting future wine tourism based on tourist intentions (Krajičková, Šauer, 2018). The profile of the wine tourist is similar to that of the wine consumer (Shor, Mansfeld, 2010).

The latest studies addressing the influence of external parameters on wine tourist behaviour such as winescape (Quintal et al., 2015), in combination with the characteristics of wine tourist, using the knowledge for segmentation of the wine tourist (Quintal et al., 2017) such as: specific cultural and geographic (Charters, Ali-Knight 2002), values reflecting on their extrovert and hedonistic lifestyle (Simpson, Bretherton, 2004), destinations offering a wide range of cultural and outdoor attractions (Getz, Brown, 2006) or level of consumer involvement, where four groups of involvement were identified - low-involvement wine tourists, highly involved wine tourists, interest-driven wine tourists, and high-risk perception wine tourists (Gu et al., 2018). Sekulic et al. (2017) have monitored Serbian's wine regions and had identified two types of wine tourists – active (consuming wine and visiting winery) and potential (consuming wine).

The logical consequence of customer clustering based on their values and preferences are several studies segmenting models and criteria for wine tourism. Brunner and Siegrist (2011) identified six segments of wine, such as the price-conscious wine consumer; the involved, knowledgeable wine consumer; the image-oriented wine consumer, the indifferent wine consumer; the basic wine consumer; and the enjoyment-oriented, social wine consumer. German researchers have accomplished new segmentation approach based on calculating direct tourism-related sales volume and revenue by selling wine at a winery (Szolnoki, 2018).

Materials and methods

The goal of this research paper is to explore the relationship between wine tourism activities and business model parameters according to the financial performance of a winery measured by Total revenue, Gross margin, and Profit. However, there are quite enough of production and economic statistics in winery, but in general, there are very few hard statistics on wine tourism. Actual studies in the field of wine tourism are aimed at activities of wine tourism, segmentation criterion, and wine tourism destinations, underlining the importance of wine tourism as a diversifying factor in the wine industry. There are a few studies concerned with the relationship between wine tourism and exact production and financial results impacting a revenue model of a winery (Remeňová, Jankelová, 2018).

The original research sample (N= 100) consists of Slovak wineries of all size types. Consultation with individual wineries and researchers in the winery field led us to focus on three areas outlined earlier. Publicly available online financial and production information and data (www.finstat.sk) were used in this analysis. The researchers have acquired information also from secondary sources that represent

the financial statements, annual corporate reports, and studies of external entities. The data obtained through the questionnaire about winery business activities are of a nominal and interval variable.

Data analysis

The non-parametric *Chi Square Test of Independence* was used to test the dependence between interval variables (Cultivated area, Annual production, Revenue, Gross Margin, Profit, On the market, No. of Revenue Streams, No. of Offline channels type, No. of Online Channels) and the nominal variables (Own Eshop, Off online channels, Sales channels (direct/indirect), Core business activity, Additional Business activity category, Vineyard Regions). This test is based on the assumption, that nominal variables are employed in the analysis for $r \times c$ contingency table. Chi-square provide information on the significance level of the observed variables, but also provides detailed information on exactly which categories account for any differences.

The strength of the association was measured through the ETA coefficients and the proportion of variability explained by the nominal variable by h^2 . The Cohen scale was used to interpret the strength of association between variables (Cohen, 1988; Hanák, 2016).

The parametric *Independent sample t-test* was used to identify significant differences in key financial performance indicators, scope of revenue streams, scope of key business activities and scope of additional business activities among two categories of providing/not providing wine tourism activities in a winery. The t-test represents an analysis of dependence, which compares mean value of continuous-level, normally distributed data.

Then the r was examined, whether a difference between two groups is meaningfully large, independent of whether the difference is statistically significant. The effect size r for t- test was then calculated as follows:

$$r = \sqrt{\frac{t^2}{t^2 + df}}$$

The assumption of homogeneity of variance and sphericity assumption was measured through Levene's test. It represents the homogeneity of variance test that is less dependent on the assumption of normality than most tests. It computes the absolute difference between the value of that case and its cell mean and performs a one-way analysis of variance on those differences.

The data were analysed in PSPP statistical software. Hypotheses were tested at a significance level of $p \leq 0.05$; while maintaining the primary rule of the Chi-Square Test of Independence, where the theoretical frequencies did not fall below a value of 5 in 80%, and for other values $X > 1$ applied

Results and discussion

Based on the descriptive statistical results, we can say that the average number of wine tourism activities is $M=1.34$. Up to a third of wineries do not carry out any wine tourism activity. Nearly 56% of enterprises carry out one to two types of tourism activities, contributing to a significant expansion of revenue sources as is presented in Table 1.

Table 1. Frequency table for wine tourism activities

wine tourism activities	Frequency	Percent	Cum Percent
Non wine tourism activities	27	27.00	27.00
One wine tourism activity	39	39.00	66.00
Two wine tourism activities	17	17.00	83.00
Three wine tourism activities	8	8.00	91.00
Four wine tourism activities	8	8.00	99.00
Five wine tourism activities	1	1.00	100.00
Mean	1.34		
Mode	1.00		
Median	1		

Source: Authors' calculations

The analysis also highlighted the small number of wineries that wine tourism activities consider to be the mainstay of revenue streams and create space for the creative use of this niche segment. 17% of wineries provide from three to five types of experience activities (Table 2).

Table 2. Descriptive statistics for wine tourism activities

Variable	N	Mean	Std Dev	Variance	Kurtosis	S.E. Kurt	Skewness	S.E. Skew	Range	Min	Max
wine tourism activities	100	1.34	1.24	1.54	.22	.48	.94	.24	5.00	.00	5.00

Source: Authors' calculations

The development of wine tourism activities increases the overall interest in traveling and business. Wine tourism interferes with and conditions the activity in gastronomy, the growth of sales channels and the transformation of the business model of the production company – a winery. What is the impact of the offer of services of winemaking on financial indicators (profit, amount of revenue, gross margin)? Is actually there any association with the individual elements of the business model of wineries? According to Newton et al. (2015), direct sales channels influence growth. The results of their study suggest that the distribution channel will have a positive impact on the gross profit margin and winery growth rates. The relation of wine tourism as a direct distribution channel and financial indicators was followed by the next hypotheses:

H0= There is no dependence between wine tourism activities and key performance indicators (financial, production) and scope of business model of a winery

H1= There is strong dependence between wine tourism activities and key performance indicators (financial, production) and scope of business model of a winery

The non-parametric Chi Square Test of Independence was used to test the dependences mentioned above. The Eta coefficient measures the relationship between the nominal and the interval variables. The summary results are shown in table 3.

Table 3. Summary results table for association between Key performance indicators of a winery and Wine tourism activities [ETA; p-value]

Variables	wine tourism activities yes/no
Cultivated area in hectares	.16 .669
Annual production_liters	.14 .607
Revenue	.07 .491
Gross Margin	.13 .445
Profit	.17 .498
On the market	.00 .188
No. of Revenue Streams	.59 .348 .000
Variables	wine tourism activities yes/no
No. of Offline channels type	.18 .200
No. of Online Channels	.15 .370

Source: Authors' calculations

In support of the hypothesis, we rejected the alternative hypothesis H1 at the significance level of $p \leq .05$, and accept null hypothesis, because there is no statistically significant dependence in the most researched variables $p > .05$. Only one dependence can confirm the alternative hypothesis H1. This is the case of No. of Revenue Streams, because of statistically significant dependence with wine tourism activities ($p = .000$, $h^2 = .348$), where variable „wine tourism activities” explains the moderate proportion of variability in the number of revenue streams. Wineries that expand the range of wine tourism activities create a wider model of revenue.

We also monitored the dependence between wine tourism activities and key elements of business model of a winery. We tested the following hypotheses:

H0= There is no dependence between wine tourism activities and elements of business model of a winery

H1= There is statistically significant dependence between wine tourism activities and elements of business model of a winery.

Results are summarized in table 4.

Table 4. Summary results table for association between elements of business model and wine tourism activities [Cramer's V, p-value]

Variables	wine tourism activities
Own Eshop	.05 .615
Off online channels	.08 .419
Sales channels (direct/indirect)	.09 .350
Key business activities	.17 .426
Variables	wine tourism activities
Additional Business activities	.33 .000
Vineyard Regions	.12 .908

Source: Authors' calculations

Finally, we rejected alternative hypothesis H1 at the significance level of $p \leq .05$, and accept null hypothesis, because there is no statistically significant dependence in the most researched variables $p > .05$. Only the variable "Additional Business activities" provide statistically significant result about dependency ($p=.000$, $V= .33$), this indicates moderate dependence.

Measurement of differences among wineries, which provide a wine tourism activity

The parametric *Independent sample t-test* was used to identify significant differences in key financial performance indicators, scope of revenue streams, scope of key business activities and scope of additional business activities among two categories of -providing/not providing wine tourism activities in a winery. The following hypotheses were tested:

H0: There is no statistically significant difference in key financial and production performance indicators, scope of revenue streams, scope of key business activities and scope of additional business activities between the groups of wineries, which provide wine tourism activities, and which does not.

H1: There is statistically significant difference in key financial performance indicators, scope of revenue streams, scope of key business activities and scope of additional business activities between the groups of wineries, which provide wine tourism activities, and which does not.

The results of the Levene's test for analyzing the sphericity and homogeneity of variance doesn't confirm the violation of this assumption if $p > .05$. Levene's statistic and data about normality testing are presented in table 5.

Table 5. Summary results table for t-test and Homogeneity of variance_wine tourism activities

Variables	No. of wine tourism activities				
	Levene's Statistic	Sig.	t	Sig.	r
Cultivated area in hectares	3.54	.064	1.27	.208	-
Annual production_liters	2.36	.133	.86	.397	-
Revenue	.49	.485	.69	.494	-
Gross Margin	4.48	.037	1.26	.210	-
Profit	.01	.962	1.62	.108	-
On the market	.02	.879	.01	.989	-
No. of Revenue Streams	29.92	.10	7.26	.000	.59
No. of Offline channels type	.11	.745	1.84	.069	-
No. of Online Channels	.18	.676	1.51	.133	-
No. of Additional Business activities	21.43	.12	7.61	.000	.61
No. of Key Business activities	12.03	.001	1.59	.115	-

Source: Authors' calculations

Based on the results of *Independent sample t –test*, we can state, that, there is no difference between wineries in terms of wine tourism activities in parameters such as - Cultivated area ($t(98)=1.27$, $p=.208$), Annual production ($t(98)=.86$, $p=.397$), Revenue ($t(98)=.69$, $p=.494$), Gross Margin ($t(98)=1.26$, $p=.219$), Profit ($t(98)=1.62$, $p=.108$), On the market ($t(98)=.01$, $p=.989$), No. of Offline channels type ($t(98)=1.84$, $p=.069$), No. of Online Channels ($t(98)=1.51$, $p=.133$), No. of Key Business activities ($t(98)=1.59$, $p=.115$). Therefore, we rejected alternative hypothesis H1 and accepted null hypothesis H0.

Finally, we find a statistically significant difference in No. of Revenue Streams, $t(98)=7.26$, $p=.000$, with a stronger effect $r = 0.59$, and No. of Additional Business activities, $t(98)=7.61$, $p=.000$, also with a strong effect $r=.61$, was found in individual groups of the variable Wine tourism activities.

The purpose of our research study was to explore the number and the structure of wine tourism activities as an important part of the business model according to financial and production performance of a winery. At present, wine tourism, from a business model point of view, represents a significant revenue stream and simultaneously refers to direct sales channel, which has an influence on winery's growth. However, the winery industry operates on the same business model, wineries differ in the scope of the revenue model. Almost 40 % of wineries provide at least one wine tourism activity.

Most of wineries are still looking at wine tourism as a minority source of income that can overcome the critical financial period. They do not look for a competitive advantage in it that would create added value for the customer. According to our findings, a third

of wineries do not offer wine tourism services at all. Wine tourism refers to tourism whose purpose includes visiting vineyards, wineries, wine festivals and events, during which the tasting and consumption of wine and experiencing the attributes of the wine-growing region are the primary motivations.

We asked the question if wineries providing the wine tourism activities have higher sales and higher gross margin. This assumption has not been confirmed. The range of wine tourism services is not so extensive in Slovakia that it should have a statistically significant financial impact on the revenue model.

Although no interaction between the six parameters (No. of Offline channels type, No. of Online Channels, Cultivated area in hectares, Annual production, Revenue, Gross Margin, On the market and Profit) emerged.

Conclusions

Winery business provides two types of product. There are goods also experienced as a wine tourism activity. In Slovak conditions, wineries primarily offer activities of wine tourism such as wine tasting, accommodation, gastronomy, and events. Despite this activity structure, there are still some wineries, which do not provide any wine tourism activity (up to a third of wineries). The key business activities represent a fundamental pillar of the business model of a winery. The relation to the next element of a business model is crucially significant - how the value for the customer is created. The dependence of the components of the business model and the services offered by the wine tourism indicate to be statistically non-significant. We have also analysed the results of the financial and production indicators; they have proven to be statistically non-significant. Using the parametric Independent sample t-test to identify significant differences in key financial performance indicators, the scope of revenue streams, scope of key business activities and range of additional business activities among two categories of - providing/not providing wine tourism activities in a winery. We found, with strong evidence, that wineries with extended revenue model by wine tourism activities reached a broader scope of additional business activities as well as the broader scope of revenue model (regarding revenue streams).

Importantly, our findings indicate, that wineries with well-defined revenue model extended by wine tourism are more likely to identify opportunities for developing new revenue sources.

Limitation of the study

The results of the research study provide answers to the existence of an innovative revenue stream of a winery regarding wine tourism and its impact on partial financial and production indicators and business model elements. Despite primary results, we realize the research limitation by a single industry of only one country. We consider the next research should be intensely focused on the financial performance of each revenue stream of the revenue model to ensure increasing profitability of a winery. It

would also be efficient to extend the statistical sample of other wineries in Slovakia and neighboring countries because the business model of these enterprises is the same, but it differs within the scope of the revenue model.

Acknowledgements

The authors are thankful to VEGA No.: 1/0109/17 The innovative approaches to management and their influence on the competitiveness and the successfulness of the companies within the conditions of the global economy for financial support to carry out this research.

Conflict of interests

The authors declare no conflict of interest.

References

1. Afonso, C., Silva, G.M., Goncalves, H.M., Duarte, & M. (2018). The role of motivations and involvement in wine tourists' intention to return: SEM and fsQCA findings. *Journal of business research*, 89, 313-321. DOI: 10.1016/j.jbusres.2017.11.042
2. Alebaki, M., Menexes, G., & Koutsouris, A. (2015). Developing a multidimensional framework for wine tourist behavior: Evidence from Greece. *Wine Economics and Policy*, 4 (2), 98-109. <https://doi.org/10.1016/j.wep.2015.11.002>
3. Asero, V., & Patti, S. (2011). Wine tourism experience and consumer behavior: the case of sicily. *Tourism analysis*, 16(4), 431-442. DOI: 10.3727/108354211X13149079788936
4. Bel, F., Lacroix, A., Lyser, S., Rambonilaza, T., & Turpin, N. (2015). Domestic demand for tourism in rural areas: Insights from summer stays in three French regions. *Tourism Management*, 46, 562-570. <https://doi.org/10.1016/j.tourman.2014.07.020>
5. Brunner, T.A., & Siegrist, M. (2011). A consumer-oriented segmentation study in the Swiss wine market. *British food journal*, 113(2-3), 353-373. DOI: 10.1108/00070701111116437
6. Byrd, E., T., Canziani, B., Hsieh, Y., Debbage, K., & Sonmez, S. (2016). Wine tourism: Motivating visitors through core and supplementary services. *Tourism Management*, 52, 19-29. <https://doi.org/10.1016/j.tourman.2015.06.009>
7. Carlsen, J., & Charters, S. (2006). *Global Wine Tourism: Research, Management and Marketing*. CAB International, Wallingford.
8. Carrà, G., Mariania, M., Radić, I., & Peri, I. (2016). Participatory Strategy Analysis: The Case of Wine Tourism Business. *Agriculture and Agricultural Science Procedia*, 8, 706-712. <https://doi.org/10.1016/j.aaspro.2016.02.050>

9. Getz, D., & Brown, G. (2006). Critical success factors for wine tourism regions: a demand analysis. *Tourism Management*, 27(1), 146-158. <https://doi.org/10.1016/j.tourman.2004.08.002>
10. Gu, Q.S., & Zhang, H.Q.Q., King, B., & Huang, S.S. (2018). Wine tourism involvement: a segmentation of Chinese tourists. *Journal of travel & tourism marketing*, 35(5), 633-648. DOI: 10.1080/10548408.2017.1401031
11. Hall, C., M., Cambourne, B., Sharples, L., & Macionis, N. (2002). *Wine Tourism Around the World: Development, Management and Markets*. Butterworth Heinemann, Oxford.
12. Krajičková, A., & Šauer, M. (2018). Differences in motivation of food festivals visitors - A view from the Czech Republic. *Geographica Pannonica*, 22(3), 189-200. DOI: 10.5937/gp22-17050
13. Krasavac Chroneos, B., Katica, R., & Bradic-Martinovic, A. (2018). SWOT analysis of the rural tourism as a channel of marketing for agricultural products in Serbia. *Economics of Agriculture*, 65(4), 1573-1584. DOI: <https://doi.org/10.5937/ekoPolj1804573K>
14. Lekić, N., Savić, G., Knežević, S., & Mitrovic, A. (2018). The efficiency analysis in small wineries in the Republic of Serbia. *Economics of Agriculture*, 65(4), 1529-1544. DOI: <https://doi.org/10.5937/ekoPolj1804529L>
15. Meler, M. (2015). Wine tourism as a centripetal force in the development of rural tourism. *3rd International scientific conference tosee - tourism in southern and eastern europe 2015: sustainable tourism, economic development and quality of life*, Opatija, 197-209. Retrieved from http://apps.webofknowledge.com/bukz2too0b0b.han2.savba.sk/full_record.do?product=WOS&search_mode=GeneralSearch&qid=1&SID=6BBnCipFncfjklpm3&page=1&doc=1
16. Mitchell, R., Charters, S., & Albrecht, J., N. (2012). Cultural systems and the wine tourism product. *Annals of Tourism Research*, 39(1), 311-335. <https://doi.org/10.1016/j.annals.2011.05.002>
17. Newton, S., K., Gilinsky, A., Jr., & Jordan, D. (2015). Differentiation strategies and winery financial performance: An empirical investigation. *Wine Economics and Policy*, 4(2), 88-97. <https://doi.org/10.1016/j.wep.2015.10.001>
18. Osterwalder, A., & Pigneur, Y. (2010). *Business model generation: A handbook for visionaries, game changers, and challengers*. John Wiley & Sons, Hoboken.
19. Quintal, V., A., Thomas, B., & Phau, I. (2015). Incorporating the winescape into the theory of planned behaviour: Examining 'new world' wineries. *Tourism Management*, 46, 596-609. <https://doi.org/10.1016/j.tourman.2014.08.013>
20. Quintal, V., Thomas, B., Phau, I., & Soldat, Z. (2017). Using push-pull winescape attributes to model Australian wine tourist segmentation. *INTERNATIONAL JOURNAL OF WINE BUSINESS RESEARCH*, 29(4), 346-372. DOI: 10.1108/IJWBR-01-2017-0007

21. Remeňová, K., & Jankelová, N. (2018). Multiple revenue streams model of wineries. *Fourth international scientific conference knowledge based sustainable economic development ERAZ 2018*, Sofia, 222-229. Retrieved from <http://www.eraz.org.rs/home.html>
22. Rüdiger, J., & Hanf, J.H. (2017). Wine tourism as an instrument of direct sales in the wine sector. *Berichte uber Landwirtschaft*, 95 (2), 1-24.
23. Rüdiger, J., Hanf, J.H., & Schweickert, E. (2015). The expectation of the behaviour of wine tourists in Germany. *Reports about agriculture*, 93(2), 1-23, Bonn. [in German: Rüdiger, J., Hanf, J.H., Schweickert, E. (2015). Die Erwartungshaltung von Weintouristen in Deutschland. *Berichte über Landwirtschaft - Zeitschrift für Agrarpolitik und Landwirtschaft*, 93(2), 1-23.
24. Santeramo, F., G., Seccia, A., & Nardone, G. (2017). The synergies of the Italian wine and tourism sectors. *Wine Economics and Policy*, 6(1), 71-74. <https://doi.org/10.1016/j.wep.2016.11.004>
25. Sekulic, D., Petrovic, A., & Dimitrijevic, V. (2017). Who are wine tourists? An empirical investigation of segments in serbian wine tourism. *Ekonomika poljoprivreda-economics of agriculture*, 64(4), 1571-1582.
26. Sevil, G., & Yüncü, H.R. (2010). Wine producers' perceptions of wine tourism. *Tourism*, 57(4), 477-487.
27. Shor, N., & Mansfeld, Y. (2010). Between wine consumption and wine tourism: Consumer and spatial behavior of Israeli wine tourists. *Tourism*, 57(4), 381-403.
28. Skrbic, I., Jegdic, V., Milosevic, S., & Tomka, D. (2015). Development of sremski karlovci wine tourism and integration in the regional tourism offer. *Ekonomika poljoprivreda-economics of agriculture*, 62(1), 229-244. DOI: 10.5937/ekoPolj1501229S
29. Szolnoki, G. (2018). New approach to segmenting tourists in a German wine region. *International journal of wine business research*, 30(2), 153-168. DOI: 10.1108/IJWBR-07-2017-0044
30. STATE OF THE VITIVINICULTURE WORLD MARKET, Retrieved from: <http://www.oiv.int/public/medias/5287/oiv-noteconjmars2017-en.pdf>, (December 12, 2018)
31. Thanh, T., & Kirova, V. (2018). Wine tourism experience: A netnography study. *Journal of Business Research*, 83, 30-37. <https://doi.org/10.1016/j.jbusres.2017.10.008>
32. Zott, Ch., & Amit, R. (2010). Business Model Design: An Activity System Perspective. *Long Range Planning*, 43(2-3), 216-226. <https://doi.org/10.1016/j.lrp.2009.07.0047>

MANAGEMENT OF JOINT-STOCK COMPANIES AND FARMS BY USING FAIR VALUE OF AGRICULTURAL EQUIPMENT IN FINANCIAL STATEMENTS ON THE EXAMPLE OF IMT 533 TRACTOR

Milan Radović¹, Jelena Vitomir², Bogdan Laban³, Slobodanka Jovin⁴, Sanda Nastić⁵,
Vera Popović⁶, Slobodan Popović⁷,

*Corresponding author E-mail: slobodan.popovic49@gmail.com

ARTICLE INFO

Original Article

Received: 13 February 2019

Accepted: 11 March 2019

doi:10.5937/ekoPolj1901035R

UDC 347.728.1

Keywords:

*fair value, agricultural
machinery, tractors, financial
report*

JEL: M41, G32, H39

ABSTRACT

More demanding management requires management to foster the application of different mechanisms. One of the upcoming ways of improving management is the use of the fair value of property and equipment in the business books of the company. The authors of this study emphasize the importance of fair valuation of agricultural equipment, processing surveyed 382 legal entities of the Republic of Serbia, in the case of widespread tractor IMT 533 agricultural holdings in 207 and 175 joint-stock companies. To show the real application of fair value, the research period lasted from 2015 to 2018. We came to the basic conclusion that there is a statistically significant relationship between organizations, enterprises and the age of the tractor to the application of the fair value of the tractor in the business books of the company. There is also a conclusion that fair financial reporting brings about benefits to agricultural entities of other legal forms.

© 2019 EA. All rights reserved.

- 1 Milan Radović, PhD, Faculty of Economics Pale, University of East Sarajevo, Alekse Šantića 3, 71420 Pale, Bosnia and Herzegovina, +387 57 226-651, knowledgemilan@gmail.com ORCID ID <https://orcid.org/0000-0002-0751-2522>
- 2 Jelena Vitomir, PhD, jelena.vitomir1@gmail.com, ORCID ID <https://orcid.org/0000-0001-6995-3297>
- 3 Bogdan Laban PhD, City administration of the City Subotica, Trg Slobode 1, 24000 Subotica, Serbia +381 24 626 888, bogdanl.su@gmail.com, ORCID ID (<https://qa.orcid.org/0000-0002-3730-0125>)
- 4 Slobodanka Jovin PhD, Professional Studies, High Business School of Novi Sad, Vladimira Perica Valtera 4, Serbia, boba_jovin@yahoo.com, ORCID ID <https://qa.orcid.org/0000-0003-4312-4532>
- 5 Sanda Nastic, PhD, JKP Vodovod i kanalizacija, Novi Sad, Masarikova 17, 21000 Novi Sad, Serbia, +381 021 4888 3333, sanda.nastic@vikns.rs, ORCID ID <https://qa.orcid.org/0000-0002-9500-6629>
- 6 Vera Popovic, PhD, Institute of Field and Vegetable Crops, Maksim Gorkog, 30, Novi Sad, Serbia, vera.popovic@ifvcns.ns.ac.rs, ORCID ID <https://qa.orcid.org/0000-0001-6032-6457>
- 7 Slobodan Popovic, PhD, Faculty of Economics and Engineering Management, Cvecarska 2, Novi Sad, Serbia, Phone: +381 64 0483 563, slobodan.popovic49@gmail.com, ORCID ID <https://qa.orcid.org/0000-0002-7884-2051>

Introduction

This work aims to provide valid evidence on the importance of using the fair value of the tractor in the business books of the company. It dominantly refers to the observation of agricultural holdings and joint stock companies in countries that want to join the EU, such as the Republic of Serbia. For the emergence of this work we used the views of the author, which originate from EU (Argilés & Slof 2001; Barlev & Haddad 2003; Feleagă et al. 2012), associated with the standardization of accounting observation and fair valuation.

During the last about 10 years it can be seen growing interest of a large number of authors who have pointed to possible improvements of the companies' management through the application of enhancements of top management financial reporting (Popović and al. 2015; Novaković and al. 2018; Popović and al. 2018). So conceived management requires from the companies' financial sector the full implementation of the already adopted international accounting standards (Daske et al. 2008; Cai and Wong, 2010). The application of international accounting standards directs small (such as farms) or large legal entities (egg. joint stock companies) to support the introduction of fair value of all assets held by the business books (Popović and al. 2014a).

Despite its commitment to democratic values, the European Union does not permit a full range of legitimate democratic choice in the economic sphere (Smith & Weeks, 2018) Presentation of fair value of equipment can be a consequence of management decisions based on recommendations of the internal control. (Arena et al. 2006; Endaya & Hanefah 2013). There are similar positions both among authors from developing countries and those from developed EU countries (Cantino, 2009; Catuogno et al. 2016). Such views of fair valuation enhance certainty of management (Greuning, 2006; Durocher & Gendron 2014; Funnell et al. 2016), but it should be noted that the role of actual accounting department of an enterprise should not be neglected (Barker & McGeachin 2013). Besides, International Accounting Standards and other financial reporting standards have to be adhered to (Brousseau et al. 2014), as it affects the appropriate presentation of operating results (Brown and Szimayer 2008).

The effects of fair valuation (Guthrie et al. 2011; Christensen et al. 2012) are created with the application of fair reporting, which is enabled by the financial reporting standards or in other words, the mentioned activities as a whole enable greater preciseness and certainty in management.

Numerous authors in different ways refer the professional public to the importance of corporate governance (Nowak and al., 2016; Baráth & Fertő 2017; Kijek et al., 2019; Gaetano & Lamonaca, 2019; Lee, 2019; Rodriguez and al., 2019) in the domain of organizing very heterogeneous agricultural activities (Anwar & Sun, 2015; Boukalova et al., 2016; Dax & Oedl-Wieser, 2016; Kuo et al., 2018; Wang., 2019).

The study conducted has a multidisciplinary approach. It brings into relation the economic-agrarian idea of agricultural equipment of agricultural estates and joint-stock

companies with an aim of their attitude toward fair valuation of agricultural equipment. In this study, the equipment is viewed through the selected IMT 533 tractors, of different year of make, that are at disposal of and managed by joint-stock companies and farms in the course of their ordinary operations.

Material and methods

The analytical framework is based on an assumption of application of as realistic as possible financial reporting which is in the subsequent stage a basis for making valid business and management decisions. Initiating new decision making relating to financial reporting according to Arena & Azzone (2007), could be a consequence internal controls of an enterprise.

Besides, when decisions on financial reporting, altering financial statements etc. are made, the very changes in the accounts are, according to Florou et al. (2016) linked to enterprise accounting department.

Having in mind all stated in this paper, the success of management is, among other things, reflected through a fair valuation of agricultural equipment. The author assumed the application of a methodological approach which is common in social research. Although the study is basically a comparative analysis, in its narrowest sense there is a case study which is observed, i.e. the selected individual agricultural equipment, the IMT 533 tractor, is in the focus of the research.

A comparative analysis is used to present the assumed differences in the use of fair-value reporting in joint-stock companies and farms in the Republic of Serbia. On the basis of that, a universal nature of views resulting from the analysis of the obtained results of the study can be pointed out.

Methods and current research

The authors used survey as a research method in order to get reliable information which could assist in the description of the process of fair valuation of agricultural equipment comprising 382 legal entities in the Republic of Serbia. In this paper, the authors by the questionnaire came to the relevant information concerning the business of agricultural holdings and joint stock companies in the Republic of Serbia, when it comes to the application of the fair value of the tractor in the business books the respective legal entities. The specific questions were set to managers and owners of farms, whether they apply IAS 16, or whether they carry out a reappraisal of the value of equipment every three years (tractors) which they use or not. The time interval of observation covered the period from 01.01.2015 to 30.06.2018. The aim of the survey was to acquire reliable information regarding the fair value of the practical application of agricultural equipment i.e. IMT 533.

The presented results in this paper are based on data processing 382 surveyed legal entities, which dominantly operate in the Republic of Serbia in the field of agriculture,

of which 175 surveyed are joint stock companies and 207 agricultural holdings. All obtained information originates from top management and owners of agricultural holdings. The authors point out that the information is obtained in the survey, and from the responsible person, which the authors considered relevant.

The authors' basic assumption is that expression of the fair value of the tractor in the business books can have benefits for all people in management functions in the Republic of Serbia. The authors' first step after the results of the survey was data processing, with a view to classification of respondents into two groups: the group of farms and the group of joint stock companies. The aim of the aforementioned steps was to detect possibly different behavior of joint stock companies and farms regarding the introduction of fair value of the tractor in the business books respective legal entities. In addition, the authors observed the behavior of enterprises in the agricultural sector in longer period, especially focused on behavior of companies when it comes to expression of fair value of the equipment or the tractors in the business books.

In the second step, the researchers examined whether there is a connection between the ages of tractors and introducing fair valuation of tractors in the business books of the aforementioned groups of legal entities. They observed a model of the tractor which was being produced in the former Yugoslavia; in fact it is a tractor IMT 533. The aforementioned tractor was produced from mid-50s to the 2005. During that period, about 800,000 tractors of this type were produced. The interesting fact is that a large number of tractors remained in use until 2016. The oldest tractor, which was in use and which was covered by a fair evaluation of this paper was made in 1959, and the youngest was produced in 2005. Therefore mentioned tractor model was in use about 46 years. The authors observed the total interval age of tractors in use, and divided it into five observation period, as follows: 1955-1965; 1965-1975; 1975-1985; 1985-1995 and 1995-2005, in order to discover similarities evaluating individual interval covered by the entire period.

In the third step, the authors processed the obtained results in order to establish the existence of a statistically significant relationship between stock companies and farms as the owner of a tractor, in terms of the application of the fair value of the tractor in the accounts. Chi-square test was used for research (Turjacanin and Cekrlija 2006). Also it is required the connection between the ages of tractors and application of the fair value of the same in the business books of the surveyed companies.

In part four of the study it was examined if there were differences in the proportion of the sample of enterprises applying the fair value principle on the basis of measurements that were made four times, in 2015, 2016, 2017 and 2018, the years in which the research was conducted. Thus, measurements were repeated in order to support views relating to establishing tested differences among three or more matched sets of frequencies. A quantitative variable was in the focus, i.e. the focus of the study was on the application of fair valuation of agricultural equipment (tractors) in the financial records.

Hypotheses

Having in mind their conceptual framework, characteristics of joint-stock companies and farms with regard to the application of fair valuation of agricultural equipment and expected effects on the basis of literature and intuitive expectations of the authors, are formulated in 4 hypotheses.

Hypothesis 1 (**H1**): Fair reporting, predominantly on enterprise equipment, gives enough freedom to make valid managerial decisions as pointed out by authors like Williams (2010). Taking into account the above stated, a starting point is that there is no statistically significant relationship between ownership structure of a farm and presentation of fair value in the books.

Hypothesis 2 (**H2**): The quality of enterprise management implies (Popović, 2014) a comprehensive treatment of a great number of management segments, an important part of which relates to fair valuation of equipment. Such approach is pointed out by other authors as well, like Soltani (2009). Having that in mind, the authors believe it is necessary to examine the statistical significance of relationship between joint-stock companies and farms and the application of fair valuation of agricultural equipment.

Hypothesis 3 (**H3**): Dynamics in the treatment of enterprise management is a basis of a modern approach to enterprise development, which is pointed out by many authors, like. With regard to that, a point of departure is that there is a difference in the proportion of the sample of agricultural enterprises applying fair valuation in their operations in all observed points of time (years that are observed). Thereby a dynamic aspect in dealing with heterogeneous agricultural enterprises is observed.

Hypothesis 4 (**H4**): Further observation of social valuation is pointed by many authors, like Bozzolan and al. (2014), Bratten and al. (2016) which is accepted by the authors of the study. At the same time, a scope of observation is widened in at least one point (year under observation) when fair valuation in agricultural enterprises substantially different in the form of ownership is concerned.

Statistical analyses

The obtained data of the survey conducted on a representative number of randomly selected respondents that represent joint-stock companies and farming estates in the Republic of Serbia relate to the application of fair valuation of agricultural equipment. In the analysis, the statistical package SPSS for Windows, version 17.0 was used. Two tests were made. The first, Chi-square test, was used with an aim of determining a significant relationship between the form of organization applying fair valuation and the age of agricultural equipment in 2017 and 2018. The second, Cochran's Q Test, was used in order to determine differences in the proportion of enterprise sample measured in four time points: 2015, 2016, 2017 and 2018, i.e. in four years.

Results

The authors presented the results of the research in three parts after reviewing. An overall view of results related to the period 2015-2018 is given in the first part, regarding the application of the fair value of the tractor IMT 533 of 382 interviewed entities. In table 1 the authors show the number of companies that have applied the fair value of the tractor in the business books per years of observation. In addition, for comparison of possible relationships and trends, the authors give the show of percent in relation to any form of mentioned economic organization, but only to those that applied the fair value of the tractor in their business books.

Table 1. Overview of the number of legal entities and the percentage of companies that applied the fair value of the tractor, per years of observation

The form of the company	Year of observation							
	2015		2016		2017		2018	
	A	B	A	B	A	B	A	B
Joint stock companies	8	4.57	20	11.42	45	25.71	80	45.71
Agricultural holdings	2	0.97	4	1.93	14	6.76	60	28.98
In total	10	2.67	24	6.98	59	15.45	140	36.64

Note (A = the number of legal entities; B = percentage of the total number of the shape of the economic activities of legal entities)

Source: Research results (2018)

After the presentation of the results in Table 1, in the second part of the analysis of the results of the surveyed legal entities, the authors give a review of the last year of observation, respectively in 2017 and 2018. This focuses on the developments in the aforementioned years, when positive progress was made in the practical benefit of application of the fair value of the tractor in the business books of the surveyed legal entities.

In addition, all tractors which are fair valued are covered by age, or by year of production. Due to the great length of the interval it is divided into five observation intervals: 1955-1965; 1965-1975; 1975-1985; 1985-1995 and 1995-2005. The fair value of the tractors was observed in the business books of the mentioned legal entities in 2017 and 2018.

For possible comparisons it is also presented the number of enterprises or agricultural farms which are applying fair valuation, but it is also given the show of the number of those legal entities that do not apply fair reporting in the business books. Below is the percentage ratio under each of the five observation period, the total carrying amount by intervals, and the total value of the application, i.e. non application of the fair value of the tractor. Display by age groups of the tractor and apply fair valuation for 2017 is given in Table 2.

Table 2. Display by age groups of the tractors and application of evaluation for 2015.

Age tractors observed at intervals within the year	Do not apply the principle of fair value		Apply the principle of fair value		In total	
	f	%	f	%	f	%
1955-1965	8	88.9	1	11.1	9	100
1965-1975	11	55.0	9	45.0	20	100
1975-1985	202	89.4	24	10.6	226	100
1985-1995	51	67.1	25	32.9	76	100
1995-2005	51	100	0	0	51	100
In total	323	84.6	59	15.4	382	100

Source: Research results (2018)

Continuation of the research was done for 2018, and display of division into age groups of the tractors and application of evaluation can be seen in Table 3.

Table 3. Display by age groups of the tractors and the application of fair valuation for 2016

Age tractors observed at intervals within the year	Do not apply the principle of fair value		Apply the principle of fair value		In total	
	f	%	f	%	f	%
1955-1965	8	88.9	1	11.1	9	100
1965-1975	12	60	8	40	20	100
1975-1985	195	86.3	31	13.7	226	100
1985-1995	27	35.5	49	64.5	76	100
1995-2005	0	0	51	100	51	100
In total	242	63.4	140	36.6	382	100

Source: Research results (2018)

The third part of the research is a continuation of the analysis of the last two years in connection with the application of the fair value of tractors in Serbia. This leads to reliable information about the existence of a statistically significant link between joint stock companies and farms as the owner of a tractor, and the application of fair value in the business books of the respective legal entities. The authors also tried to establish a link between the age of tractors that the company owns and application of fair valuation. This was done by using the Chi-square test.

Chi-square test was used, to test the existence of relations between the two categorical variables that should be compared with the proportion of cases in each category, with the values that would be expected, that between those two observed variable there is no connection. The analysis was carried out processing information obtained by the survey for 2017 and 2018, as in previous years negligibly small number of companies applied the principle of fair valuation, which is emphasized in the previous paragraphs of the authors.

In this paper the variables were analyzed in order to identify:

- Links between forms of organization (joint stock companies and farms) on the one hand and their application of fair valuation of tractor IMT 533 in the business books of the respective legal entities in the Republic of Serbia on the other hand
- Links between the the age of tractors that mentioned legal entities possess and their application of the fair value in the business books of the same.

The research results. after processing using the Chi-square test with the aim of existence of links between selected variables, are shown in table 4.

Table 4. Display of the application of the fair value of the results obtained after the Chi-square test for the 2017 and 2018

We analyzed categorical variables	Year of observation					
	2017			2018		
	Winning values			Winning values		
	Chi-square	df	p	Chi-square	df	p
Total number of analyzed agricultural enterprises (N = 382)	26.078	1	0.000	11.430	1	0.001
Age tractor	44.572	4	0.000	167.315	4	0.000

Source: Research results (2018)

The results of Chi-square test shows that there is a statistically significant link between the forms of organization, or joint stock companies and farms and their application of fair value in their books, as well as between the age of the tractors and their application of fair value in 2017 and 2018. The obtained results presented in Table 4 indicate that the resulting value is $p < 0.05$, which means that the authors with the 95% confidence claim that the tested connections are statistically significant and the null hypothesis is rejected in favor of the alternative hypothesis.

The fourth part of research results is further in favors of the fair valuation hypothesis in the course of ordinary operations of agricultural enterprises. To arrive to that, it was

necessary to examine the existence of differences in the proportion of the sample of agricultural enterprises applying the principle of fair valuation in their operations in all points of time (years under observation), as comes out from the hypothesis. An even deeper observation of views on the existence of difference even in one point (year of observation) regarding fair valuation in agricultural enterprises is the last phase of the statements given in hypothesis 4 at the beginning of the paper.

In order to prove statements, the Cochran's Q Test (Bagdonavicius & Nikulin 2011) were used as it enables repeated measurements aimed at discovering possible differences in the proportion of the sample of enterprises applying the fair valuation principle measured in four points of time: 2015, 2016, 2017 and 2018 (which are actually the years in which the research was made).

The obtained results are presented by the authors in Tables 5 and 6. Please note that the application or non-application of fair valuation of agricultural equipment in enterprise financial records is presented for the years in question.

Table 5. Frequency display (years) and the application of the fair value of agricultural equipment

Year of observation	Do not apply the principle of fair value		Apply the principle of fair value	
	Number	%	Number	%
2015	372	97.4	10	2.6
2016	358	93.7	24	6.3
2017	323	84.6	59	15.4
2018	242	63.4	140	36.6

Source: authors' calculation

Table 6 shows the results following the testing.

Table 6. Display test results (Cochran's Q Test)

Description	Received values
sample size	382
Cochran's Q Test	283.57
df	3
p	0.000

Source: authors' calculation

The result obtained is statistically significant. It can be seen that there are significant changes in percentage of enterprises applying the fair valuation principle in the given points of time. In the first observed year (2015), the number of enterprises which applied

fair valuation of agricultural equipment expressed as percentage was only 2.6 out of 382 enterprises covered by the survey. In each subsequent year the number increased by more than twice, and in 2018 the percentage of enterprises applying fair valuation in their ordinary activities was 36.6.

Discussion

The presented results can serve as a basis for obtaining an overall picture when it comes to the application of the fair value of the tractor in the period 2015-2018 in the Republic of Serbia. The first point, to which the authors indicate arises from the tabulation 1, is the conclusion that there are positive movements in relation with the introduction of the fair value of the tractors in the business books. Joint stock companies by the end of 2015 had 4.6% of subjects who introduced fair value in their business, and by the next year, that percentage increased and amounted to just over 11%, and in mid-2018, the percentage was about 45%. In the same period it can be seen that the farms at the beginning of the observation period had four times worse starting position in relation to the joint stock companies. At the end of the observation period, this percentage was fixed, and an increase in the number of those farms that apply the fair value can be seen, and at the end of the observation period it amounted to almost 30% of surveyed farms.

Another point that was emphasized in this paper refers to 2017, where the authors analyzed the age of the tractors, and how it reflected on the presentation of the fair value of the tractors. Namely, in the oldest period (1955-1965) of observation of tractors by year of production, there is also the smallest number of tractors (Table 2), which was expected. The results indicate that the fair valuation is about 11% of all tractors in this interval. We emphasize that these are very old tractors, age over 50 years, but is still used within the business of enterprise and they need to be evaluated in the the business books which is in accordance with the paragraph, that the management of enterprises must continuously improve. Authors observed the fair value in the context of improving the management, because then the value of the assets, ie equipment is approaching to the market value, which is in accordance with IAS 16. In the interval 1965-1975 the present of number of the fair valued tractors is the highest and it is 45% compared to the observed tractors in that interval. It should be noted that the number of individual tractors that are fair valued is not the greatest. In the next interval (1975-1985) the number of tractors that are fair valued grows at 24, although the percentage of valued tractors in this way is 10% in this interval. In the interval of observation (1985-1995) almost the same number of tractors that are fair valued was kept and it accounted for 25, although in this interval the percentage of fair valued tractor is growing to about 30%. The last observation interval by the age of tractors is (1995-2005) and we can see that in both forms of economic organization for 2017 there are no tractors that are fair valued.

The third point relates to the last year of studies, ie 2018, when it comes to the fair value of tractors in relation to the five preset interval, in which the company tractors are classified according to the criteria of age. Based on the display given in Table 3 it can be seen that in the first interval of observation ie in the period (1955-1965), the ratio was

8 to 1 in favor of the non application of fair value for both two types of organization of surveyed companies. In the next period, the situation improved and the ratio is 6 to 4 in favor of the non application of fair value for both of the two types of surveyed companies. Period (1975-1985) is very similar to the first interval of observation (1955-1965), only the number of tractors fair valued in the business records of legal entities is larger. In the last two observation interval ie in (1985-1995) and interval (1995-2005), there is an increase in the number of tractors that are fair valued in the bussiness books. The percentage of fair valued tractors is about 65% in period (1985-1995), that in the last interval all of 51 tractors were fair valued, which makes 100% of the fair value within the last observation interval. Thus, we can conclude that there is a drastic increase in the fair value compared to the previous observed 2017 year, especially in the last interval of observation. In addition, the positive thing is that the youngest tractors are fair valued, although it should be noted that this is economically speaking the old working machines, which have a value, ie after the assessment it is necessary to make a fair evaluation in business books.

The fourth point relates to the display of the authors' obtained results using Chi-square test with the aim to display a statistically significant relationship between the forms of organization, ie joint stock companies and farms and to apply fair value in business books, as well as between the age of tractors and implementing fair value in 2017 and 2018. The results presents in Table 4 clearly indicate that the resulting value is $p < 0.05$, which means that the authors confidently claim that the test connection is statistically significant and hypothesis 1 is rejected in favors of hypothesis 2. It is thus confirmed that there is a statistically significant relationship between the form of ownership of agricultural enterprise and presentation of fair valuation in financial records.

Another test was performed within this point. Cochran's Q test was used to examine the existence of differences in the proportion of the sample of agricultural enterprises applying the fair valuation principle in operations in all time points (years). In addition to that, a more careful observation was conducted in order to detect differences in the implementation of fair valuation in joint-stock companies and farms even in one year.

The results presented in Table 6 show $p < 0.05$, which indicates the rejection of hypothesis 3, in other words there is essentially no difference in the proportion of the sample of agricultural enterprises applying the fair valuation principle in their operations in all time points (years under observation). By rejecting hypothesis 3, the validity of hypothesis 4 is confirmed. Therefore, there is a difference even in one point (year under observation) with regard to fair valuation in joint-stock companies and farm estates.

Conclusion

Firsly it can be concluded that the farms made great progress in relation to insurance companies regarding the practical application of the fair value of the tractors. However, it is not enough because the agricultural holdings in the application of the fair value of tractors is still lagging behind by about 1/3 compared to joint stock companies. At

the beginning of the observation period (2015) in both forms of earning a percentage of those who introduced the fair value was approximately 3% that in mid 2018 the percentage was about 37%, which represents an increase of more than 10 times. The authors point to the importance of economic analyzes, with the aim of changing the functional management of the company, which is the conceptual to the real financial reporting indicated. In a word, there is progress in the adoption of the fair value of tractors in the business books of both observed economic activities in agriculture Republika Serbia, which are much more distinguished economic factors. However it should be noted the existence of a bad starting position in both forms of legal entities when it came to the fair value of tractors in the business books at the beginning of the observation period covered by this work.

The second conclusion would be that in 2017 both forms of organizations are not fair valued tractors that were produced in the period 1995-2005, although those are the youngest tractors by age in this study. In this interval, there were 51 tractors and their value was not fair valued in the business books. Such behavior is not in accordance with the adopted international accounting standards, and about the importance of the practical application many speak like Greuning (2006) with which also agree the authors of the work and emphasize that the future task of top management is the introduction of strict application of fair evaluation in regular operations.

The third conclusion is that in 2018 the situation changed drastically in both forms of organization in terms of fair value of the tractors. The tractors produced in the period 1995-2005 were evaluated in the business books in general.

The fourth conclusion is a statistically significant relationship between the forms of organization, and implementing fair value in the business books, as well as the existence of links between ages of tractors and application of fair value, for 2017 and 2018. The results of Chi-square test show $p < 0.05$, which additionally supports the view of the authors.

Beside the stated principal view, the authors point out the existence of another segment in drawing conclusions within the conclusion four. That is the existence of differences in the implementation of fair valuation of agricultural equipment, i.e. tractors, in joint-stock companies and farm estates even in one year under observation. That view was confirmed by the Cochran's Q test, with $p < 0.05$.

The research was conducted in a country which in on the way to EU integration. However, even so, this research may be applied in developed countries as well, such as the EU countries. The results of the study were obtained on the basis of examples of fair valuation of agricultural equipment up to fifty years old, which even after so much time after it was made and used had its value. The existence of actual value should be treated in an appropriate way in financial records of agricultural enterprises irrespective of whether it is about a country on the way to the EU or a developed country in EU. A continuation of the research relating to valuation of agricultural equipment would be desirable against a comparison with the equipment valuation results obtained in developed countries. Any future research would be made in order to give assurance of

a universal type of fair valuation of equipment in the course of enterprise operations. The authors with this study justify presentation of the obtained results, whereas the conclusions may serve as guidelines for management in a great number of enterprises, primarily in agriculture.

Conflict of interests

The authors declare no conflict of interest.

References

1. Anwar, S. & Sun, S. (2015): Taxation of labour income and the skilled–unskilled wage inequality. *Economic Modelling*, 47: 18-22 <https://doi.org/10.1016/j.econmod.2014.12.037>
2. Arena, M., Arnaboldi, M., Azzone, G. (2006): Internal audit in Italian Organizations: a Multiple Case Study. *Managerial Auditing Journal*. 21(3): 275-292. DOI: [10.1108/02686900610653017](https://doi.org/10.1108/02686900610653017)
3. Arena, M., & Azzone, G. (2007): Internal Audit Departments: Adoption and Characteristics in Italian Companies. *International Journal of Auditing*. 11(2): 91-114. <https://doi.org/10.1111/j1099-1123.2007.00357.x>
4. Argilés, J., & Slof, E. (2001): New opportunities for farm accounting. *European Accounting Review*. 10: 361–383. 27. <https://www.researchgate.net/publication/281239788>
5. Bagdonavicius, V. & Nikulin, M. (2011): Chi-squared goodness-of-fit test for right censored data. *International Journal of Applied Mathematics and Statistics*TM 24(SI-11A): 30-50. <http://www.ceser.in/ceserp/index.php/ijamas/article/view/627>
6. Barker, R. & McGeachin, A. (2013): Why is there inconsistency in accounting for liabilities in IFRS? An analysis of recognition, measurement, estimation and conservatism. *Accounting and Business Research*. 43(6): 579-604. <https://doi.org/10.1080/00014788.2013.834811>
7. Baráth, L. & Fertő, I. (2017): Productivity and Convergence in European Agriculture. *Journal of Agricultural Economics*, 68: 228-248 <https://doi.org/10.1111/1477-9552.12157>
8. Barlev, B. & Haddad, J. (2003): Fair value accounting and the management of the firm. *Critical Perspectives on Accounting*. 14: 383-415. DOI: [10.1016/S1045-2354\(02\)00139-9](https://doi.org/10.1016/S1045-2354(02)00139-9)
9. Boukalova, K., Kolarova, A. & Lostak, M. (2016): Tracing shift in Czech rural development paradigm (Reflections of Local Action Groups in the media). *Agricultural Economics (Zemědělská ekonomika)*, 62: 149-159 <https://doi.org/10.17221/102/2015-AGRICECON>

10. Bozzolan, S., Laghi, E. & Mattei, M. (2016): Amendments to the IAS 41 and IAS 16 – implications for accounting of bearer plants. *Agric. Econ. – Czech.* 62: 160-166. <https://doi.org/10.17221/48/2015-AGRICECON>
11. Bratten, B. - Jennings, R. - Schwab, C. (2016): The accuracy of disclosures for complex estimates: Evidence from reported stock option fair values. *Accounting, Organizations and Society.* 52: 32-49. <https://doi.org/10.1016/j.aos.2015.09.001>
12. Brousseau, C., Gendron, M., Belanger, P. & Coupland, J. (2014): Does fair value accounting contribute to market price volatility? An experimental approach. *Accounting & Finance.* 54(4): 1033–1061. <https://doi.org/10.1111/acfi.12030>
13. Brown, P. - Szimayer, A. (2008): Valuing executive stock options: performance hurdles, early exercise and stochastic volatility. *Accounting & Finance.* 48(3): 363-389. DOI: [10.1111/j.1467-629X.2008.00259.x](https://doi.org/10.1111/j.1467-629X.2008.00259.x)
14. Cai, F. & Wong, H. (2010): The effect of IFRS adoption on global market integration. *International Business & Economics Research Journal.* 9(10): 25-34. <https://www.researchgate.net/publication/296622836>
15. Cantino, V. (2009). *Corporate governance, performance measurement and regulatory compliance of the internal control system.* DataStatus, Belgrade. [in Serbian: Cantino, V. (2009). *Korporativno upravljanje, merenje performansi i normativna usaglašenost sistema internih kontrola.* DataStatus, Beograd].
16. Catuogno, S. - Arena, C. - Saggese, S. - Sarto, F. (2016): The Influence of Blockholders, Bondholders and Families on the Venturers' Accounting Behavior. *International Journal of Business and Management.* 11(8): 31-43. <https://www.researchgate.net/publication/305487345>
17. Christensen, B. - Glover, S. - Wood, D. (2012): Extreme Estimation Uncertainty in Fair Value Estimates: Implications for Audit Assurance. *AUDITING: A Journal of Practice & Theory.* 31(1): 127-146. <https://aaapubs.org/doi/abs/10.2308/ajpt-10191?journalCode=ajpt>
18. Daske, H. - Hail, L. - Leuz, C. - Verdi, R. (2008): Mandatory IFRS Reporting Around the World: Early evidence on the economic consequences. *Journal of Accounting Research.* 46: 1085-1142. <http://ssrn.com/abstract=1024240>
19. Dax, T. & Oedl-Wieser, T. (2016): Rural innovation activities as a means for changing development perspectives An assessment of more than two decades of promoting LEADER initiatives across the European Union. *Studies in Agricultural Economics,* 118, 30-37 <https://doi.org/10.7896/j.1535>
20. Durocher, S. - Gendron, Y. (2014): Epistemic commitment and cognitive disunity toward fair-value accounting. *Accounting and Business Research.* 44(6): 630-655. <https://doi.org/10.1080/00014788.2014.938012>

21. Gaetano, S. & Lamonaca, E. (2019): On the drivers of global grain price volatility: an empirical investigation. *Agric. Econ. – Czech*, 65: 31-42 <https://doi.org/10.17221/76/2018-AGRICECON>
22. Guthrie, K. - Irving, J. - Sokolowsky, J. (2011): Accounting Choice and the Fair Value Option. *Accounting Horizons*. 25(3): 487-510. <https://doi.org/10.2308/acch-50006>
23. Endaya, K. - Hanefah, M. (2013): Internal Audit Effectiveness: An Approach Proposition to Develop the Theoretical Framework. *Research Journal of Finance and Accounting*. 4(10): 92-102. <https://www.researchgate.net/publication/328095795>
24. Feleagă, L. - Feleagă, N. - Răileanu, V. (2012): Theoretical considerations about implementation of IAS 41 in Romania. *Theoretical and Applied Economics*. 2: 31–38. <http://store.ectap.ro/articole/686.pdf>
25. Florou, A. - Kosi, U. - Popoe, P. (2016): Are international accounting standards more credit relevant than domestic standards?. *Accounting and Business Research*. 46(7): 1-29. <https://doi.org/10.1080/00014788.2016.1224968>
26. Funnell, W. - Wade, M. - R. Jupe. (2016): Stakeholder perceptions of performance audit credibility. *Accounting and Business Research*. 46(6): 601-619. <https://doi.org/10.1080/00014788.2016.1157680>
27. Greuning, H. (2006). *International Financial Reporting Standards, Practical guide*. MATE, Zagreb. [in Serbian: Greuning, H. (2006). *Međunarodni standardi finansijskog izveštavanja, Praktični vodič*. MATE, Zagreb].
28. Kijek, A., Kijek, T., Nowak A. & Skrzypek, A. (2019): Productivity and its convergence in agriculture in new and old European Union member states. *Agric. Econ. – Czech*, 65: 01-09 <https://doi.org/10.17221/262/2017-AGRICECON>
29. Kuo, K., Lee, C. & Wu, S. (2018): environmental policy and labour market imperfection. *Bulletin of Economic Research*, 70: 175-184 <https://doi.org/10.1111/boer.12122>
30. Lee, J. (2019): Regional heterogeneity among non-operating earnings quality, stock returns, and firm value in biotech industry. *Agric. Econ. – Czech*, 65: 10-20 <https://doi.org/10.17221/24/2018-AGRICECON>
31. Novaković, S., Vukasović, D., Laban, B., Ivić, M., Popović, V. & Popović, S. (2018). Managing agricultural company by using internal control and significance of risk presentation, *Economics of Agriculture*, 2: 801-812. [doi:10.5937/ekoPolj1802801N](https://doi.org/10.5937/ekoPolj1802801N)
32. Nowak, A., Janulewicz, P., Krukowski, A. & Bujanowicz-Haraś, B. (2016): Diversification of the level of agricultural development in the member states of the European Union. *Cahiers Agricultures*, 25: 55004 <https://doi.org/10.1051/cagri/2016040>

33. Popović, S. (2014). *Socio-economic factors limiting the development of agrarian*, Feljton, Novi Sad. [in Serbian: Popović, S. (2014). *Socio-ekonomski faktori ograničenja razvoja agrara*, Feljton, Novi Sad].
34. Popović, S., Mijić, R. & Grublješić, Ž. (2014a): Internal control and internal audit in the function of management, *Škola Biznisa*, 1, 95-107. [in Serbian: Popović, S., Mijić, R. i Grublješić, Ž. (2014a): Interna kontrola i interna revizija u funkciji menadžmenta, *Škola Biznisa*, 1, 95-107].
35. Popović, S., Majstorović, A. and Grublješić Ž. (2015). Valuation of facilities in use and application of international accounting standards, *Actual problems of economics*, 3(165): 379-387. <https://eco-science.net/en/downloads>
36. Popović, S., Đuranović, D., Laban, B., Ivić, M., Jovin, S., Nastić, S., Grublješić, Ž. & Popović, V. (2018). Impact of different light intensity on the production of the plant narcissus l. and its financial effects, *Economics of Agriculture*, 4: 1359-1370. doi:10.5937/ekoPolj1804359P
37. Rodriguez, M., Miguel, Sanchez, L., Cejudo, E. & Antonio, C. (2019): Variety in local development strategies and employment: LEADER programme in Andalusia. *Agric. Econ. – Czech*, 65: 43-50 <https://doi.org/10.17221/106/2018-AGRICECON>
38. Soltani, B. (2009). *Audit, International Approach*, Mate, Zagreb. [in Serbian: Soltani, B. (2009). *Revizija, Međunarodni pristup*, Mate, Zagreb].
39. Smith, J., & Weeks, J. (2018). Bringing democratic choice to Europe's economic governance: the EU treaty changes we need, and why we need them. *Journal of Self-Governance & Management Economics*, 6(3)
40. Turjačanin, V. & Čekrlija, Đ. (2006). *Basic statistical methods and techniques in SPSS-U*. Centar za kulturni i socijalni popravak, Banja Luka [in Serbian: Turjačanin, V. i Čekrlija, Đ. (2006). *Osnovne statističke metode i tehnike u SPSS-U*, Centar za kulturni i socijalni popravak, Banja Luka].
41. Wang, D. (2019): Manufacturing and agricultural pollution, private mitigation and wage inequality in the presence of pollution externalities. *Agric. Econ. – Czech*, 65: 51-58 <https://doi.org/10.17221/79/2018-AGRICECON>
42. Williams, C. (2010). *Principles of management*, DataStatus, Belgrade. [in Serbian: Williams, C. (2010). *Principi menadžmenta*, DataStatus, Beograd].

BIOECONOMY-BASED FOOD INDUSTRY OF SERBIA: THE ROLE OF INTELLECTUAL CAPITAL

Gordana Dobrijević¹, Jelena Đorđević Boljanović², Filip Đoković³, Radovan Pejanović⁴, Goran Škatarić⁵, Ivana Damnjanović⁶

*Corresponding author E-mail: gdobrijevic@singidunum.ac.rs

ARTICLE INFO

Original Article

Received: 20 September 2018

Accepted: 24 January 2019

doi:10.5937/ekoPolj1901051D

UDC 005.96:[502.7+33(497.11)]

Keywords:

knowledge-based bioeconomy, intellectual capital, intellectual capital indicators

JEL: Q57, Q18, O34

ABSTRACT

The aim of this exploratory study was to determine most useful indicators of intellectual capital in Serbian food industry. The study investigated managers' perceptions of indicator usefulness and practical application. They were top and middle managers from 18 food organizations, committed to the bioeconomy. The survey items were divided into human, structural, and relational capital. A closed-ended questionnaire was used to collect data, later analysed by SPSS 21 statistical software. The results have demonstrated that all indicators were seen as very important, with relational capital being the most useful of all.

© 2019 EA. All rights reserved.

Introduction

The majority of the EU regions/countries (98.6%) feel pressured to include the bioeconomy related aspects in their research and development priorities and plans. At the same time, there are also regions in Europe that do not use their bioeconomy potential. The European Commission report (European Commission, 2017) demonstrates that the bioeconomy related research is a priority for most European countries and regions from 2014 to 2020. According to the Europe 2020 Strategy (passed in 2010), sustainable economy should be indispensable for contemporary organizations, as well as countries.

-
- 1 Gordana Dobrijević, PhD, Associate professor, Singidunum University, Danijelova no. 32, +381113094094, gdobrijevic@singidunum.ac.rs
 - 2 Jelena Đorđević Boljanović, PhD, Associate professor, Singidunum University, Danijelova no. 32, +381113094094, jboljanovic@singidunum.ac.rs
 - 3 Filip Đoković, PhD, Associate professor, Singidunum University, Železnička no. 5, +38114292611, fdjokovic@singidunum.ac.rs, ORCID ID (<https://orcid.org/0000-0002-2342-9358>)
 - 4 Radovan Pejanović, PhD, Full professor, Agricultural Faculty, Dositeja Obradovica Square no. 8, 21000 Novi Sad, Phone: +381 21 6350 622, pejanovic@uns.rs
 - 5 Goran Škatarić, PhD, Associate professor, Donja Gorica University, Donja Gorica bb, Donja Gorica bb, 81000 Podgorica, Phone: +382 20 410 777, goran.skataric@udg.edu.me
 - 6 Ivana Damnjanović, PhD, Assistant professor, Singidunum University, Železnička no. 5, +38114292611, idamnjanovic@singidunum.ac.rs, ORCID ID (<https://orcid.org/0000-0001-7087-3147>)

Bioeconomy is a sustainable, eco-efficient transformation of renewable biological resources into food, energy and other industrial products (Schmid, Padel and Levidov, 2012). The driving factors in bioeconomy may be political – realising existing or newly defined objectives in a country, or economic – stimulating existing economic performance and/or generating new market forces, such as realisation of environmental protection objectives (reducing waste, reducing greenhouse gas emissions, and improvement of environmental quality) (European Commission, 2015). In a more detailed analysis of the factors influencing this type of economy, the OECD classified all the factors into external and institutional *i.e.* social ones (OECD, 2009). The external factors include: an increase in global population, which is expected to reach 8.3 billion in 2030; demographic changes, in terms of an increasingly ageing, but also more educated population; energy consumption and climate change; increasing demand for agricultural products, rising food prices and water scarcity; increase in healthcare costs; development of technologies, particularly those relevant to the bioeconomy – informatics (IT) and nanotechnology. Analysing these trends, the OECD's strategy points out that the influence of these factors on bioeconomy is different across different sectors. For example, population growth will have an impact on primary production, demographic changes will have an impact on health biotechnology, while the climate change will affect industrial processes. On the other hand, according to the OECD, the most important drivers for the development of bioeconomy are three institutional and one social: public research funding, legal regulations, intellectual property and public acceptance.

Materials and methods

The European Commission (2012a) defines bioeconomy as the “production of renewable biological resources and the conversion of these resources and waste streams into value - added products, such as food, feed, bio based products, and bio energy.” It includes agriculture, forestry, fisheries, food, pulp and paper production sectors, and parts of chemical, biotechnological and energy industries. It is related to different sciences, including life sciences, ecology, biotechnology, agronomy, and ICT (European Commission, 2012b). Bioeconomy provided jobs for around 18.6 million people in the EU in 2014, or 8.5% of total European work force. Agriculture, and food, beverage and tobacco sectors account for three quarters of that number (Ronzon et al., 2017). The main elements of bioeconomy are: food production and processing, agri-environmental products and services, value-added food and health products, and energy and bio-processing (Socaciu, 2014).

Literature review shows different, sometimes opposing, views regarding bioeconomy and green economy. For example, according to Socaciu (2014), green economy is part of an overall bioeconomy concept. On the other hand, D'Amato et al. (2017) analysed bibliometric data from almost 2,000 articles published around the world during the last thirty years. They reached the conclusion that green economy comprises concepts from bioeconomy, such as bio-efficiency. While green economy deals with all ecological processes, and is more focused on certain features at local level (such as eco-tourism), bioeconomy is directed more towards resources, biosecurity and rural policies (Socaciu, 2014).

Unlike the traditional agricultural systems, the bioeconomy-oriented systems concentrate on incorporating environment, natural resources, food and agriculture, energy and industrial development (Socaciu, 2014). Agriculture is the main source of local employment in many countries. Closely connected to agriculture, bioeconomy creates food and energy by use of sustainable biological resources, thus facilitating resource efficiency and reducing the carbon footprint (European Investment Bank, 2017). Various adverse factors that influence global economy, such as limited access to energy resources, population growth, and periodic financial crises have brought about the change of the global agricultural framework. Agriculture has to adjust to the new economic and environmental challenges. Food safety and security have become the cornerstones of the European agricultural model (Drăgoi et al., 2018), while food quality and safety have incorporated new values for companies and consumers (Pop, Dracea, and Vlădulescu, 2018). Food security is an extensive issue, which has various economic, social and environmental aspects. Food and feed are important parts of bioeconomy (Ronzon et al., 2017).

Bioeconomy requires intensifying research and development activities; bringing together professionals from various fields, who are willing and motivated to share their knowledge and to convert tacit forms of knowledge into explicit, accessible to all; developing an environment that will foster creativity and innovation, providing new ideas and solutions; freely accessible, easy-to-search knowledge bases. Only this can ensure a free flow of knowledge within an organisation and using all available resources (Đorđević Boljanović, 2009). It is worth mentioning the launch of the Bioeconomy Knowledge Centre (n.d.), under the auspices of the European Commission, which provides open access to the knowledge on the methods of sustainable production of renewable resources and their transformation into new products. Consider all that, also can be said that power of human-machine collaboration is need in industry growth (Bolton et al., 2018).

To fully understand the significance of knowledge in bioeconomy, it is important to define the so-called environmental knowledge. According to Fryxell (2003), this kind of knowledge is defined as general knowledge of facts, concepts and relationships concerning the natural environment and its major ecosystems, *i.e.* the knowledge that people have about the environment, key environmental aspects and impacts, and about collective responsibilities for sustainable development. The definition itself conveys the impact that the management of this kind of knowledge has on sustainable development of organisations, especially those focused on bioeconomy. Such organisations strive to manage this knowledge in order to make it useful for their business activities and to address the four key current challenges that have emerged both in theory and in practice (Beljić et al., 2013):

- inconsistency between environmental knowledge about management of raw materials, energy efficiency, and waste;
- failure to identify and analyse important environmental features related to raw materials, energy and waste management;

- lack of empowerment, which prevents employees from taking relevant environmental protection actions, using their environmental knowledge and integrating their individual knowledge, plans, experience and goals into organisational structures;
- lack of ability of an organisation to make external contacts, acquire and adopt knowledge from external stakeholders and to properly integrate it into internal knowledge.

Therefore, an organisation that is committed to sustainable development and the bioeconomy-based business needs to focus on its knowledge resources and its intellectual capital (IC). IC is related to a company's whole operations (Starovic and Marr, 2006). If sustainability is one of the fundamental postulates of bioeconomy, then intellectual capital of an organisation is indeed one of the key indicators showing the extent of business sustainability of an organisation, *i.e.* to what extent an intellectual capital investment will provide not only its temporary survival in the environment, but also the continuation of its effective business performance (Bose and Thomas, 2007). This involves striving for sustainable food production that will be based on regeneration of natural resources and the assimilation capacity of the environment (Szűcs, Vanó, Korsós-Schlesser, 2017).

Intellectual Capital

The knowledge economy has moved its attention from tangible to intangible assets (Bramhandkar, Erickson, and Applebee, 2007). The intangibles are also becoming increasingly important in business appraisal (Bischoff, Vladova, and Jeschke, 2013). They clarify the gap between a company's book and market value (Sveiby, 1997). Intellectual capital, also called intangible assets or knowledge assets, are assets that do not have a material or financial manifestation (OECD, 2011). Among the most widely accepted definitions are "Intangible assets are those that have no physical existence but are still of value to the company" (Edvinsson and Malone, 1997, p. 22), and "Intellectual capital is intellectual material – knowledge, information, intellectual property, experience – that can be put to create wealth – collective brainpower" (Stewart, 1998, p. XI).

Intellectual capital is usually divided into human, structural, and relational capital (Starovic and Marr, 2006). Human capital consists of the competence, knowledge, and creativity of all employees of an organization. Structural or internal capital integrates procedures, patents, models, and databases belonging to the organization, independent of individuals. Relational capital, includes the relationships with customers and partners, marketing channels, brands, and the organization's reputation (Sveiby, 2001; Feleagă, L., Feleagă, N., Dragomir, and Râbu, 2013).

All these elements are closely related and their synthesis leads to creation of new values for the company. Their interrelations are singular for each context, industry or organization (Kozera, 2011; López López, & Salazar – Elena, 2017).

There is now consensus on importance of intangibles in creating value, and many studies (e.g. Zeghal, and Maaloul, 2010; Vishnu and Gupta, 2014, Urbanek, 2016, Sharabati, Naji Jawad, Bontis, 2010) have found a significant positive impact of intellectual capital on organizational performance. However, there are different approaches to measuring intellectual capital. This area is still evolving, so many of these approaches have limitations. Companies need to understand how these intangible assets are developed, so that they could allocate their resources more effectively, and eventually create more value (Starovic and Marr, 2006).

As reported by Sveiby (2010), “No one method can fulfil all purposes.” Organizations should choose a method according to “purpose, situation and audience” (Sveiby, 2010, p. 4). Therefore, it is no wonder there are quite a few different methods for measuring intellectual capital. For example, Kaplan and Norton (2004) based their Balanced Scorecard on causal relationships between four measurables (financial, customer, internal processes, and learning and growth) and objectives within “strategy maps”. Similarly, the Skandia Navigator (Edvinsson and Malone, 1997) analyses financial, process, human, customer, and innovation perspectives, using different indicators to measure them, human capital being the most important element of the Navigator. Celemi’s Intangible Assets Monitor combines three categories, namely people (competence), customers (external structure), and organization (internal structure), with three main areas of growth, efficiency, and stability (Starovic and Marr, 2006). In their study in Canada, Miller, DuPont, Fera, Jeffrey, Mahon, Payer, and Starr (1999) also divided intellectual capital in human, structural, and customer capital. They found that human and customer capital indicators were preferred above structural capital indicators.

There are several important national programmes and strategies related to green and bioeconomy in Serbia, e.g. National Strategy on Sustainable Use of Natural Resources and Environment, National Sustainable Development Strategy, and National Environmental Protection Programme. Many companies in Serbia are dedicated to green economy and bioeconomy (UNDP / UNEP, 2012). Still, to the authors’ best knowledge, only few studies have addressed intellectual capital, or specifically, intellectual capital in food industry in Serbia (Kontić and Čabrilo, 2009; Komnenic, Tomic, D. and Tomic, G., 2010; Djekic, I., Dimitrijevic, B. and Tomic, N., 2017).

Komnenic, Tomic, D. and Tomic, G. (2010) established a positive relationship between the IC and organizational performance in the agri-food sector of Vojvodina (Serbian northern province). Djekic, Dimitrijevic, and Tomic (2017) found that the most valued IC indicators in Serbian fruit industry are customer satisfaction and loyalty (indicators of relational capital), while the study of Kontić and Čabrilo (2009) showed that human indicators are more important than relational and structural IC indicators.

The main objective of our exploratory study is to identify the indicators of intellectual capital that are relevant and applicable in Serbia. These indicators would in turn help Serbian enterprises manage their intellectual capital, which is of paramount importance for improving organizational performance levels.

The paper is organized as follows: It begins with the literature review, which introduces and defines bioeconomy. Then intellectual capital, its structure and measurement are presented. The methodological section shows the logic behind using the particular methods in this study was explained, as well as the data collection and analysis. Then the results are analysed and compared to previous research. The conclusions are discussed in the final section.

Methodology

In order to examine the importance of managing intellectual capital in food industry organizations, we focused on managers' perception of the value and usability of IC indicators. Two main research questions were explored:

1. What IC indicators do managers in food industry regard as useful?
2. What IC indicators do managers use in their activities?

The survey was conducted by email from January to March 2018, with the response rate of 44.2%). We focused on food industry organizations which clearly show (publicly promote on their website) their commitment to bioeconomy, such as solving problems of biodegradable waste from their own production process, using waste to produce energy, clean production, etc. All of them belong to large and medium enterprises. The respondents (61 in total) were top and middle managers from 18 companies belonging to different areas of food industry in Serbia, such as meat industry, fruit and vegetable juices industry, dairy industry, etc. (Statistical Office of the Republic of Serbia, n.d.). The same research sample was used in a wider study, with a different research focus and modified research questions (Djordjevic-Boljanovic, Dobrijevic, Cerovic, Alcakovic, Djokovic, 2018).

We used a modified form of the survey used in the research by Miller, DuPont, Fera, Jeffrey, Mahon, Payer, and Starr (1999), conducted in different industrial sectors in Canada. The original survey was based on IFAC (1998), Sveiby (1997), and Edvinsson and Malone (1997). The definitions of all relevant terms were provided at the beginning of the survey: intellectual capital, human capital, structural capital, relational capital.

Statistical analysis was carried out using SPSS Statistics 21. The internal consistency of the instruments used was checked using Cronbach's alpha coefficient (*Table 1*). The items showed relatively high internal consistency, over 0.8, including the overall (0.889), as well as the separate IC indicators, all over 0.8.

Table 1. Cronbach's alpha coefficient

Measured construct	Number of items	Cronbach's alpha coefficient
Indicator usefulness (all)	33	0.889
Human indicators	9	0.851
Structural indicators	13	0.827
Relational indicators	11	0.847

Results and Discussion

High scores in *Table 2* indicate that managers value the importance of all IC indicators. Relational indicators (e.g. customer loyalty, customer satisfaction, number of supplier/customer networks) are considered most useful of all, while structural indicators (such as number of software licenses, number of multifunctional product teams, and average length of time for product design) are considered least useful. This is not consistent with the results of Kontić and Čabrilo (2009), and Miller, DuPont, Fera, Jeffrey, Mahon, Payer, and Starr (1999), which found that human capital indicators were perceived as the most useful of all. The reason for high perceived usefulness of relational capital indicators could be that, since bioeconomy is relatively a new field, companies try to acquire sustainable competitive advantage through relationships with customers and other stakeholders (Djordjevic-Boljanovic, Dobrijevic, Cerovic, Alcakovic, Djokovic, 2018).

Table 2. Perception of overall usefulness of IC indicators

	N	Min	Max	M	SD
IC indicators (all)	61	3.1	4.97	4.12	0.39
Human indicators usefulness	61	2.89	5	4.16	0.45
Structural indicators usefulness	61	2.62	4.92	3.88	0.48
Relational indicators usefulness	61	3.09	5	4.33	0.47

Note. n – sample size, Min – minimum, Max – maximum, M – Mean, SD – standard deviation

Amongst individual human capital indicators, employee motivation, employee satisfaction, and IT literacy of staff are seen as the most important. They are also most used indicators. Employee motivation is the most important indicator of all used in our study (mean 4.79). In knowledge economy, employee motivation and satisfaction are crucial in gaining competitive edge, because motivated and satisfied employees lead to more satisfied and loyal customers.

In general, relational capital indicators are perceived as most important of all IC indicators, most of all market share, customer loyalty, and customer satisfaction, while ratio of customers to employees and number of alliances or partnerships are considered least important. On the other hand, the number of supplier/customer networks is used most frequently of all relational capital indicators. Relational capital focuses on the role of social interactions and benefit of connections (Still, Huhtamäki, & Russell, 2013).

Regarding the question of how the managers would use each of the human, structural, and relational capital, the results show considerable differences between the three groups of indicators. More than 57% stated they would use all three groups of IC indicators to increase shareholder value. Naturally, almost all managers (96.7%) would use human capital indicators to manage human resources (*Table 3*). Moreover, two thirds of participants would use human capital indicators to improve operational efficiency.

Table 3. Preferred indicator use

Use indicator to	N	Human capital	Structural capital	Relational capital
Manage human resources	61	96.70%	24.60%	23.00%
Market product	61	31.10%	50.80%	68.90%
Secure funding/capital	61	31.10%	70.50%	52.50%
Gain competitive edge	61	47.50%	57.40%	78.70%
Increase shareholder value	61	57.40%	68.90%	63.90%
Improve quality of product	61	47.50%	62.30%	59.00%
Improve operational efficiency	61	65.60%	68.90%	32.80%
Allocate resources	61	50.80%	70.50%	32.80%
Facilitate budget planning	61	55.70%	68.90%	42.60%
Influence government policy	61	33.30%	50.00%	60.00%

Note. n – sample size

The results have shown that the majority of everyday managerial activities would require structural capital indicators. This is conflicting with answers to previous questions (*Table 2*), which showed that structural capital indicators are the least useful of all IC indicators. The reason for this could be that structural capital elements (such as patents, licenses, and data bases) are easier to assess and evaluate than human capital, and is owned by the company. Contrarily, employees only work for the company, and their skills and knowledge are not owned by the company. Structural capital is generally perceived to be a support for human capital (Djordjevic-Boljanovic, Dobrijevic, Cerovic, Alcakovic, Djokovic (2018).

Conclusions

The research objective of this paper was to determine the indicators of intellectual capital that are applicable and useful in bioeconomy-based food companies in Serbia.

The managers perceived intellectual capital indicators as quite useful (overall higher than 4.1) in most cases. Our results have demonstrated that relational capital indicators are seen as the most useful. Relational capital is the value based on maintaining good relationships with organization's customers and partners. It means that the majority of managers who participated in this study value the connections and networking with organization's stakeholders.

Unexpectedly, structural capital indicators would be used in nearly all managerial activities, even though these indicators were perceived as least useful. The reason for this could be that structural capital is usually seen as some sort of support for human capital, since it is visible and easily quantifiable.

There are several limitations to this research. Only the companies in food industry committed to bioeconomy were included in the survey. The results would probably be different if compared to other industries or sectors. The research sample was too small for generalizing results for the whole industry. This research could be useful in understanding and application of IC indicators in the process of managing intellectual

capital in bioeconomy-based food organizations in Serbia. Future research could spread across other industrial sectors in Serbia, with a larger sample.

Conflict of interests

The authors declare no conflict of interest.

References

1. Beljić, M., Panapanaan, V., Linnanen, L., & Uotila, T. (2013). Environmental knowledge management of Finnish food and drink companies in eco-efficiency and waste management. *Interdisciplinary Journal of Information, Knowledge, and Management*, 8, 99-119.
2. Bioeconomy Knowledge Centre (n.d.), available on <https://biobs.jrc.ec.europa.eu>, accessed March 20, 2018
3. Bischoff, S., Vladova, G., Jeschke, S. (2013) Measuring Intellectual Capital. In *Automation, Communication and Cybernetics in Science and Engineering 2011/2012*. Jeschke, S., Isenhardt, I., Hees, F., Henning, K. (Eds.) 2013, XXVI. ISBN 978-3-642-33389-7. Springer-Verlag Berlin Heiderberg.
4. Bolton, Charlyne, Veronika Machová, Maria Kovacova, and Katarina Valaskova (2018). The Power of Human–Machine Collaboration: Artificial Intelligence, Business Automation, and the Smart Economy, *Economics, Management, and Financial Markets* 13(4): 51–56.
5. Bose, S., Thomas, K. (2007) Valuation of intellectual capital in knowledge-based firms The need for new methods in a changing economic paradigm, *Management Decision*, Vol. 45 Iss 9 pp. 1484 – 1496, available from <http://dx.doi.org/10.1108/00251740710828726>, Emerald Insight
6. Bramhandkar, A., Erickson, S. and Applebee, I. (2007) Intellectual Capital and Organizational Performance: An Empirical Study of the Pharmaceutical Industry. *Electronic Journal of Knowledge Management*, 5, 357-362.
7. D’Amato D, Droste N, Allen B, Kettunen M, Lähtinen K, Korhonen J, Leskinen P, Matthies BD, Toppinen A, (2017). Green, circular, bio economy: A comparative analysis of sustainability avenues. *Journal of Cleaner Production*, doi: 10.1016/j.jclepro.2017.09.053.
8. Djekic, I., Dimitrijevic, B. and Tomic, N. (2017) Quality Dimensions of Intellectual Capital in Serbian Fruit Industry. *Engineering Management Journal*, 29 (3), 154-164, DOI: 10.1080/10429247.2017.1339582. Available from <http://dx.doi.org/10.1080/10429247.2017.1339582>. Accessed March 22, 2018.
9. Djordjevic-Boljanovic, J. Dobrijevic, G., Cerovic, S., Alcakovic, S., Djokovic, F. (2018) Knowledge-Based Bioeconomy: the Use of Intellectual Capital in Food Industry of Serbia. *Amfiteatru Economic* 20 (49):717-731

10. Drăgoi, M.C., Andrei, J.V., Mieilă, M., Panait, M., Dobrotă, C.E. and Lădaru, R.G., (2018). Food Safety and Security in Romania – An Econometric Analysis in the Context of National Agricultural Paradigm Transformation. *Amfiteatru Economic*, 20(47), pp. 134-150.
11. Đorđević Boljanović J. (2009) *Menadžment znanja* (In Serbian). Data Status, Belgrade.
12. Edvinsson, L. & Malone, M. (1997). *Intellectual Capital: Realizing Your Company's True Value by Finding Its Hidden Brainpower*. Harper Business, New York.
13. European Commission (2012a) *Bioeconomy Strategy and Action Plan “Innovating for Sustainable Growth: A Bioeconomy for Europe”*. Available from https://wbc-rti.info/object/event/11271/attach/05_Bio_economy_for_Europe.pdf accessed September 4, 2018.
14. European Commission (2012b) *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Innovating for Sustainable Growth: A Bioeconomy for Europe*. Available from http://ec.europa.eu/research/bioeconomy/pdf/official-strategy_en.pdf, accessed March 7, 2018.
15. European Commission (2015) *Results of the JCR – SCAR Bioeconomy Survey*, author: J.W.A. Langeveld, accessed at https://www.scar-swg-sbgb.eu/lw_resource/datapool/items/item_24/survey_bioeconomy_report1501_full_text.pdf, downloaded on 30.1.2018.
16. European Commission (2017) *Bioeconomy development in EU regions Mapping of EU Member States' / regions' Research and Innovation plans & Strategies for Smart Specialisation (RIS3) on Bioeconomy*, Final Report – February 2017, written by Silke Haarich.
17. European Investment Bank (2017) *Agriculture and bioeconomy: Unlocking production potential in a sustainable and resource-efficient way*. Available at <http://www.eib.org/infocentre/publications/all/agriculture-and-bioeconomy.htm>. Accessed March 7, 2018
18. Feleagă, L., Feleagă, N., Dragomir, V. and Răbu, L. (2013) European evidence on intellectual capital: Linking methodologies with firm disclosures. *Acta Oeconomica*, 63 (2), 139-156
19. Fryxell, G., & Lo, C. W. H. (2003). The influence of environmental knowledge and values on managerial behaviors on behalf of the environment: An empirical examination of managers in China. *Journal of Business Ethics*, 46(1), 45-69.
20. Goods and Farmer Perspective, *Bio-based and Applied Economics* 1(1): pp. 47-63., ISSN 2280-6172 (online), Firenze University Press, prema DG Research (2006) FP7 Theme 2: food, agriculture, fisheries and biotechnology (FAFB)

21. International Federation of Accountants (IFAC), (1998). *The Measurement and Management of Intellectual Capital: An Introduction*. Study 7, IFAC, New York.
22. Kaplan, R., Norton, D. (2004) *Strategy Maps: Converting Intangible Assets into Tangible Outcomes*. Harvard: Harvard Business School Publishing Corporation.
23. Komnenic, B, Tomic, D. and Tomic, G. (2010) Measuring Efficiency of Intellectual Capital In Agriculture Sector of Vojvodina. *APSTRACT (Applied Studies in Agribusiness and Commerce)*. 4(3-4), pp 25/31
24. Kontić, Lj. and Čabrilo, S. (2009) A Strategic Model for Measuring Intellectual Capital In Serbian Industrial Enterprises. *Economic Annals* 14(183), pp. 89-117
25. Kozera, M. (2011) Intellectual capital in agriculture – measurement and determinants. *Acta Scientiarum Polonorum Oeconomia* 10(3), pp. 83-95
26. LópezLópez, A. & Salazar - Elena, J. C. (2017) The Role of Intellectual Capital Management on Innovation Process: Does One Size Fit All? *UAM – Accenture Working Papers* ISSN: 2172-8143. Working Paper # 2017/29.
27. Miller, M., DuPont, B.D., Fera, V., Jeffrey, R., Mahon, B., Payer, B.M. and Starr, A. (1999) Measuring And Reporting Intellectual Capital From a Diverse Canadian Industry Perspective: Experiences, Issues and Prospects. *OECD Symposium*, Amsterdam June 9-11, 1999.
28. OECD (2009) *The Bioeconomy to 2030, Designing a policy agenda*, accessed at <http://www.oecd.org/futures/long-termtechnologicalsocietalchallenges/thebioeconomyto2030designingapolicyagenda.htm>, downloaded on 30.1.2018
29. OECD (2011) *A new OECD project New sources of growth: intangible assets*, available at <https://www.oecd.org/sti/inno/46349020.pdf>. Accessed February 27, 2018.
30. Pop, S.Z., Dracea, R. and Vlădulescu, C. (2018). Comparative Study of Certification Schemes for Food Safety Management Systems in the European Union Context. *Amfiteatru Economic*, 20(47), pp. 9-29.
31. Ronzon, T., Lusser, M., Klinkenberg, M. (ed.), Landa, L., Sanchez Lopez, J. (ed.), M'Barek, R., Hadjamu, G. (ed.), Belward, A., (ed.), Camia, A., (ed.), Giuntoli, J., Cristobal, J., Parisi, C., Ferrari, E., Marelli, L., Torres de Matos, C., Gomez Barbero, M., Rodriguez Cerezo, E. (2017). *Bioeconomy Report 2016*. JRC Scientific and Policy Report. EUR 28468 EN
32. Schmid, O., Padel, S., Levidow, L. (2012). The Bio-Economy Concept and Knowledge Base in a Public Goods and Farmer Perspective. *Bio-based and Applied Economics* 1(1), pp. 47-63.
33. Sharabati, A., Naji Jawad, S., Bontis, N. (2010). Intellectual capital and business performance in the pharmaceutical sector of Jordan. *Management decision*, 48(1), pp. 105-131 DOI 10.1108/00251741011014481
34. Socaciu, C. (2014). Bioeconomy and green economy: European strategies, action plans and impact on life quality, *Bulletin UASVM Food Science and Technology*, 71(1), pp. 1-10.

35. Starovic, D. and Marr, B. (2006) *Understanding corporate value: Managing and reporting intellectual capital*. London: Chartered Institute of Management Accountants. Available from <http://www.cimaglobal.com/Documents/ImportedDocuments/intellectualcapital.pdf>, accessed February 27, 2018
36. Statistical Office of the Republic of Serbia, available from <http://www.stat.gov.rs/WebSite/Default.aspx>, accessed March 21, 2018.
37. Stewart, T.A. (1998). *Intellectual Capital – the new Wealth of Organizations*, Nicolas Brealey Publishing, London.
38. Still, K., Huhtamäki, J. & Russell, M. (2013). Relational Capital and Social Capital: One or two Fields of Research?. *Proceedings of the 10th International Conference on Intellectual Capital, Knowledge Management and Organisational Learning*, The George Washington University, Washington, DC, USA, 24-25 October 2013, pp. 420-428.
39. Sveiby, K.E. (1997). *The New Organizational Wealth: Managing and Measuring Knowledge-Based Assets*. Berrett-Koehler Publishers, Inc., San Francisco.
40. Sveiby, K-E. (2001) A knowledge-based theory of the firm to guide in strategy formulation. *Journal of Intellectual Capital*, 2(4), pp. 344-358
41. Sveiby, K-E. (2010) *Methods for measuring intangible assets*, January 2001, updated 27 April 2010. Available at <http://www.sveiby.com/files/pdf/intangiblemethods.pdf>. Accessed February 27, 2018.
42. Szűcs, C., Vanó, G., Korsós-Schlesser, F. (2017) Agricultural and Food Production in Hungary: On the Road to Sustainability, *Visegrad Journal on Bioeconomy and Sustainable Development*, 6(2), pp. 59-63, ISSN (Online) 1339-3367, DOI DOI: <https://doi.org/10.1515/vjbsd-2017-0010>
43. UNDP / UNEP (2012). *Study on Achievements and Perspectives towards a Green Economy and Sustainable Growth in Serbia*. Available on <https://sustainabledevelopment.un.org/content/documents/984serbia.pdf>, accessed March 2, 2018.
44. Urbanek G. (2016)“The links between the Intellectual Capital Efficiency Ratio (ICER) and the performance of Polish Listed companies from the food industry sector. *The Electronic Journal of Knowledge Management*, 14(4), pp. 220-230, available online at www.ejkm.com. Accessed February 28, 2018
45. Vishnu, S. And Gupta, K. (2014) Intellectual Capital and Performance of Pharmaceutical Firms in India. *Journal of Intellectual Capital*, 15, 83-99. <https://doi.org/10.1108/JIC-04-2013-0049>
46. Zeghal, D. andMaaloul, A. (2010) Analysing Value Added as an Indicator of Intellectual Capital and its Consequences on Company. *Performance. Journal of Intellectual Capital*, 11, pp. 39-60. <https://doi.org/10.1108/14691931011013325>

THE EFFECTS OF WEATHER CONDITIONS ON THE HEALTH OF PEOPLE LIVING IN URBAN AND RURAL ENVIRONMENTS

Irena Čelić¹, Sandra Živanović², Nebojša Pavlović³

*Corresponding author E-mail: irena.celic994@gmail.com

ARTICLE INFO

Original Article

Received: 25 September 2018

Accepted: 28 December 2018

doi:10.5937/ekoPolj1901063C

UDC 613.11:[911.373+911.375]

Keywords:

weather conditions, people's health, urban and rural environment

JEL: I12

ABSTRACT

Meteorology is an essential part of people's lives. Its influence on every aspect of human life is vast and especially connected to the well-being of an individual. The objective of this paper is to ascertain how meteorologic changes influence the health of people who live in urban and rural environments. The testing was carried out on a sample of 130 respondents. The respondents are of different sex, age and come from various environments. This research was conducted via an anonymous questionnaire. The results point to the fact that meteorological changes affect the health and well-being of both healthy and ill individuals, whether they live in urban or rural environments. The significance of this paper is reflected in the acquiring of data that can be used in medicine as well as health tourism.

© 2019 EA. All rights reserved.

Introduction

Health is the most valuable thing a person can have. Due to increasingly faster pasted lifestyles, very few people take care of their physical and mental health. This type of lifestyle can lead to more and more people being prone to different illnesses.

There is a many factor with negatively effects on people's health. Genetics and unhealthy lifestyles aside, certain global changes that have an influence on both healthy people and those who have chronic illnesses, are nowadays considered a significant health risk factor. Climate change and unstable weather conditions are identified as the biggest global changes. Data that is gathered from biometeorological weather forecasts is invaluable for

-
- 1 Irena Čelić, PhD Student, Faculty of Hotel Management and Tourism in Vrnjačka Banja – University of Kragujevac, Vojvođanska 5A, 36210 Vrnjačka Banja, (+381 36) 515 00 21, e-mail: irena.celic994@gmail.com, ORCID ID (<https://orcid.org/0000-0001-6914-6321>)
 - 2 Sandra Živanović, PhD, Associate Professor, Faculty of Hotel Management and Tourism in Vrnjačka Banja – University of Kragujevac, Vojvođanska 5A, 36210 Vrnjačka Banja, (+381 36) 515 00 21, e-mail: zivanovicsandra@hotmail.com, ORCID ID (<https://orcid.org/0000-0002-9149-4530>)
 - 3 Nebojša Pavlović, PhD, Associate Professor, Faculty of Hotel Management and Tourism in Vrnjačka Banja – University of Kragujevac, Vojvođanska 5A, 36210 Vrnjačka Banja, (+381 36) 515 00 21, e-mail: racapn@gmail.com, ORCID ID (<https://orcid.org/0000-0002-3981-7945>)

those who are more susceptible to the influence of changing weather conditions. This means that people who have difficulties tolerating temperature differences can be better prepared with the proper therapy and be able to reduce the negative effects to a minimum. Likewise, health-warning systems that exist in big cities in the USA are very helpful. These warning systems are based on a synoptic approach and forecasting meteorological variables that can predict dangerous weather conditions and warn their citizens (Ballester, 2003). The benefits of this research are pertaining to the possibilities of educating people about the influence of weather conditions on health and promoting a healthy lifestyle that people disregard nowadays, especially in urban environments.

The issue of this research is establishing the effects that weather conditions have on people's health in urban and rural environments. The objective of this paper is to ascertain how meteorologic changes influence the health of people who live in urban and rural environments. The main goal of this paper is to establish the effect of changing weather conditions on health of people who live in different environments.

Meteorology as a science

During the years, environmental's process and phenomena have negatively effects on people. Meteorology, as a branch of geophysics, studies these different processes in detail. As a science, meteorology has been developing for a long time. The Greeks were the first to record meteorological observations (Neves, Gallardo & Vecchia, 2017).

Meteorology is a science that deals with atmospheric changes (Vujević, 1948). Meteorology is a science that studies different physical processes that take place in the atmosphere and how they interact with land and sea surfaces (Todorović, 2012). Physical processes and phenomena have a mutual term "weather". Weather is the atmospheric state in a certain location at a certain time (Kaiser, 2003). Weather is the state of meteorological elements and phenomena that occur in the lowest layers of the atmosphere in a short period, in a certain geographic area. It often changes and is determined by meteorological elements and processes (Živanović, 2015).

During historic development, scientists have divided meteorology into a series of subgroups, such as synoptic meteorology, dynamic meteorology, aerology, climatology, micrometeorology and others (Deljanić, 1976; Živanović, 2015). From a medical standpoint, synoptic meteorology is important as it provides predictions of weather conditions, and based on those, advice and instructions are given to those with chronic illnesses but to those who are healthy, on how to behave in situations when weather conditions change rapidly (Gajić, 2013).

Meteorological elements and phenomena

A large number of factors can affect the weather and weather conditions at a certain location. We can call all of these factors by a single name - meteorological elements and phenomena. Meteorological elements consist of a number of parameters that are used in meteorology to determine quantitative and qualitative properties of the atmosphere (Cvetanović and associates, 1988).

Cvetanovic and associates (1988) list temperature and air humidity, atmospheric pressure, cloudiness and other occurrences as meteorological elements. According to Zivanovic (2015), meteorological elements include Sun radiation, the Earth's radiation, horizontal visibility, temperature, barometric pressure, air flow, precipitation, the height of snow accumulation, while meteorological phenomena include fog, clouds, snow, frost, hoar frost, black ice, cyclones, anticyclones, air fronts and atmospheric storms (Živanović, 2015).

The effects of weather conditions on health

Biometeorology is the study of the effect of weather on all living things. Biometeorology makes up a large part of meteorology. It is a science of relationship between atmosphere physical and chemical factors and living organisms (Kukutanov, 2014). Humane biometeorology studies the effects of weather on people's health through various fields, according to Zivanovic (2015). According to the area it studies, humane biometeorology can be divided into meteorophysiology, meteoropathology, meteorotherapy and meteoroprophylaxis (Živanović, 2015).

Weather conditions affect all areas of human life. Some of these areas include food manufacturing, transport, tourism, construction, foresting and so on. As an example, food manufacturing will depend on weather conditions at a certain location. A smaller amount of precipitation during a warm period can influence the loss of crops because of drought (Otošec, 1991). Weather conditions also have a large influence on health. Health is the level of functional and metabolic efficiency of a living organism. In people, it is the ability to adapt to and be in control of one's self when confronting physical, psychological, emotional or social changes in their environment, whether as an individual or as a community (Huber et al, 2011). Changes of meteorological factors, such as Sun radiation, temperature, humidity or rain can have an effect on the environment, as well as the person. Aside from having an influence on the health of the individual, weather conditions also, affect mood, behaviour and the general state of the organism (Živanović & Manojlović, 2016).

Weather conditions can be classified in multiple ways. The methods for classification are divided into two groups: the subjective (manual) and objective (automatic) (Putniković, 2017). Weather conditions can be divided into three groups: weather conditions of the warmer period of the year (weather without frost), weather conditions where the highest temperature is positive and the lowest is negative and the weather conditions of the colder period of the year (weather with frost) (Živanović, 2015).

Meteoropathy - the illness of the modern age

The human organism was created in a way that it is able to adjust to different influences from nature. The intensity of a person's reaction to weather changes can be different (Brkić, 2006). Certain organisms adjust faster and with more ease to these influences, while others can be very sensitive (Živanović, 2015). One of the illnesses that develops

under the influence of weather elements and conditions is meteoropathy. The term meteoropathy dates back to the ancient states. The fact that term meteoropathy comes from the Greek words meteoron (heavenly apparition) and pathos (pain, suffering), reflects this statement.

Weather related pains could be of different intensities and have a common term, meteoropathy. Meteoropathy is an illness of the modern age. It refers to the difficulties of a neurovegetative nature that can happen in certain weather conditions. People who are susceptible to the effect of weather changes are meteoropathic (Živanović, 2015).

Changes in temperatures, air humidity and atmospheric pressure can cause headaches and rheumatic pains (Kaiser, 2003). Foggy weather, when the air humidity is high, can lead to difficulties in breathing, even in healthy individuals (Dukić, 1967).

Environmental temperature changes are one of the most significant indicators of climate change that can not only lead to death and illness, but also cause major problems to those who suffer from cardiovascular and respiratory illnesses (Zheng et al, 2016). High temperatures can lead to exhaustion (Kaiser, 2003). Due to sudden increases in temperature (especially during the summer months), the blood vessels in humans can expand and that can lead to a drop in blood pressure (Živanović, 2015). Because of these natural elements, those who suffer from high blood pressure, despite of medication, might suffer of the disease.

Furthermore, low temperatures can have an even worse effect on people who suffer from chronic cardiac pains. Blood pressure increases during warm weather (Zuzelo, 2018). Low temperatures can make the blood vessels narrower, putting a bigger strain on the heart. In a matter of just 2 or 3 days, a person who has blood pressure problems can have a heart attack with fatal consequences (Eckmann et al, 2000). Types of people who are usually influenced by high air temperatures are children, the elderly, obese and sick people (Kaiser, 2003).

Atmospheric pressure can also make an impact on a person. High atmospheric pressure can slow down breathing, while low atmospheric pressure can have a negative effect on patients with cardiac and rheumatic issues.

As previously mentioned, the effects that weather conditions have on health can be of different intensities. This means that changes of certain meteorological elements can cause various problems in people. Zivanovic (2015) states that these problems can be psychological in nature (fatigue, sudden mood swings, insomnia), physical problems (headache, migraine, mood swings), cardiovascular issues (increased heart rate, spikes in blood pressure) or problems with the digestive tract (gastritis, stomachaches). A sudden weather change can lead an increased number of heart attacks and strokes, pneumonias and asthma attacks in older generations and in patients with chronic cardiovascular problems (Živanović, 2015).

A representation of weather influences on certain illnesses

Weather conditions can have a different impact on people who live in urban and rural environments. Weather changes can have an effect on people with certain health issues (Horowitz, 2002). Brain cells, the cardiovascular system, rheumatological disorders and others can be especially affected by weather changes.

Psychological disorders. The most common form of these disorders is insomnia. Insomnia is the feeling of inadequate sleep, regarding either quality or quantity of it, most commonly not connected to sleep in the afternoon hours (Andreoli, Loscalzo & Carpenter, 2008). A sleeping disorder can lead to numerous problems, such as parasomnia and narcolepsy. Psychosis that can lead to suicide occurs as a more severe form of mental illness, and is usually associated with sudden changes of hot and cold weather or warm wind (Andreoli, Loscalzo & Carpenter, 2008).

General physical disorders. These types of disorders are becoming more and more common nowadays. Headaches can be a manifestation of these types of disorders. They are described as a painfully sensitive neurological structure in a person. High temperatures, wind or low air humidity can be common causes (Andreoli, Loscalzo & Carpenter, 2008).

Disorders of the gastrointestinal tract. A large number of people is troubled by these disorders, and the most common form is gastritis. Gastritis is an inflammation of gastric mucosa. Patients with gastritis are usually the most sensitive in spring, when the air temperature induces acid secretion. In spring, stomach acid secretes more, which can cause increased pains (Andreoli, Loscalzo & Carpenter, 2008).

Rheumatic disorders. One of the most common rheumatic disorders is arthritis. A disease that manifests itself with pain and rigidity of joints is called arthritis. Sudden changes of atmospheric pressure and humidity can lead to an increased feeling of pain in patients with arthritis, while lower temperatures increase rigidity. A drop in the atmospheric pressure causes the spreading of fluids and gases, including synovial fluids and the air inside the synovial membrane, which can cause pressure to the tissue that, is inflamed or injured, increasing pain levels (Bevan, 1987). Dampness and cold weather can especially affect rheumatic illnesses and cause arthritis to appear (Cvetanović & associates, 1998).

Cerebrovascular disorders. These types of disorders are not seasonal. They most commonly manifest as thrombosis, apoplexy and emboly. Cardiovascular disorders can appear at any time of the year. Most commonly, they manifest during sudden drops in atmospheric pressure, due to wind and cloudiness, as well as a rise in temperature (Cvetanović & associates, 1998).

Bronchial asthma. Asthma is an illness that is characterized by difficulty in breathing due to the narrowing of airways and reduced airflow. For the past twenty years, asthma has been one of the leading disease of respiratory organs (Cucalon, 1985). An increase in air humidity, low cloudiness or a drop in temperature can all have negative effects on patients with asthma (Cvetanović & associates, 1998).

Hypertension (elevated blood pressure). Hypertension affects nearly 50 million people in the USA, which makes it a bigger threat than any cardiovascular disease (Sacks et al, 2001). Combined with other disorders it poses a risk factor for developing angina pectoris or having a heart attack. The changes are most apparent when the temperature and the atmospheric pressure drop (Bevan, 1987). This puts people with an elevated blood pressure at higher risk during the cold part of the year. According to the World Health Organization (WHO), the deadliest diseases in 2016 were diseases of the heart (<http://www.who.int>). This statement is precisely the reason why there needs to be a bigger focus on the influence of weather on health, because different weather conditions can lead to hypertension, which can cause death.

The research methodology

In accordance with the theme of the paper, in this chapter we will set the topic, objective and hypothesis of the research as well as describe the methodology used for obtaining data. The research itself was conducted on sample of 78 respondents who live in urban environments, during December of 2017. The sample of respondents who live in rural environments consists of 52 people questioned during April of 2018.

The topic of research. The topic of this research is to determine the effects that changes of meteorological conditions and phenomena have on people's health. The significance of this research is best seen in gathering newer data that can be used in both medicine and health tourism.

The objective of research. The main objective of this paper is to ascertain the influence weather changes have on people who live in different environments. In accordance with the objective, the effect of weather on both healthy and ill individuals will be shown, as well as the most common issues people face because of sudden weather changes.

The hypothesis of research. Based on the set objective, which refers to determining the effect of weather changes, the main hypothesis is defined. The hypothesis: The changes of weather conditions in urban and rural environments have an effect on a person's health. Based on the main hypothesis, the following is defined: Hypothesis number 1: The weather changes in urban and rural environments affect healthy people. Hypothesis number 2: The weather changes in urban and rural environments affect healthy people with certain diagnoses. Hypothesis number 3: Weather conditions and phenomena have a different effect on people in urban and rural environments.

The methodology of research. For the purposes of this research, methods such as descriptive analysis, statistical analysis and a survey questionnaire were used. The method of a survey questionnaire was applied to research the problem and to achieve the set objectives. The technique that was used during the questionnaire examination was a survey questionnaire that was specifically tailored for the purpose of the research and consists of 17 questions. The questions were divided into two groups. The first group of questions are general information about the respondents (age, sex, education, and employment status), while the second group of questions refers to the respondents'

health and weather conditions affect their health. The majority of the questions that the respondents had to answer were closed type questions, meaning they could be answered with more than one option. For a total of 13 questions, the respondents had the option of choosing one out of multiple answers provided, 1 question required two answers, while the Likert scale was used on 2 questions, where the respondents had to rate a statement from 1 to 5, depending on how strongly they agreed or disagreed with it. The survey contained one open type question, where the respondents had to write down a complete answer.

Results

The total number of respondents that participated in the research was 130. Out of those 130, 78 respondents live in urban environments, while 52 live in rural ones. The majority of the respondents were female. The bigger part of the respondents that live in urban environments were over the age of fifty, while the ones that live in rural environments are between 25 and 49 years of age. Relating to the total number of participants, the respondents who have completed high school and are unemployed are prevalent.

The opinions on the condition of their health are vastly diverse. According to the data from Table 1, we can conclude that the people who live in urban environments consider themselves to be extremely healthy, while those in rural environments believe they are fairly healthy.

Table 1. The opinions of the respondents on their own health

Offered answers	Urban environment	Rural environment
Extremely healthy	33	9
Fairly healthy	16	28
Unhealthy	29	15
Total	78	52

Source: Self-conducted research

Weather changes influence people whether they live in an urban or rural environment. Even 65 respondents answered that weather changes influenced their health. Out of the rest 130 respondents, 30 of those said that weather changes did not influence their health while 35 stated that it affected them occasionally. Observing the areas where the respondents are from, over half of those surveyed in the rural environment said that weather changes affect their health.

The respondents rated their health based on different criteria that relate to their mood, occurrence of headaches or pain in places where they had fractured bones, during a cloudy or rainy day. When it comes to their mood, data from Table 2 reflects that the rating is lower during cloudy or rainy days in urban environments, while it is 1,4 higher in rural environments. If the entire sample is observed, it can be deduced that the average rating of mood in the respondents is 2,74.

Table 2. The mood of the respondents during a cloudy and rainy day

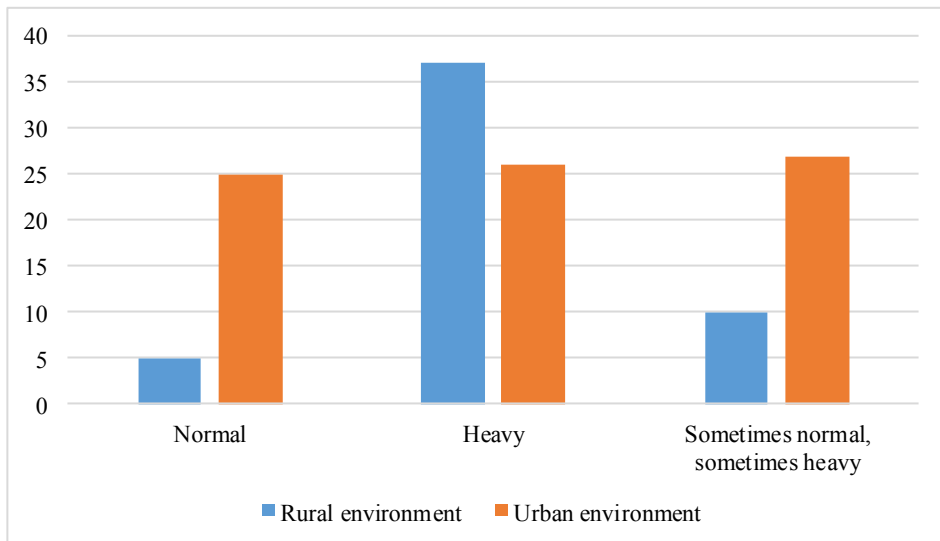
	Number of respondents	Lowest rating (very bad)	Highest rating (excellent)	Average rating
Urban environment	78	1	5	2,04
Rural environment	52	1	5	3,44

Source: Self-conducted research

A rainy day can often cause headaches. The majority of respondents from rural environments have stated that they get headaches during rainy or cloudy days; while the population from the urban environment answered, they sometimes have headaches during this type of weather. When it comes to pain in fractured areas, the results point to the fact that most of the respondents who have had fractures feel pain in those areas during a rainy day. Out of the entire sample, 93 have never had a fracture; while only 13 respondents who have had fractures stated they never feel pain on rainy or cloudy days.

When it comes to fog, the breathing of respondents in rural environments is usually obstructed, while those in urban environments report that their breathing is only occasionally obstructed. Figure 1 shows the structure of answers when it comes to difficulties in breathing on days with fog.

Figure 1. Breathing of respondents during fog



Source: Self-conducted research

Blood pressure of most respondents in both urban and rural environments remains mostly stable during the winter months of cold weather. The majority of the ones that were interviewed, 64 to be exact, has had a problem with increased blood pressure during

winter months, while only 3 of them had lower blood pressure. Even 61 respondents reported that they have stable blood pressure during these months.

Weather conditions have a strong impact on those who have chronic illnesses. In rural environments, 15 respondents suffer from some type of chronic illness, while that number reaches 30 in urban environments. Based on the data from Table 3, it can be concluded that people in rural environments mostly suffer from cholesterol issues, while the ones that live in the urban environments have issues with high blood pressure.

Table 3. Most common chronic illness in respondents

Chronic illness	Number of respondents	
	Urban environment	Rural environment
High blood pressure	9	4
Bronchitis	3	/
Low blood pressure	3	/
Allergy	2	/
Diabetes	4	1
Rheumatism	5	1
Thyroid gland	4	/
Cholesterol	/	9

Source: Self-conducted research

Most of the respondents questioned stated that they were not on therapy prescribed to them by a medical specialist. The others that are receiving treatment said that their condition would worsen if the weather conditions changed and they had not taken their medication on time. If change in the atmospheric pressure occurs, most respondents from urban environments said that their health sometimes changed, while the other respondents stated that it most commonly did not change at all.

High temperatures during summer months are conducive to forming certain illnesses. The reported health of respondents was significantly lower during these months, as shown in Table 4. The average rating of health during summer months is 2,39 (urban environment 2,32; rural 2,46).

Table 4. Respondents' health during summer months

	Number of respondents	Lowest rating	Highest rating	Average rating
Urban environment	78	1	5	2,32
Rural environment	52	1	5	2,46

Source: Self-conducted research

There are different factors that lead to health deterioration. Foggy weather and temperature fluctuations have the biggest influence on people in rural environments,

while the ones living in more urban parts find that the biggest problems are weather fluctuation and high air humidity. The respondents had to choose two answers. These results are represented in Table 5.

Table 5. Influence of certain meteorological elements and phenomena on health in respondents

Weather conditions and phenomena	Number of respondents	
	Urban environment	Rural environment
1-Rain	15	12
2-Fog	18	40
3-Cloudiness	14	8
4-Drastic temperature fluctuations	45	16
5-High air humidity	38	10
6-Wind	15	12
7-Atmospheric storms	13	6

Source: Self-conducted research

Discussions

The results of this research point to the fact that weather changes affect people that live both in urban and rural environments. People from urban environments are especially affected by high temperature fluctuations and high air humidity, while the ones from rural environments are mostly influenced by foggy weather.

Certain weather conditions, such as high or low temperatures can have the same effect on people from both urban and rural environments. So for example, the results of the research illustrate that during cold winter months when the temperature is low, blood pressure of the respondents' raises. These results confirm the opinions of different authors that wrote about increased blood pressure during winter months (Zuzelo, 2018). Authors such as Zheng have reached similar conclusions: that temperature changes can lead to illnesses (Zheng et al, 2016), or Bevan and Eckmann who have concluded that due to temperature drops, blood pressure changes (Bevan, 1987; Eckmann et al, 2000). High temperature affects the respondents' organisms, which was also confirmed by the author Kaiser in 2003, who states that high temperatures can cause exhaustion.

Furthermore, most respondents that had previously had some sort of fracture, state that they feel pain or discomfort in that area before it starts raining. The same effect is seen in patients with chronic illnesses that are taking therapy prescribed to them by a medical specialist. During rain or fog, when the respondents are not receiving therapy, their health significantly worsens. These results confirmed the fact that weather changes affect people with certain health issues (Horowitz, 2002; Živanović, 2015; Zheng et al, 2016).

The research also showed that most people from urban environments have problems with high blood pressure that has a detrimental effect on the heart. This verifies the data from the World Health Organization that stated that the deadliest illnesses in 2016 were heart diseases.

Foggy weather accompanied with high air humidity has an effect on the respondents. These weather conditions mostly affect people from rural environments. The results of the research confirm the statements that the author Dukic made in 1967, about high air humidity causing difficulties in breathing even in healthy individuals.

The changes of certain meteorological elements can cause different problems in people that live in completely different environments. The research has shown that the mood of the respondents on rainy days was different, so the ones who live in urban environments thought of their mood as well, while their counterparts in rural environments thought of their mood as poor. Furthermore, most of the respondents in rural environments reported that they had headaches on rainy days. In urban environments, they stated that they sometimes have trouble with headaches. These results coincide with the ones that authors such as Brkic made, where he stated that the intensity of a person's reaction to weather changes is different, and also Zivanovic that spoke about how certain organisms respond to changes with more ease, while others are more sensitive to them (Brkić, 2006; Živanović, 2015).

Weather changes affect mood, rheumatic pains, headaches which authors such as Kaiser in 2003 and Zivanovic in 2015 have also observed. Kaiser states in his paper from 2003 that weather can affect the apparition of headaches and rheumatic pains, while Zivanovic includes mood changes, increased and decreased blood pressure and asthma attacks as well.

Atmospheric pressure also has an effect on the respondents. The majority of the respondents sometimes have health issues during atmospheric pressure changes. This validates the statement Dukic made in 1967, where he concluded that high atmospheric pressure could slow down breathing movements, while low atmospheric pressure can have a detrimental effect on patients with cardiac and rheumatic problems.

The research that was conducted on a sample of 130 respondents has verified the hypothesis set prior. **The hypothesis:** Weather changes in urban and rural environments have an influence on a person's health. **Hypothesis number 1:** The weather changes in urban and rural environments affect healthy people. **Hypothesis number 2:** The weather changes in urban and rural environments affect healthy people with certain diagnosis. **Hypothesis number 3:** Weather conditions and phenomena have a different effect on people in urban and rural environments. As an example, the changes in atmospheric pressure in most respondents from rural environments have no effect on their health. Furthermore, in rural environments people usually have headaches during rainy days, while the respondents from urban environments only have them occasionally.

Conclusions

Nowadays people are leading faster paced lives and neglecting their health. A large number of factors can influence if people have problems with their blood pressure, or respiratory issues, mood swings and similar issues. Weather change stands out as one of the most important factors which can often make completely healthy individuals feel unwell or even worsen the physical state of patients with chronic illnesses.

Weather changes had different effects depending on the group that was tested. Some people can handle temperature changes or shifts in the atmospheric pressure, while others may have more difficulties with them. The results of the research have shown that changes of different meteorological states can influence both a healthy organism and the one that has chronic issues. Certain elements, such as high temperature fluctuations or high air humidity can have an impact on people in urban environments. The biggest effect on people in rural environments is fog weather. Research shows that headaches and poor mood in respondents are directly linked to rain. Moreover, high temperatures can exhaust a healthy organism. The effects of cold weather on blood pressure are also of great importance. The worst possible outcome of low temperature weather for people with elevated blood pressure is death. This is why it is crucial for a person to thoroughly prepare for weather changes by carrying out prescribed therapy or other alternative methods that can help reduce the effects of weather changes on health.

Conflict of interests

The authors declare no conflict of interest.

References

1. Andreoli, T. E., Loscalzo, J., Carpenter, C. C. J. and Griggs, R. C. (2008). *CECIL Essentially in medicine*. IKP Evro-Giunti, Belgrade. [in Serbian: Andreoli, T. E., Loscalzo, J., Carpenter, C. C. J., Griggs, R. C. (2008). *CECIL Suštinsko u medicini*].
2. Ballester, F., Michelozzi, P. And Iñiguez, C. (2003). *Weather, climate, and public health*. Journal of Epidemiology & Community Health, BMJ Group, No. 57, pg. 759-760, London.
3. Bevan, Dž. (1987). *Family doctor*: First volume - glossary. Nolit, Belgrade. [in Serbian: Беван, Џ. (1987), *Породични лекар*. Први том – појмовник].
4. Brkić, B. (2006). *The impact of climate on human health*. Croatian Journal of Public Health, Vol.2, No. 8., Zagreb. Available at: <http://hcjz.hr/index.php/hcjz/article/view/2007/1983> Accessed on June 4th. 2018. [in Croatian: Brkić, B. (2006). *Utjecaj klimatskih prilika na zdravlje čovjeka*].
5. Čučalin, A. G. (1985). *Bronchial asthma*, Medicine, Moscow. [in Russian: Чучалин, А. Г. (1985), *Бронхиальная астма*].
6. Cvetanović, S. S., Đekić, M., Stožinić, S., Vojnović-Kljajić, R., Tramošljanin, M., Jovanović, O. and Hydrometeorological Institute of the Republic of Serbia. (1988), *The Impact of Time on Human Health*, Scientific Paper, Belgrade. [in Serbian: Цветановић, С. С., Ђекић, М., Стожинић, С., Војновић-Кљајић, Р., Трамошљанин, М., Јовановић, О., Хидрометеоролошки завод РС. (1988), *Утицај времена на здравље људи*].
7. Deljanić, I., (1976). *Basics of meteorology*. Hydrometeorological Technical School, Belgrade. [in Serbian: Делјанић, И., (1976). *Основи метеорологије*].

8. Dukić, D. (1967). *Climatology with the basics of meteorology*. Scientific book, Belgrade. [in Serbian: Дукић, Д. (1967). *Климатологија са основама метеорологије*].
9. Eckmann, D. M., Bowers, S., Stecker, M. and Cheung, A. T. (2000). *Hematocrit, volume expander, temperature, and shear rate effects on blood viscosity*. Anesthesia & Analgesia, University of Pennsylvania, 91 (3), Philadelphia.
10. Gajić, V. (2013). *A historical overview of the study of the impact of time on humans and the development of medical meteorology*. ABC Emergency Medicine Journal, Serbian Medical Association (Emergency Medicine Section), Vol. XIII, broj 2-3, 65-69., Belgrade. [in Serbian: Гајић, В. (2013). *Историјски преглед проучавања утицаја времена на људе и развој медицинске метеорологије*].
11. Horowitz, S. (2002). *Biometeorology: What it is and how it affects our health*. Alternative & Complementary Therapies, Mary Ann Liebert, 8 (11), pg. 34-39., New York.
12. Huber, M., Knottnerus, J.A., Green, L., van der Horst, H., Jadad, A.R., Kromhout, D. and Smid, H. (2011). *How should we define health?* British Medical Journal, The BMJ, BMA House, 343(7817), p. 235-237., London.
13. Kajzer, M. (2003). *How weather affects health*. Publishing house "Draganić", Novi Beograd. [in Serbian: Кајзер, М. (2003). *Како време утиче на здравље*].
14. Kukutanov, G.R. (2014). *Meteorology*. Goce Delcev University, Štip. [in Macedonian: Кукутанов, Г.Р. (2014). *Метеорологија*].
15. Neves, G. Z. D. F., Gallardo, N. P. and Vecchia, F. A. D. S. (2017). *A Short Critical History on the Development of Meteorology and Climatology*. Climate, MDPI, 5 (1), 23., Basel, Switzerland.
16. Otoperec, S. (1991). *Agrometeorology*. Scientific book, Belgrade. [in Serbian: Оторепец, С. (1991), *Агрометеорологија*].
17. Putniković, M.S. (2017). *Objective classification of atmospheric circulation above Serbia* - doctoral dissertation, University of Belgrade, Faculty of Physics, Belgrade. [in Serbian: Путниковић, М.С. (2017), *Објективна класификација атмосферске циркулације изнад Србије*- докторска дисертација].
18. Sacks, F. M., Svetkey, L. P., Vollmer, W. M., Appel, L. J., Bray, G. A., Harsha, D. and Karanja, N. (2001). *Effects on blood pressure of reduced dietary sodium and the Dietary Approaches to Stop Hypertension (DASH) diet*, New England journal of medicine, NEJM Group, 344 (1), 3-10., Boston MA.
19. Todorović, B. (2012). *Aeronautical meteorology*. Ultralight pilot school "MAG-plastic", Smederevo. [in Serbian: Тодоровић Б., (2012), *Ваздухопловна метеорологија*].
20. Vujević, P. (1948). *Meteorology*. Prosveta-publishing company of Serbia, Belgrade. [in Serbian: Вујевић, П. (1948). *Метеорологија*].

21. World Health Organization, Available at: <http://www.who.int/news-room/factsheets/detail/the-top-10-causes-of-death> Accessed on: June 1st 2018.
22. Zheng, S., Wang, M., Li, B., Wang, S., He, S., Yin, L. and Li, T., (2016). *Gender, age and season as modifiers of the effects of diurnal temperature range on emergency room admissions for cause-specific cardiovascular disease among the elderly in Beijing*. International journal of environmental research and public health, MDPI, 13(5), 447., Basel, Switzerland.
23. Živanović, S. (2015). *Forms and trends of health tourism*. Faculty of Hospitality and Tourism, Vrnjačka Banja. [in Serbian: Живановић С., (2015), *Облици и трендови здравственог туризма*].
24. Živanović, S. and Manojlović, N. (2016). *Human biometeorology with biotroph weather conditions and meteorotropism in the context od health tourism*, The First International Scientific Conference: Tourism in function of development of the Republic of Serbia, 2-4 June, Vrnjačka Banja, University of Kragujevac, Faculty of Hotel Management and Tourism, p.20-35. Vrnjačka Banja. Available at: http://www.hit-vb.kg.ac.rs/conference/images/thematic_proceedings/thematic-proceedings-i.pdf Accessed on: April 7th 2018.
25. Zuzelo, P. R. (2018). *The Interconnectedness of Climate, Weather, and Living Organisms' Health*. Holistic nursing practice, LWW Business Offices, 32(1), 56-58., Philadelphia

IMPLEMENTATION OF CERTIFICATION SCHEMES IN THE BALKAN AGRO-FOOD SECTOR

Dragan Čockalo¹, Dejan Đorđević², Mila Kavalić³, Cariša Bešić⁴

*Corresponding author E-mail: dragan.cockalo@tfzr.rs

ARTICLE INFO

Original Article

Received: 18 October 2018

Accepted: 20 December 2018

doi:10.5937/ekoPolj1901077C

UDC 006.83:338.439(497)

Keywords:

Certification schemes, Agro-food sector, Competitiveness, Europe, Balkan countries.

JEL: D24, Q13, Q18.

ABSTRACT

Standardization and the use of certification schemes affect economy competitiveness in general, and therefore the agro-food sector as well - certification according to quality standards is a pre-condition for increasing the competitiveness of agro-food industry. Implementation of quality assurance systems in the agro-food sector and in the retail chains of the Balkan countries are covered in this paper. The Balkan countries mainly focus on the mandatory standards, whereas the non-mandatory ones are almost exclusively used by the country market leaders. It is also the case with the retail chains which by expanding their network also expand the range of standards, and therefore increase the level of competitiveness. This paper provides the information on standardization and implementation of certification schemes in the agro-food industry and retailers in the Balkan Region, also connection of competitiveness and implementation of standards. As the authors of this review know, the consolidated data of this type have not been presented yet.

© 2019 EA. All rights reserved.

Introduction

Private food standards and regulations differ from one another per complacency extent: some of them are voluntary while the others are compulsory. Private standards are developed as a response to consumer concerns, primarily as the means of competitive

- 1 Dragan Čockalo, Ph.D., Full Professor, University of Novi Sad, Technical faculty "Mihajlo Pupin" in Zrenjanin, 23000 Zrenjanin, Đure Đakovića bb, Republic of Serbia. Phone: +381 62 801 97 41, E-mail: dragan.cockalo@tfzr.rs ORCID ID (<http://orcid.org/0000-0003-2085-5420>)
- 2 Dejan Đorđević, Ph.D., Full Professor, University of Novi Sad, Technical faculty "Mihajlo Pupin" in Zrenjanin, 23000 Zrenjanin, Đure Đakovića bb, Republic of Serbia. Phone: +381 62 801 97 26, E-mail: dejan.djordjevic@tfzr.rs ORCID ID (<https://orcid.org/0000-0001-9453-9207>)
- 3 Mila Kavalić, M.Sc., Assistant, University of Novi Sad, Technical faculty "Mihajlo Pupin" in Zrenjanin, 23000 Zrenjanin, Đure Đakovića bb, Republic of Serbia. Phone: +381 63 531 636, E-mail: milazakin@gmail.com
- 4 Cariša Bešić, Ph.D., Full Professor, University of Kragujevac, Faculty of technical science Čačak, 32000 Čačak, Svetog Save 65, Republic of Serbia. Phone: +381 60 369 96 96, E-mail: carisa.besic@sbb.rs ORCID ID (<https://orcid.org/0000-0001-5370-5328>)

placement for agro-food products of high value on the markets (Henson and Reardon, 2005). Another difference is in terms of their geographic area, (Gavron and Theuvsen, 2009). There are also individual standards such as Nature's Choice (Tesco), Filières Qualité, Field-to-Fork and collective national and international standards, Assured Food Standards, Qualitat Sicherheit and Farm Assured British Beef and Lamb as the examples for former and International Food Standard, Marine Stewardship Council, Forest Stewardship Council and GLOBALG.A.P. as the examples of latter international standards. Many different retailer control schemes were designed to meet this new legal obligation. Some liability schemes in Europe include the British Retail Consortium (BRC) standard and the International Food Standard (IFS), but Safe Quality Food Institute (SQF) standard, HACCP and ISO 22000 also operate in the EU market. Complementarity with HACCP is one out of ten reasons for implementation of ISO 22000 (Escanciano and Santos-Vijande, 2014). These private standards have evolved in response to regulatory developments and, more directly, consumer concerns, and as means of competitive positioning on the markets for high-value agricultural and food products. Thus, private rather than public standards are becoming predominant drivers of agro-food systems (Henson and Hooker, 2001). Further, while this phenomenon is well-established in industrialised countries, private standards are quickly becoming a global phenomenon, not only in the context of the international trade but also within developing country agro-food markets (Reardon et al., 1999; Reardon and Berdegue, 2002). Theuvsen, Plumeyer and Gawron (2007) argued that certification schemes affected sharing information in food supply chains and, therefore, had a strong effect on their competitiveness. Carter et al. (2018) investigating online buying experience, through an internet-enabled collective intelligence (CI) on how, what and why decisions were made to purchase food and apparel. Interesting study was conducted by authors Šapić et al. (2018) which investigated prestige and national identity as predictors of food products purchase. Also, useful can be study by authors Dumitrescu & Oana (2018) which analysed judgments and decision making in consumer behavior

We agree with the statement “as growing numbers of retailers request private standards, the standard is no longer an element of competitiveness, but simply a tool to stay on the market” (Rossignoli and Moruzzo, 2014), but this statement doesn't mean the same in the Balkans. In our opinion, there is a significant potential in the observed area. It seems that the Balkan region provides “sufficient diversity” starting points and pretensions in relation to regional, EU and global market and according to EU food safety certification schemes, harmonization efforts, systematic quality assurance and improved traceability are considered cornerstones for improving the competitiveness of European agro-business. The most prevalent schemes in the Balkan countries are: ISO 9001, ISO 14001, HACCP, GLOBAL G.A.P., ISO 22000, BRC Global Standard, Demeter and PDO/PGI/TSG systems, (Bešić et al., 2015).

Materials and methods

Competitiveness of the national agro-food sector is based on the use of quality standards in the supply chain. A stronger orientation in the Balkan countries agro-food sector towards EU and the world market export have resulted in the larger number

of certified companies. On the other hand, if the tendency is in favour of regional competitiveness, the number of certificates is smaller – which is the case in Serbia. It means that stimulating national certification according to quality standards is a prerequisite for increasing the competitiveness of agro-food industry. International retailers have a significant role here, requiring suppliers' use of certain standards as a default. The productivity factor can also be linked to competitiveness, especially in the agricultural sector, where the number of employees and the size of a property also play a significant role. A review of the realised income, directly related to the retailers' competitiveness, is also the subject of this paper.

This research is based on analysis of the implementation of quality assurance systems in the Balkan agro-food sector, and on the implementation of standards on the Balkan retail market as well. By using a descriptive approach and a tabular comparison we have intended to establish the connection of agro-food sector in the Balkan region regarding competitiveness and the implementation of standards.

The research was carried out from 2015 to 2017, resulting in a selection of significant data for the aforementioned and preceding years. Data and analyses available online have been reviewed, including FAO, Eurostat, OECD, EU Commission, WEF, IDK, GFK, Deloitte, the World Bank, local statistics office data, available data on certification schemes and their use, as well as the available relevant reports by the local Ministries. The retail chains were contacted with the aim to check their existing certificates. The chosen chains were ranked by IGD rank, distinguishing the chains by their realised income. As a characteristic competitiveness indicator, due to the limited number of comparable data, Revealed Comparative Advantage (RCA) was used, just like in retail, to show the mutual competitiveness in food industry of the Balkan countries, as well as the NEI (Net Export Index) to compare the competitive position of the region's agriculture.

Implementation of certification schemes in the Balkan countries

Being in the centre of the supply chain, consumers can choose among a multitude of retailers and, in that way, they induce retailers to innovate their products and services, reduce prices, give discounts or offer other benefits to consumers. Therefore, it seems that key to success lies in investing in competitive and reliable supply chains which know how to satisfy consumer requirements. Unfair activities could damage their ability to offer a wide range of products and considerably weaken their competitive position. On the other hand, a good relationship between retailers and suppliers brings the best benefits to consumers. In such innovative, pleasant and mutually beneficial ambience both suppliers and retailers share plans and common targets and objectives to achieve profitable growth. Suppliers are also trying to offer special products with competitive advantage in order to give additional value to retailers. Nowadays, about 29 million Europeans work in retail and wholesale sector which contributes to quality of life in city centres, small towns and villages, making them more attractive. (EuroCommerce, 2016).

Speaking about agricultural products, retailers lead in their promotion, mostly through retailer brands. They help in finding new markets for agricultural products and in increasing sale through different promotional activities and investments. Retailers also improve the communication between farmers and consumers by providing farmers with communication tools. There are numerous certification schemes for agricultural products and food that prove the cooperation in the food chain. Retailers also implement quality standards through third party certification schemes such as IFS, BRC, ISO22000, IMQ, ICS BIO, Ecolabel, non-GMO, MCS, ACS etc. and support and promote the development of sustainable agricultural and fishing practices, (EuroCommerce, 2016; Vlahović et al., 2016). Balkan retailers support IFS, Global G.A.P, HACCP and ISO 22000 certification scheme and demand certification from their suppliers. Except the international, there are also lots of local, national and regional retailers who are competing by their offer and quality on this, regarding the price, exceptionally sensitive market. Although with considerable deviations, the minimum requirements that they impose to their suppliers of food products include HACCP standard.

According to Djekic et al. (2011), Djordjevic et al. (2011) also Smigic et al. (2015) in some Western Balkan countries (Serbia, Bosnia and Herzegovina and Macedonia) the implementation of different quality and food safety assurance schemes is either required by law or large multinationals (both producers and retailers) that establish their own schemes and requirements (such as HACCP). However, other private and food quality standards are applied periodically although their implementation and certification is promoted by the governments of these countries. Except HACCP, food safety standard ISO 22000 and QMS ISO 9001 are most commonly implemented in the Balkan countries. It should be mentioned here that food producers in these countries received financial support from different governmental and nongovernmental organizations (USAid, SIEPA and EU funds). Besides HACCP, the most common certifications in the Western Balkan food industry cover food safety (ISO 22000) and quality management systems (ISO 9001).

Combined with ISO 9001 and ISO 14001, ISO 22000 standard represents an equal partner in creation of the integrated management system based on a risk. While observing the application of ISO standards in the Balkan countries, we are focused on the application of ISO 9001, ISO 14001 and ISO 22001. These standards can only be conditionally used in the comparison and analysis of agro sector competitiveness since, according to the available data, the application of these standards worldwide in the sectors such as agriculture, fishing, food products, beverages and tobacco, wholesale & retail trade, hotels and restaurants, is ranked among top 5 industrial sectors with the highest rate of application. Their application was observed in 2014 and 2015, (see Table 1). Indices are interesting for the following reason - in the Balkan countries, more and more attention is paid not only to the most widespread standard ISO 9001, but the economies are directed to other standards as well, which affects the creation of added value of both products and services. Romania represents the leading country in the application of ISO 9001 and 14001 standards, while Greece leads in the application of

ISO 22001. Montenegro and Albania are the countries with the least application of ISO standard. Serbia is positioned in the middle of the list.

Table 1. Number of ISO 9001, ISO 14001, ISO 22001 certificates in the Balkan countries

Standard	ISO 9001 certificates		ISO 14001 certificates		ISO 22001 certificates	
	2015	2017	2015	2017	2015	2017
Total Balkan countries	40,199	32,643	15,937	11,764	3,379	3,620
Albania	279	215	106	70	12	9
Bosnia and Herzegovina	790	1,140	149	247	12	19
Bulgaria	5,441	5,397	1,484	1,820	283	261
Croatia	2,529	2,381	884	966	98	78
Greece	6,187	7,056	1,115	1,520	1,526	2,285
Montenegro	84	46	17	17	4	8
Romania	20,524	12,031	10,581	5,555	1,171	708
Serbia	2,521	2,213	1,120	887	232	187
Slovenia	1,481	1,720	357	450	13	18
Macedonia	363	444	124	232	28	47

Source: ISO, 2017

The Balkan countries are in somewhat similar situation with the former Yugoslav countries. The use of standards is still in its developing phase, the market is still being adjusted to the mandatory standard use and only the leading companies introduce non-mandatory standards in their practice. The predominantly used standard is HACCP, being required not only by law but also by the majority of retailers. The most promising private standard directly related to food in the Balkan Region is Global G.A.P.

A comparative example of standards implementation in agro-food industry and their use in Serbia and the West Balkan countries and the whole Balkans is presented in Table 2. Regarding the West Balkan countries, Serbia is a leader in relation to implementation of all schemes of standards. However, regarding other Balkan countries, Serbia lags behind significantly. Apart from GLOBALG.A.P., the implementation of other standards in the Republic of Serbia is low. Comparing to Greece, for example, (which is globally one of the leading countries in this standard implementation), Serbia lags behind considerably. This phenomenon additionally contributes to uncompetitiveness of Serbian companies. It is obvious from the Tables 1 and 2 that other countries from the Balkans, such as Romania and Bulgaria, are more oriented towards ISO certification schemes (generally) than towards GLOBALG.A.P. scheme, while for Serbia (strictly for food safety) the opposite is true. There are several reasons for an insufficient use of standards in Serbian agro-food industry but it seems that the most important one is when a company which implements GLOBALG.A.P. standard has an obligation to perform re-certification every year, which represents a significant financial effort. Moreover, Ministry of Agriculture, Forestry and Water Engineering of the Republic of Serbia has terminated co-funding.

Three quality logos attest to the specific traditions and qualities of food, agricultural products and wines, aromatised wines and spirits, produced in the European Union or in other countries. Two of these logos - the Protected Designation of Origin (PDO) and the Protected Geographical Indication (PGI) - have a specific link to the region where the product comes from, while the third one - the Traditional Speciality Guaranteed (TSG) - logo highlights a traditional production process. Food products are eligible for all three logos: PDO, PGI and TSG. Wine is eligible for PDO and PGI while spirits and aromatised wines qualified for PGI recognition (see Table 2.). Greece is the leading country in the application of PGI, PDO and TSG. Demeter is a brand for the products from Biodynamic Agriculture. Only strictly controlled and contractually bound partners are permitted to use the Brand. A comprehensive verification process insures strict compliance with the International Demeter Production and Processing Standards, as well as applicable organic regulations in the various countries without a gap, through every step, from agricultural production to processing and final product packaging. The holistic Demeter requirements exceed government mandated regulations. Not only do they exclude the use of synthetic fertilisers and chemical plant protection agents in agricultural crop production, or artificial additives during processing, but they also require very specific measures to strengthen the life processes in soil and foodstuffs. Demeter farmers and processors actively contribute to shaping the future worth living by creating healthy food of distinctive taste, truly “Food with a Character”. Demeter - the Brand you can trust to. Slovenia and Greece represent the leading countries in the application of Demeter standard. The Global Competitiveness Report (2016) and Agricultural policy costs are shown in Table 2. Croatia (141), Greece (129) and Serbia (128) are among the leading countries considering Agricultural policy costs. Albania (97) and Serbia (94) are the leaders in relation to competitiveness.

Table 2. Implementation of standards in the Balkan countries

Standards	GLOBAL G.A.P.	BRC	PDO/ PGI/TSG	Demeter Farms + processors+ distributors	Agricultural policy costs WEF
Total Balkan countries	11,554	409	155	49 + 7 + 5	-
Albania	0	1	0	0	64
Bosnia and Hercegovina	269	2	0	0	124
Bulgaria	17	29	7	1 + 0 + 1	120
Croatia	141	14	13	2 + 0 + 1	141
Greece	10,764	265	106	21 + 6 + 2	129
Macedonia	14	1	0	0	23
Montenegro	0	0	0	0	27
Romania	46	51	4	1 + 0 + 0	69
Serbia	281	37	0	0	128
Slovenia	22	9	25	24 + 1 + 1	107

Source: QS, 2015; BRC, 2017; EU, 2017; DI, 2017; GLOBALG.A.P., 2012

Implementation of certification schemes on the Balkan retail market

Onwards, the Table 3 will present retail chain standards in the Balkan countries. 10 countries with their areas mainly on the Balkan peninsula are included here. Having only 5% of its area on the Balkans and therefore not being in the focus of our research, Turkey is excluded from this review. Given that the presented countries have suffered numerous economic shocks like transitions, economic crises, wars, they are still in the process of market building. This is particularly the case of former Yugoslav countries. Since the retail chains are increasingly oriented towards growth, the number of their certificates is larger. It is noticed that HACCP standard is the most common one, since its use is mandatory. The retail chains in our focus were chosen on the basis of GDI analysis per income. The majority of the retail chains using non-mandatory standards, the use of ISO 9001, ISO 14001 and Global G.A.L. and IFC is present in a very small proportion. Retail chains using these standards are at the top of the list by their market share and revenue. The overview of the realised income (in EUR) is directly related to the retailers' competitiveness, and the competitiveness of retail chains is reflected in the increased use of standards.

Table 3. Implementation of standards in Balkan retails

Country	Retail chains	Realised income (,000 EUR)	Market share %	Store number	ISO 9001	ISO 14001	HACCP	ISO 22001	GLOBAL G.A.P.	BRC	IFS
BiH	Konzum Bih	781.14	8,76	234	-	x	x	-	x	-	-
	Bingo	521.66	5,85	112	-	-	x	-	-	-	-
	Tropic	434.81	4,87	62	-	-	x	-	-	-	-
	Interex	244.17	2,74	24	-	-	x	-	-	-	-
	Engrotus	143.16	1,6	27	-	-	x	-	-	-	-
	Robot Komerc	140.08	1,37	22	-	-	x	-	-	-	-
Bulgaria	Schwarz Group (Kaufland)	2,156.63	11,63	151	-	-	x	-	-	-	-
	Billa Bulgaria	488.00	2,63	158	-	-	x	-	-	-	-
	Fantastico	357.20	1,93	40	-	-	x	-	-	-	-
	Marinopoulos	312.70	1,69	33	-	-	x	-	-	-	-
	Maxima Bulgaria	169.37	0,91	61	-	-	x	-	-	-	-
	Piccadilly	125.00	0,67	20	-	-	x	-	-	-	-
CBA Asset Management	69.60	0,38	144	-	-	x	-	-	-	-	
Croatia	Konzum Croatia	11,794.10	19,75	1,775	-	x	x	-	x	-	-
	Schwarz Group (Lidl)	10,296.42	17,24	142	-	-	x	-	-	-	-
	Plodine	4,006.40	6,71	77	-	-	x	-	-	-	-
	SPAR Croatia	2,914.61	4,88	57	-	-	x	-	-	-	-
	Tommy	2,491.00	4,17	191	-	-	x	-	-	-	-
	Billa Croatia	1,768.44	2,96	97	-	-	x	-	-	-	-
KTC	1,416.40	2,37	36	-	-	x	-	-	-	-	

Country	Retail chains	Realised income (,000 EUR)	Market share %	Store number	ISO 9001	ISO 14001	HACCP	ISO 22001	GLOBAL G.A.P.	BRC	IFS
Greece	Marinopoulos	1,833.76	7,25	579	-	-	x	-	-	-	-
	Lidl Greece	1,726	6,82	240	-	-	x	-	-	-	-
	Ahold Delhaize Central and Southeastern Europe	1,612.20	6,37	348	x	-	x	-	-	-	-
	Sklavenitis	1,432.60	5,66	122	-	-	x	-	-	-	-
	Metro AEBE	781.50	3,09	243	-	-	x	-	-	-	-
	Masoutis	620.70	2,45	246	-	-	x	-	-	-	-
Macedonia, FYR	VERO	6,461.64	4,38	11	-	-	x	-	-	-	-
	Tinex	5,693.07	3,86	59	-	-	x	-	-	-	-
	Engrotus	3,261.97	2,21	14	-	-	x	-	-	-	-
	Skopski Pazar AD Skoplje	3,021.87	2,05	25	x	-	x	-	-	-	-
	Ramstore Bulgaria	1,148.50	0,78	20	x	-	x	-	-	-	-
Romania	Schwarz Group	15,654.29	10,95	329	-	-	x	-	-	-	-
	Carrefour Romania	6,793.44	4,75	278	-	-	x	-	-	-	-
	Auchan Romania	4,675.87	3,27	34	-	-	x	-	-	-	-
	Ahold Delhaize Central and Southeastern Europe	3,865.60	2,70	580	x	-	x	-	-	-	-
	Profi Romania	3,592.00	2,51	501	-	-	x	-	-	-	-
	Rewe Group	1,896.77	1,33	198	-	-	x	-	-	-	-
	Cora	1,758.66	1,23	11	-	-	x	-	-	-	-
Slovenia	Merkator Slovenia	1,364.80	31,23	483	x	x	x	x	-	-	x
	SPAR Slovenia	766.80	17,55	103	-	-	x	-	-	-	-
	Engrotus	461.70	10,57	302	-	-	x	-	-	-	-
	Hofer Slovenia	420.00	9,61	81	-	-	x	-	-	-	x
	Lidl Slovenia	401.00	9,18	51	-	-	x	-	-	-	-
	Eurospin	217.06	4,97	50	-	-	x	-	-	-	-
	Leclerc	101.51	2,32	2	-	-	x	-	-	-	-

Country	Retail chains	Realised income (,000 EUR)	Market share %	Store number	ISO 9001	ISO 14001	HACCP	ISO 22001	GLOBAL G.A.P.	BRC	IFS
Serbia	Ahold Delhaize Central and Southeastern Europe	127,041.90	12,24	409	x		x	-	-	-	-
	Merkator Serbia	100,211.00	9,66	332	x	x	x	-	-	-	-
	Dis	22,835.00	2,20	24			x	-	-	-	-
	Univerexport	22,109.00	2,13	189	x	-	x	-	-	-	-
	Aman	12,036.00	1,16	200	-	-	x	-	-	-	-
	Gomex	10,723.00	1,03	170	-	-	x	-	-	-	-
	Super Vero	7,062.78	0,68	6	-	-	x	-	-	-	-
Albania	Big Market (Albania)	-	37	75	-	-	x	-	-	-	-
	Marinopoulos (Greece) (Carrefour franchise)	-	21	15	-	-	x	-	-	-	-
	Conad (Italia)	-	29	34	-	-	x	-	-	-	-
	ECO Market (Albania)	-	13	15	-	-	x	-	-	-	-
Montenegro	Expo (Montenegro) (Delhaize franchise)	-			x	-	x	-	-	-	-
	Roda (ex. Mercator) (Agrokor, Croatia)	-	45	103	x	x	x	x	-	-	-
	Voli (Montenegro)	-	30	61	x	-	x	-	-	-	-
	Lakovic D.O.O	-	25	22	x	-	x	-	-	-	-

Source: Authors' own research (the data for 2017.)

Discussion and conclusions

Competitiveness of agro-food sector in the Balkan countries is based on the increased use of quality standards in the retail chains. A stronger orientation of a country's agro-food sector towards EU and world market export results in the larger number of certified companies. On the other hand, if the tendency is in favour of regional competitiveness, the number of certificates is smaller – which is the case in Serbia. This means that stimulating national certification according to quality standards is a prerequisite for increasing competitiveness of agro-food industry.

The Balkan countries mainly focus on the mandatory standards, whereas the non-mandatory ones are almost exclusively used by the country market leaders only. The leaders in the agro sector have realised their objective to be competitive by using standards and adding value to customers on one side, and by increasing the export on the other side. The more focused a provider is to expand their network and export,

the more they use the standards. This is also the case with the retail chains, which by expanding their network, expand the range of standards and therefore increase the level of competitiveness. International retailers have a significant role here, requiring suppliers' use of certain standards as a default, and therefore directly stimulating the rise in the use of standards and good practice.

Several important prerequisites can be distinguished in improving competitiveness of both agro-sector and retail chains: (1) harmonisation of practice with the quality system ISO 9000 standards and technical regulations; (2) quality certification of domestic companies and its correlation with export results – the role of quality certificates in practice; (3) foreign customers and their requirements related to the product quality; (4) WTO; (5) ISO 14000 – standards in the field of ecology.

Conflict of interests

The authors declare no conflict of interest.

References

1. Bešić, C., Bogetić, S., Čočkalović, D., & Đorđević, D. (2015). The Role of Global G.A.P in Improving Competitiveness of Agro-food Industry. *Ekonomika poljoprivrede (Economics of Agriculture)*, 62(3), 583-597.
2. BRC. (2017). BRC Directory Retrieved 03.02.2017, from <http://www.brcdirectory.com/>
3. Carter, S., & Yeo, A. C. M. (2018). Internet-enabled Collective Intelligence as a Precursor and Predictor of Consumer Behaviour, *Economics, Management, and Financial Markets*, 13(4): 11–38.
4. DI. (2017). Certified Demeter operations. Retrieved 05.02.2017, from Demeter-International (DI) <http://www.demeter.net/statistics>
5. Djekic, I., Tomasevic, I., & Radovanovic, R. (2011). Quality and food safety issues revealed in certified food companies in three Western Balkans countries. *Food Control*, 22(11), 1736-1741.
6. Djordjevic, D., Cockalo, D., & Bogetic, S. (2011). An analysis of the HACCP system implementation - The factor of improving competitiveness in Serbian companies. *African Journal of Agricultural Research*, 6(3), 515-520.
7. EBRD, ETF, SEECEL, EU, & OECD. (2016). SME Policy Index: Western Balkans and Turkey (Publication no. 10.1787/9789264254473-en). Retrieved 05.05.2017, from EBRD, ETF, SEECEL, EU, OECD <https://europa.ba/wp-content/uploads/2016/06/SME-Policy-Index-Western-Balkans-and-Turkey-2016.pdf>
8. Escanciano, C., & Santos-Vijande, M. L. (2014). Reasons and constraints to implementing an ISO 22000 food safety management system: Evidence from Spain. *Food Control*, 40, 50–57.
9. EU. (2017). DOOR database (“Database of Origin and Registration”). Retrieved 03.05.2017 <http://ec.europa.eu/agriculture/quality/door/list.html>

10. EuroCommerce. (2016). Retail and agriculture: Contribution to the agri-markets task force. Retrieved 05.05.2017., from EuroCommerce http://www.eurocommerce.eu/media/130179/agri_markets_task_force_contribution_-_final_version.pdf
11. Gawron, J.-C., & Theuvsen, L. (2009). Certification schemes in the European agri-food sector: Overview and opportunities for Central and Eastern Europe. *Outlook on Agriculture*, 38(1), 9-14.
12. GLOBALG.A.P. (2012a). GLOBALG.A.P. Annual Report 2012. Retrieved 02.02.2015, from GLOBALG.A.P. http://www.globalgap.org/export/sites/default/content/galleries/documents/130124_AR12_web_en.pdf
13. Hatanaka, M., Bain, C., & Busc, L. (2005). Third-party certification in the global agrifood system. *Food policy*, 30(3), 354-369.
14. Henson, S., & Hooker, N. H. (2001). Private sector management of food safety: public regulation and the role of private controls. *The International Food and Agribusiness Management Review*, 4(1), 7-17.
15. Henson, S., & Reardon, T. (2005). Private agri-food standards: Implications for food policy and the agri-food system. *Food policy*, 30(3), 241-253.
16. ISO. (2018). The ISO Survey 2017. Retrieved 05.05.2018, from ISO <https://www.iso.org/the-iso-survey.html>
17. Mirică, C. O. (2018). Judgments and Decision Making in Consumer Behavior: The Use of Psychophysiological Measures to Investigate Emotions and Cognitive Responses, *Economics, Management, and Financial Markets* 13(4): 39–44.
18. QS. (2015). Annual Report 2012 - Outlook 2013. Retrieved 03.02.2015, from QS Qualität und Sicherheit GmbH [https://www.q-s.de/services/files/mediocenter/publikationen/QS Annual Report-ES_2013.pdf](https://www.q-s.de/services/files/mediocenter/publikationen/QS%20Annual%20Report-ES_2013.pdf)
19. Reardon, T., & Berdegué, J. A. (2002). The rapid rise of supermarkets in Latin America: challenges and opportunities for development. *Development Policy Review*, 20(4), 371–388.
20. Reardon, T., Codron, J.-M., Busch, L., Bingen, J., & Harris, C. (1999). Global change in agrifood grades and standards: agribusiness strategic responses in developing countries. *The International Food and Agribusiness Management Review*, 2(3-4), 421–435.
21. Rossignoli, C. M., & Moruzzo, R. (2014). Retail Power and Private Standards in the Agri-Food Chain. *Agroecology and sustainable food systems*, 38(9), 1108-1124.
22. Smigic, N., Rajkovic, A., Djekic, I., & Tomic, N. (2015). Legislation, standards and diagnostics as a backbone of food safety assurance in Serbia. *British Food Journal*, 117(1), 94 - 108.
23. Sterns, P. A., Codron, J.-M., & Reardon, T. (2001). *Quality and quality assurance in the fresh produce sector: a case study of European retailers*. [Selected Paper]. 2001 Annual meeting, August 5-8, Chicago, IL. American Agricultural Economics Association.

24. Šapić, S., Furtula, S., & Durkalić, D. (2018). Prestige and national identity as predictors of food products purchase. *Economics of Agriculture*, 65(2), 643-657.
25. Theuvsen, L., Plumeyer, C.-H., & Gawron, J.-C. (2007). Certification systems in the meat industry: Overview and consequences for chain-wide communication. *Polish Journal of Food and Nutrition Sciences*, 57(4C), 563-569.
26. Vlahović, M., Kavalić, M., Borić, S., Stanisavljev, S., & Ćurčić, N. (2016). The impact of the number of retail outlets on the market share of consumer goods' retail brands. *Journal of engineering management an Competitiveness (JEMC)*, 6(1), 36-45.

STRATEGIC MULTICRITERIA DECISION-MAKING PROCESS IN AGRICULTURE

Strahinja Bogdanović¹, Miroljub Hadžić²

**Corresponding author E-mail: strahinja.bogdanovic.15@singimail.rs*

ARTICLE INFO

Original Article

Received: 17 Decembar 2018

Accepted: 13 March 2019

doi:10.5937/ekoPolj1901089B

UDC 005.51:338.48

Keywords:

Agriculture, Strategic Decision Making, Net Present Value (NPV), Analytical Hierarchy Process (AHP)

JEL: Q10

ABSTRACT

The annual plantations in agriculture do not require large investments; therefore financial yields with this type of investments are limited. On the other hand, investment in perennial plantations, such as walnuts, hazelnuts or apples can be significantly higher, but the ROI or the return on such investment is therefore much higher than those on classic crop production. Making complex strategic decisions in agriculture, like whether to invest in an annual or move to perennial plantations, has been out of the sight for economic theorists for a long time. Therefore, the scientific contribution of this article is an effective use of a hybrid model that combines a quantitative method - such as the Net Present Value (NPV), and a qualitative method - such as the Analytical Hierarchy Process (AHP) in a multi-criteria decision-making environment which proved that choosing the perennial plantations is a better long term investment strategy than the classic crop production.

© 2019 EA. All rights reserved.

Introduction

Agriculture is one of the main branches of any industry in the world, and in the Republic of Serbia as well. Lately, small agricultural holdings in the Republic of Serbia have taken a secondary role compared to large agricultural producers who have raised the level of production and trade of agricultural products to a higher level. Desirous of quick results, through the Ministry of Agriculture, the political structures were often inclined to encourage classic crop production that could produce financial effects very quickly. In this way, raising perennial plantations has slid into the second plan, along with the financial potential that it carries. The role of the state could be amplified by promoting insurance in agriculture, and also by financing researches that are not exclusively commercial (Njegomir, Demko-Rihter, 2018).

This research put in the perspective cost-effectiveness of investing in classic crop production, such as maize, wheat, and soybean, in comparison to investments in raising

1 Strahinja Bogdanović, PhD student, Singidunum University, 32 Danijelova Street, +381653004196, e-mail: strahinja.bogdanovic.15@singimail.rs, ORCID ID <https://orcid.org/0000-0001-7464-208X>

2 Miroljub Hadžić, Full professor, Singidunum University, 32 Danijelova Street, +38163288480, e-mail: mhadzic@singidunum.ac.rs, ORCID ID <https://orcid.org/0000-0002-8009-2026>

perennial plantations such as walnut, hazelnut or apple. Consequently, the profitability of either investment in above-mentioned alternatives will be tested using the Net Present Value (NPV) method, and the Analytical Hierarchy Process (AHP) method in one strategic decision-making process that could help agricultural producers to choose the best alternative.

Many authors have addressed the issue of strategic decision-making in a multi-criteria environment, but there are not many studies that use scientific methods such as the Analytical Hierarchy Process (AHP) in agriculture. This article has the intention to help agricultural holdings, environmental and agricultural economists, as well as managers in agriculture to fully grasp on decision-making processes so they could be in a better position to decide between alternatives in front of them.

Background

Agriculture depends on a favorable climate, hence is among the sectors of the global economy where most concern currently lies in the context of climate change which is one of the burning issues of the World these days (Islam, 2012). In many countries, intensive crop production has had negative impacts on production, ecosystems, and the larger environment, putting future productivity at risk (Reddy, 2016). In the Republic of Serbia however, crop production is a leading agricultural segment in the flatland areas where the production of maize and wheat takes the primacy. There are two groups of crop producers in the Republic of Serbia: the first group are large agricultural producers (cooperatives and large holdings with several thousand hectares of land and significant processing machinery); and the second group are small agricultural producers (engaged in classical crop production on small areas and plots not more than a few hectares in size). Crop production is a very risky business for small producers because it largely depends on weather conditions, and they are not in the position to leverage their production with plants that do not depend much on weather conditions. For that reason, this research analyzed the classic crop production of maize, wheat and soybean.

Classic crop production

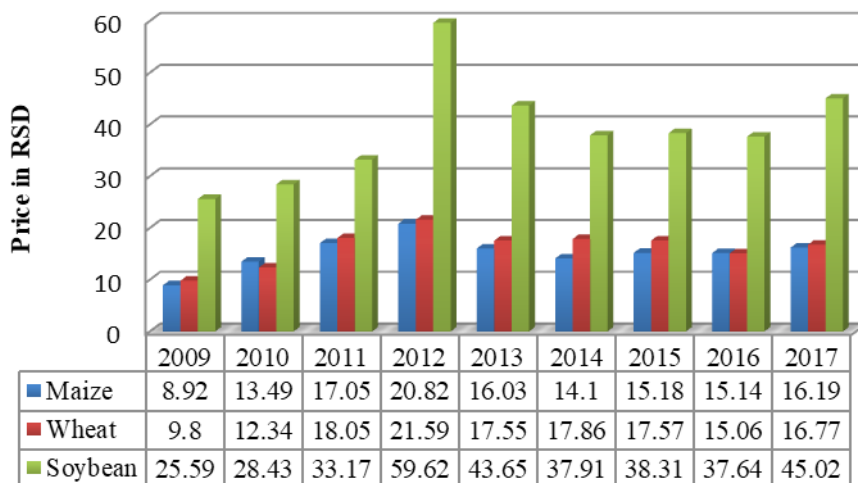
Maize is one of the most important cultivated plant species. It is the third in the World measured by planted area (after wheat and rice), and second in the World in terms of quantity of the produced grain. Maize is important as a staple crop (mainly in developing countries) but it is also important as animal feed and, increasingly, as biofuel (Reynolds, 2017). In 2001, it became the first crop in the World for the produced grain quantity. In the Republic of Serbia, maize production is the most common. Taking the last 100 years in consideration, the maize production in the World has increased seven times, and two and a half times in Serbia in the past 50 years (Stefanovic et al., 2011).

Wheat is the most important cereal that is produced and sold worldwide. It is used in the food industry mainly to produce bread and other bakery products, and it has been widely used in the pharmaceutical industry. One-quarter of all arable land in the World

is sown by wheat. It is the main source of human food, because wheat bread is the basic food for 70% of the human population. It is estimated that almost two-thirds of total wheat production are used for food production; the remaining one-third is used as seeds, fodder, and non-food products. Developing countries are becoming increasingly urbanized and the land for agricultural production is decreasing rapidly. In the Republic of Serbia, in recent years, grain yield has fallen by an average rate of 2.4% per year, reflecting the economic powerlessness of the producers and the unstable socio-political situation in the country.

Soybean is a plant from the Fabaceae family and is originated from Asia. In order to have successful plant production, it is necessary to select high-yield varieties as well as to implement the correct and timely agro-technical measures. Soybean production is of great importance because it is used both in nutrition and in the pharmaceutical and other industries. Also, soybean is very important for the nitrogen fixation, maintenance of the crops, etc. Soybean takes an ever-increasing place in crop production, so does the products obtained by processing of soybean such as soybean milk, soybean beverages, tofu-soy cheese, pâtés, etc. Soybean production in the Republic of Serbia is growing constantly. The domestic and the European Union market demand for soybean is very high. The Republic of Serbia is one of the largest soybean producers in Europe. Reasons for such a large production are good cultivation varieties, and climate conditions that suit the cultivation of this culture.

Figure 1 - Average annual purchase prices of maize, wheat and soybean, expressed in RSD



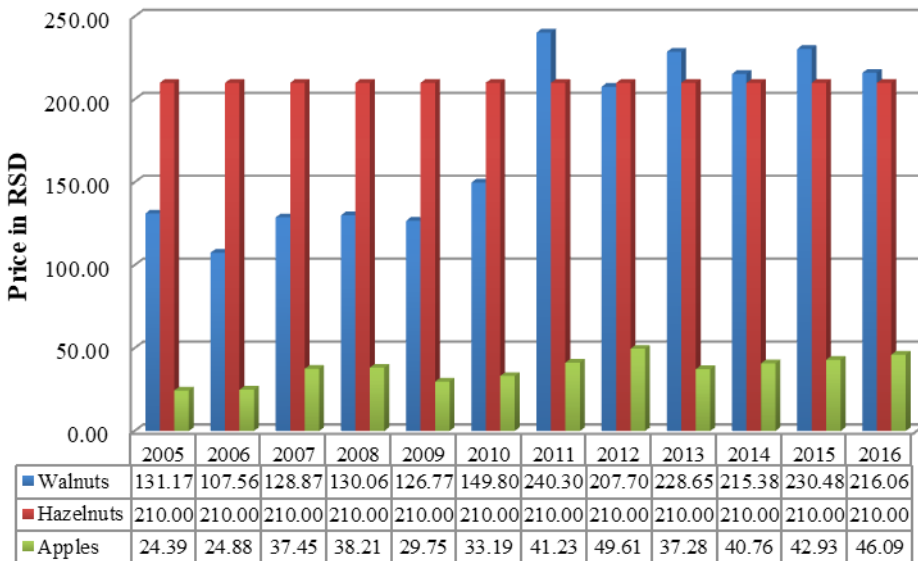
Source: Author's calculations based on available data from the website of the Serbian Republic Statistical Office

Buying prices of maize in the observed period are ranging from 8.92 RSD per kilogram to 20.82 RSD per kilogram. When it comes to purchasing prices of the wheat, the graphics (*Figure 1.*) show that the prices have large oscillations and that the market is not well regulated and stable. Prices are ranging from 10 RSD per kilogram to 21.59 RSD per kilogram. The price of soybeans varies from year to year, which creates problems for agricultural producers. The highest price level was present in 2012, where the purchase price was two times higher than the previous three years.

Raising perennial plantations

Walnuts are plants from the Juglandaceae family. The Latin name *Juglans* originates from the words “Jovis” and “Glans” which means “Jupiter’s gypsum” because the walnut has always been considered the fruit of fertility. The basic advantages of walnut production are easy transportation and low maintenance costs. When it comes to income, walnut can also yield several times higher profits than classic crops. Still, the production of walnuts in the Republic of Serbia is relatively small, and the import of this agricultural product is required. The average purchase prices of walnuts in the Republic of Serbia from 2005 to 2016 were from 1.3€ for kilogram to 2.3€ for a kilogram. An overview of these prices can be found in the following table and chart (*Figure 2.*).

Figure 2 - Average annual purchase prices of walnuts, hazelnuts, expressed in RSD



Source: Author’s calculations based on available data from the website of the Serbian Republic Statistical Office

Hazelnut is a very old type of fruit. There are some remains of this plant that were found and estimated its origin 8,000 years BC (Šoškić, 2018). In modern conditions, hazelnuts

are raised to meet the needs of the tree itself but also needs for mechanization on the other hand. Therefore it is mainly grown in the form of a buidler or a bush that is up to 4 m high. When raising such plants, maintenance costs are considerably lower. The hazelnut production and distribution market in the Republic of Serbia is relatively new so the prices range from 1.2 € for kilogram to 2.7 € for kilogram for hazelnuts in the shell.

Apple is a genus of woody plants from the Rosaceae family. Apple is one of the most widespread fruits in the World (originating from Asia, and the area of China and the Himalayas is characterized by the greatest variety of species). The territory of the Republic of Serbia is one of the most optimal areas in Europe for the production of apples, with its favorable agro-climatic conditions. The average purchase prices of apples in the period from 2005 to 2016 can be found in the table and chart above (*Figure 2.*).

Materials and methods

In order to obtain objective results for this paper, a multi-methodological approach was used. Research methods were complementary to each other and chosen based on their significance in assessing the cost-effectiveness of the long-term investment. Consequently, the same methods have the potential to assess the investment alternatives in the strategic decision-making process in agriculture. The Net Present Value method (NPV) was used to evaluate the cost-effectiveness of the investment alternative, while the Analytical Hierarchy Process (AHP) was used as a strategic decision-making tool in a multi-criteria environment.

For the purpose of this research, authors used the AHP-NPV hybrid method in order to analyze two alternatives – the investment in classic crop production (maize, wheat, and soybeans); and the investment in raising perennial plants (walnut, hazelnuts, and apples). In order to obtain the maximum objectivity of the results for the Analytical Hierarchy Process, method of formal or structured interviews was used with key persons in the field of agricultural production and trade. During interviews, all respondents gave the greatest significance to the economic factor of the investment, i.e. its cost-effectiveness. Therefore, the detailed analysis of the Net Present Value for the above-mentioned alternatives has been carried.

One way to rank, i.e. to evaluate the cost-effectiveness of the investment is by calculating its Net Present Value. This method is dynamic and starts from the future net incomes, and then, using the discount rate, it's reduced to the present value. The aim is to determine whether the present value of cash inflows is sufficient to cover the present value of cash outflows and to achieve planned returns. Net Present Value represents the difference between the present value of the net inflow - the effects of an investment; and the present value of the cash outflow – initial investment itself.

$$NPV = V - I$$

V - discounted net cash inflow (Net Income)

I - initial investment value

Formula for calculating the present value:

$$k = \frac{\text{Pr}}{(1+d)^n}$$

where: k = current value, Pr = annual amount of net cash inflow discounted to the present value, d = discount rate, n = time.

An investment project can be considered acceptable if the present value of its net cash inflows is greater than the present value of the investment in the project, hence if the Net Present Value is greater than zero. Therefore, an investment project is rejected if the present value of its net cash inflow is less than the present value of the investment in the project, or if the Net Present Value is less than zero (Julian, 2011). When calculating NPV in agriculture, the net cash inflow that is going to be generated throughout the period of exploitation must be calculated for a certain moment in time, an operation that is called discounting.

The discount rate reflects the risk of the activity. In this research, a discount rate of 10% was applied for perennial plantations and 8% for classic crop production. The discount rate included:

- Country and activity risk (the political risk, regulatory risk and the risk of purchasing power reduction) at a rate of 2%;
- Interest rate (the inflation + real interest rate on investments without the risk) at a rate of 4%;
- Project risk rate (fluctuation in sales prices, yield fluctuations and fluctuations in input prices) at a rate of 2% to 4%

Analytic Hierarchy Process (AHP) is one of the most famous multi-criteria decision-making methods developed by Thomas Saaty in 1980 (Saaty, 2016). AHP is a powerful technique that can help to better express a general decision-making operation by decomposing a complex problem into a multi-purpose hierarchical structure of objective criteria and alternatives (Das & Saha, 2016). AHP performs comparative comparisons in order to achieve the relative significance of the criteria in each level of the hierarchy. AHP also evaluate alternatives in the hierarchy so that the decision makers could make the best choice among alternatives. This method is an effective decision-making tool especially significant when there is a lot of subjectivity involved. It is very suitable for solving problems where decision-making criteria can be organized hierarchically in sub-criterion (Tuzmen & Sipahi, 2011).

Analytic Hierarchy Process is used to determine the relative priorities on absolute scales of discrete and continuous paired comparisons on multiple levels of the hierarchy (Vargas, 2017). Determination of the relative priority between a pair within the AHP methodology is achieved by assigning the marks according to the Saaty scale from 1 to 9 (*Table 1.*) (Saaty, 2016). A parallel matrix of the significance of these factors provides measures for calculating the global importance of the criteria (Das & Saha, 2016).

Table 1 – Saaty scale 1 ÷ 9 for the comparison of pairs of the decision elements

Saaty's scale	Definition	Explanation
1	Same significance	Two elements have the same significance relative to the higher level goal
3	Weak dominance	Experience or reasoning slightly favors one element in relation to the other
5	Strong dominance	Experience or reasoning greatly favors one element in relation to the other
7	Very strong dominance	Very strong dominance of one element in relation to the other
9	Absolute dominance	Dominance of the highest degree
2, 4, 6, 8	Middle Values	They are used to show the compromise of the priorities between the above estimates 1, 3, 5, 7, 9

Source: (Saaty, 2016)

The AHP method is based on three principles: first - the structure of the model; second - a comparative assessment of criteria and/or alternatives; third - the synthesis of priorities. In the first step, the problem regarding the decision is structured as a hierarchy (Zyoud et al., 2016). AHP initially breaks down the complex multi-criteria decision-making process in the hierarchy of mutually related elements (criteria, sub-criteria and decision alternatives). In the hierarchy, the goal, decision factors (criteria) and sub-factors (sub-criteria), as well as the alternatives, are all arranged in a structure similar to a family tree. The hierarchy has at least three levels: the general goal that needs to be achieved - which is at the top, multiple criteria and sub-criteria that define alternatives - in the middle, and the alternatives at the lowest level (Petruni et al., 2017).

For the purposes of this research, AHP is used to prioritize the criteria that guides strategic decision - whether on a given land, in the long-term period of thirty years or even more, is better to go with the classic crop production or invest in perennial plantings. When the problem is broken down and the hierarchy is constructed, the prioritization procedure begins in order to determine the relative importance of all the criteria. At each level, the criteria are compared in accordance with the degree of their impact to certain criteria at a higher level. In AHP, comparative pairings are based on a standardized scale of nine levels (*Table 1.*) (Saaty, 2016).

If the $K = \{K_j \mid j = 1, 2, \dots, n\}$ is defined as a set of criteria within the appropriate level of hierarchy - Level 1. The results of the comparison of elements at a given level of the hierarchy are placed in the corresponding matrix pairs $A (n \times n)$, where each element a_{ij} ($i, j = 1, 2, \dots, n$) of the matrix A can be defined as the ratio of the criteria weight:

$$A = (a_{ij})_{n \times n} = \begin{pmatrix} a_1 & a_2 & a_{1n} \\ a_2 & a_2 & a_{2n} \\ 1/a_{n1} & 1/a_{n2} & 1/a_n \end{pmatrix}$$

At the last step, each matrix is normalized, and then the relative weight for each criterion is found. The relative weightings give the right vector (*max*) as:

$$A_w = \lambda_{max} \cdot w$$

If the comparisons are completely consistent, the matrix $A_{max} = n$. In this case, the weight can be obtained by normalizing any of the rows or columns of the matrix A. It should be noted that the quality of the AHP output is relative to the consistency of the paired comparisons. Consistency is defined by the relationship between inputs A: $a_{ij} \times a_{jk} = a_{ik}$. The consistency index (CI) can be calculated using the formula below.

In order to calculate the degree of consistency or the Consistency Ratio (CR), the Consistency Index (CI) must first be calculated according to the following relation (Živković, Nikolić, 2006):

$$CI = \frac{\lambda_{max} - n}{n - 1}$$

where λ_{max} is the maximum eigenvalue of the matrix of the comparison A (n x n):

$$\begin{pmatrix} a_{11} & a_{12} & a_{1n} \\ a_{21} & a_{22} & a_{2n} \\ \vdots & \vdots & \vdots \\ 1/a_{n1} & 1/a_{n2} & 1/a_{nn} \end{pmatrix} \begin{bmatrix} w_1 \\ w_2 \\ \vdots \\ w_n \end{bmatrix} = \begin{bmatrix} b_1 \\ b_2 \\ \vdots \\ b_n \end{bmatrix} \rightarrow \begin{bmatrix} b_1/w_1 \\ b_2/w_2 \\ \vdots \\ b_n/w_n \end{bmatrix} = \begin{bmatrix} \lambda_1 \\ \lambda_2 \\ \vdots \\ \lambda_n \end{bmatrix} \rightarrow \lambda_{max} = \frac{1}{n} \sum_{i=1}^n \lambda_i$$

Then, the degree of consistency is determined on the basis of the relation:

$$CR = \frac{CI}{RI}$$

where (RI) is the Random Index that depends on number of rows n in the matrix A, and is taken from the table below (Table 2.) (Saaty, 2016):

Table 2 - Random Index in relation to the number of rows of the matrix

n	1	2	3	4	5	6	7	8	9	10
RI	0	0	0.58	0.90	1.12	1.24	1.32	1.41	1.45	1.49

Source: (Saaty, 2016)

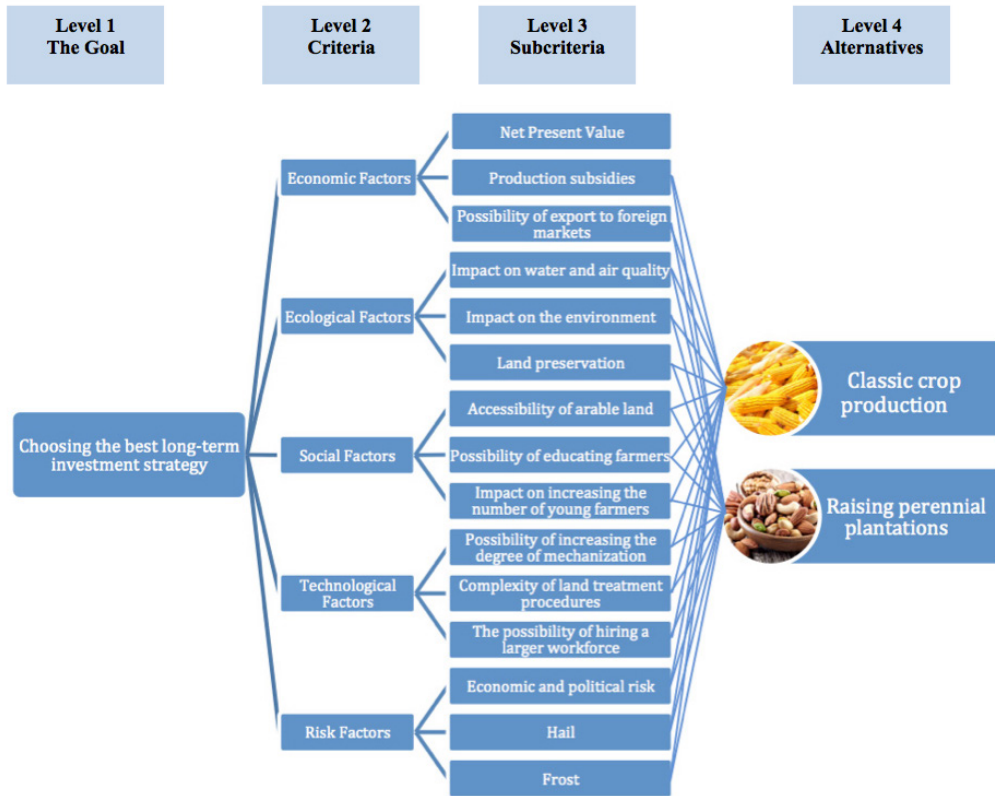
If the Consistency Ratio is less than 0.10 (less than 10%) the result is sufficiently accurate and there is no need for corrections in the comparison and the repetition of calculations. However, if the degree of consistency is greater than 0.10, the reasons for inconsistency should be determined and the results should be re-analyzed again (Živkovic, Nikolić, 2016).

In order to obtain more objective results, authors have conducted interviews with relevant persons in the field of agricultural production. Employees of The Department for Agriculture of the city administration of Sombor were interviewed, as well as local agricultural producers, three university professors of the Faculty of Agriculture, and the agricultural engineer from The Ministry of Agriculture of the Republic of Serbia. The choice of these interlocutors was based on their knowledge of the topic, and also their political, social and economic importance for agricultural production in the Republic of Serbia. Each interview lasted about two hours. They were presented with the closed questionnaire related to economic, social, ecological, technological and risk factors of agricultural production. They were also given the freedom to openly discuss many issues regarding the importance of perennial farms for agriculture in the country and the region. Respondents' answers provided excellent insight into the current situation in this market, providing us with a strong basis for the creation of AHP hierarchy. Then, the hierarchy was created as in the following figure (*Figure 3.*), after which the respondents were presented with the pairwise comparison of the criteria, sub-criteria, and alternatives, so they could prioritize them according to their personal knowledge and belief.

The highest level of the hierarchy is the goal, which in this case is the choice of the strategy for agricultural production for the next thirty years. The second level represents the criteria on the basis of which the priorities of the respondents/advisors will be ranked. Each of the above criteria also contains sub-criteria, that is, the decision-making attributes, which are at the Level 3 of this hierarchy. Finally, at the Level 4 of this hierarchy there are alternatives (*Figure 3.*). In order to avoid confusion by the large number of comparisons, which significantly increases the uncertainty of the process, the alternatives are presented in a group, that is, one alternative for one-year plantings and the other alternative for perennial plantings.

After creating the hierarchy, respondents were presented with the pairwise comparison in Levels 2 and Level 3. For each presented pair, they had to rank the significance of one criteria in comparison to the other, using the Saaty's scale - 1 for the same significance, 3 meaning that the one criteria is slightly more significant than the other, 5 meaning that the one criteria is moderately more significant than the other, 7 giving the great significance to one criteria, and 9 for the absolute dominance of one criteria over the other. Their answers were collected using the laptop and the Microsoft Excel sheet. After that, the average prioritization was calculated for each pair and entered into a Microsoft Excel spreadsheet created using Saaty's AHP prioritization standards. Finally, at the Level 4, the alternatives were also prioritized according to their relevance with each of the sub-criteria from the Level 3. As an end result, the AHP method provided values that clearly indicated the choice of one of the two alternatives.

Figure 3 - Four levels of the Analytical Hierarchical Process designed for this research



Source: Author's hierarchy design

When considering which projects to follow, and which alternative should be chosen, there is a constant desire for clear, objective and mathematical criteria (Abdel-Basset et al., 2017). However, the decision-making process is, in its entirety, a cognitive and mental process that comes from a choice based on tangible and intangible criteria (Saaty & Vargas, 2018), arbitrarily chosen by decision-makers. Given any specific situation, making the right decisions is probably one of the most difficult challenges in the field of science, technology, or business (Khan et al., 2014).

Results and Discussion

After the pairwise prioritization by the respondents, the averages of their responses were rounded to the nearest absolute values for the Saaty scale (1, 3, 5, 7 or 9) and entered in a previously created Microsoft Excel spreadsheet, also designed by authors using the Saaty's model for alternatives selection in a multi-criteria environment. Therefore, the local weights of the criteria in Level 2 were obtained. The Economic factor got the highest weight because the respondents gave it the most significance

relative to other criteria. This seems logical given the fact that the goal is choosing the investment strategy for the next thirty years, which must be profitable. Below (*Table 3.*) we can see weights of the factors at Level 2 of the hierarchy.

Table 3 - Local weights of the factors at the Level 2 of the hierarchy

CRITERIA	Economic Factors	Ecological Factors	Social Factors	Techn. Factors	Risk Factors		
Economic Factors	1.000	9.000	7.000	5.000	3.000		
Ecological Factors	0.111	1.000	0.333	1.000	0.333		
Social Factors	0.140	3.000	1.000	0.333	0.333		
Techn. Factors	0.200	1.000	3.000	1.000	0.333		
Risk Factors	0.333	3.000	3.000	3.000	1.000		
SUM	1.784	17.000	14.333	10.333	3.999		
CRITERIA	Economic Factors	Ecological Factors	Social Factors	Techn. Factors	Risk Factors	Local Weight	Consistency
Economic Factors	0.561	0.529	0.488	0.484	0.750	0.562	5.317
Ecological Factors	0.062	0.059	0.023	0.097	0.083	0.065	5.285
Social Factors	0.078	0.176	0.070	0.032	0.083	0.088	5.370
Techn. Factors	0.112	0.059	0.209	0.097	0.083	0.112	5.601
Risk Factors	0.187	0.176	0.209	0.290	0.250	0.223	5.413
SUM	1.000	1.000	1.000	1.000	1.000		
Consistency Index CI	0.099						
Random Index RI	1.12						
CONSISTENCY RATIO CR	0.089						

Source: *Author's calculations*

From the table above we see that the Economic factors with 0.562 have the highest value among the other factors at Level 2 of the hierarchy. Next, there are Risk factors with 0.223, then the Technological factors with 0.112, Social factors with 0.088 and finally, Ecological factors with 0.065. The degree of consistency is below 10%, or less than 0.10, making this prioritization consistent and credible.

After prioritizing the criteria at Level 2, we conducted the prioritization for all the sub-criteria at Level 3 of the hierarchy. Obtained priorities – the local weight of sub-criteria, then had to be compared with the weight of the criteria from the level above in the hierarchy. Multiplying those two weights does this. The reason for that is the need to obtain the global weight of the sub-criteria (sub-factors), in order to determine the significance of each sub-criterion relative to other sub-criteria in the hierarchy, so they could be properly ranked. The global weights of the sub-criteria, or their overall significance in the hierarchy, are shown below in (*Table 4.*).

In the following table (*Table 4.*), we can also see that the sub-factor Net Present Value has the highest global weight of 0.408. This means that in the overall analytical hierarchy process, this decision-making attribute should have the most influence on

the final choice of the alternative. Also, given its more pronounced global weight in relation to all other sub-factors, the method of calculating the Net Present Value for each alternative had to be included in this research. By practicing the multidisciplinary approach to this research, the authors have provided the verification for the results and quantitatively confirmed the justification of the alternative selection using the Analytical Hierarchical Process.

Table 4 - Total weight of sub-factors at the Level 3 of the hierarchy

CRITERIA	WEIGHT OF THE CRITERIA	SUB-CRITERIA	LOCAL WEIGHT OF THE SUB-CRITERIA	GLOBAL WEIGHT OF THE SUB-CRITERIA
ECONOMIC FACTORS	0.562	Net Present Value	0.725	0.408
		Production subsidies	0.081	0.046
		Possibility of export to foreign markets	0.194	0.109
ECOLOGICAL FACTORS	0.065	Impact on water and air quality	0.255	0.017
		Impact on the environment	0.107	0.007
		Land preservation	0.638	0.041
SOCIAL FACTORS	0.088	Accessibility of arable land	0.193	0.017
		Possibility of educating farmers	0.083	0.007
		Increasing the number of young farmers	0.724	0.064
TECHNOLOGICAL FACTORS	0.112	Increasing the degree of mechanization	0.656	0.073
		Complexity of land treatment procedures	0.158	0.018
		The possibility of hiring a larger workforce	0.187	0.021
RISK FACTORS	0.223	Economic and political risk	0.714	0.159
		Hail	0.143	0.032
		Frost	0.143	0.032

Source: Author's calculations

The next step in this process was to analyze each of the alternatives from Level 4 of the hierarchy (*Figure 3.*). This had to be done through the lens of all fifteen sub-criteria from Level 3. In this sense, local weights of alternatives were first determined, and then compared with the global weights of all sub-factors from Level 3. Multiplying local values of alternatives with global values of each sub-factor, we obtained the global weights of alternatives in relation to all sub-factors at the Level 3 of the hierarchy.

After the summation of the alternative's global weights, the result suggested that the Alternative 2 was the better choice (*Table 5.*). The second alternative has a significantly higher weight than the first one, and accordingly, it can be concluded that in the Republic of Serbia, based on the prioritization by interviewed experts, raising the

perennial plantations is a far more profitable investment for farmers than the classic crop production. Below (*Table 5.*) we can see that the Alternative 2 have 0.670 total weights, and Alternative 1 have 0.380 total weights.

Table 5 - Global weights of alternatives at the Level 4 of the hierarchy

CRITERIA	WEIGHT OF THE CRITERIA	SUB-CRITERIA	LOCAL WEIGHT OF THE SUB-CRITERIA	GLOBAL WEIGHT OF THE SUB-CRITERIA	ALT. 1 CLASSIC CROP PRODUCT. GLOBAL WEIGHT	ALT. 2 RAISING PERENN. CROPS GLOBAL WEIGHT
ECONOMIC FACTORS	0.562	Net Present Value	0.725	0.408	0.051	0.357
		Product. subsidies	0.081	0.046	0.011	0.034
		Poss. of export to foreign markets	0.194	0.109	0.027	0.082
ECO. FACTORS	0.065	Impact on water and air quality	0.255	0.017	0.008	0.008
		Impact on the environment	0.107	0.007	0.003	0.003
		Land preservation	0.638	0.041	0.010	0.031
SOCIAL FACTORS	0.088	Accessibility of arable land	0.193	0.017	0.013	0.004
		Possibility of educating farmers	0.083	0.007	0.002	0.005
		Increasing the No.of young farmers	0.724	0.064	0.016	0.048
TECHN. FACTORS	0.112	Increasing the degree of mech.	0.656	0.073	0.055	0.018
		Complexity of land treatment	0.158	0.018	0.013	0.004
		Possibility of hiring a larger w.f.	0.187	0.021	0.016	0.005
RISK FACTORS	0.223	Economic and political risk	0.714	0.159	0.133	0.027
		Hail	0.143	0.032	0.016	0.016
		Frost	0.143	0.032	0.005	0.027
				SUM	0.380	0.670
				CHOICE		X

Source: *Author's calculations*

It has been previously noted that the Economic factors from Level 2 of the AHP hierarchy was given the highest weight by expert's prioritization. That means they were given the highest significance in relation to other criteria. Consequently, the sub-factor of Net Present Value was given the most significance, largely because it can be the best predictor of the cost-effectiveness of a long-term investment. For this reason, Net Present Value calculations were carried for each of the alternatives, for a period of thirty years, on an area of 10 hectares.

Classic crop production is analyzed in a single case. It starts with the assumption that the land is in the ownership of the agricultural producer itself, and that the sowing will be done using the crop rotation system – maize, then the soybean and wheat, and that the farmer himself will acquire the necessary machinery for the basic land cultivation. Following example will reflect the true state of the agricultural production on small farms in the Republic of Serbia.

Total annual costs for the investments in production of maize on 10 hectares amounts roughly to **665.000 RSD**, then, **645.000 RSD** for soybean and **372.000 RSD** for the wheat. These costs include all the material costs along with the costs of sowing and cultivation. Agricultural producers need to have machinery for the cultivation, and most of them do. Mechanization is very old in the Republic of Serbia, where most of the machines are inherited. It has been calculated that the cost of procurement of such machinery for a period of 30 years amounts to **2.160.000 RSD**, while the cost of maintenance for the dilapidated machinery during the period of exploitation is **1.153.843 RSD**. Purchase prices for crop yields were calculated based on the average and the trend of the purchase prices over the period of past 7 years - maize 16 RSD / kg, wheat 17 RSD / kg and soybean 40 RSD / kg, and the yields per hectare have been calculated according to the yields trend in the Republic of Serbia.

In order to calculate the Net Present Value, Net Income was discounted at a rate of 8% for a period of thirty years. Then, the initial investment in procurement and the maintenance of mechanization was deducted. Total discounted value of the Net Income during the period of exploitation of maize, soybean, and wheat was **7.587.238 RSD**, and initial investment in procurement and the maintenance of mechanization of **3.313.843 RSD** was then deducted. By subtracting these two values we've got the Net Present Value. Since the difference between these two values is positive, the investment is justified.

$$\text{NPV} = 7.587.238 \text{ RSD} - 3.313.843 \text{ RSD} = 4.273.395 \text{ RSD}$$

Second alternative –the investment in raising perennial plantations was analyzed in detail for each plant because of the need for selection of one of the sub-alternatives - walnut, hazelnut or apple. The analysis also began with the assumption that the agricultural holding owns 10 hectares of land. It also included all investment costs on one side, and all revenues on the other side, for a period of thirty years. Below are calculations for obtaining the Net Present Value for each plant. The final results are presented within the table of the Net Present Value for all alternatives and sub-alternatives latter in the conclusion (*Table 6.*).

As with every perennial plantation, walnut plantations also need large investments. It is necessary to pass five to six years for the perennial planting of walnuts to achieve full fertility. For this reason, ratio of the investment and the waiting period for full fertility is longer than with apple, apricot, peach, and other fruit species. Contrary to this deficiency, the exploitation period of this fruit is up to two times longer than the above-mentioned species. In order to protect such large investment, it is necessary to properly fence the plantation and preserve it in the ripening period. After initial investment, and a waiting period of five years, a period of full fertility begins in the 6th year. In this period, financial investments are also very high and include the cost of materials, services and labor costs. Total costs of production of walnuts on 10 hectares of land for a period of 30 years of full exploitation is **32.637.000 RSD**.

Net result is calculated by deducting the costs of regular production from the total revenues for a given year. Purchase price was set to 230 RSD / kg (price of the walnuts in a shell). This price was calculated based on a trend of movement of walnut prices in a period from 2005 to 2016. It should be emphasized that there are three periods of fertility: the period of early fertility, the period of full fertility and the period of declining fertility. The yield of the genus depends directly on the period of fertility.

Total discounted value for Net Income obtained during the period of exploitation of walnut is **50.705.437 RSD**. Initial investment of **15.094.804 RSD** was then deducted. By subtracting these two values, the Net Present Value was obtained. Since the difference was positive, the investment is fully justified. The amount of NPV for walnut could even be higher, but for this case, the period of exploitation was calculated for 30 years, although it is known that plantations of walnut could be exploited for up to 50 years.

$$\text{NPV} = 50.705.437,08 \text{ RSD} - 15.094.804 \text{ RSD} = 35.610.633,08 \text{ RSD}$$

Same calculations were carried for perennial plantations of hazelnut. Total discounted value for Net Incomes during the period of hazelnut exploitation was **45.054.196 RSD**. After the subtraction of the initial investment prior to the period of exploitation, which amounts to **14.927.306 RSD**, Net Present Value for the production of hazelnut for a period of 30 years was **30.126.890 RSD**.

$$\text{NPV} = 45.054.196,46 \text{ RSD} - 14.927.306 \text{ RSD} = 30.126.890,46 \text{ RSD}$$

When it comes to the production of apples for a period of 25 years, Net Present Value was obtained in the following way. Total discounted value for Net Incomes during the period of apple exploitation amounts to **140.435.093 RSD**. Initial investment that amounts to **52.948.101 RSD** was then deducted. Subtracting these two values, Net Present Value result was obtained, and was by far the highest among all the other sub-alternatives. Investment in apples was not only justified, but also desirable, since the Net Present Value was **87.486.992,01 RSD**.

$$\text{NPV} = 140.435.093,01 \text{ RSD} - 52.948.101 \text{ RSD} = 87.486.992,01 \text{ RSD}$$

AHP prioritization pointed that the second alternative - raising the perennial plantations - was a better choice. The analysis for the Net Present Value has enabled the quantification of AHP method's priorities and additionally contributed to the decision-making process of choosing the best long-term investment strategy. The following table (Table 6.) shows the Net Present Values of both the first alternative - raising annual plantations of maize, soybean, and wheat in a crop rotation, and the second alternative - raising perennial plantations of walnuts, hazelnuts or apples. So, Analytic Hierarchy Method provided the base for choosing the best alternative, and the Net Present Value method helped additionally in the process of choosing the best sub-alternative.

Table 6 - Ranking of the Net Present Values for all sub-alternatives involved in this research

Alternatives	Culture	Initial Investments	Discounted Incomes	Net Present Value (NPV)	Ranking according to NPV
Alternative 1	Classic crop production	3.313.843	7.587.238	4.273.395	4.
Alternative 2	Walnut	15.094.804	50.705.437	35.610.633	2.
	Hazelnut	14.927.306	45.054.196	30.126.890	3.
	Apple	52.948.101	140.435.093	87.486.882	1.

Source: Author's calculations

Conclusion

The results have shown that the AHP prioritizing in the multi-criteria decision-making process, regarding the choice of the investment strategy in an agricultural production could clear many doubts when deciding upon alternatives for a period of 30 years. Interviewed experts gave the most significance to Economic factors of the investment, and to the Net Present Value as a sub-factor, so authors decided to use AHP-NPV method to choose the best investment alternative.

Calculations have shown (Table 6.) that all three sub-alternatives of the second alternative have significantly higher Net Present Values than the classic crop production. However, classic crop production carries a lower risk of investment as well as far lower initial investment. If an agricultural holding does not have the ability to raise a loan or access funds for greater initial investment, it will not be able to think about and calculate second alternative. Furthermore, in addition to Financial factors, there are many other factors that can influence the final decision, such as the type of land, the climate and the location of the land, the proximity of roads, etc. The choice of sub-alternative could also become a new goal for the next AHP prioritization process.

This research has proven that the application of AHP method in the decision-making process regarding long-term investments in an agricultural multi-criteria environment is not only possible but also desirable. Combined method that involve experts and collect their opinions into a system where their preferences are quantified, and where their

subjective opinions become objective values, clarifies the decision-making process, turning it into indispensable tool in an agricultural production. The creation of such AHP-NPV hybrid method in order to facilitate investment decisions in agriculture is also a great scientific contribution of this research.

Acknowledgements

Authors would like to thank The Department for Agriculture of the city administration of Sombor, the local agricultural producers, university professors of the agricultural faculty that participated as interviewers in this research, and agricultural engineers from The Ministry of Agriculture of the Republic of Serbia, for facilitating the creation of the AHP hierarchy.

Conflict of interests

The authors declare no conflict of interest.

References

1. Abdel-Basset, M., Mohamed, M., Zhou, Y., & Hezam, I. (2017). Multi-criteria group decision-making based on neutrosophic analytic hierarchy process. *Journal of Intelligent & Fuzzy Systems*, 33(6), 4055-4066.
2. Das, D., & Saha, A. (2016). *Analytical hierarchy process based supplier selection methodology: a framework and application*. *International Journal of Reliability and Safety*, 10(2), 125-144.
3. Islam, M. A. (2012). *Agricultural adaptation to climate change: Issues for developing countries*. *ABC Journals*, 30.
4. Julian, J.W. (2011). *AgProfit™: a net present value and cash flow based decision aid for agriculture producers*, *Agricultural Finance Review*, Vol. 71 Issue: 3, pp.366-378
5. Khan, S., Dulloo, A. B., & Verma, M. (2014). *Adaptation of the AHP as Multi-Criteria Decision Making Approach and Testing the Original AHP over Two Evaluative Criteria*. *International Journal of Scientific & Engineering Research*, 5(6), 963-968.
6. Njegomir, V. & Demko-Rihter, J. (2018) *The problem of the demand for crop insurance: The case of Serbia*, *Ekonomika poljoprivrede*, 2018, vol. 65, iss. 3, pp. 995-1014
7. Petruni, A., Giagloglou, E., Douglas, E., Geng, J., Leva, M. C., & Demichela, M. (2017). Applying Analytic Hierarchy Process (AHP) to choose a human factors technique: Choosing the suitable Human Reliability Analysis technique for the automotive industry. *Safety Science*.
8. Reddy, P. P. (2016). *Sustainable intensification of crop production*. Springer, Singapore

9. Reynolds, M.P. (2017). *Climate Change and Crop Production*, CABI Publishing, Wallingford, United Kingdom
10. Saaty, T. L., & Vargas, L. (2018). *Decision Making with the Analytic Hierarchy Process*. 2008. Int. J. Services Sciences
11. Saaty, T.L., (2016) *The analytic hierarchy and analytic network processes for the measurement of intangible criteria and for decision-making*. Multiple criteria decision analysis (pp. 363-419). Springer, New York, NY.
12. Šoškić M., (2018), *Walnut and hazelnut*, Parthenon, Belgrade [in Serbian: *Orah i leska*, Partenon, Beograd]
13. Stefanović L., Simić M., Šinžar B. (2011). *Control of weeds in maize agroecosystem*, Corn Institute ZemunPolje, Belgrade [in Serbian: *Kontrola korova u agroekosistemu kukuruza*, Institut zakukuruz Zemun Polje, Beograd]
14. Tuzmen, S. & Sipahi, S. (2011). *A multi criteria factor evaluation model for gas station site selection*. Journal of Global Management. 2. 12-21.
15. Vargas, L. G. (2017), *The Legacy Of The Analytic Hierarchy/Network Process*. International Journal of the Analytic Hierarchy Process, 9(3).
16. Živković, Ž. i Nikolić, Đ. (2016). *Fundamentals of Strategic Management School of Mathematics*, University of Belgrade, Technical Faculty in Bor[in Serbian: *Osnove matematičke škole strategijsko gmenadžmenta*, Univerzitet u Beogradu, Tehničkifakultet u Boru]
17. Zyoud, S. H., Kaufmann, L. G., Shaheen, H., Samhan, S., & Fuchs-Hanusch, D. (2016). *A framework for water loss management in developing countries under fuzzy environment: Integration of Fuzzy AHP with Fuzzy TOPSIS*. Expert Systems with Applications, 61, 86-105.

CONSIDERING ECOLOGICALLY SUSTAINABLE PACKAGING DURING DECISION-MAKING WHILE BUYING FOOD PRODUCTS

Kristina Petljak¹, Dora Naletina², Kristina Bilogrević³

*Corresponding author E-mail: kpetljak@efzg.hr

ARTICLE INFO

Original Article

Received: 06 March 2019

Accepted: 20 March 2019

doi:10.5937/ekoPolj1901107P

UDC 502.14:658.8

Keywords:

ecologically sustainable packaging, food products, green consumer behaviour, recycling, Croatia

JEL: L81, D12

ABSTRACT

Modern production of packaging is characterized by great choice of packaging materials and the shape of the packaging. There is almost no product on the market that does not have highlighted symbols that should give information about the product and the packaging. Although most consumers pay attention to the symbols, a certain number never checks them, because they consider them irrelevant. The paper investigates consumer perception of the importance of green packaging of food products. A primary research on the sample of 115 respondents has been carried out investigating respondents' behaviour while making the choice on food product packaging. The findings suggest that concern for the environment and less danger for health are two major motives for buying food products in ecologically sustainable packaging. The respondents think that wood and paper have least influence on the environment, while plastic and glass harm the environment the most.

© 2019 EA. All rights reserved.

Introduction

History of packaging began in the times when people used materials from nature for transporting food, through trade and industry development, when the need for better ways of protection and transport of goods emerged, until today when packaging is everywhere in modern society to such extent that it represents a threat to the environment. Packaging protects the goods from mechanical, climate, chemical and micro-biological influences, but it also protects the surroundings from potentially harmful goods. With its shape, texture, graphical solutions and identification it communicates with the consumer. Besides that, it must enable simple use and be attractive and modern at the same time.

-
- 1 Kristina Petljak, PhD, Assistant Professor at Department of Trade and International Business, Faculty of Economics and Business, University of Zagreb, J.F. Kennedy 6, 10000 Zagreb, Republic of Croatia, 0038512383376, kpetljak@efzg.hr, ORCID ID: 0000-0002-5785-1928
 - 2 Dora Naletina, PhD, Assistant Professor at Department of Trade and International Business, Faculty of Economics and Business, University of Zagreb, J.F. Kennedy 6, 10000 Zagreb, Republic of Croatia, 0038512383384, dora.naletina@efzg.hr, ORCID ID: 0000-0002-6275-7039
 - 3 Kristina Bilogrević, VELUX Hrvatska Ltd., Customer service consultant, kristinacavic@gmail.com
- <http://ea.bg.ac.rs>

Packaging materials and their waste have numerous damaging influences on the environment. Some of those influences relate to the very process of packaging production, collecting the packaging waste and its subsequent disposal and management. Next to traditional packaging materials, today, there is a focus shift on biodegradable materials manufactured from renewable raw materials that are easily broken down under the influence of the factors from the surroundings. Over the last years, there is a trend of developing biodegradable packaging that can meet all the needs of the product regarding the preservation of its quality and it can reduce pollution at the same time. This paper investigates consumer perception on the importance of eco-friendly packaging of food products. For the purpose of the paper, an online research has been conducted regarding ecologically sustainable packaging and purchase frequency of food products in eco-friendly packaging. The research instrument was a questionnaire, and the research has tried to answer the following research questions (RQs):

RQ1: What are the motives for buying products in ecologically sustainable packaging?

RQ2: To what extent are the respondents ready to pay extra for a food product in eco-friendly packaging?

The research results will enable better understanding of consumer habits regarding purchases of products in eco-friendly packaging and environmental care.

Materials and methods

Introduction into the packaging

Defining packaging is complex due to its multiple purposes, but generally, it can be said that packaging suggests containers of different shapes and sizes made of packaging materials in the narrow sense, in which any type of goods or victuals is packaged, transported, stored or sold (Vujković et al., 2007). Article 4 of the Regulation on Packaging and Packaging Waste (Official Gazette, 88/2015) defines packaging and packaging waste as follows:

„Package is any type of product, regardless of the material it is made of, used for containing, protection, handling, delivery and presentation of the goods from raw materials to finished products, from manufacturers to consumers. Packaging is also any type of irretrievable items intended for the manufacture of the packaging that will be used for the above-mentioned purposes, as well as additional resources for packing used for wrapping of binding goods, packaging, sealing, preparation for shipment and labelling.” Packaging material is any type of material packaging is manufactured from, like: glass, plastic, paper, cardboard, wood, metal, composit mixed material and other materials.”

Packging can be defined from different aspects (Andrijanić et al., 2012):

- from the manufacturing aspect, packging is something the product is placed in

for the purpose of preserving it during the transport, storage and usage,

- from the aspect of preservation, packaging prevents the product spillage, protects it from the environmental effects, theft etc.,
- from the aspect of construction, packaging needs to be functional, simple, attractive; it has to comply with the modern taste and wishes of the consumers, shape and representation mode,
- from the aspect of cost-effectiveness, packaging is “sufficient packing” that, with minimal costs, preserves and represents the product.

In his book, Rodin (1977) defines packaging:

“A packaging prepares the product – from the moment of the manufacture to the consumption – for its delivery to the buyer-consumer; the way it is manufactured, in different conditions of transport, warehousing, handling, distribution and its presentation on the sales place, so the product in the packaging is best preserved from all external and internal influences.”

In order to correctly protect a food product, i.e. to be safely transported, stored and delivered to the final consumer, it must be packed in appropriate packaging (Jamnicki, 2011). From the aspect of packaging, a product can be considered a product only if it is delivered to the consumer correctly. This mission lies on the packaging and distribution conditions of the product. Only then will the product have its value, not just the nominal, set by the price, but the actual value, the practical and useful one, assigned by the manufacturer and realized by the consumer (Rodin, 1984). One of the functions of food packaging is also to pack food in the way that is most cost-effective, but also to satisfy conditions of food industry and consumers, as it has to keep food safe and minimize external influences on the stability of the packed content (Marsh and Bugusu, 2007). On their way from the producer to the consumer, goods are exposed to many influences that can more or less damage them, and the packaging should protect the goods as much as possible on this way to reach the consumers undamaged and unspoiled. Packaging has to protect the goods from many mechanical stresses, physical and chemical impacts, microorganisms and insects, atmospheric influences, and additionally, prevent the loss of goods or any of its components (Andrijanić et al., 2012). Most common damages that occur on the packaging and products happen because of the influence of (Rodin, 1977): (1) heat: spoilage, putrefaction, evaporization and drying out; (2) cold: freezing, crystallization and cracking; (3) water and water vapors: spoilage, corrosion, blistering and thawing; (4) pressure: breaking and cracking. There is also the function of protection from the influence of the oxygen – oxidation effects manifest in different ways, most often oxygen changes (spoil) the colour, taste or odour. Certain victuals, especially sensitive to oxidation, can be packed in the way that air is partly extracted, and such a packaging is called vacuum packing. The other possibility for protection from the influence of the oxygen is packing in a modified atmosphere. In this case, carbon dioxide or nitrogen is injected in the packaging. They are inert in relation to the

packed victual (Vujković et al., 2007). In general, composite packaging materials with good barrier properties are used for vacuum packing (Lazić et al., 2008).

Packaging is also required to protect the product from the moisture from the environment, which means that the share of moisture in the packed product should not rise nor fall. Should it vary, it could lead to undesirable changes of the packed goods (Vujković et al., 2007). Some packaging materials, like metal, glass and minerals will get moist only on the surface, and if they are exposed to air of relatively low moisture, it will dry completely (Stipanelov Vrandečić, 2010). Foods are divided into easily perishable (meat, milk, vegetable) and microbiologically stable. Packaging protects the content while the product moves through the marketing channel and when the product is used. Packaging also prolongs the shelf life of the product, which is important to manufacturers as well as final users (Abdalkrimi AL-Hrezat, 2013).

Some raw materials, auxiliary materials, semi-finished products and almost all finished goods are stored and transported in the appropriate packaging. Packaging with well-executed *storage-transport functions* enables rational use of warehousing and transporting space and realization of these functions depends on the shape and dimensions of the packaging and its compatibility with the dimensions of the packed goods (Stipanelov Vrandečić, 2010). Shape and dimensions of the packaging should be adjusted to the dimensions of the goods because otherwise, storage facility space or the space of the transporting vehicle will not be fully used. Goods that are without shape, pastes and goods that can be disseminated or spilled, take the form of the packaging, so the volume of the packaging should be in line with the amount of the packed goods. If the goods have a stable shape, dimensions and shape of the packaging have to be adjusted to the dimensions and shape of the goods (Andrijanović et al., 2012). The space inside the transporting packaging and the space in the warehouse or the vehicle can be also used with the packaging in the shape of a cuboid. The stability of the stacked goods is increased considerably by crossing and binding the transported units during the stacking. If the goods are stacked on palettes during the transport, dimensions of the packaging should be fitted to the dimensions of the palettes in order to use the size of the palette as better as possible (Vujković et al., 2007). For the optimization of storage-transport function the packaging is labelled with graphical elements to make handling and register of the goods easier (Andrijanović et al., 2012).

Today, when it is possible to manufacture any kind of product in any amount, the problem is to market the product, i.e. to sell it, and the packaging plays here a very important role. When we talk about *the packaging sales value*, it mostly relates to sales packaging (Vujković et al., 2007). Sales packaging rationalizes the sales. It means that the amount of goods that matches consumer needs is packed and what amount of goods will be packed in a sales packaging unit depends on the type of goods, usage, durability, purchasing power etc. Packaging that has a well-realized sales function increases the sales scope. It has to attract the attention of the buyers, spark their interest in a very short time, convey a message and encourage them to buy, so the buyer is actually more ready to pay for reasons of the image, persuasion and reliability of the better packaging.

Since it is the packaging that has replaced the role of the trader in modern stores, it should contain all information that the buyer used to receive from the sales person. All necessary information should be displayed on the packaging: information about the manufacturer, the origin, content, shelf life and instruction for use, date of manufacture and the preservation instructions. Sales packaging also has to guarantee the quality and the amount of the packed goods, i.e. it has to guarantee that no one before the consumer has opened the packaging, that it is undamaged and that inside, there is the amount stated on the label (Stipanelov Vrandečić, 2010).

Usage function of the packaging becomes important when the product is used and in the period after that (Vujković et al., 2007). Packaging that has a well-realized usage function should enable easy opening, preparation for use, taking the required amount of the product without spilling it and resealing it if the product is not to be used at once (Stipanelov Vrandečić, 2010). If necessary, specific message should be printed on the packaging informing the consumer about how to open and consumate the product and what to do with the packaging. Packaging should be easy to open and safe to handle without the danger of injury (Vujković et al., 2007). For the products that are not completely used after they are opened, the packaging should have the possibility to be sealed again to preserve the quality of the food until fully consumed (Robertson, 2016). The packaging should be suitable and easy to handle, and user-friendly packaging should be eco-friendly as well (Molina-Besch and Pålsson, 2016). Packaging material and the shape of the packaging are crucial for the way it is opened. It can be opened by a smaller or larger tearing, partially or completely deforming the lid or without tearing nor deforming. The usage function should aim at enabling its reuse, be it for recycling, decorative purposes, containers or other ways useful to the consumer (Vujković et al., 2007).

Ecological function of the packaging has been imposed over the last twenty years as the consequence of environmental care and can be realized in different ways: packaging made out of different eco-friendly materials, recycling, reducing the number of wrapping packagings per product unit, selling more units in a single packaging, using biodegradable materials and edible packaging for food products (Stipanelov Vrandečić, 2010). Today, ecological aspect of packaging is considered even more important than the economic one. This fact benefits the packaging materials based on cellulose since they could be replaced with afforestation of the used resource and are very suitable for recycling. These advantages lead to the increased use of packaging materials based on paper and cardboard (Jamnicki, 2011).

The term of eco-sustainable packaging defines the criteria evaluating the influence of used and discarded packaging on the environment. The dominant place is occupied by the biodegradability criterion. In addition, there are other criteria: recycling possibility, reprocessing, energy production and pollution. There is commonly accepted understanding that most eco-friendly are paper, cardboard and wood packaging because they can be degraded in natural conditions and the products do not harm the environment. Glass and metal packaging materials are also satisfactory; glass because it is, for the most part, made out of natural mineral raw materials, and metal because,

under the influence of the elements, iron and aluminium oxides are produced, which are compounds found in soil (Vujković et al., 2007).

Packaging needs to meet three basic requirements regarding environmental protection (Ščedrov and Muratti, 2008):

- reduction of packaging and not using the packaging altogether, without endangering the product,
- reuse and multi-use of the packaging and
- choice of material for the packaging that is eco-friendly (possibly biodegradable and without harmful substances).

One of the ways in which environment could be better preserved is the use of fewer materials and reduction of the size, thickness and the weight as much as possible. In the last 30 years, packaging industry has made an enormous advance in reduction of the weight of the packaging. Jars and tins are lighter by the third than they were in the 1980s. Reducing packaging means reducing the necessary amount of material and less energy is consumed for the production and transport of lighter packaging. Reuse is one other way for caring about the environment. Returnable packaging has to be made of stronger materials than packaging intended to be used once. There is the question of safety and pollution. To establish whether the reuse of the packaging is useful, an analysis of the entire life cycle of the product needs to be conducted. The use of the material with recycled content reduces resource and energy consumption used in production. Also, the market for waste material is created, which makes recycling sustainable. Technologically, it is possible to recycle all types of packaging materials, but to be sustainable, recycling needs to be economically attractive, too (Unilever, 2009).

Since the beginning of the 1970s until today, many international agreements on environmental protection have been signed. In the era of general raise of awareness on the need for environmental protection that began at the end of the 1960s and the beginning of the 1970s, in 1972, the United Nations organized the Conference on Human Environment in Stockholm. The conference was held from 5 June to 16 June 1972, with the participation of the representatives from 113 countries and numerous international organizations, being up to that point the largest UN conference ever. The term “sustainable development” has been since then highlighted in the report made by the UN World Commission on Environment under the title “Our common future” in 1987, becoming the basic framework of the new global international ecological policy. The UN Conference on Environment held in 1992 in Rio de Janeiro is considered the turning point of global ecological policy (Afrić, 2002). The exact time when green packaging began putrefaction recycled into new plastic packaging. Packaging made out of natural materials goes back to the day when hunters and collectors used animal skin, tree bark and leaves. Three decades ago, packaging was just “packing”. It was the means to achieve the goal; it was the container that enabled people to transport food and drinks from one place to another. It was a functional and practical item. Now,

of course, the situation is completely different. Modern packaging industry is under enormous pressure to constantly develop and to satisfy new standards of environmental protection (The Manufacturer, 2014). Different possibilities of green packaging are becoming more popular because people have started to recognize the issues the world is facing. It has led to the increased ecological awareness regarding the packaging manufacture. The result is packaging that can be recycled and is made out of recycled materials. The use of packaging for packing food products is increasing constantly, and the reasons are: the growing distance between the point of production and the point of consumption, more processing phases and prolongation of the shelf life of the product, raising the life standard and the growing number of the total consumers of the product. Discarded packaging appears as waste in industry and stores and it is a part of domestic waste. Parallel to the development of packaging industry and more packaging found in our daily routine, there arises the issue of packaging treatment after the use of the product. Negative influence on the environment can be prevented with the use of biodegradable packaging. The name itself implies that it is manufactured from materials that can be degradable under certain conditions. This process of decomposition takes place in natural conditions when packaging becomes waste. It can happen under the influence of moisture, electromagnetic radiation, oxygen, biological influence, and there is also compostable packaging that decomposes after specific amount of time due to chemical and physical changes in the structure without the influence of external factors (Vujković et al., 2007).

Today, development and commercial manufacture of biodegradable packaging, besides paper, is directed towards other sustainable sources of vegetable origin (corn, soy, sugar beet etc.), i.e. the production of biopolymers. Development of products from sustainable resources, besides the reduced negative influence on the environment, has the additional advantage in the reduction of energy consumption for their production (Tokić et al., 2011).

Recycling is a relatively old term. Metals have been recycled since they were discovered due to their high value, rarity and properties that enable almost constant reprocessing. Recycling of the textiles also has a long history since old textile was used for paper manufacture (Chiellini, 2008). Used and discarded packaging is very valuable secondary material that can be used again as material, in chemical and energy recycling (Stipanelov Vrandečić, 2010). Turning waste into new raw material is the true essence of green economy and sustainable development. Everything can be reused, recycled or composted; it is just a matter of the process of sorting out and good waste management (Bortek, 2014). The first step in the recycling process is sorting out different types of packaging materials. Paper packaging is raw material for the manufacture of lower quality paper, while textile is a valuable material used for the production of the best quality paper. Expensive and sought-after tin (pewter) is separated from discarded white tin cans and the leftover iron tin is used in the manufacture of steel. Aluminium cans are used for aluminium regeneration. Glass represents a very valuable packaging material because glass can be recycled over and over again without the quality being affected. Wooden packaging can be reused for energy as cheap solid fuel. Polymers can be reused as

material, energy or chemical agents. Regarding plastic, the first issue is the heterogeneity of the secondary waste, i.e. plastic is mixed with other types of waste or there are many types of plastics mixed together, and secondly, it is often manufactured from more than one type of polymers or as a composite material (Stipanelov Vrandečić, 2010).

When there is no economic benefit from the reuse of packaging waste, discarded packaging can provide energy by burning. Energy can be generated from different waste materials: paper, cardboard, wood, polymers, composites and other materials. For generating energy, raw materials and the energy for their production are consumed, but the process is justified because in this way the mass for landfills is reduced. The equipment for generating energy by burning waste is technically so designed that the losses of energy are minimal and the protection of the environment is maximized regarding possible air and water pollution (Vujković et al., 2007).

Consumers make ecological choice when they, between otherwise similar products, pick the one with environmental protection label. This way they send a clear message to the manufacturers they will buy only the products that do not influence the environment. For consumer goods, acceptable price and proved quality are not enough to find their way to the buyers. Rising ecological awareness has put before the manufacturers the condition that they should offer products that satisfy high ecological standards. Ecological acceptability has become “added value” of the product (Imamović et al., 2009). In order to reduce the labelling confusion and the labels and signs on the product could be read and applied properly, there has to be an agreement about the sign: what it should look like, that it should not have multiple meanings, there should not be more signs conveying the same message etc. The purpose of the labels is to convey some kind of message about the product (e.g. it is dangerous or heavy), the instructions how to handle it during transportation, how to store it, use it or other information; labels need to be clear, homogeneous, understandable and visible because only then will they provide good, simple and clear information (Bačun, 2009).

Ecological labels are instruments of environmental protection that manufacturers and service providers use to show that they respect high standards of environmental protection during the life cycle of the product and the provided service. They are important in advocating international policy of sustainable production and consumption which aims at reducing negative effects of production and consumption on the environment, health, climate and natural resources and which encourages socially responsible business and sustainable life styles (Ministry of Environmental Protection and Energy, N/A). Mandatory change of the signs relates to the prescribed and normed signs. Mandatory application means that manufacturer that does not place the sign on the product and/or packaging can be punished or its product will not have free access to the specific market. There are regulations for specific signs regarding their looks and their use, but the application of the signs is not mandatory. The manufacturers decide whether they want to set in motion the procedure for the right to use the sign, and what its placement on the product means for them (Bačun, 2009).

Type I Eco Labels are used throughout the world, and organizations that assign these labels are mostly voluntary or governmental organizations. It indicates that the product is ecologically more acceptable than other products from the same category and the purpose is to encourage eco-friendly products purchases (Imamović et al., 2009). Type I eco designations have been developed by governmental or private non-commercial organizations. It is voluntary and the products or the production processes have to comply with several ecological provisions, i.e. the entire life cycle of the product has to be in line with ecological standards. Type I Eco Label (ISO standardization) is allocated to only those products that have completely met ecological criteria. Considering the strict selective principle of labelling, there is a limited number of products that can acquire this label (Stanković, 2012).

Type II Eco Labels are assigned by industrial associations or the companies themselves. It is the international standard called "self-declaration". This type of eco labels relate to one specific property of the selected product and not to the analysis of the entire life cycle. In a broad sense, ISO type II label can be in the form of a claim, symbol or label on the packaging. There are specific terms that have to be used, like: possibility of recycling, recycled content, reduced water consumption, less waste, sustainable sources of energy etc. (Stanković, 2012). The advantages of the application of these standards are evident not only in the area of higher environmental protection but they are also economically justifiable through better positioning of the product on the market, especially in international exchange. Since the application of the standards is voluntary and bearing in mind all the positive effects of their implementation, it is in companies' best interest to opt for the complete introduction of the labels and designations of environmental protection for all products (Simin et al., 2013).

Type III eco labels are voluntary programmes that provide quantified environmental data of products based on pre-set parameters. These parameters are assigned based on life cycle assessment by a qualified third party that provides data on the influences of the products on the living environment. Unlike ISO type I, this label does not imply such strict selection of products, but it is a much more complex type of eco label. ISO Type III is therefore firstly intended for the industry and not the consumers. More accurately, ISO Type III is most suitable for successful trading of raw materials, auxiliary materials and components among the companies and not the distribution of final products to the consumers (Budak et al., 2009).

It is important to point out that the basic purpose of a systematic packaging labelling is to give the right, unambiguous information about what material the packaging is manufactured from. This information is extremely important to those included in the process of sorting and managing packaging waste. Symbols have a dual purpose: to consumers, they mostly show that the packaging can be recycled and to those that are better informed it gives information about what type of plastic is used. Plastic bottles, containers and other packaging have one of the oldest and most elaborate systems for labelling (numeric label and abbreviation for plastic). For labelling plastic (polymeric) materials, numbers from 1 to 19 are reserved by the Regulation, however, only numeric labels from 1 to 6 are assigned letters of specific plastic polymeric materials (Bačun, 2009).

The process of recycling glass implies turning discarded glass into a useful product. The Regulation does not prescribe whether a sign or a part of a sign should be inside the triangle, whether the triangle should be used at all, if they should be placed and, if yes, where in relation to the circle etc. Glass can have different colours, but three most common are: colourless (transparent) glass, green and brown glass. Looking at these labels, the question arises as to what about the bottles that are blue or some other colour? Naturally, they should be disposed of in the container for waste glass (Bačun, 2009).

In practice, it is impossible to find wooden packaging with the label of material, which is logical, because it is not necessary to label the obvious. For that reason, most of cardboard packaging is also not labelled.

The overview of the existing research of eco-packaging of food products

Ricci et al. (2018) have conducted research with the aim of exploring of consumer intentions for buying eco-friendly convenience food. Primary data has been collected through face to face interviews with respondents in Milan (Italy). Results have confirmed that respondents are ready to buy food that has marked more eco-friendly attributes. It is confirmed that characteristics of products that remarked on it are crucial for consumer trust.

Prakash and Pathak (2017) have conducted primary research to explore the influence of ecodesigned packaging on the consumers' behaviour. In the survey it has participated 204 young consumers from India. Results of conducted research have indicated that consumers decision about buying product that is eco-designed packed depends on its personal norms, attitudes, concern about environment and finally with willingness to pay.

Jiménez-Guerrero et al. (2015) were analyzing innovations in eco-packaging in private labels. Packaging represents very important attribute of the product and especially for the private labels which are related to the products of lower price. Authors remarked that innovation in eco-packaging can be a source of competitive advantage as it can either influence on increase of sale or it can reduce costs.

Lindh et al. (2015) provided insight into consumers in Sweden and their perceptions regarding food packaging and environmental protection. The research on the packaging accentuates its protective function as the main contribution to environmental protection. Opposite to that, the consumers almost exclusively think how the material is the most important factor. Swedish people think that paper is eco-friendly, while metal and plastic are not.

Vlaeminck et al. (2014) were investigating perception of Belgian consumers about food labelling and eco-friendly consumption. As well they wanted to see how important if consumers visibility of informations about product's environmental impact. For the purpose of the paper they have conducted an online survey and results have confirmed that label with well marked informations about environmental impact stimulate consumers to buy that product.

Rahman et al. (2013) conducted research with aim of investigating the relationship between green elements of packaging and the eco-friendly packaging design. For the purpose of investigating the mentioned relationship, they have conducted primary research on 157 respondents in Malaysia. The results of the research have confirmed that four green elements (mainly green resources, carbon footprint, eco label and eco elements) are in relation with the eco-friendly packaging design, while it has not been confirmed significant relationship of eco-efficiency structure and eco-friendly packaging.

Cerf et al. (2011) investigated the influence of different levels of information of environmental protection on key consumer metrics. More precisely, they had a goal of comparing ecologically benign products with those having negative influence on the environment. The findings show that consumer perception on the quality of the product and their value does not considerably differ regarding the products with positive messages on environmental preservation and those without any message. Consumers think products with positive messages are better than those which have labels with negative messages regarding environmental protection.

Finisterra do Paco and Raposo (2010) investigated behaviour of individuals and their perceptions on green consumerism. The research encompassed 887 consumers in Portugal. The findings show how certain ecological and demographic variables are significant in distinguishing “green” consumer groups and other segments. Portuguese consumers, despite their support of the policies directed towards better environmental protection, do not always want to transfer their concerns into eco-friendly behaviour.

Research methodology

A primary and secondary research have been conducted for the purpose of this paper. The secondary research includes the analysis of the existing data, i.e. of the earlier research on the similar subjects. The primary research was conducted during September and October of 2016, with a questionnaire that was posted for the respondents online on www.facebook.com. The questionnaire comprised of 16 questions, 11 of them being closed-ended, 3 multiple choice questions and 2 questions with statements. The purpose of the research was to gain the best possible insight into the perception of the consumers on the importance of ecologically sustainable food product packaging.

Research sample

The respondents were men and women between 18 and 65, users of the Facebook social network. The respondents from all over Croatia participated in the research, belonging to various age groups and of different profiles. The sample consisted of 115 respondents.

Research results

The respondents answered questions regarding their age, monthly household income, region where they live, level of education and work status. The primary research sample structure and the display of sociodemographic characteristics of the respondents are displayed in Table 1.

Table 1. Sociodemographic characteristics of the respondents

		FREQUENCY
GENDER	Male	29 (25.2%)
	Female	86 (74.8%)
AGE	18 - 24	10 (8.7%)
	25 – 34	80 (69.6%)
	35 - 44	17 (14.8%)
	45 - 54	4 (3.5%)
	55 - 64	4 (3.5%)
	over 65	0 (0.0%)
MONTHLY INCOME OF HOUSEHOLD	≤ 1800 Kuna	5 (4.3%)
	1801 – 3500 Kuna	5 (4.3%)
	3501 – 5500 Kuna	13 (11.3%)
	5501 – 8000 Kuna	19 (16.5%)
	8001 – 11000 Kuna	29 (25.2%)
	over 11000 Kuna	44 (38.3%)
QUALIFICATIONS	No lower qualifications/no elementary education	2 (1.7%)
	Elementary education	0 (0.0%)
	Qualified (a three-year vocational school)	0 (0.0%)
	Highly qualified (four-year vocational school /gymnasium)	19 (16.5%)
	Higher or highest level of education	85 (73.9%)
	Master's/doctorate	9 (7.8%)
WORK STATUS	Employed; contract of indefinite duration	65 (56.5%)
	Employed; contract of definite duration	24 (20.9%)
	Part-time job	9 (7.8%)
	Working undeclared	1 (0.9%)
	Self-employed	1 (0.9%)
	Unemployed	15 (13%)
REGION	Zagreb and the surrounding area	88 (76.5%)
	North Croatia	10 (8.7%)
	Slavonia	4 (3.5%)
	Lika, Kordum and Banovina	2 (1.7%)
	Istria, Primorje and Gorski Kotar	1 (0.9%)
	Dalmatia	10 (8.7%)

Source: primary research

The questionnaire was filled out by 86 women and 29 men, i.e. high percentage of female respondents participated in the survey (75.0%), while the share of men was only 25%. Most respondents were women, although, regarding the fact that the survey had been distributed to a large number of consumers, it was expected that there would be a somewhat equal number of the respondents of both gender. Most respondents, 80 of them, are between 25 and 34 years of age and make up 69.6% of the sample. Then, there is the group between the ages of 35 and 44, 17 of them (14.8%). Then there are 10 of them (7%) in the group between 18 and 24. The least respondents (4 of them) are in the groups between the ages of 45 and 54, and 55 and over. The assumption is that older people use the Internet less or do not use social networks at all. More

than half of the respondents, 85 of them (73.9%) have finished higher of the highest level of education (university level). 19 respondents (16.5%) have finished high school and other respondents are without formal education (1.7%) or have a master's or a doctoral degree (7.8%). Based on this data, we can conclude that most respondents are of higher education. 65 respondents (56.5%) are employed permanently. Then there is the category of those that have contracts of definite duration, 24 respondents (20.9%), and the unemployed (13% of them, i.e. 15 respondents). Other respondents work part time (7.8%), undeclared (0.9%) or are self-employed, also 0.9%. Most of them live in Zagreb or the surrounding area, 88 respondents (76.5%). 10 respondents (8.7%) come from northern Croatia and Dalmatia, respectively. 4 respondents (3.5%) live in Slavonia, and in Lika, Kordun and Banovina 2 respondents (1.7%), while only one respondent (0.9%) comes from Istria, Primorje and Gorski Kotar. Out of 115 of them, 50 (43.5%) say they buy food products in eco-friendly packaging, while the rest 65 (56.5%) state they do not buy such products.

According to the research made by Brčić-Stipčević, Petljak and Guszak (2010), one of the most mentioned obstacles to buying food products in eco packaging is higher price. The answers to the question about the reasons why they do not buy the products packed in green packaging were: 33 of them say it is the high price (28.7%), for 15 respondents the reason is the insufficient content (13.0%). The next reason is poor quality of the packaging (5 respondents, 4.3%), and even 15 respondents claim it is some other reason.

Out of 50 respondents that buy eco-friendly packaged food products, 15 of them say (30%) they do it daily. Another 15 respondents buy them once a week. 13 of them buy the products in green packaging once a month, while 7 of them (14%) buy those products only a few times a year.

Lately, most consumers have come to conclusion that their purchasing habits have a direct influence on environmental issues, and it is one of the criteria consumers take under consideration while buying products (Esmailpour and Rajabi 2016). The next question had the possibility of multiple choice, and the answers that were offered had been adjusted respecting the findings from the research by Brčić-Stipčević, Petljak and Guszak (2010). More than one third of the respondents (34.0%) chose the care for the environment as the key motive for buying the product in eco-friendly packaging. Next, there is less danger to the health, chosen by 18 respondents (15.7%). Then, there is support for "the better tomorrow" with 13% of the respondents, while the last place is occupied by the motives related to the attractive design of the packaging (8.0%) and habits (6.0%).

Most respondents (62.0%) think that it is most important that milk and dairy come in green packaging. Then there are baby foods (44.0%) and meat and meat products. Sweets and snacks come last. In the research conducted by Lindh and Williams (2015), almost 79.0% of the respondents think that paper packaging has the least effect on the environment. After that, there are glass and plastic. Their research also suggests that plastic (62.0%) has highest negative influence on the environment, after which there is metal.

In the current research, most respondents, 47 of them (40.9%), think that wood least affects the environment. Then there are paper and cardboard (39 respondents, 33.9%) and glass (19 respondents, 16.5%). Six respondents think that textile has least negative effect; two of them think it is metal and one respondent opted for some other type of packaging material. According to the respondents, it is plastics that have major negative influence on the environment (91 respondents, 79.1%). Then there is metal with 16.5% (19), glass with 2.6% (3), while wood and textile are in the last place with just one answer.

Consumer attitudes on recycling and eco-friendly packaging

The respondents were asked to express their level of agreement about the statements on the scale from 1 to 5, where 1= strongly disagree, 2= disagree, 3= neither agree nor disagree, 4= agree and 5= strongly agree. The statements were divided in two categories. They relate to the perception of the respondents on food products in eco-friendly packaging and eco labels, and their habits regarding packaging recycling.

Table 2. The level of respondents agreement with the statements regarding the perception of food products in eco-friendly packaging

	1	2	3	4	5	Mean	Standard deviation
I prefer buying food products in eco-friendly packaging.	0	1	10	17	22	4.2	0.833
I have convinced the members of my family and my friends to buy food products in eco-friendly packaging.	2	8	26	10	4	3.12	0.918
I am ready to pay more for food products packed in green packaging.	8	4	17	13	8	3.18	1.273
If the prices of the products in eco-friendly packaging rise, I will continue to buy them.	4	11	23	9	3	2.92	0.986
If the prices of the products in eco-friendly packaging rise, I will stop buying them.	9	13	18	5	5	2.68	1.186
I read labels on food products packaging to find out if they are eco-friendly.	3	4	17	16	10	3.52	1.092
I think eco labels on food products are reliable.	2	3	18	19	8	3.56	0.972
I think food product packaging labelled as eco-friendly is really manufactured in line with the classification.	1	6	16	19	8	3.54	0.973
I am ready to stop buying the product if I found out that the manufacturer did not use eco-friendly packaging.	4	9	16	8	13	3.34	1.272

Source: primary research

50 respondents that had declared they bought food products in green packaging answered the next two questions. By analysing the data presented in Table 2, it can be noticed almost half of the 50 respondents strongly agree with the statement that they prefer buying products in eco-friendly packaging, and additional 34.0% of them stated they agreed with the statement. Also, many respondents, 42.0%, are ready to pay higher price for the products packed in eco-friendly packaging, while 24% of them are not

willing to do that. They largely agree with the statements that they read the labels on the packaging (52.0%), and that eco labels on food products are reliable (54.0%). Twenty-one respondents, 42%, agree with the statement that they would be ready to stop buying the product if the manufacturer did not use green packaging.

Table 3. The level of agreement with the statements regarding recycling and environmental protection

	1	2	3	4	5	Mean	Standard deviation
When there is a choice, I choose products that have less negative influence on the environment.	0	2	5	18	25	4.32	0.819
I think that purchase of food products in eco-friendly packaging contributes to environmental protection.	0	0	4	17	29	4.5	0.647
I usually buy food products in recycled packaging.	1	3	16	20	10	3.7	0.931
I usually buy food products in packaging that can be reused.	1	2	17	20	10	3.72	0.904
I separate waste to recyclable materials and non-recyclable waste.	3	3	7	21	16	3.88	1.118
I think manufacturers should use more recycled materials for the production of the packaging for food products.	0	0	3	22	25	4.44	0.611
I think manufacturers should provide more information on the recycling possibilities of food product packaging.	0	0	5	18	27	4.44	0.675

Source: primary research

According to the answers in Table 3, conclusions can be made that respondents take care of the environment and that they mostly recycle the packaging. A big percentage of the respondents, 87.0%, agree with the statement that when possible, they choose products with less negative effects on the environment. According to the research by Borin, Cerf and Krishnan (2011) on the sample of 329 respondents, most of them separate waste to recyclable and non-recyclable. Similar results come from this research as well, where 74.0% of the respondents also separate waste material. This data is not surprising due to the rising environmental concern and more possibilities for recycling different materials. Also, many respondents (90.0%) think how manufacturers should give more information about the recycling possibilities of the packaging.

Influence of socio-demographic characteristics on consumer behaviour

The subchapter is focused on defining differences among the respondents that come from sociodemographic characteristics. Some of the characteristics used in these comparisons are the level of education, age and region where they live. Those who had answered the first question affirmatively (50 respondents), also answered questions regarding the crosstabs. If we compare the level of education and the preferences for buying food products in eco-friendly packaging, we come to the following conclusions: as it was expected, most of those who prefer buying products in green packaging are

the respondents who have finished higher or high level of education (28 respondents). Seven respondents who agree with the statement have finished high school and four of them are with a masters or a doctoral degree.

It is evident from the research that consumers who separate waste into recyclable and non-recyclable live mostly in Zagreb and the surrounding area. Out of 37 of the respondents who separate the waste material, 26 of them live in Zagreb and its surrounding area. This is not surprising, because most respondents who have participated in the survey come from that area. The age category has been first divided in six groups, but for the purpose of further research and better understanding, the respondents were divided into two groups. The first group is made of young people, from 18 to 34, and the other of those between 35 and 55 and over. Out of 50 respondents that said they bought food products in eco-friendly packaging, 34 respondents are younger people from the group between 18 and 35, and there are 16 respondents from the other group. Out of 65 respondents who said they did not buy such products, most of them (56) are from the first, younger group, and only 9 of them from the second, older group.

One more time, age has been considered as a socio-demographic characteristic for the comparison of consumer behaviour. It is compared with the statement how the respondents are ready to pay more for food products packed in eco-friendly packaging. Here, the age category was also divided into two groups. In the first group, younger than 35, 15 respondents said they agreed or strongly agreed with the statement. In the category of older respondents, the number was considerably smaller, 6 respondents. Many respondents, 17 in total from both categories, have neutral opinion about the statement, i.e. they neither agree nor disagree with the statement.

When comparing the frequency of purchase of food products in green packaging in relation with the monthly household income, most respondents who buy those types of products daily have monthly household income from 8,001 to 11,000 kuna and more. In the same category of monthly income, 12 respondents do it on a weekly basis, 11 on a monthly basis and two respondents only few times a year. As could be expected, only two respondents that have the income of less than 3,500 kuna buy such products daily or once a week.

Discussions

The respondents participating in this research are Internet users, mostly over 18 years old with a profile on www.facebook.com. In Croatia, there are 1.5 million Facebook users (<http://marketingmagazin.eu>), one third (560,000) of them living in Zagreb. The use of Facebook differs regarding the age groups. Most users are in the group between 25 and 34 years (430,000), while the fewest are from the group between 13 and 17 (71,000). A considerable number of users, 110,000 are older than 55. Although the respondents of all ages were included in the survey, a small number of the respondents older than 55, 4 of them (3.5%), filled out the questionnaire.

There are several other limitations regarding the research. The sample of the consumers that have filled the questionnaire is not big enough to use the conclusions based on

their answers for some broader framework. Furthermore, the most part of the research on the consumer perception about the importance of eco-friendly packaging relates to the consumers from the Zagreb area.

The recommendation is that the research be conducted again on a larger sample and that it should include more respondents over 45 years of age. The research should also include more respondents from other parts of Croatia. Besides using only Facebook, the research could be conducted via other social networks, emails or interviews. Also, the questionnaire could be added some more questions and statements to broaden the research topic. Such research would result in new valuable knowledge about the importance of sustainable food product packaging.

Conclusions

Packaging has ever since its beginning evolved together with the development of human civilization. Over the last years, there is a growing development of materials for packaging products, mostly due to high demands for product safety and environmental influence and the ecological question prompted by packaging waste is becoming more and more serious. Most consumers have understood how their purchasing habits have direct influence on the environment and for that reason they are starting to change their behaviour and habits.

By researching consumer behaviour while they are buying food products in eco-friendly packaging, the following conclusions have been drawn:

- Fewer than 50% of the respondents buy food products in green packaging and the most common reasons are high prices and insufficient content of the packed food.
- Motives of those who buy such products are environmental care and less harm to their health.
- They consider wood a material with least negative effect on the environment and plastic being the most harmful to the environment.

Continual pressure for eco-friendly materials is not just a whim any more, it is a life style and environmental concern and how to protect it are thoughts ever more rising in the mindsets of more and more people.

Conflict of interests.

The authors declare no conflict of interest.

References

1. Abdalkrim, G. M., & AL-Hrezat, R. I. S. (2013). The role of packaging in consumer's perception of product quality at the point of purchase. *European Journal of Business and Management*, 5(4), 69-82.

2. Afrić, K. (2002). Ecological consciousness - pre-condition of solving ecological issues. *Ekonomski pregled*, 53(5-6), 578-594. [in Croatian: Afrić, K. (2002). Ekološka svijest - pretpostavka rješavanja ekoloških problema].
3. Andrijanić, I., Buntak, K. & Bošnjak, M. (2012). *Quality management with knowledge of goods*. Visoka poslovna škola Libertas, Zagreb. [in Croatian: Andrijanić, I., Buntak, K. & Bošnjak, M. (2012). *Upravljanje kvalitetom s poznavanjem robe*].
4. Bačun, D. (2009). *Handbook on signs on products and packaging*. Hrvatski poslovni savjet za održivi razvoj, Zagreb. [in Croatian: Bačun, D. (2009). *Priručnik o znakovima na proizvodima i ambalaži*].
5. Borin, N., Cerf, D. C., & Krishnan, R. (2011), Consumer effects of environmental impact in product labelling, *Journal of Consumer Marketing*, 28(1), 76-86. DOI: 10.1108/0736376111110197.
6. Bortek, S. (2014). Pokrenimo se, otpad nije smeće! Eko mreža. Retrieved from: <http://www.ekomreza.org/clanak/pokrenimo-se-otpad-nije-smece/3065> (August 28, 2018).
7. Budak, I., Kosec, B., Hodolič, J., Karpe, B., Stević, M., & Vukelić, D. (2009). *Labeling products about environmental production*. Fakultet tehničkih nauka, Novi Sad. [in Serbian: Budak, I., Kosec, B., Hodolič, J., Karpe, B., Stević, M., & Vukelić, D. (2009). *Označavanje proizvoda o zaštiti životne sredine*].
8. Chiellini, E. (Ed.) (2008). *Environmentally compatible food packaging*. Woodhead Publishing Limited, Cambridge.
9. Finisterra do Paco, A. M., & Raposo, M. L. B. (2010), Green consumer market segmentation: empirical findings from Portugal, *International Journal of Consumer Studies*, 34(4), 429-436. DOI: 10.1111/j.1470-6431.2010.00869.x.
10. Imamović, N., Goletić, Š., & Hodolič, J. (2009). Ecolabelling of type I. *Zbornik radova 6. naučno-stručni skup sa međunarodnim učešćem "KVALITETA 2009"*, 495-505. [In Bosnian: Imamović, N., Goletić, Š., & Hodolič, J. (2009). Ekooznačavanje tipa I].
11. Jamnicki, S. (2011). *Evaluation of the suitability of different grades of recycled paper for the production of health-care food packaging*. Grafički fakultet, Zagreb. [in Croatian: Jamnicki, S. (2011). *Evaluacija prikladnosti različitih klasa recikliranih papira za izradu zdravstveno ispravne prehrambene ambalaže*].
12. Jiménez-Guerrero, J. F., Gázquez-Abad, J. C., & Ceballos-Santamaría, G. (2015), Innovation in eco-packaging in private labels, *Innovation*, 17(1), 81-90. DOI: 10.1080/14479338.2015.1011055.
13. Lazić, V., Gvozdrenović, J., & Petrović T. (2008). Possibilities of modern food packaging. *Časopis za procesnu tehniku i energetiku u poljoprivredi/PTEP*, 12(1-2), 49-52. [in Serbian: Lazić, V., Gvozdrenović, J., & Petrović T. (2008). Mogućnosti savremenog pakovanja hrane].

14. Lindh, H., Olsson, A., & Williams, H. (2015), Consumer Perceptions of Food Packaging: Contributing to or Counteracting Environmentally Sustainable Development?, *Packaging Technology and Science*, 29(1), 3-23. DOI: 10.1002/pts.2184.
15. Marsh, K., & Bugusu, B. (2007), Food packaging - roles, materials, and environmental issues, *Journal of food science*, 72(3), 39-55. DOI: 10.1111/j.1750-3841.2007.00301.x.
16. Ministarstvo zaštite okoliša i energetike (N/A). Eko-oznake, Retrieved from: <https://www.mzoip.hr/hr/okolis/eko-oznake.html> (18 October, 2018).
17. Molina-Besch, K., & Pålsson, H. (2016), A Supply Chain Perspective on Green Packaging Development Theory Versus Practice, *Packaging Technology and Science*, 29(1), 45-63. DOI: 10.1002/pts.2186.
18. Official Gazette (2015). *Pravilnik o ambalaži i otpadnoj ambalaži*. Zagreb, Official Gazette Plc., No. 88.
19. Prakash, G., & Pathak, P. (2017), Intention to buy eco-friendly packaged products among young consumers of India: A study on developing nation, *Journal of Cleaner Production*, Vol. 141(January), 385-393. DOI: 10.1016/j.jclepro.2016.09.116.
20. Ricci, E. C., Banterle, A., & Stranieri, S. (2018), Trust to go green: an exploration of consumer intentions for eco-friendly convenience food, *Ecological economics*, Vol. 148(June), 54-65. DOI: 10.1016/j.ecolecon.2018.02.010.
21. Rahman, M. S., AbRahman, R. B., Islam, N., & Khan, A. H. (2013). Branding through eco-friendly package design, *Proceedings of the 2nd Applied International Business Conference (AIBC2013)*, Universiti Malaysia Sabah, 373-389. Retrieved from https://www.researchgate.net/profile/Seng_Chee_Lim3/publication/304785445_PROCEEDINGS_2nd_AIBC2013/data/577b593908ae213761c9cddf/PROCEEDINGS-2nd-AIBC2013.pdf#page=374 (23 October, 2018).
22. Rodin, A. (1977). *Packaging as a marketing element*. Grafičar štamparsko izdavačko poduzeće, Ludbreg. [in Croatian: Rodin, A. (1977). *Ambalaža kao element marketinga*].
23. Rodin, A. (1984). *Packaging, distribution, point of sale*. Udruženje propagandista SR Hrvatske, Zagreb. [in Croatian: Rodin, A. (1984). *Ambalaža, distribucija, mjesto prodaje*].
24. Ščedrov, O., & Muratti, Z. (2008). Packaging and environment protection. *Sigurnost*, 50(3), 287-297. [in Croatian: Ščedrov, O., & Muratti, Z. (2008). *Pakiranje, ambalaža i zaštita okoliša*].
25. Simin, M., Janjušić, D., & Blažević, Z. (2013). Eco labelling as a criterion for registration and protection of trademark. *Praktični menadžment, stručni časopis za teoriju i praksu menadžmenta*, 4(2), 76-79. [in Croatian: Simin, M., Janjušić, D., & Blažević, Z. (2013). *Ekološko obilježavanje kao kriterij za registraciju i zaštitu robne marke*].

26. Stanković, M. (2012). Eco-labelling: barrier or incentive of international. *Škola biznisa*, No. 4, 34-41. [in Serbian: Stanković, M. (2012). Eko-označavanje: prepreka ili podsticaj međunarodnoj trgovini].
27. Stipanelov Vrandečić, N. (2010). *Packaging*. Kemijsko-tehnološki fakultet, Split. [in Croatian: Stipanelov Vrandečić, N. (2010). *Ambalaža*].
28. The Manufacturer (2014). The evolution in packaging over the last 30 years, Retrieved from: <http://www.themanufacturer.com/articles/the-evolution-in-packaging-over-the-last-30-years/> (28 October, 2018).
29. Tokić, I., Fruk, G., & Jermić, T. (2011). Biodegradable packaging for storage of fruit and other horticultural products: materials, properties and its effect on fruit quality. *Journal of Central European Agriculture*, 12(1), 226-238. [in Croatian: Tokić, I., Fruk, G., & Jermić, T. (2011). Biorazgradiva ambalaža za čuvanje voća i drugih hortikulturnih proizvoda: materijali, svojstva i učinak na kakvoću].
30. Unilever (2009). Sustainable packaging?, Retrieved from: https://www.unilever.com/Images/sd_sustainable-packaging--2009-_tcm13-387437_tcm244-409779_1_en.pdf (23 October, 2017).
31. Vlaeminck, P., Jiang, T., & Vranken, L. (2014), Food labeling and eco-friendly consumption: Experimental evidence from a Belgian supermarket, *Ecological Economics*, Vol. 108 (December), 180-190. DOI: 10.1016/j.ecolecon.2014.10.019.
32. Vujković, I., Galić, K., & Vereš, M. (2007). Food packaging. Tectus, Zagreb. [in Croatian: Vujković, I., Galić, K., & Vereš, M. (2007). *Ambalaža za pakiranje namirnica*].

PREFERENCES OF CUSTOMERS AND IMPROVEMENT OF PRODUCTION AND SALES OF ORGANIC PRODUCTS IN SERBIA

Goran Dašić¹, Adriana Radosavac², Desimir Knežević³, Ružica Đervida⁴

*Corresponding author E-mail: adrianaradosavac@gmail.com

ARTICLE INFO

Original Article

Received: 01 March 2019

Accepted: 21 March 2019

doi:10.5937/ekoPolj1901127D

UDC 658.8.012/.013:631.147(497.11)

Keywords:

organic farming, internet, marketing, incentives to agriculture

JEL Q013

ABSTRACT

Promotion and sale of organic products require particular approach to introduce customers about the branding, packaging and advantages in comparison to conventional products. The aim of work is investigation which are sources of promotion of organic products use customers and effects of sources on trade improvement. In this study conducted interviews of 400 of customers through the mail. The results showed differences among customers according to: sources of their information about traits of products and market place, and their behavior and decision for use of organic product. Women more often use electronic media, professional literature, while man use magazine as a source of information. Both gender, male and female used internet equally. Customers old between 21 and 40 years more often bought in supermarkets and specialized stores, while customers of age between 41 and 60 years more often bought directly on market from producers. Customers who have more than 60 years buy on the market from producers and the supermarket. This differences depends of gender, age, education, as well as place of residence of customers

© 2019 EA. All rights reserved.

Introduction

Organic agriculture is production system without the use of artificial substances for increased productivity that sustains the health of soils, ecosystems and people. Organic

-
- 1 Goran Dašić, High School of Modern Business, Terazije 27, Belgrade, Serbia, E-mail: goran.dasic@mbs.edu.rs, ORCID ID: <https://orcid.org/0000-0002-9001-7468>
 - 2 Adriana Radosavac, University Business Academy in Novi Sad, Faculty of Applied Management, Economics and Finance in Belgrade, Jevrejska 24, 11000 Belgrade, Serbia; E-mail: adrianaradosavac@gmail.com, ORCID ID: <https://orcid.org/0000-0001-8639-6189>
 - 3 University of Pristina, Faculty of Agriculture, Kosovska Mitrovica-Lesak, Kopaonicka bb., 38219 Lesak, Kosovo and Metohija, Serbia, deskoa@ptt.rs, ORCID ID: <https://orcid.org/0000-0001-8471-9060>
 - 4 Independent Universities of Banja Luka, NUBL, Banja Luka, Veljka Mladenovića 12e, 78000 Banja Luka, Republic of Srpska, E-mail: ruzica.djervida@gmail.com, ORCID ID: <https://orcid.org/0000-0003-2880-6324>

farming is sustainable production system of quality health-safe strictly controlled, certified food from farm to table, in order to satisfy the desires and needs of consumers, achieving economic and ecological profits and environmental protection (Babović, 2008).

Organic farming promotes agro-viable biological cycles and soil biological activity (Phillip & Dipeolu, 2010).

Organic farming in Serbia is in development which focused on promotion of sustainable lifestyle while preserving the environment. In Serbia, there is considerable potential for the production of organic feed (geographical position and moderate continental climate, soils on which long-term was not applied chemicals, preserved biodiversity, and qualified human resources for agricultural production and food trade), Sudarević (2005).

Organic production in Serbia in 2015 - 2016, was carried out on a total area of 15.298 hectares (including meadows and pastures), including surfaces that are certified as organic and other in conversion period. Total surface area increased by 62 percent in comparison to 2014 was 9,548 hectares with trend of increasing (Zarić & Mijajlović, 2014; Simić, 2017).

The organic food products offer profitable business opportunities as they fetch a higher price *than* conventional food product in the domestic as well as export markets. For increasing of organic production and sale of organic products is very important market development, market access, and marketing techniques with a strong focus on marketing for export purposes.

One single farm or individual producer is not able to supply the volume required by the market, as well to achieve product development, branding and effective promotion (Schmid, et al. 2004). However, traders can promote organic products and provide access to clients and markets. There are international standards and private guidelines, which regulate the socio-economic dimensions of trade. The each market characterized of the local economy, demographics, accessibility and information on potential local competitors.

The information about the organic product which can be purchased by single people, families with children, people with a high or low income, people that highly educated or less educated, can often be found in market research studies published on the Internet, books, periodicals or newspapers. There are different instrument of promotion of organic products that have influence on consumers to determine for purchase. Demand for organic products is increasing all over the world due to changes in consumer lifestyle and eating habits. Consumers have more information about the food market and are becoming more concerned about living healthily (Grubor & Djokić, 2016). Therefore, producers should be more focused on consumer perceptions towards organic products in order to meet consumers' needs (Schleenbecker & Hamm, 2013; Xie et al., 2015; Golijan & Dimitrijević, 2018).

The Prospects of development of organic food production in Serbia can estimate on the base of state support to this form of production and requirements of customers on market for organic products.

State incentives are very modest in both for agricultural production and for sale and distribution of products. Therefore many manufacturers of need plan additional time and finances for organization of product placement, alone or through association with other producers by linking with small, medium and large systems of suppliers and distributors.

In numerous of national strategies are promotes organic agriculture as a fast-growing and profitable business, but at the same time insufficient attention is paid to its peculiarities.

In Serbia, declared the Law for Organic Production (in 2010 and a series of regulation established the production of agricultural products and other organic products by methods of organic production, processing, storage, labeling, transport, certification and marketing of products) in order to obtain a product with a confirmed procedure of production, consumers protection, environmental protection, protection of natural resources from pollution, increase soil fertility (The Official Journal RS, no. 30/10, 2010).

The aim of work is investigation which are mode of information and sources of promotion of organic products use customers and how is potential effect of promotion model on trade improvement of organic products.

Advantages of organic agriculture

As defined by the FAO (Food and Agriculture Organization of the United Nations at the UN) and WHO (World Health Organization), "Organic agriculture is a production management system that promotes the recovery of ecosystems, including biodiversity, biological cycles and emphasizes the use of methods that largely exclude the use of inputs outside farm." (FAO/WHO 1999).

The organic production is important for utilization of renewable energy sources, maintenance and agro-ecosystem, environment, reduction of all forms of pollution, that occur in conventional agriculture. Also, many farmers accept organic farming as a way to increase their income due to public policy support and growing market demand. The organic production method allows the rational use of resources and energy to ensure protection of natural resources for future generations (Bozic & Vega Garcia, 2013).

Accordingly, "organic product is any product produced and labeled in accordance with the law and regulations based on it" (The Official Journal RS, no. 30/10, 2010).

The main goals of organic products are the production of health food without the use of synthetic chemical insecticides, fungicides, herbicides, synthetic fertilizers, additives, growth regulators, hormones, antibiotics and GMO. The end of twentieth and the beginning of the twenty-first century was rich with the programs and actions

in the field of the protection, revitalization and improvement of the environment (Kovačević, 2011).

The development of organic production affected by knowledge, education and training for producers, the development of processing, association of producers, processors, contracting production for known buyer, production and certification of products, agro economic politics, business associations and the use of IPARD funds of the EU in development of organic agriculture.

The development of organic production in Serbia is limited due to the effect of several factors: (Vlahović, et al. 2010).

- decline in living standards and reducing the purchasing power of the population, which resulted in the decrease of demand for organic food;
- low level of environmental awareness and the culture of life; and
- insufficient funding and support from the state

Eating of organic food means a return to nature, a healthy lifestyle and traditional values.

Many marketing experts are studying and investigating the tendency of the market especially in the case of organic food. There are three groups of consumers interested in organic food: one group that prefers organic products for health reasons, the other group that wants to improve and maintain their health and that of their families and a third group of people who tried to propagate back to the rural areas in the aim of revival of the village and engage in healthy physical culture.

For increasing of interest for organic food in consumers, it is necessary establish marketing strategies. Firstly we have to have make influence on consumers to change their habits of diet and that determine healthier foods. The process is long-term, because there is a doubt and distrust to the changes of behavior in majority of consumers. Therefore, the role of marketing strategy must related to education of the people and their determination.

In some studies it has been shown that most people are determined for organic foods only when faced with health problems. In fact, consumers search for organic food in order to maintain their health (Dumea, 2012; Petrescu et al., 2017; Smith-Spangler et al., 2012; Rosona & Gebresenbet, 2018).

The function of marketing strategy should be reflected in supporting the changes and motivation of consumers to accept changes in diet in the aim of improving quality of life style and harmonization of mind, body, health, need, desires and interest of consumers.

The characteristics of the market for organic products in the Republic of Serbia

The first business of organic farming in Republic of Serbia, began the company Den Juro with forming plantation of fruit in Blace in 1989. The first shipment of organic fruit, company is exported after (Kalentić, et al. 2014).

Developing of organic production is influenced by awareness of consumers about the importance and benefits of organic food, which led to the increasing of interest in this type of product (Sudarević, et al. 2011; Xie et al., 2015).

However, a significant increase in demand for organic products is recorded only since 2000 year. That was result of the numerous projects that had various international organizations (GIZ from Germany, Avalon from the Netherlands, SIDA of Sweden and others) that were conducted with the aim of improving organic production and promotion of organic products.

Sales of organic products is organized so that most organic products are sold to wholesalers and processors, while only 20% of producers are sale directly on market (Oljača, 2015). One of the problems that producers of organic food have today is lack of storage space. Therefore, the majority of organic agricultural products is available only in season.

The global economic crisis has negatively affected the economic trends in Serbia. The decline in living standards as a result of recession in which the economy in the Republic of Serbia has contributed to reducing the demand for organic products. Furthermore, the higher prices of organic products compared to products produced in conventionally production was too big a burden for household budgets.

Reduced demand for organic products has affected the decrease in production, which was reflected to the market of the Republic of Serbia with greater occurrence of imported products compared to products produced by domestic manufacturers.

In extensive research about customers' demands and consumption of organic agro-food products in all over the world were found that price is one of the limited factor (Willer & Lernoud, 2014). This indicates that organic farming can be a driving force not only the development of agriculture, but also the economy in general.

The local market for organic products

The great awareness about importance of organic food is existing among consumers living in urban areas. This is result of increasing offer on market and availability of organic products in retail stores, especially supermarkets. The offer of organic food existing in majority of chain stores in Republic of Serbia, Those products are exposed to special shelves marked as space with offer organic product how can be more visible for customers. Progress in promoting organic products is the promotion of the national sign of origin, that guarantee of quality and recognition of organic products.

Serbia Organica has implemented a promotional campaign in retail shopping facilities in aim of raising consumer awareness about the importance of organic products for health and contribution of organic production to preservation of the environment.

In Republic of Serbia, consumers of organic products can buy in supermarkets, specialized shops and in market place. The purchasing on the market place connected

with difficulties related to freshness of products, organoleptic properties of product, and information about production and producers. Consumers in Serbia generally not possess enough knowledges about organic products advantages, technology of production and in addition have no confidence in certificates (Vlahović et al. 2010).

For this reason, it is necessary to introduce the standard of a control of the products from the field to the table and preventing an unexpected accident (ISO 9000: standards for quality management system; ISO 14000: systems of management of environmental protection; ISO 22000: food safety management system; BRC: standard production of processed food and services; IFS: international food standard, HALAL: system of food production and processing; Kosher: the system of production and preparation of food; GOST-R: the standard of the food product; GLOBALG.AP: standard of good agricultural practices; HACCP: system for analysis of risk and management of processes at critical control points; Organic (BIO) Certificate: Certificate for organic production and products; PGI / PDO: certificate of protection of geographical origin, names, sign).

The greatest demand for organic products is in bigger cities due to higher purchasing power. In offer of large retail chains in Serbia (Tempo, Maxi, Univerexport, Idea, DIS, Aman, Sunce), organic products are exhibited on separate special shelves that contain specific types of products (for example: flour without gluten, grains, unrefined vegetable oils cold-pressed, thermally processed products such as jam, sweet, pastries with seeds, unfermented biscuits etc).

In research of Vlahovic et al. (2013) the main motives for the purchase and consumption of organic food are:

- taste: many people buy organic food because they believe that it tastes better than conventional, and better for health.
- health: in average, organic food contains higher levels of vitamin C and mineral elements (calcium, magnesium, iron) as well as antioxidants.

The appearance of these supermarkets launched a rise in food prices, while producer prices declined. Michelsen et al. (1999) in their analysis of complex organic European market at the beginning of the nineties of 20 century, found that the development of market of organic food is in strong relation to high levels of sales in supermarkets.

In small communities, smaller domestic retail chains also following this trend by exhibition of organic food at visible places for customers and mark of promotion of local producers.

Problem and hypothesis

In this work were conducted study about importance and value of organic products at the customers opinion, theirs habit of purchase, which is source of information or level of knowledge about organic products and satisfaction with organic products.

Research hypotheses are defined as:

- Consumers prefer to purchase organic products, with particular purchasing habits, information and satisfaction concerning these products.
- Consumer behavior in relation to organic products is conditioned by their socio-demographic characteristics.

Materials and methods

In this study were investigated the level of information of customers about the market and the interest of buyers of organic products in Serbia, as well as ways to promotion organic products.

The questionnaire was sent by e-mails to 400 consumers in Belgrade region from 05 to 31 January 2019.

The questions are designed in a way that even very short answers are sufficient to form a specific thesis, and estimation of the situation on the ground. The main purpose of the research was to determine how the market is interested in organic products and informed about the benefits, which forms of promotion proved to be the best and to what extent organic food production sustainable and profitable business in Serbia, and what measures can be taken to the population to a large extent interested in these products.

The questionnaire was compiled by researchers which contained 18 questions that include demographic characteristics of the customers, their attitude towards organic products, buying habits, information and satisfaction market organic products. Completing the questionnaire was anonymous.

The study included a total of 400 customers, of whom 37.1% male and 62.9% female customers. The sample included different age groups, ranging from 21 years to a category that includes more than 60 years.

Distribution in percentages is as follows: first age group 21-30 has a share-29.6%; second age group 31-40 has a share-24.4%; third age group 41-50- has a share 28,2%;fourth age group 51-60 has a sharp -11.7% and fifth age group over the 60 year has a share - 6.1%. The most of customers had completed secondary education (54.5%), followed by high school or college (34.3%). While a smaller percentage of customers completed only elementary school (1.4%), or master, master and doctoral study (9.9%)

The less than 2/3, or 60.6% of the customers live in the urban area, while 39.4% are stationed on the outskirts of the city. The most of the customers were employees (71.4%), followed by students (16%), unemployed (6.6%) and pensioners (6.1%).

The obtained data about answers of customers were studied by using descriptive statistics and Chi-square test. For statistical analysis used program, IBM SPSS 20.

Results

The customers, throughout the survey, answered on series of questions to determine the way in which they see and consume organic products. It turned out that 71.8% of customers preferred to use organic than conventionally produced products. However, more than half customers that they seldom buys organic products (46%) or they do not buy (8.5%) - a total of 54.5%. The smallest number of customers always buys organic products - 2.3%, while 43.2% of them often buy.

The largest number of customers purchase organic products in supermarkets (30.5%), on market places (25.4%) and in specialized shops (23.5%). Significantly less number of customers purchase organic products directly from the manufacturer (14.1%) or online (6.6%).

The reasons which customers the most encouraged to purchase organic products are next: the primary health care (29.6%), the desire to consume quality food (28.6%), better taste (14.6%), and at the end of eco-friendliness (7.5%). A fifth of customers indicated none of the above reasons and the assumption is that these are people who do not prefer organic produce and rarely buy those (19.7%).

When consumers make decision to purchase organic products they take into account the reliability of the manufacturer about 38%, and the price about 23%. The 25.4% of customer answered that for them is the most important personal preferences. Fewer number of consumers cited as an important assortment (10.3%) and location (3.3%).

In addition, the characteristics of the product that are significant for customers are primarily related to reputation (in 25.4% of cases) and the recommendations of others (33.3%). Fewer number of customers make decision depending on the price (19.7%), brand (10.3%) and advertising (8.9%) while the lowest depending on the packaging (2.3%).

The majority of consumers 61% believe that is partly informed about characteristics of organic farming. Significant number of the sample of customers stated that it is fully informed - 17.4%. A smaller number interviewed customers is not informed - 9.4% while 12.2% of customers cannot say with certainty whether are informed. Moreover, the Internet plays an important role in informing customers about organic products. A third of customers said that it internet is primary tools of information (34.3%), a slightly smaller number of customers are informed by using electronic media (23.9%) and from people in environment (23%).

Approximately equal number of customers use professional literature and magazines for information about organic products. Although the Internet is the primary medium for informing customers about the organic products they are accessing the media critically.

Of the total sample - 20% of customers stated that information from the Internet significantly affect to level of information about organic products, 33.8% of customers said that the Internet affects little or no impact, and 46% have a relative impact. The most of the customers find information on websites (45.1%), social networks (38.5%), blogs (9.4%) and discussion forums (7.0%).

Except of shopping habits and aspects of information and relationship to the information, in this research were tested customers satisfaction about availability, quality and diversification of organic products.

The highest number of customers is satisfied. They are the most satisfied with quality, than with availability and the less with diversity of organic products (table 1).

Table 1. Satisfaction of customers with organic products (availability, quality, diversity)

Answers	How satisfied are you with the availability of organic products in your city?	How much are you satisfied with the quality of organic products?	How satisfied are you with the diversity of organic products that are available to you?
I am very satisfied (%)	7.5	10.8	7.5
I am satisfied (%)	53.5	64.3	50.2
I am not satisfied (%)	33.8	23.0	39.4
I am not at all satisfied (%)	5.2	1.9	2.8
Total (%)	100.0	100.0	100.0

Source: Authors' calculations

Demographics characteristics and purchasing habits of organic products

By using Chi-square test was examined the influence of demographic characteristics of consumers in Serbia on purchase of organic products. Among the features that have been investigated in the work - gender, age, status, education, place of residence were found that significant influence had gender and age.

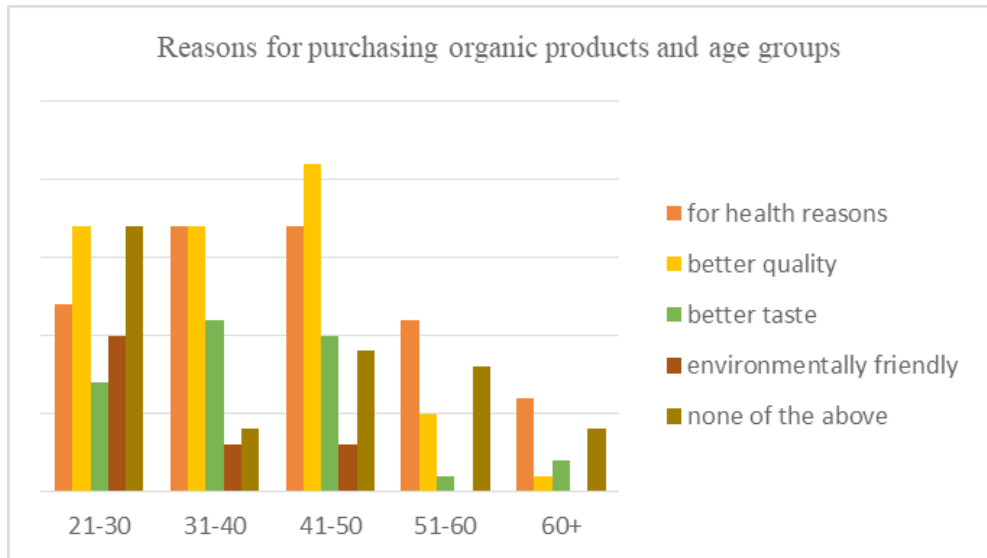
Based on the results obtained through a series of chi-square test were shown that women significantly more frequent purchases organic products than men ($\chi^2(400, 3) = 15.051, p < 0.01$).

Additionally, the way of information is different between the sexes. Women are informed significantly more through electronic media, from people in environment, as well as professional literature, while men are informed more likely through the magazine. The internet is represented equally in both gender ($\chi^2(400, 4) = 15.013, p < 0.01$).

The relation of customers according to the purchase of organic products depends on the age groups. Results of Chi-square test showed that the customers in the category 21-30 years and 31-40 years more often bought in supermarkets and specialized stores. Customers of age 41-50 years and 51- 60 years more often purchase in the market place and directly from producers. While the customers, who have more than 60 years mainly purchase in market places and supermarket. We believe that these features are part of a wider pattern of the consumer, not just of purchasing organic products. The differences between groups are statistically significant - $\chi^2(400, 16) = 15.051, p < 0.05$.

Age of consumers is related to the reasons which encourage purchase of organic products ($\chi^2(400, 16) = 31.879, p < 0.05$) Figure 1.

Figure 1. Correlation of reason purchasing of organic products and the age of the consumers



Source: Authors' calculations

Age is factor which influence on decision of customers for purchase organic products depends of traits of products. Customers younger than 30 years and aged between 41 and 50, respect the reputation of products. Also, customers old between 41 and 50 years equally respect price, reputation and reputation of products, while for customers older than 60 years the most important is price of products ($\chi^2(400, 20) = 35.175, p < 0.05$).

Age of customers have statistically significant influence on the level of information and ways of information about organic food. The most affirmed customers are old between 41 to 50 years, than customers between 31 to 40 years of age and after that customers younger than 30 years. The value of Chi-square test was 24,913, a significance was less than 0.05.

Differences exist according to the manner in which people of different ages informed. Customers younger than 30 years and those between 41 to 50 years of years, the mostly use the Internet and other electronic media ($\chi^2(400, 16) = 32.574, p < 0.01$).

From internet services, people younger than 30 years of age, the most often use social networks for information, while older people the most believe in the content on Web sites ($\chi^2(400, 12) = 31.297, p < 0.05$).

Moreover, age of customers have influence on satisfaction with diversity of products that are available for purchase ($\chi^2(400, 12) = 25.493, p < 0.05$). There are significant differences between age group of customers according to diversity of products. The less satisfied customers which are between 31 and 40 years old.

Discussions

On the base of processed data of research can be said that both the hypotheses confirmed.

There is a preference for organic products in comparison to buying conventionally produced products. However, when we talk about the behavior of consumers, who participated in our study can be seen that less than half the customers often or always purchases organic products. This tells us that although there is a preference at the cognitive level, it not confirmed in behavior of customers.

The results corresponds to other investigation (Baudry et al., 2017; Paul et al., 2016). which reported that consumers are motivated for purchasing organic food from the reason to influence on technology o production food with reduction of environmental damages with their attitude in decision of food purchasing

When looking attitude towards organic products in our population can be concluded that the health and safety remain significant factors in the decision when purchasing organic products. This is illustrated by the fact that organic products are purchased primarily by recommendation and reputation. It means that customers very rarely make decision on the base of influence of advertisements, packaging, brand and even price.

In some research were found that consumers decide for purchasing on the base corporate social responsibility practice in interaction through non-financial information as well as that consumers prefer to accept to believe in the quality and price of products (Chang, 2017; Topp-Becker & Ellis, 2017).

The processors and traders of organic products are the most interested in gaining consumers trust and meeting their expectation for high-quality and certified organic products. Marketing of organic products contribute to competitiveness of producers and improve profitability allows appropriate prices. Marketing influenced by product policy, price policy, promotion policy and distribution policy.

The promotion of organic products is to achieve better recognition of products in on market, better information of consumers and their loyalty for purchase in the long term. In promotion the brand is very important indicator for recognition of the value of organic products. The priority in the food production is to establish a sound food safety management system as well as secure the food safety for consumers (Hsu et al., 2018).

The organic producers do not use synthetic pesticides, and since consumers and retailers are largely unaware of this, which need explain directly by means of product leaflets, magazines, internet, electronic media. Also, they need suggest a specific and authentic technology of production and products which must respond to functional and added value attributes.

It is necessary that the chosen promotion instruments should be adjusted to the operational marketing objectives. It is also essential to emphasize that the chosen marketing mix should not be statically fixed and that it does not need to cover all marketing measures in all cases, but instead must adapt to the (changing) operational

objectives. The costs of such measures vary considerably, depending on the country and local costs for public relations and other marketing activities. Producers of organic products can educate retailers how need efficiently give information to consumers, and to increase organic food purchase intentions (Chang & Chang, 2017).

The decision based on internet data information in purchase of organic product very often induce caution and certain degree of justified mistrust in society. Internet is not sufficient source of information what shows a significant percentage of customers with a critical review of the information obtained in this way.

Statistically significant differences in gender and age show us how much the purchase, manner of purchase and information about organic products and further conditioned by demographic characteristics. Results show that for each age group and gender need take approach in a specific manner, respecting and taking into account their habits and types of information. It is likely that the differences obtained in relation to the purchase of organic products caused by the different habits that are part of the general behavior of different consumer groups.

Customers want to know about the added value, about proposition of selling, the social and ecological benefits, the production methods shelf-life and product prices, and the health benefits and to taste recipes (Grubor & Djokić, 2016). Consumers believe that the organic food products are healthier than conventional products, and they are ready to pay more for such products (Sharma et al., 2016; Sarumathi, 2017).

There is different instruments which should be combined for a promotion about producer and potential customer of organic products, with different types of media at different times. The mix of instruments depends from business area, the products and the target groups and available budget:

- High-cost promotion: media advertising, sales and price promotions, merchandising;
- Medium-cost promotion: trade fairs, exhibitions, press receptions, open days, telephone sales;
- Low-cost promotion: press releases, newsletters leaflets, brochures and posters.

The desired product assortment can be based on one product or on a broad assortment. The broader the range, the less risky the marketing because selling activities are on different bases. There is the disadvantage, however, that broad assortments often lead to less specialization and the effects of economies of scale are reduced.

In Serbia there are resources for organic production and government support programs of production through different measure. The development of organic production in Serbia has to include a network of collaborators, led by the relevant ministry, through manufacturers, distributors, to consumers, to really great opportunities for the development of this industry in Serbia really take advantage.

Conclusions

The results of research showed that there are different habits of customers of organic products. Differences between customers are expressed on the base: of their mode of information about organic products, the reasons for purchasing organic products, of their requirements for quality of products on the market, according to place of purchasing organic products. According to habits of consumers of different sex and age, status, education, place of residence were established differences. Female more often use information from electronic media, other people and professional literature, while male more often use magazine for information about characteristics of organic products. Also, customers under the age of 30 and those between 41 to 50 years old, mostly use the Internet and other electronic media ($\chi^2(400, 16) = 32.574, p < 0.01$).

Majority of consumers (71.8%) in Serbia preferred to use organic products in comparison to conventionally produced products. They purchase organic products in different places: supermarkets (30.5%), on market places (25.4%) and in specialized shops (23.5%). Significantly less number of customers purchases organic products directly from the manufacturer (14.1%) or online (6.6%). The customers' decision to purchase organic products was influenced by reliability of the manufacturer (38%), price (23%), personal preferences (25.4%), assortment (10.3%), and location (3.3%).

Also, age of customers have influence on satisfaction with diversity of products that are available for purchase ($\chi^2(400, 12) = 25.493, p < 0.05$). The less satisfied customers which are old between 31 and 40 years.

Acknowledgements

This study financed by Ministry of Education, Sci and Technology Development of Republic Serbia-Project TR 31092.

Conflict of interests

The authors declare no conflict of interest.

References

1. Babović, J. (2008). Agribusiness in Organic Production, Agromenagement and Quality Standards, Organic Production Marketing, Multifunctional and Rural Development - Agrotourism, *Monograph, Organic Agriculture, Institute of Field and Vegetable Crops*, Novi Sad. [in Serbian: Babović, J. (2008). Agrobiznis u organskoj proizvodnji, Agromenadžment i standardi kvaliteta, Marketing organske proizvodnje, Multifunkcionalni i ruralni razvoj - agroturizam].
2. Baudry, J., Péneau, S., Allès, B., Touvier, M., Hercberg, S., Galan, P., Amiot, M.J., Lairon, D., Méjean, C. & Kesse-Guyot, E. (2017). Food choice motives when purchasing in organic and conventional consumer clusters: focus on sustainable concerns (The NutriNet-Santé Cohort Study), *Nutrients*, 9 (2), 1-17.

3. Božić, M., & Vega Garcia, A. (2013). Organic agriculture in Austria. *Journées Internationales du Marketing, 9, Marrakesh, Morocco, Conference paper.*
4. Chang, H. H. (2017). Consumer socially sustainable consumption: the perspective toward corporate social responsibility, perceived value, and brand loyalty. *Journal of Economics and Management, 13* (2), 167-191.
5. Chang, S.H. & Chang, C.W. (2017). The strength, green expertise, and interpersonal influences on the purchase of organic food in an emerging market. *British Food Journal, 119*(2)284-300.
6. Dumea, A-C. (2012). Factors Influencing Consumption of Organic Food in Romania. *The USV Annals of Economics and Public Administration, 12*, 107-113.
7. Food and Agriculture Organization of the United Nations, FAO / WHO. (1999). "Guidelines for the production, processing, labeling and marketing of organically produced foods", Codex Alimentarius Commission, FAO, p. 2, available at:
8. <http://www.codexalimentarius.net/download/standards/360/CXG032e.pdf>
9. Golijan, J. & Dimitrijević, B. (2018). Global organic food market. *Acta Agriculturae Serbica, XXIII, 46*, 125-140.
10. Grubor, A., Djokić, N. (2016). Organic food consumer profile in the Republic of Serbia. *British Food Journal, 118* (1), 164-182.
11. Hsu, S.Y., Chang, C-C. & Lin, T.T. (2018). Triple bottom line model and food safety in organic food and conventional food in affecting perceived value and purchase intentions. *British Food Journal, doi.org/10.1108/BFJ-07-2017-0403*
12. Kalentić, M., Stefanović, E., Simić, I., & Maerz, U. (2014). Organic Agriculture in Serbia 2014. *National Organic Production Development Organization "Serbia Organica", Belgrade.* [in Serbian: Kalentić, M., Stefanović, E., Simić, I., & Maerz, U. (2014). Organska poljoprivreda u Srbiji 2014].
13. Kovačević, D. (2011). Contemporary concepts of sustainable agriculture development. permanent seminar of the Academy of Engineering Sciences of Serbia (AINS) <http://www.ains.rs/predavanja/Dusan%20Kovacevic%20predavanje%20AINS.pdf> [in Serbian: Kovačević, D. (2011). Savremeni koncepti održivog razvoja poljoprivrede].
14. Law on Organic Production, (2010). The official Journal RS, No. 30/10,
15. Michelsen, J., Hamm, U., Wynen, E. & Roth, E. (1999). The European Market for Organic Products: Growth and Development. *Organic Farming in Europe: Economics and Policy, 7*, pp. 199, University of Hohenheim, Germany, Hohenheim.
16. Oljača, S. (2015). Control and certification in organic production in Serbia: project Improvement of organic agricultural production in Western Serbia through education of agricultural producers. Ministry of Agriculture and Environmental Protection, available at: <http://arhiva.nara.ac.rs/handle/> [in Serbian: Oljača, S. (2015). Kontrola i sertifikacija u organskoj proizvodnji u Srbiji: projekat Unapređenje organske poljoprivredne proizvodnje u zapadnoj Srbiji putem edukacije poljoprivrednih proizvođača].
17. Paul, J., Modi, A. & Patel, J. (2016). Predicting green product consumption using theory of planned behavior and reasoned action. *Journal of Retailing and Consumer Services, 29*, 123-134.

18. Petrescu, A.G., Oncioiu, I. & Petrescu, M. (2017). Perception of Organic Food Consumption in Romania. *Foods*, 6, 42. doi:10.3390/foods6060042
19. Phillip, B., & Dipeolu, A. O. (2010). Willingness to pay for organic vegetables in Abeokuta, South West Nigeria. *African Journal of Food, Agriculture, Nutrition and Development*, Vol. 11, Nairobi.
20. Rosona, T. & Gebresenbet, G. (2018). Swedish Consumers' Perception of Food Quality and Sustainability in Relation to Organic Food Production. *Foods*, 7, 54; doi:10.3390/foods7040054
21. Sarumathi, S. (2017). A study on consumer's knowledge and willingness to pay for organic food products (in Pondicherry region). *International Journal of Innovative Research in Management Studies (IJIRMS)*, 1(12), 35-40.
22. Schleenbecker, R., Hamm, U. (2013). Consumers' perception of organic product characteristics. A review. *Appetite*, 71, 420-429.
23. Schmid, O., Hamm, U., Richter, T. & Dahlke, A. (2004). Organic Marketing Initiatives and Rural Development: A Guide to Successful Organic Marketing Initiatives. *FiBL*, p. 46. Frick.
24. Sharma, S., Shukla, R., Leua, A., Parmar, G., & Chaudhari, B. (2016). Consumers' awareness and opinion regarding organic food products in south Gujarat. *International Journal of Farm Sciences*, 6(3), 206-215.
25. Simić, I. (2017). Organic Agriculture in Serbia At a Glance 2017. *National Association Serbia Organica*, Novi Sad. [in Serbian: Simić, I. (2017). Organska poljoprivreda u Srbiji, ukratko 2017].
26. Sudarević, T., & Davčik, St.N. (2005). Labeling of Organic Agricultural Products in Serbia. *Annals of the Faculty of Economics in Subotica*, 14, 79-86. [in Serbian: Sudarević, T., & Davčik, St.N. (2005). Obeležavanje organskih poljoprivrednih proizvoda u Srbiji].
27. Sudarević, T., Salai, S., & Pupovac, Lj. (2011). Marketing Aspects of Supply of Organic Agricultural Products in Serbia and the Environment. *Annals of the Faculty of Economics in Subotica*, 47(26), 36-37. [in Serbian: Sudarević, T., Salai, S., & Pupovac, Lj. (2011). Marketing aspekti ponude organskih poljoprivrednih proizvoda u Srbiji i okruženju]
28. Topp-Becker, J. & Ellis, J.D. (2017). The role of sustainability reporting in the agri-food supply chain. *Journal of Agriculture and Environmental Sciences*, 6 (1), 17-29
29. Vlahović, B. & Puškarić, A., (2013). Organic agriculture - the chance for agribusiness, Novi Sad, Department of Economy, Novi Sad. [in Serbian: Vlahović, B., & Puškarić, A., (2013). Organska poljoprivreda-šansa za agrobiznis].
30. Vlahović, B., Tomić, D., & Popović V. (2010). Situation and Perspectives of Organic Agriculture Products. *Proceedings, Fourth Forum on Organic Production*, Selenča [in Serbian: Vlahović, B., Tomić, D., & Popović V. (2010). Stanje i perspektive potrošnje proizvoda organske poljoprivrede].
31. Willer, H., & Lernoud, J. (2014). The World of Organic Agriculture. Statistics & Emerging Trends 2014. Research Institute of Organic Agriculture (FiBL) and International Federation of Organic Agriculture Movements (IFOAM), Frick

32. Xie, B.; Wang, L., Yang, H., Wang, Y. & Zhang, M. (2015). Consumer perceptions and attitudes of organic food products in Eastern China. *British Food Journal*, 117, 1105–1121.
33. Zarić, V., & Mijajlović, J. (2014). Consumer attitudes towards organic products in Kraljevo municipality. [in Serbian: Zarić, V., & Mijajlović, J. (2014), Stavovi potrošača prema organskim proizvodima u opštini Kraljevo] *Agroekonomika*, 43(63-64), 136-144.

FUTURE DRIVERS OF RURAL PROSPERITY IN KNOWLEDGE AGE: LITHUANIAN CASE

Rita Vilke¹, Zivile Gedminaite-Raudone², Drago Cvijanovic³

*Corresponding author E-mail: rita.vilke@laei.lt

ARTICLE INFO

Review Article

Received: 18 December 2018

Accepted: 03 March 2019

doi:10.5937/ekoPolj1901143V

UDC 005.941:338.435(474.5)

Keywords:

Networking, innovation, social responsibility, rural community, rural prosperity, rural development policy.

JEL: M14, O18, O31, R11, D85.

ABSTRACT

The knowledge age greatly shaped society's understanding of what goes beyond the agribusiness and sharply raised the question of farmers' responsibilities on the way they do farming in relation to the payments they receive as public support. Therefore the new rural prosperity drivers in knowledge age calls for the new principles of European Union support distribution for agriculture and rural development. The aim of this research is to explore future drivers of rural prosperity based on knowledge society measures. It is argued, that the upcoming European Union rural prosperity is guided by knowledge philosophy encompassing the nexus among 'innovating', 'networking' and 'giving back' to society. Original empirical data, collected in Lithuanian in 2017, explores farmers' attitudes towards listed knowledge society measures in relation to farm size and other relevant characteristics. Research findings suggest more promising directions for agriculture and rural development that contributes better for rural prosperity in knowledge age.

© 2019 EA. All rights reserved.

Introduction

EU support principles for agriculture and rural development had been recently controversially debated by broad society. The new rural development paradigm faces new challenges due to the greatly changed overall development in the world. Overall development in rural areas performed numbers of transformations due to the establishment of the Treaty of Rome and Common Agricultural Policy (CAP). Industrialization due to mechanization, farm electrification, installation of irrigation and

-
- 1 Lithuanian Institute of Agrarian economics, V. Kudirkos st. 18–2, 03105 Vilnius, Lithuania, tel. +370 672 00413, e-mail: rita.vilke@laei.lt., ORCID ID <https://orcid.org/0000-0003-3112-5415>.
 - 2 Zivile Gedminaite-Raudone, Lithuanian Institute of Agrarian economics, V. Kudirkos st. 18–2, 03105 Vilnius, Lithuania, tel. +370 5 261 3169, e-mail: zivile.gedminaite@laei.lt, ORCID ID <https://orcid.org/0000-0001-8437-5368>.
 - 3 University of Kragujevac, Faculty of hotel management and tourism in Vrnjačka Banja, Vojvodjanska bb, 36210 Vrnjacka Banja, Serbia, tel. +381 36 515 0024, e-mail: drago.cvijanovic@kg.ac.rs, ORCID ID <https://orcid.org/0000-0002-4037-327X>

amelioration systems, chemical production technologies, including artificial fertilizers, herbicides, insecticides, fungicides, etc. greatly affected work processes, and composed grassroots for side effects later to arrive. The so-called progress in these processes is lately exponentially accelerated by growing application of various knowledge and new technology-based soft (non-technical) and hard (technical) innovations in agricultural processes and production. The reformed CAP in 2014–2020 was a strong response from the EU to the biggest challenges of today, such as food safety, climate change, sustainable growth and job creation in rural areas. There was an aim to support in this period a market-oriented agriculture where farmers can obtain stronger position within the food production chain. The CAP is seen as an important driver for jobs, smart, sustainable and inclusive growth.

For 50 years, the CAP has been a genuinely European policy of strategic importance. As it is a true Community policy, more than 70 percent of agricultural funding in Europe today comes from the EU and no longer from national or regional coffers. Its share in the Multiannual Financial Framework (MFF) for 2014–2020 is considerably large: 312.7 billion euros or 29 percent for market-related expenditure and direct aids (Pillar 1); and 95.6 billion or 9 percent for rural development (Pillar 2) (The European Commission, 2017). In total for CAP it is 38 percent of total MFF budget for 2014–2020.

Significant changes arrived alongside these transformations both to rural landscapes and everyday life in the countryside. Recent scientific discussions addressed this as a shift in rural paradigm (e.g., Murdoch, 2000; Mather, Hill, & Nijnik, 2006; Horlings & Marsden, 2014; Vidickiene & Melnikiene, 2014, etc.). The activity and wellbeing of farmers and rural residents had been strongly shaped due to the established agricultural policy and support schemes, since farmers are responsible for the provision of public goods on more than half of the territory of the EU (European Commission, 2018). Thus responsibilities, which arise alongside the farming activity, keep shaping the industrial meaning of agriculture as public goods' provider. And therefore future rural prosperity highly depend on transformations-sensitive political drive with precisely defined new directions, taking into account described dramatic shift of rural development paradigm (Murdoch, 2000; Mather, Hill, & Nijnik, 2006; Horlings & Marsden, 2014).

The discussions about future values for rural prosperity in knowledge society, demanded by rural residents had been raised due to the changed society's understanding about the quality of life in rural areas. Several studies (e.g. Fink, Lang & Richter, 2017; Jentsch, 2017; Liu and Li, 2017; Lavesson, 2017; Whitby and Willis, 2017, etc.) argue that educated and skilled people in countryside communities with innovative success baggage, filled-in with abilities to network, innovate and share acquired advancements with local residents by 'giving back' to society hold potential to accelerate the development of rural areas. However, there is still lack of scientific discussions in literature related to future rural prosperity drivers regarding the combination of new success factors, i.e. networking, innovating and 'giving back' to society.

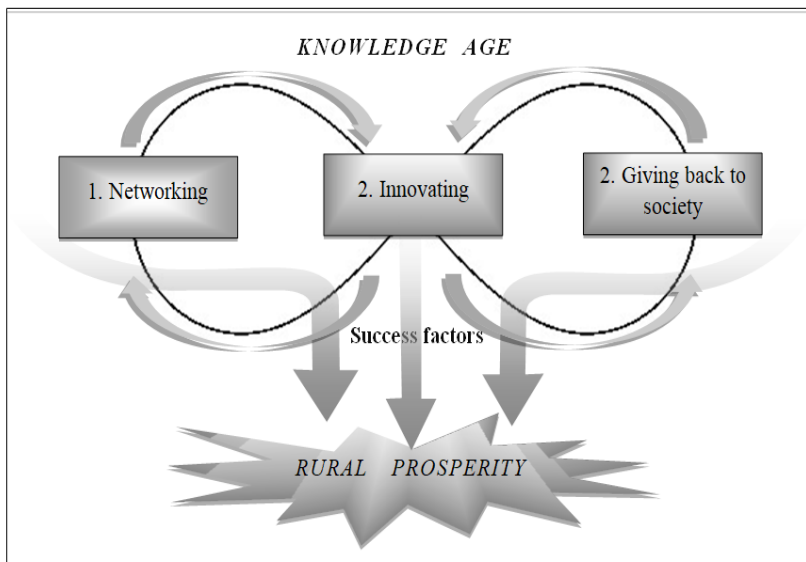
The main aim of this research is to explore the major factors that are promising to moderate rural prosperity in on-going knowledge age. To reach the aim, theoretical assumptions made through scientific literature analysis are proved with representative empirical evidence, collected using survey method in Lithuanian farms in 2017.

Theoretical background

The increasing role of knowledge and its empowerment in recent research is often addressed to a shift from industrial to post-industrial phase of development and supported with systemic explanation of transformations in social, cultural and economic systems (Murdoch, 2000; Mather, Hill, & Nijnik, 2006; Horlings & Marsden, 2014; Vidickiene and Melnikiene 2014; Fink, Lang & Richter, 2017; Lavesson, 2017). Thus rural development paradigm had performed significant changes that composed new set of elements for success in knowledge age. The three major factors that call for rural prosperity under modern conditions might be summarized using three knowledge society measures: networking, innovating and 'giving back' to society. Nowadays increase number of artificial intelligence use cases by industry with high job impact, global merger-and-acquisition activity related and and cognitive technology-driven automation leads to economic growth (Vochozka et al., 2018; Hardingham et al., 2018; Neary et al., 2018; Nica et al., 2018).

Thus future drivers of rural prosperity in knowledge age might be explored using continuous moving throughout the infinite pathway of networking, innovating and 'giving back' to society (see Figure 1).

Figure 1. Continuously interacting factors for rural prosperity in knowledge age



Source: Composed by authors

Networking is emphasized as an important strategic tool in attaining innovation. It is beneficial to capture ideas, reduce distance with policy makers, prevent them from insulation, know the right people and places to obtain information (Lambrecht et al., 2015; Madureira et al., 2015; Jentsch, 2017). At the same time, networks give access to complementary resources, skills, capabilities, and knowledge that are not internally available (Pittaway et al., 2004; Vacaro et al., 2012; Whitby and Willis, 2017). Some scholars (e.g., Liu and Li, 2017; Sumane et al., 2017) stress the compulsory existence of knowledge networking and multi-actor knowledge networks that facilitate knowledge exchanges, joint learning and the generation of new, more integrated solutions, aiming to achieve sustainable and resilient agriculture.

Innovativeness most is often is defined as the major success factor in modern society (Chrisman et al., 2015; Dunne et al., 2016; Kusano, Wright & Conger, 2016). In knowledge age success is found when focusing on innovation as a core farming business value (Madureira et al., 2015; Reimers-Hild & Dye, 2015a; Reimers-Hild & Dye, 2015b; Neumeier, 2017; etc.). There is a lot of evidence, how innovative rural communities create better quality of life (Pittaway et al., 2004; Vaccaro et al., 2012; Esparcia, 2014; Saleminck, Strijker & Bosworth, 2017). Normally, due to particular reasons a lot of innovative initiatives fail (von den Eichen, Freiling & Matzler, 2015). Innovations itself hold a necessity to compose appropriate network, that might serve as a platform to exchange most important information among relevant stakeholders of the issue. Network might be elaborated from personal, informal and formal contacts, taking into account actors in the field from both close and remote environment. Researchers suggest (Pittaway et al., 2004; Vacaro et al., 2012; Lambrecht et al., 2015; Madureira et al, 2015; Sumane et al., 2017) that networks should cover variety of stakeholders: colleagues, input industries, traders, researchers, extensionists, government officials, civil society organizations, etc.

Among different scholars innovating in the field of rural development is recognized as quite specific. Modern networks in all their forms perfectly serve for ensuring the sufficient flow of information regarding innovative products and services proposed by farmers and rural communities to the customers (Vacaro et al., 2012; Lambrecht et al., 2015). Thus they become vitally important for the quick spread of innovative knowledge concerning rural issues. But the most important factor to accelerate the spread of innovative knowledge is to put together actors from different spheres into one network and organizes knowledge sharing among them. There is no need for any specific infrastructure (e.g. electronic devices, software etc.) to get involved in innovative rural networks. Ordinary software applications for modern communication equipment, various popular applications compose successful joint local community and farmers' contact system (Madureira et al, 2015; Saleminck et al, 2017). Exceptional skills are not on demand to make a platform for innovating together, as it can be successfully moderated by community leader, who hold obvious software skills in knowledge age.

In knowledge age, more inclusive and flexible modes of governing the generation, integration and sharing of knowledge are on demand. A current challenge of agriculture,

and the many roles it is being asked to fulfil is tightly related to dynamic contexts, complexity and the local specificity (Pittaway et al, 2004). In knowledge age it is vitally important to recognize all stakeholders, including farmers as equal co-authors of knowledge generation (Sumane et al., 2017). At the same time both formal and informal knowledge need to be brought together in innovation processes.

Willingness to *'give back' to society* in a form of shared knowledge and experiences through networks is one more essential factor, which should exist aiming to accelerate rural community and farmers to perceive prosperity. The initial idea of *'giving back'* to society arrives from business literature of the mid-fifties of the 20th century (Bowen 1953) after the theory of corporate social responsibility (CSR). The main idea of the theory is that every operating unit hold responsibility for the society at a large or locally in its operating area (Boyd et al, 2017; Lee-Davies, 2017; Schwartz, 2017; Carroll & Brown, 2018). CSR theory says that the way of running an activity beyond the law is equally important to the aim of earning profits and increasing productivity. Most often CSR is explained as a three-fold responsibility of any operating unit, including economic environmental and social responsibility (Carroll & Brown, 2018). In agricultural literature CSR appeared in a first decade of the 21st century and is referred as a toolbox which might help implement the sustainable development goals (Mazur-Wierzbicka, 2015). *'Giving back'* to society is tightly related to the so-called *'openness'* of innovation, or responsible innovation which conditionally determines the willingness to innovate together in close and remote environments. It overwhelms the spread of the affected area thus giving evidence on both internal and external effects of innovation for local community implementation, especially with regard to distanced social systems in regions with the help of networks. This sometimes also refers to *'responsible innovation'*, as it is intended to make a positive change for society in the region. Therefore, it becomes evident how important is innovating together - spreading the externally acquired knowledge to local community members when raising its potential to innovate (Duh & Kos, 2016; Specht, Zoll & Siebert, 2016). Local farmers may become a networked driving force for burning and sharing innovations with local community, thus making a tremendous contribution to the development of rural regions and local communities itself. In this research openness for local rural community and willingness to share acquired knowledge and skills is called *'giving back'* to society.

Summarized scientific literature in the field of interest of this research highlight the existing lack of scientific discussions regarding the impact of infinite networked collaboration for innovation in agriculture and its spread thus *'giving back'* to society. It has never been defined before in such continuous relation and interaction. It is suggested by authors to use the proposed theoretical model (see Figure 1) to define future drivers of rural prosperity in knowledge age as a combination of new success factors, i.e. networking, innovating and *'giving back'* to society, by sharing gained advancements with local residents. It should be stated here, that various knowledge society measures had been proposed in many scientific studies before, but they had been never analysed in such combination as drivers for rural prosperity in knowledge

age. Further research results and discussion on empirical findings help validate the proposed theoretical model as relevant for further developments in the field.

Research approach and methods

Positivist methodology approach was used as a basis for this research. Conceptual framework was built using scientific literature review, systematization and theoretical modelling methods. Focused review of scientific literature in the field of issue-specific innovations, networking theories and conception of social responsibility as 'giving back' to society helped identify relevant themes and appropriate factors as drivers for rural prosperity in knowledge age. In this research stage it was identified that future drivers of rural prosperity in knowledge age seems to be greatly shaped by networked collaboration for innovation and 'giving back' to society between rural communities and farmers. Systematization method was applied aiming to build a theoretical construct for the research. Theoretical modelling served for the reduction of actual topics and factors to be measured when building the research framework.

Reliability of primary theoretical findings was done with help of two-stage expert evaluation. Nonprobability criterion sampling procedure was applied when attracting voluntary international experts, who proved the suitability of theories and selected factors to be employed in the agrarian discourse. The first stage of expert evaluation consisted of rating the theoretically selected approaches towards rural prosperity from most suitable to least suitable concerning innovations, networking and social responsibility theories in the agrarian discourse. The second stage was devoted to test the probability of theoretically selected most relevant factors in this discourse. Sufficiency on the agreement among expert opinions was assessed using Kendall's coefficient of concordance W which was found close to 1. Therefore, aggregated expert evaluation results approved theoretical findings.

The research question was formulated as follows: "what are the future drivers of rural prosperity in knowledge age?". The three main themes theoretically approved for further empirical investigation as future drivers of rural prosperity research were 'networking', 'innovating' and 'giving back' to society:

- '*Networking*' theme was encompassed in relation to innovations (networking with universities) and 'giving back' to society (sharing acquired knowledge with local community), as well as channels used to sell products (5 options of both ordinary and networked channels and open position for listing other).
- '*Innovating*' theme was disclosed by questioning farmers, how often (i.e., less than 1 time per year, 1 time per year or more than 1 time per year) they buy new and upgrade the existing technical infrastructure as well as processes in their farms.
- '*Giving back*' to society theme was disclosed by asking whether farmers consider their self as local community members who may contribute to its

development using polar (yes or no) question and list of more concrete 10 activities (1 to 5 Likert scaling) to be performed in the name of 'giving back' to society.

Scientists' team performed pilot face-to-face interviews with 100 Lithuanian farmers. After insignificant corrections original representative empirical data was collected by experienced subcontractor. General population of Lithuanian farmers equals to =138.9 thousand (Agriculture and food sector in Lithuania, 2016, p.36). Calculated representative population under statistical conditions of 3 percent error ($\epsilon=0,05$) and 95 percent ($p=0,5$) confidence level is $n=1059$ (Schwarze, 1993). Respondents were selected using systemic sampling of research subcontractors' database. Data were collected using telephone interviews of Lithuanian farmers in January-February 2017. Potential respondents had been telephoned 3211 times, 1491 times without response, 612 farmers rejected the suggestion to take part in the interview. Finally 1108 interviews were acknowledged suitable for further investigations which satisfy defined statistical conditions.

The obtained data was processed with descriptive statistical analysis. The percentage distribution of respondents' answers was calculated, comparing data between the groups by using χ^2 test (significance level $p<0,05$). The sample size of the study allows ensuring that the statistical error of the results does not exceed 3.1 percent. Statistical analysis of data was performed using the SPSS 22.0 program. A two-stage variable χ^2 independence test was performed to determine whether the respondent's characteristics (sex, age, etc.) affect the distribution of answers to questions. Only those answers are used as evidence, in which the test showed that the distribution of answers depends on the respondents' characteristics.

The interviewed Lithuanian farmers represent all the municipalities of the country, different natural areas; reflect various farming conditions and the corresponding characteristics of farmers and farms: the gender, age, education of the farmer; size of farm, duration of farming activity, and type of farming (Agriculture and food sector in Lithuania, 2015).

The study involved 57.7 percent men and 42.3 percent women. The majority of surveyed farmers (38.3 percent) were respondents aged from 55 to 64; the second age group (27.6 percent) were farmers aged between 45 and 54, respondents of 65 years and older composed 23.9 percent. The smallest group of respondents is represented by youngest farmers: 1.1 percent is up to 35 years and 9.1 percent aged between 35 and 44. The majority of respondents (34.5 percent) had acquired professional education; farmers with acquired upper and secondary education composed respectively 23.7 percent and 21.4 percent. The smallest group of respondents according to their education consists of respondents with lower secondary (4.6 percent) and primary education (1.6 percent). The majority (88.4 percent) of the surveyed farmers acquired education before 1990 (or in the Soviet period), 10 percent - before the Lithuania's accession to the EU (i.e. in the period of 1990-2004) and 1.6 percent in 2005 or later, i.e. after Lithuania's accession to the EU.

Less than half of the surveyed farmers (40.2 percent) have a farm of economic size (turnover in euros per month) up to 4,000 euros and, according to this criterion, falls into the smallest group of farms. 22.3 percent of respondents' farms has the turnover from 4 001 to 8 000 euros; 16.3 percent - from 8 001 to 15 000 euros, 8.8 percent - from 15 001 to 25 000 euros, 6.3 percent - from 25 001 to 50 000 euros. The smallest group of respondents consists of the farms with largest turnover. The turnover of the surveyed companies ranges as following: 3.4 percent - from 50 001 to 100 000 euros, 1.9 percent - from 100 001 to 250 000 euros and 0,8 percent - more than 250 001 euros. The majority of respondents (44.8 percent) are farmers whose farm size is up to 20 hectares (ha); 32.1 percent - from 20.1 to 50 ha; 13.7 percent - from 50,1 to 100 ha. The smallest part of the respondents are farmers with farms of 100.1 to 500 ha (9.2 percent) and more than 500.1 ha (0.2 percent).

According to the criterion of the duration of the activity, almost half of the surveyed farmers (46.6 percent) started their farming activities 21 year ago or even earlier, a similar proportion of respondents (43.1 percent) – from 11 to 20 years ago, and the youngest farms with experience 10 and less years of farming composed 10.3 percent. More than half of the respondents (54.1 percent) have mixed (both crop and livestock) farms, 21.5 percent are crop farmers, and livestock farmers compose 13.3 percent. By summarizing the general characteristics of survey respondents, it can be stated that the survey data is representative.

Results and discussions

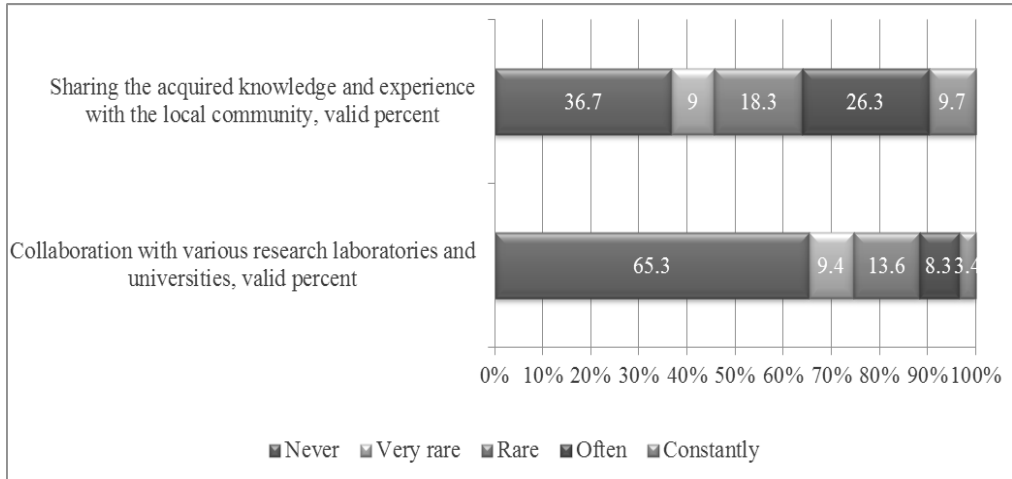
Research results approved significant role of all three theoretically explained counterparts of rural prosperity in knowledge age, including infinite flow of knowledge, creating innovations through networks and bringing it back to society.

Lithuanian farmers' willingness *to network* was firstly approved by the size of farms. During the research it became evident, that almost half of Lithuanian farmers (48.1 percent) hold less than 5 hectares of land (ha) and are too small to compete in the market equally in gaining knowledge and innovating with those big farms with great resources to innovation. 21.8 percent of Lithuanian farms hold from 5.1 to 10 ha, 13.5 percent of farms hold 10.1-20 ha, 8.9 percent holds 20.1-50 ha. And only the rest 7.7 percent of farmers hold 50 ha and bigger farms that have enough resources and potential to act in knowledge market and innovation process their self, without advantages assured through networking.

'Networking' theme was also encompassed in relation to innovations as networking with universities – acquisition of innovative knowledge through direct knowledge creators and providers. Research suggests that Lithuanian farmers quite rarely consider universities as networking and innovation partners, since they are very passive in collaboration with universities (see Figure 2). Only 3.4 percent of farmers continuously collaborate with universities and research laboratories, 8.3 percent stated they do this often. Rare collaboration was stated by 13.6 percent, very rare by 9.4 percent or

Lithuanian farmers. 65.3 percent of farmers responded, they had never collaborated with any university or research laboratory.

Figure 2. Frequency of farmers' intent to acquire new knowledge for innovation and share it with local community



Source: authors' calculations

Related part of networking was encompassed parallel with modern knowledge society measure under 'giving back' to society. It helped to disclose openness of acquired knowledge as innovation through networks. Sharing acquired knowledge with local community was defined as 'never performed' by 36.7 percent, 'very rare' - by 9.0 percent and 'rare' by 18.3 percent of Lithuanian farmers. 9.7 percent farmers constantly share their knowledge with local community, and 26.3 percent do this quite often.

Everyday networking activity, implemented by Lithuanian farmers was also investigated using more practical aspect - channels used by farmers to sell their products. Most of Lithuanian farmers sell their products via cooperatives (44.0 percent) and directly from farms (43.7 percent). Small farmers' markets are acceptable for 10.5 percent farmers. Among the other product distribution network possibilities (18.5 percent) most often mentioned co-operators were found processors of agricultural raw materials. It might be summarized, that all researched types of networking is most actively performed by farmer's who hold 20,1-50 ha farms, has turnover of up to 4000 Eur, are aged between 40-64 years and hold professional or higher education, acquired before 1990.

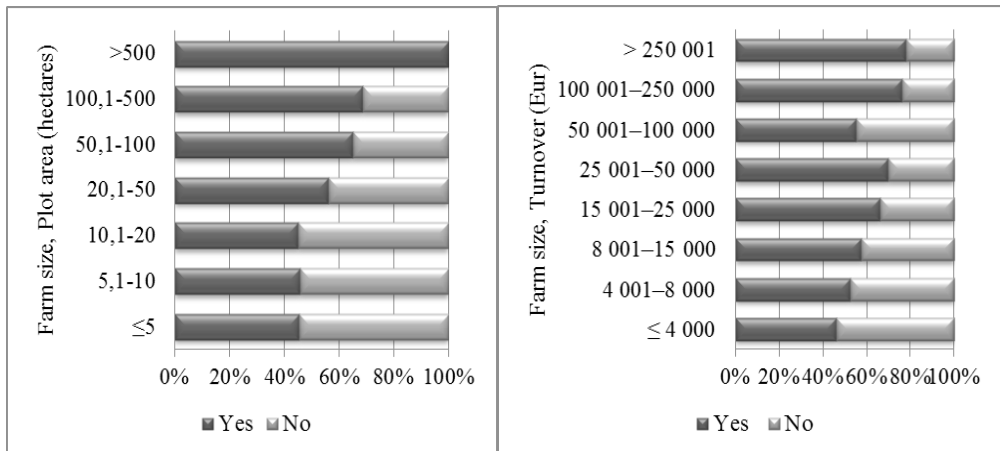
'Innovating' counterpart helped disclose, that most of Lithuanian farmers are passive innovators due to the upgrading organizational processes and technical equipment. In upgrading the existing production facilities dominant position, represented by 76.1 percent of farmers, is less than once a year. Organizational processes are also very rarely upgraded - 85.2 percent of interviewed farmers said they do this less than once a year. The question concerning the purchasing of modern production facilities

was mentioned as performed rarer than once a year by 90.2 percent of respondents. Installing innovative organizational processes less than once a year is done by 84.3 percent of Lithuanian farmers.

Deeper descriptive analysis of research results reveal, that experienced farmers who hold the farm for 11 and more years are those farmers who responded that they perform listed innovative activities 1 time per year and more than 1 time a year. Innovations are more acceptable to install and apply in mixed farms (56.77 percent), than in crop farming (25.54 percent) and livestock farms (17.69 percent). It was unexpected finding that the bigger the farm is due to its annual turnover, the less it is active in upgrading equipment and organizational processes. Similar situation was found with purchasing new equipment and installing innovative organizational processes. It became evident from this point of view that most active innovators both from technical to organizational innovations are farms with turnover up to 50 000 euros. Research results demonstrate that most active innovators are between 45 and 65 years old.

'Giving back' to society counterpart results were diverse. The first part of findings demonstrates farmer's intent to 'give back' to society from farm size (economic units and plot area in hectares), farmer's gender, age and education perspectives. Research results reveal that the bigger the farm in its size is (both in economic and plot area aspects), the greater farmer's consideration to contribute to local community development is (see Figure 3).

Figure 3. The relation among farm size and farmer's self-consideration as contributor to its local community development by 'giving back' to society.



Source: Composed by authors

It was disclosed almost equal half-by-half share of farmers who consider their self as local community development contributors (53.8 percent) or non-contributors (46.2 percent). In depth descriptive analysis reveals that male farmers consider their self as

community developers more often (57.0 percent) than women (49.5 percent). It was found that age acted as a significant factor for 'giving back' to society. The younger the farmer was, the greater intent to contribute to local community development he/she held: positive answers were received from 83.3 percent of respondents under 35 years old. Education was also found among significant factors: the higher farmer's education was, the stronger his consideration to contribute to local community development rose. Significant finding was made with regard to the relation between period of time when first higher education was acquired (i.e., before Lithuanian regained independence in 1990s; before Lithuania's acquisition the EU 1990-2004; after Lithuania's acquisition to the EU - 2005 and later) and farmer's intent to contribute to local community development. It was found much greater intent to contribute to local community development from farmers, who acquired their first higher education in 2005 and later.

The second part of results helped rate the activities performed by Lithuanian farmers for local community development in the name of 'giving back' to society. Among proposed 10 options of possible activities top three positions (according to Likert scale accumulated results of 'permanently' and 'often') were: first, supporting transparency and keeping public-interest-protecting position in relations with local government representatives (47.2 percent); second, taking into account the interest of local indigenous people when developing a farm (42.0 percent); third, taking active role in local in the community events and traditional festivals (39.8 percent). 36.0 percent or questioned farmers constantly and often share acquired knowledge and experiences with local community. However, giving the fact that Lithuanian farmers pay the least attention to cooperation with various research laboratories and universities (the last position: 'never', 'very rarely' and 'seldom' - 88.3 percent of farmers), it can be argued that so far Lithuania farmers are more likely to share their practical experiences with community members than innovative knowledge acquired through seminars and other educational events organized by universities and research laboratories as knowledge dissemination activities.

This study fulfilled previously collected evidence regarding future values of rural prosperity e.g. Fink, Lang & Richter, 2017; Jentsch, 2017; Liu and Li, 2017; Lavesson, 2017; Whitby and Willis, 2017, etc.), that knowledge come through the channels of young entrepreneurs, which propose different acting schemes for rural communities and thus start playing crucial role in modern rural development, especially in case of raising social innovations and transformations made by people in a countryside.

Conclusions

1. The ongoing scientific discussion highlights the changing understanding of the main function of rural regions as places with dominant agricultural activity as food and fiber providers. Due to the radical shift from agriculture to services, rural regions perform crucial transformation in knowledge society, which promise to change significantly rural prosperity success factors in nearest future. And this will happen in a continuous interflow of knowledge through networks which will provide 'giving back' to society.

2. Rural prosperity in knowledge age calls for collective, innovative and responsive actions via networking which might help accelerate the access and acquisition to brand new knowledge as well as spreading these ideas for community in the region, which in total would lead to opening the innovation. Rural prosperity in knowledge age might come into action in case of existence of the three main factors: first, accelerated networking - the size of farms and rural enterprises due to the limited number of employees; second, the shift from technical to organizational innovations; third, the shift from individual sectorial to responsive territorial rural development strategies, enabled through the spread of acquired and shared knowledge.
3. The dominance of small farms in Lithuania calls for the necessity to collaborate and network. Only bigger farms have enough resources and potential to act in knowledge market and innovation process their self, without advantages assured through networking. Passive farmers' collaboration with universities demonstrates low networking level and low ability of farmers to acquire new knowledge for innovating and thus compose barriers for rural prosperity in future. Alongside, inability of Lithuanian farmers to act actively in knowledge market due to limited networking and innovating practices creates significant difficulties for the existence of the third measure – 'giving back' to society, since there is nothing to share once nothing was acquired through networks and innovation channels.
4. Research findings demonstrate that, in Lithuanian case, the EU support does not fulfil the major goals of sustainability. It still increases productivity, instead of putting all actors in fair responsibility for future generations. Thus future drivers for rural prosperity based on knowledge society measures, that encompass the upcoming rural prosperity in European Union should be changed. They should be necessarily guided by knowledge philosophy focusing at least the nexus among 'innovating', 'networking' and 'giving back' to society.

Conflict of interests

The authors declare no conflict of interest.

References

1. Agriculture and Food sector in Lithuania in 2015 (2016). Lithuanian Institute of Agrarian Economics. Vilnius, 2016.
2. Agriculture and Food sector in Lithuania in 2016 (2017). Lithuanian Institute of Agrarian Economics. Vilnius, 2017.
3. Boyd, B., Henning, N., Reyna, E., Wang, D., Welch, M., & Hoffman, A. J. (2017). *Hybrid organizations: New business models for environmental leadership*. Routledge.
4. Carroll, A. B., & Brown, J. A. (2018). Corporate Social Responsibility: A Review of Current Concepts, Research, and Issues. In *Corporate Social Responsibility* (pp. 39-69). Emerald Publishing Limited.

5. Chrisman, J. J., Chua, J. H., De Massis, A., Frattini, F., & Wright, M. (2015). The ability and willingness paradox in family firm innovation. *Journal of Product Innovation Management*, 32(3), 310-318.
6. Duh, E. S., & Kos, A. (2016, October). Fablabs as drivers for open innovation and co-creation to foster rural development. In *Identification, Information and Knowledge in the Internet of Things (IIKI), 2016 International Conference on* (pp. 214-216). IEEE.
7. Dunne, T. C., Aaron, J. R., McDowell, W. C., Urban, D. J., & Geho, P. R. (2016). The impact of leadership on small business innovativeness. *Journal of Business Research*, 69(11), 4876-4881.
8. Esparcia, J. (2014). Innovation and networks in rural areas. An analysis from European innovative projects. *Journal of Rural Studies*, 34, 1-14.
9. Ethical CSR Leadership: Passion or Fashion. *International Journal of Sustainable Entrepreneurship and Corporate Social Responsibility (IJSECSR)*, 2(2), 1-22.
10. European Commission (2017). MFF 2014-2020. http://europa.eu/rapid/press-release_IP-13-1096_en.htm.
11. European Commission (2018). CAP Expenditure and CAP Reform Path. https://ec.europa.eu/agriculture/sites/agriculture/files/cap-funding/pdf/cap-spending-09-2018_en.pdf.
12. Fink, M., Lang, R., & Richter, R. (2017). Social entrepreneurship in marginalised rural Europe: towards evidence-based policy for enhanced social innovation. *Regions Magazine*, 306(1), 6-10.
13. Friedrich von den Eichen, S., Freiling, J., & Matzler, K. (2015). Why business model innovations fail. *Journal of Business Strategy*, 36(6), 29-38.
14. Hardingham, Eileen, Jaromír Vrbka, Tomas Kliestik, and Jana Kliestikova (2018). Will Cognitive Technology-Driven Automation Lead to Economic Growth?. *Journal of Self-Governance and Management Economics*, 6(4): 13–18.
15. Horlings, L. G., & Marsden, T. K. (2014). Exploring the ‘New Rural Paradigm’ in Europe: Eco-economic strategies as a counterforce to the global competitiveness agenda. *European Urban and Regional Studies*, 21(1), 4-20.
16. Jentsch, B. (2017). Young people in rural areas of Europe. Taylor & Francis.
17. Kusano, S., Wright, M., & Conger, A. (2016). Development and assessment of self-agency, and the ability to innovate and take risks. *Center for Research on Learning and Teaching Occasional Paper*, 34.
18. Lambrecht, E., Taragola, N., Kühne, B., Crivits, M., & Gellynck, X. (2015). Networking and innovation within the ornamental plant sector. *Agricultural and Food Economics*, 3(1), 10.
19. Lavesson, N. (2017). When and how does commuting to cities influence rural employment growth?. *Journal of Regional Science*, 57(4), 631-654.

20. Liu, Y., & Li, Y. (2017). Revitalize the world's countryside. *Nature News*, 548(7667), 275.
21. Madureira, H., Nunes, F., Oliveira, J. V., Cormier, L., & Madureira, T. (2015). Urban residents' beliefs concerning green space benefits in four cities in France and Portugal. *Urban Forestry & Urban Greening*, 14(1), 56-64.
22. Mather, A. S., Hill, G., & Nijnik, M. (2006). Post-productivism and rural land use: cul de sac or challenge for theorization? *Journal of Rural Studies*, 22(4), 441-455.
23. Mazur-Wierzbicka, E. (2015). The application of corporate social responsibility in European agriculture. *Miscellanea Geographica*. Vol. 19. No. 1: 19–23.
24. Murdoch, J. (2000). Networks—a new paradigm of rural development?. *Journal of rural studies*, 16(4), 407-419.
25. Neary, B., Horák, J., Kovacova, M., & Valaskova, K. (2018). The Future of Work: Disruptive Business Practices, Technology-Driven Economic Growth, and Computer-Induced Job Displacement, *Journal of Self-Governance and Management Economics* 6(4): 19–24.
26. Nica, E., Manole, C., & Stan, C. I. (2018). A Laborless Society? How Highly Automated Environments and Breakthroughs in Artificial Intelligence Bring About Innovative Kinds of Skills and Employment Disruptions, Altering the Nature of Business Process and Affecting the Path of Economic Growth. *Journal of Self-Governance and Management Economics*, 6(4): 25–30.
27. Neumeier, S. (2017). Social innovation in rural development: identifying the key factors of success. *The geographical journal*, 183(1), 34-46.
28. Pittaway, L., Robertson, M., Munir, K., Denyer, D., & Neely, A. (2004). Networking and innovation: a systematic review of the evidence. *International journal of management reviews*, 5(3-4), 137-168.
29. Pittaway, L., Robertson, M., Munir, K., Denyer, D., & Neely, A. (2004). Networking and innovation: a systematic review of the evidence. *International journal of management reviews*, 5(3-4), 137-168.
30. Reimers-Hild, C. I., & Dye, A. (2015). How to Grow Your Rural Business with Purpose and Meaning.
31. Reimers-Hild, C., & Dye, A. (2015). Become a Future-Focused Leader: Use Three Megatrends to Grow Your Rural Business.
32. Salemink, K., Strijker, D., & Bosworth, G. (2017). Rural development in the digital age: A systematic literature review on unequal ICT availability, adoption, and use in rural areas. *Journal of Rural Studies*, 54, 360-371.
33. Schwartz, M. S. (2017). *Corporate social responsibility*. Routledge.
34. Specht, K., Zoll, F., & Siebert, R. (2016). Application and evaluation of a participatory “open innovation” approach (ROIR): The case of introducing zero-acreage farming in Berlin. *Landscape and Urban Planning*, 151, 45-54.

35. Sumane, S., Kunda, I., Knickel, K., Strauss, A., Tisenkopfs, T., Des, I., ... & Ashkenazy, A. (2017). Local and farmers' knowledge matters! How integrating informal and formal knowledge enhances sustainable and resilient agriculture. *J. Rural Stud.* *In press*, 1-10. Lee-Davies, L. (2017).
36. Vaccaro, I. G., Jansen, J. J., Van Den Bosch, F. A., & Volberda, H. W. (2012). Management innovation and leadership: The moderating role of organizational size. *Journal of Management Studies*, 49(1), 28-51.
37. Vidickiene, D., Melnikiene, R. (2014). Evolution of rural policy: monograph. – Vilnius: Lithuanian Institute of Agrarian Economics. 272 p. ISBN 978-9955-481-44-7.
38. Vochozka, M., Kliestik, T., Kliestikova, J., & Sion, G. (2018). Participating in a highly automated society: how artificial intelligence disrupts the job market. *Economics, Management, and Financial Markets*, 13(4): 57–62.
39. Whitby, M. C., & Willis, K. G. (2017). Rural resource development: an economic approach. Routledge.

THE EFFECT OF WORKING CAPITAL MANAGEMENT ON PROFITABILITY: EVIDENCE FROM SOUTHEAST EUROPE

Bojana Vuković¹, Dejan Jakšić²

**Corresponding author E-mail: bojanavuk@ef.uns.ac.rs*

ARTICLE INFO

Review Article

Received: 27 September 2018

Accepted: 15 December 2018

doi:10.5937/ekoPolj1901159V

UDC 657.411.1:338.435(4-12)

Keywords:

Working capital Management, Profitability, Food industry

JEL: M40, G32

ABSTRACT

The research is designed to examine the effect of working capital management on company's profitability in the food industry in Southeast Europe, during the five years period (2010-2014). The sample included 9883 active companies. The influence of certain variables of working capital management (current liquidity, the ratio of current to total assets of companies, the ratio of current liabilities to total assets of companies, financial leverage and size of the company) was measured on the probability of higher profitability by applying probit regression analysis. The results of probit regression provide support to a hypothesis that most of the analyzed variables of working capital management have statistically significant impact on the probability of higher profitability. In this paper is also researched how the optimal level of working capital management can contribute to the growth of profitability and value of the company as a whole.

© 2019 EA. All rights reserved.

Introduction

Working capital management is the capital needed to meet the regular, continuous activities of the company and may constitute a high percentage of company's assets. The primary goal of working capital management is to prove a sustainable level of company's current assets and liabilities so that the company does not have the problem with profitability and liquidity. Reduced inventory enhances the financial liquidity risk due to reduced working capital (Golas, Bieniasz, 2016). Except for company's profitability and liquidity, working capital management has the impact on risk, solvency and value. So, efficient working capital management has the impact, not only on profitability as short-term financial performance, but also on shareholder's value maximization, as long-term financial performance.

-
- 1 Bojana Vuković Ph.D, Assistant Professor, University of Novi Sad, Faculty of Economics, 9-11 Segedinski put, 24000 Subotica, Serbia; bojanavuk@ef.uns.ac.rs, tel: +381214852933, <https://orcid.org/0000-0002-2147-8877>
 - 2 Dejan Jakšić Ph.D, Full Professor, University of Novi Sad, Faculty of Economics, 9-11 Segedinski put, 24000 Subotica, Subotica, Serbia; jaksicd@ef.uns.ac.rs, tel: +381214852947, <https://orcid.org/0000-0003-1711-1869>

In this paper is researched the impact of management of working capital on the profitability of companies in the food industry in 2010-2014. The sample consists of 9883 active companies. The companies in the food industry are chosen according to the fact that this industry has high operational engagement and also high incomes compared to other industries. On the other hand, this industry is characterized by a relatively high rate of indebtedness and loans with extremely high-interest rates and other unfavorable conditions. Another key issue is the problem of insolvency. Further, companies in the food industry in the Southeast Europe has not yet been subject of this kind of research in which was analyzed the impact of working capital management on company's profitability through five components (current liquidity, the ratio of current to total assets, the ratio of current liabilities to total assets, financial leverage and size of the company). Observed countries were Bulgaria, Bosnia and Herzegovina, Greece, Croatia, Romania, Slovenia, Serbia.

The ratio of current liquidity as the ratio of current liabilities and assets represents the company's ability to meet its current liabilities as they mature. Current liquidity is some kind of precondition for ensuring that company is able to meet their short-term obligations. It is essential to ensure the balance between profitability and liquidity because two main goals of any company are liquidity and profitability. The measurement of profitability and liquidity is vital to the existence and continuous survival of business. It enables companies to have a reasonable idea of their past financial activity (profitability) and current financial position (liquidity), which will provide them to take corrective measures in order to prevent any future financial activity arising from future profitability and liquidity crisis (Chukwunweike, 2014).

The share of current in total assets is a ratio necessary to consider bearing in mind that increasing the share of current assets affects the growth of regular activities. The adequate structure of funding sources is necessary for increased volume of business activities, primarily adequate amount of own and long-term sources. Current liabilities are very important factor in efficient management of working capital, due to the impact on increasing company's profitability and shareholder value (Deloof, 2003). More profitable companies often have lower liabilities.

Leverage is the sum of financial debt that companies use to increase profitability. The higher the level of debt, the higher is leverage, so the greater is the risk of companies. Companies with a lower share of debt, have less leverage and thus lower the risk of bankruptcy and less risk that they will not continue with their continuous activities.

Company's size is an essential determinant of the efficiency of a firm's working capital management. Larger companies may require larger investments in working capital because of larger sales and may be able to use their size because of necessary for reductions in investments in working capital.

Profit is a good measure of the performance of the company. Return on Assets (ROA) is an indicator that showed the efficiency of the company at generating profits from each unit of shareholders equity, in order to explain to what extent does the company use investments in order to earn a profit (Alshatti, 2015).

In order to determine the impact of management of working capital on profitability, this paper is structured in the following way. Firstly, we revised the relationship between working capital management and profitability through the literature review examined. Secondly, we described data model and used methods to assess the effect of the policy of working capital management on profitability. Before the conclusion, we presented the results of research with the discussion. Based on the results, in the end, we described requirements of the policy of optimal management of working capital, bearing in mind the limitations of the research and plans for future research in this field.

Literature review

Working capital management is essential in meeting daily activities of any company and often changes its form in the course of daily business of companies. Effective working capital management has a direct impact on profitability and liquidity of the company. According to Harris, A., management of working capital represents the ability of the company to provide adequate coverage of short-term liabilities from short-term assets (Harris, 2005).

Pouraghajan & Emamgholipourarchi (2012) analyzed the effect of management of working capital on profitability and market valuation of the companies. They analyzed a sample of 400 companies listed in Tehran Stock Exchange in the time period from 2006 to 2010. Return on assets and return on invested capital are observed as a measure of the company's profitability. Cash conversion cycle, current ratio, current to total assets ratio, current liabilities to total assets ratio and total debt to total assets ratio are observed as a measure of management of working capital. The results showed that there exists significant relationship among management of working capital and profitability of the company. Additionally, the results indicated that company's profitability can be improved by reducing cash conversion cycle and the ratio of total liabilities to total assets (Pouraghajan, Emamgholipourarchi, 2012).

Palanisamy, A., Sengottaiyan A. (2015) considered the effect of management of working capital on the profitability. In the focus of research, the author gathered data from pharmaceutical companies in India in the time period from 2002-2004 to 2012-2013. The ratio of total liabilities to capital was negatively linked to return on assets which imply that company should borrow more in order to achieve a higher return on assets. Companies should provide enough cash to fulfill their obligations and ensure high return on their assets. The ratio of current liabilities to total assets was also negatively linked to return on assets, which imply that by increasing current debts, the company will receive a maximum rate of return on assets (Palanisamy, Sengottaiyan, 2015).

The research covered by Irfan Ahmed (2013) examines the impact of management of working capital on the firms' performance by using the financial statement data of 253 non-financial firms listed on Karachi Stock Exchange (KSE). The data were analyzed by Ordinary Least Square (OLS) logistic regression and Pearson's correlation. The result seems that current asset to total sales has a negative relation with profitability, while

working capital management (WCM) has a positive relation to the firm's performance. However, the logistic result gives the suggestion that firm profitability is highly determined by the current ratio, assets to total asset & total sales ratio (Ahmed, 2013). Similar research was conducted by Binti, M. & Mohd Saad, N. in order to analyze the impact of indicators of working capital management on profitability and the company's market value. The results of regression analysis showed that observed indicators such as cash conversion cycle, current liquidity, current assets to total assets ratio, current liabilities to total assets ratio and debt ratio were in an inverse relationship with return on assets and return on invested capital (Binti, Mohd Saad, 2010).

Research methodology

Proper and optimal management of working capital should ensure that the company has no problems with liquidity and profitability. This paper was considered following indicators of management of working capital: current liquidity, the ratio of current to total assets of companies, the ratio of current liabilities to total assets of companies, financial leverage and size of the company.

The current liquidity ratio represented the company's ability to finance its due liabilities by available current assets. If management increases the level of current in total assets of the company, there will be a more conservative policy in managing current assets of the company. The companies with a lot of current liabilities can face significant liquidity risk, so it is necessary to consider the value of current liabilities to total assets ratio in terms of better financing.

The coefficient of financial leverage presented the share of debt in the total capital of the company ie. how much units of debt come to each unit of capital. A negative sign of financial leverage ratio pointed out that high level of indebtedness due to high-interest rates has reflect on bad operating results and rate of return (Pervan, Mlikota, 2013). Corporate performance is positively linked to capital structure (Soheilrad et al., 2017), so it is very important to take into account the structure of capital in order to have better profitability. Company's size is an essential determinant of the efficiency of management of working capital. Larger companies may require larger investments in working capital because of larger sales.

Return on assets as a measure of profitability explains the ability and performance of a company in using its assets to generate the income. In Table 1 (*Table 1.*) was presented used indicators of management of working capital and company's profitability.

Table 1. Indicators of Working Capital Management and Profitability

Indicators	Method of calculation
Current liquidity	Current assets/Current liabilities
CATAR	Current assets/Total assets
CLTAR	Current liabilities/Total assets
Debt ratio	Total liabilities/Total capital

Indicators	Method of calculation
Return on assets (ROA)	Operating result/Average total assets
Size of the company	According to the number of employees, the amount of assets and the amount of income

Source: Author's calculation

Empirical data and analysis

In order to analyze the relationship between working capital management and profitability, in the paper was used aggregate indicators of financial statements of 9833 active companies. These companies operate in the food industry in the Southeast Europe. Amadeus database was a basis for data because it contains financial and other information of private and public companies (Amadeus, 2017). Probit regression was used in Statistical program Stata 13 as a measurement for the effect of the management of working capital on the possibility of higher profitability of the company. So, return on assets was the dependent variable, while independent variables were current liquidity, the ratio of current to total assets, the ratio of current liabilities to total assets, financial leverage and company's size. According to previous research in this field and bearing in mind the importance of this issue, there were set five hypotheses:

H1: Current liquidity has significant negative impact on the possibility of higher company's profitability.

H2: The ratio of current to total assets has significant positive impact on the possibility of higher company's profitability.

H3: The ratio of current liabilities to total assets has significant negative impact on the possibility of higher company's profitability.

H4: Financial leverage has significant negative impact on the possibility of higher company's profitability.

H5: Firm's size has significant positive impact on the possibility of higher company's profitability.

Results of the research and discussion

Descriptive statistics for observed variables was presented in Table 2 (*Table 2*). The average rate of profitability in the observed period was 70%, which was in accordance with the reference value ($\geq 10\%$). Companies in the food industry had a high level of return on assets of the company. The average value of the ratio of current liquidity was 2.7, which was in accordance with the reference value (>2). So, short-term assets of companies in the food industry were sufficient for

settlement short-term liabilities in reporting period. Debts participated in total capital of company 781.3, so the reference value was not satisfied (financial leverage ratio $<$ 1). Companies were indebtedness in observed period and were not financed according to requirements of the traditional theory of finance or theory of organic composition of capital.

Table 2. Descriptive Statistics

Indicators	Obs	Average value	Standard deviation	Min	Max
Return on Assets	9883	.7022178	.3963243	-1.08e-06	15.15883
Current Liquidity	9883	2.684623	5.889181	-.5298399	99.31111
Current/Total Assets	9883	.4625351	.2477577	0	1.026116
Current liabilities/ Total Assets	9883	.4192303	.4940331	-.0847905	10.95211
Total liabilities/Total Capital	9883	781.3298	4315.936	-.879351	85.245.53
Size	9883	.2156228	.4112745	0	1

Source: Author's calculation

Table 3 (*Table 3.*) was presented the results of Chi2 which showed that the model was statistically significant ($p<0.05$).

Table 3. Probit regression

Log likelihood	LR chi2(5)	Prob > chi2	Pseudo R2
-6705.7961	289.15	0.0000	0.0211

Source: Author's calculation

According to the results presented in Table 4 (*Table 4.*), the first three observed variables of working capital management and size of the company significantly affected profitability ($p<0.05$). On the other hand, the impact of financial leverage wasn't significant ($p=0.870$).

Table 4. Probit regression

Indicators	Coef.	Std. Err.	z	P> z	[95% Conf.	Interval]
Current Liquidity	-.0190321	.0025007	-7.61	0.000	-.0239334	-.0141307
Current/Total Assets	.8541686	.0541317	15.78	0.000	.7480724	.9602648
Current Liabilities/ Total Assets	-.1350987	.0288155	-4.69	0.000	-.191576	-.0786213
Total Liabilities/ Total Capital	-4.85e-07	2.97e-06	-0.16	0.870	-6.30e-06	5.33e-06
Size	.1038481	.0311709	3.33	0.001	.0427543	.1649419
Cons.	-.309936	.0291613	-10.63	0.000	-.3670911	-.2527809

Source: Author's calculation

The results of margin effects in Table 5 (*Table 5.*) showed that current liquidity and ratio of current liabilities to total assets negatively affected the possibility of higher profitability. On the other hand, the ratio of current to total assets and the size of the company positively affected the possibility of higher profitability. These results confirmed hypothesis H1, H2, H3, H5.

Table 5. Margin effects

Indicators	dy/dx	Delta-method Std. Err.	z	P> z	[95% Conf.	Interval]
Current Liquidity	-0.0074198	.0009667	-7.68	0.000	-.0093145	-.005525
Indicators	dy/dx	Delta-method Std. Err.	z	P> z	[95% Conf.	Interval]
Current/Total Assets	.3330029	.0202707	16.43	0.000	.2932731	.3727328
Current Liabilities/ Total Assets	-.0526691	.0111972	-4.70	0.000	-.0746151	-.030723
Total Liabilities/ Total Capital	-1.89e-07	1.16e-06	-0.16	0.870	-2.46e-06	2.08e-06
Size of the Company	.0405074	.0121438	3.34	0.001	.0167061	.0643088

Source: Author's calculation

The liquidity issue is time for repaying debts. The significant positive effect of the current assets to total assets ratio on profitability implies that the companies in the food industry in Southeast Europe mostly have a conservative investment policy in working capital. The increase in the value of the current/total assets will lead to the increase in the possibility that ROA will be higher for 0.33%. In addition, the significant negative impact of the current liabilities to total assets ratio on profitability implies less aggressive financing policy in the working capital.

The increase in the value of the size of companies will lead to the increase in the possibility that ROA will be higher for 0.04%. Confirmed the hypothesis H5 was in accordance with research conducted by Ammar et al. (2003) who found that profitability was significantly different among small, medium and large firms because profitability drops as firms grow larger than 50 million dollar sales (Ammar et al., 2003). The reason for higher profitability of the larger firms can be (Pervan, Visic, 2012):

1. the ability of larger firms to cope better with market changes and to determine prices and conditions of the market because of monopoly position;
2. larger firms have greater bargaining power and effectively take advantage of economies of scale and process of research and development;

The empirical research conducted by Akinlo confirmed also that there is a long run steady-state relationship among company's size and profitability. Enhanced company's size can increase company's profitability. As well, enhanced company's profitability can lead to increased company's size (Akinlo, 2012).

The issue of profitability is a good use of debts. The profitability is affected by the use of debt. During the period of economic expansion, higher financial leverage has a positive impact on business operations, while in the period of economic recession financial leverage has an adverse effect on the profitability of the company. According to the results presented in Table 5 (*Table 5.*), financial leverage had a negative impact on profitability, but it wasn't significant ($p=0.870$). So, the hypothesis H4 was disapproved. This result was in accordance with the research conducted by Pepur et al. (2016) who found that profitability is negatively related to leverage, so that the more profitable companies rely more on internal funds, and on this basis there is less need for financing from other sources (Pepur et al., 2016).

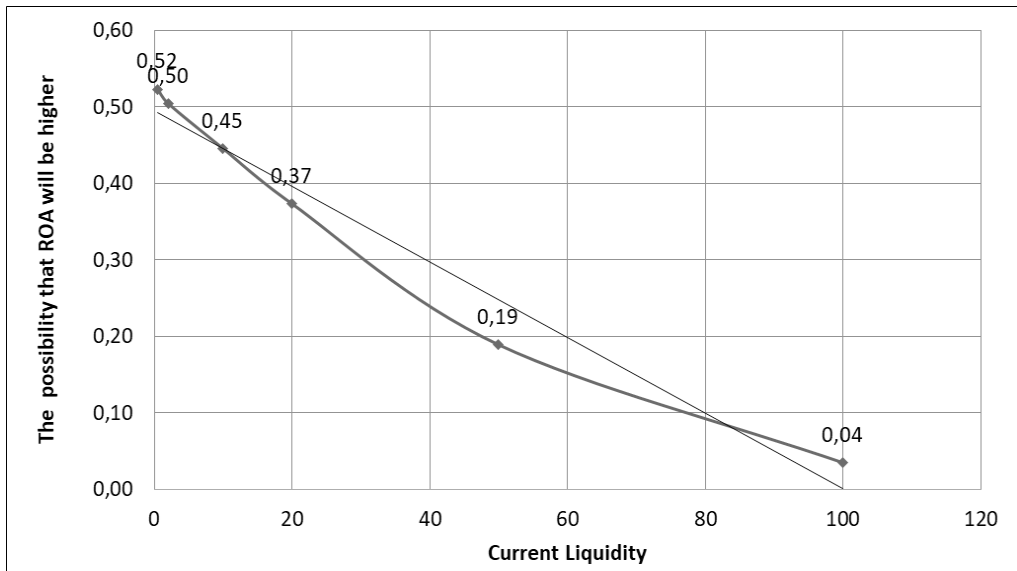
Brigham & Daves agreed that the positive relationship among financial leverage and operating risk is of particular importance for the company's profitability (Brigham, Daves, 2010). Alemeida and Campello discussed that there is a negative relationship between profitability and financing which includes the use of other sources of financing (Alemeida, Campello, 2006). Oppositely, some other schools of thought believes that more profitable firms should rely on external funds like debt to finance their investments (Graham, 2000). Similarly, Papadognas concluded that debt structure and company's size had a positive impact on profitability after analysis of 3035 manufacturing companies in Greece. Regardless of the size of the company, company's profitability is always positively influenced by company's size (Papadognas, 2007). Larger firms are often more profitable, but less productive.

Table 6 (*Table 6.*) was presented the results of margin effects of current liquidity. The results showed that if current liquidity is 0.5, the possibility that profitability will be higher is 0.52%. Similarly, if current liquidity is 10, 20, 100, the possibility that profitability will be higher is 0.45%, 0.37%, 0.04%.

Table 6. Margin effects-Current Liquidity

Indicators	Margin	Delta-method Std. Err.	z	P> z	[95% Conf.	Interval]
.5	.5234124	.0057899	90.40	0.000	.5120645	.5347604
2	.5048771	.0049912	101.15	0.000	.4950945	.5146598
10	.4456899	.0086377	51.60	0.000	.4287603	.4626195
20	.373521	.0166939	22.37	0.000	.3408016	.4062403
50	.1892838	.0313857	6.03	0.000	.1277689	.2507987
100	.0350853	.0183755	1.91	0.056	-.00093	.0711005

Source: Author's calculation

Figure 1. Margin effects-Current Liquidity

Source: Author's calculation

Table 7 (Table 7.) was presented the results of margin effects of current assets/total assets ratio. The results of margin effects showed that if the ratio of current/total assets is 0.1, the possibility that profitability will be higher is 0.38%. Similarly, if the ratio of current/total assets is 0.2, 0.6, 0.8, 1 the possibility that profitability will be higher is 0.41%, 0.55%, 0.61%, 0.68%.

Table 7. Margin effects-Current/Total Assets Ratio

Indicators	Margin	Delta-method Std. Err.	z	P> z	[95% Conf.	Interval]
0	.3476561	.0102652	33.87	0.000	.3275366	.3677755
0.1	.3795204	.0088046	43.10	0.000	.3622637	.396777
0.2	.4122191	.0073448	56.12	0.000	.3978235	.4266147
0.3	.4455328	.0060527	73.61	0.000	.4336697	.4573959
0.4	.479229	.0052021	92.12	0.000	.469033	.4894249
0.5	.5130671	.0051031	100.54	0.000	.5030652	.5230691
0.6	.5468038	.0058004	94.27	0.000	.5354353	.5581723
Indicators	Margin	Delta-method Std. Err.	z	P> z	[95% Conf.	Interval]
0.7	.5801978	.0070132	82.73	0.000	.5664521	.5939434
0.8	.6130155	.0084441	72.60	0.000	.5964654	.6295656
0.9	.6450356	.0099046	65.12	0.000	.6256228	.6644483
1	.6760536	.011285	59.91	0.000	.6539353	.6981718

Source: Author's calculation

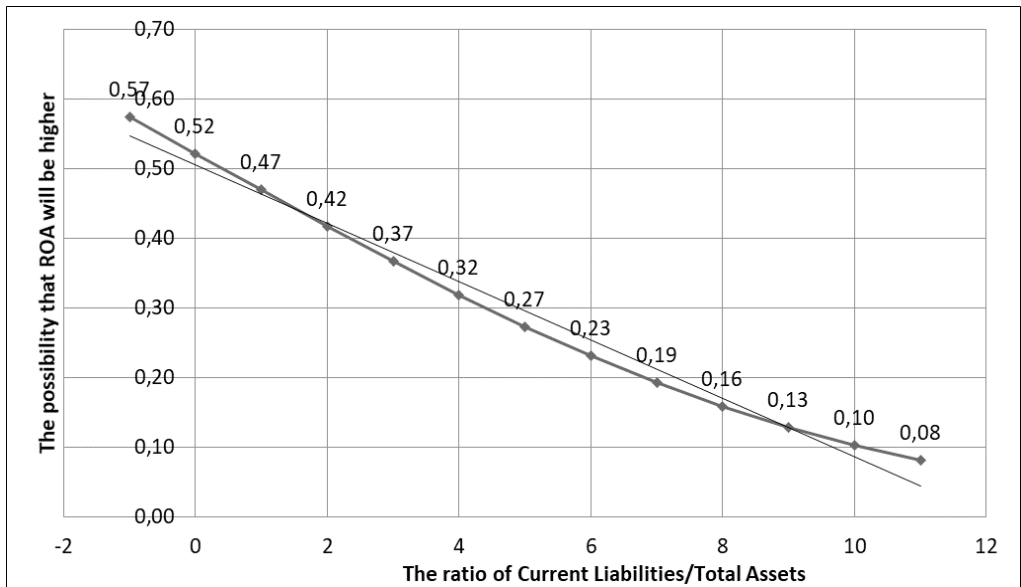
Table 8 (Table 8.) was presented the results of margin effects of current liabilities/total assets ratio. The results of margin effects showed that if the ratio of current liabilities/total assets is 1, the possibility that profitability will be higher is 0.47%. Similarly, if current liabilities/total assets ratio is 2, 6, 8, 10 the possibility that profitability will be higher is 0.42%, 0.23%, 0.16%, 0.10%.

Table 8. Margin effects-Current Liabilities/Total Assets

Indicators	Margin	Delta-method Std. Err.	z	P> z	[95% Conf.	Interval]
-1	.5741614	.0163084	35.21	0.000	.5421976	.6061252
0	.5220128	.006794	76.83	0.000	.5086969	.5353287
1	.4694781	.0081487	57.61	0.000	.4535069	.4854492
2	.4174649	.0179665	23.24	0.000	.3822512	.4526785
3	.366854	.0276361	13.27	0.000	.3126882	.4210198
4	.3184553	.0360948	8.82	0.000	.2477108	.3891998
5	.2729685	.042889	6.36	0.000	.1889076	.3570295
6	.2309546	.0477659	4.84	0.000	.1373351	.324574
7	.1928164	.050634	3.81	0.000	.0935755	.2920573
8	.1587927	.0515477	3.08	0.002	.0577611	.2598243
9	.1289623	.0506846	2.54	0.011	.0296223	.2283024
10	.1032591	.0483165	2.14	0.033	.0085605	.1979577
11	.0814935	.0447743	1.82	0.069	-.0062625	.1692495

Source: Author's calculation

Figure 2. Margin effects-Current Liabilities/Total Assets



Source: Author's calculation

Table 9 (*Table 9.*) was presented the results of margin effects of company size. The results of margin effects showed that if the company size is 0 and 1, the possibility that profitability will be higher is 0.49% and 0.53%.

Table 9. Size

Indicators	Margin	Delta-method Std. Err.	z	P> z	[95% Conf.	Interval]
0	.49129	.0056049	87.65	0.000	.4803047	.5022753
1	.5317974	.0107467	49.48	0.000	.5107342	.5528606

Source: Author's calculation

Conclusions

Achieving an optimal level of management of working capital is a necessary assumption to maintain the going concern principle, regardless of the nature of the company's business. It helps managers to create optimal level between the assets and the liabilities of the company, so whether to invest in current assets as compared to fixed assets or to use more long-term debts as compared to current liabilities.

The results of this research showed that current liquidity and current liabilities to total assets ratio significantly negatively influenced the possibility of higher profitability of companies in the food industry. If the company in the food industry does not have enough cash and cash equivalents that may be the result of large investments. Highest current liability to total asset ratio indicates that the companies need to maintain the higher amount of working capital to maintain its short-term solvency position and automatically reduces the profitability of companies. Companies with a high level of current liabilities in their financing often have a higher market value than the book value. A higher ratio means a relatively aggressive financing policy that yields the negative return on assets.

The larger volume of current assets leads to the growth of profitability of business. If the company opts for an aggressive working capital management policy, it implies a low level of current assets as a percentage of total assets in order to achieve higher gains on fixed assets. More aggressive working capital management is often associated with higher profitability. If firms are having an aggressive approach to managing the short-term liabilities, investors give more value to those firms in stock markets.

Although the impact of financial leverage was not statistically significant, the results confirmed that the leverage is variable which affecting company's profitability negatively. The companies with higher debt rates were less profitable. So, more profitable firms should rely on internal funds in financing their operations. The results also showed that firm's size has significant positive impact on the possibility of higher profitability of the company. So, the absolute firm size plays an important role in explaining profitability.

The effect of working capital management on profitability can be measured using

different variables and observed many dimensions. In this study, we considered presented five variables, so the study was limited only to the impact of mentioned variables of working capital management on profitability. Some other variables of working capital management as Average Collection Period (Account Receivables), Inventory Turnover in days, Average Payment Period, Cash Conversion Cycle, Net Trading Cycle, Sales Growth and their impact on profitability will be the scope of further research. Profitability would be also measured by Return on Equity (ROE) and Return on Invested Capital (ROIC). There should be also considered some other factors that have an impact on working capital management policies, such as business efficiency, business and economic environment, the technology used, industry affiliation, organizational structure and culture.

Another limitation is data which were available only for 5 years for all seven countries. Data were obtained from financial statements whose truth and objectivity are subject to independent auditors. Bearing in mind that the research was carried out in the food industry, some other industries would be the subject of further studies because the results could vary with the examined industry. Similarly, future research could be conducted in the food industry for some other countries in Europe. According to that, the policy of working capital management could be compared between the countries of Europe in order to determine better guidelines for the company's management and increase the profitability and value of the company in the food industry.

Managers should strive to achieve the higher level of working capital in order to satisfy the growth of production and sales which leads to a greater value of the company in the long run. Efficient management of working capital is especially important for improving cash flow according to the size of the company and to increase company's economic value added. Improving cash flow from efficient working capital management means lower cost of capital and higher value of equity. With the optimal level of working capital, management could utilize profitable investments, promptly and appropriately react to market fluctuations and gain competitive advantages for the companies in the food industry.

Conflict of interests

The authors declare no conflict of interest.

References

1. Ahmed, I. (2013). Impact of Working Capital Management on Performance of Listed Non Financial Companies of Pakistan: Application of OLS and LOGIT Models, *Proceedings of 2nd International Conference on Business Management*, University of Sargodha, Lhore, Punjab, 1-22. Retrieved from: <https://www.umt.edu.pk/icobm2012/pdf/2C-55P.pdf>
2. Akinlo, E., A. (2012). Firm Size-Profitability Nexus: Evidence from Panel Data for Nigeria. *Economic Research-Ekonomska Istraživanja*, 25 (3), 706-721.

3. Alemeida, H., & Campello, M. (2006). Financial Constraints, Asset Tangibility, and Corporate Investment. *NBER Working Papers 12087.*, National Bureau of Economic Research, 1-37.
4. Alshatti, S. (2015). The Effect of the Liquidity Management on Profitability in the Jordanian Commercial Banks. *International Journal of Business and Management*, 10 (1), 62-71.
5. Ammar, A., Hanna, A., Nordheim, E., & Russell, J. (2003). Indicator Variables Model of Firm's Size-Profitability Relationship of Electrical Contractors Using Financial and Economic Data. *Journal of Construction Engineering and Management*, 129, 192-197.
6. Binti M., N. E. A., & Mohd Saad, N. B. (2010). Working Capital Management: The Effect of Market Valuation and Profitability in Malaysia. *International Journal of Business and Management*, 5 (11), 140-155.
7. Brigham, E., & Daves, P. (2010). *Intermediate Financial Management*. South-Western Cengage Learning, Mason, USA.
8. Chukwunweike, E. (2014). The Impact of Liquidity on Profitability of Some Selected Companies: The Financial Statement Analysis (FSA) Approach. *Research Journal of Finance and Accounting*, 5 (5), 81-90.
9. Company Information across Europe, Retrieved from <https://www.bvdinfo.com/en-us/our-products/company-information/international-products/amadeus> (January, 15, 2017)
10. Deloof, M. (2003). Does Working Capital Management Affect Profitability of Belgian Firms? *Journal of Business Finance & Accounting*, 30 (3-4), 573-588.
11. Golas, Z., & Bieniasz, A. (2016). Empirical Analysis of the Influence of Inventory Management on Financial Performance in the Food Industry in Poland. *Inzinerine Ekonomika-Engineering Economics*, 27 (3), 264-275.
12. Graham, J. (2000). How Big are the Tax Benefits of Debt? *Journal of Finance*, 55, 1901-1941.
13. Harris, A. (2005). Working Capital Management: Difficult, but Rewarding. *Financial Executive*, 21 (4), 52-53.
14. Palanisamy, A., & Sengottaiyan A. (2015). Impact on Profitability of Working Capital Management of Selected Pharmaceutical Companies in India. *International Journal of Research in Finance and Marketing*, 5 (7), 117-129.
15. Papadogonas, T.A. (2007). The Financial Performance of Large and Small Firms: Evidence from Greece. *Int. J. Financial Services Management*, 2 (½), 1-12.
16. Pepur, S., Ćurak, M., & Poposki, K. (2016). Corporate Capital Structure: the Case of Large Croatian Companies. *Economic Research-Ekonomska Istraživanja*, 29, 498-514.

17. Pervan, M., & Mlikota, M. (2013). What Determines The Profitability of Companies: Case of Croatian Food and Beverage Industry. *Economic Research-Ekonomska istraživanja*, 26 (1), 277-286.
18. Pervan, M., & Visic, J. (2012). Influence of Firm Size on its Business Success. *Croatian Operational Research Review*, 3, 213-223.
19. Pouraghajan, A., & Emamgholipourarchi, M. (2012). Impact of Working Capital Management on Profitability and Market Evaluation: Evidence from Tehran Stock Exchange. *International Journal of Business and Social Science*, 3 (10), 311-318.
20. Soheilrad, S., Sofian, S., Mardani, A., Zavadskas, E., K., Kaklauskas, A., & Darvishvand, J., M. (2017). The Relationship between Non-Financial Stakeholders and Capital Structure. *Inzinerine Ekonomika-Engineering Economics*, 28 (4), 363–375.

THE INFLUENCE OF CLIMATE ELEMENTS ON THE YIELD OF AGRICULTURAL CROPS IN THE AREA OF SUMADIJA IN SERBIA

Gordana Petrović¹, Bojan Labović², Boban Dašić³

*Corresponding author E-mail: milicakg98@yahoo.com

ARTICLE INFO

Review Article

Received: 27 September 2018

Accepted: 11 March 2019

doi:10.5937/ekoPolj1901173P

UDC 551.5:631.559(497.11)

Keywords:

Climate elements, agricultural crops, Spearmans rank correlation coefficient, Gruža, climate changes.

JEL: Q10, Q54

ABSTRACT

The goal of this paper is to examine the existence of correlation between temperature and precipitation as independent variables and crop yield (wheat, corn) as dependent variable by applying Spearman's rank correlation coefficient. As the research field, region of Gruža is taken, more precisely county of Knić. Climate features of previously mentioned territory are obtained by monitoring the climate elements condition (temperature and precipitation) for the time period from 1991 to 2011 in weather stations Kragujevac, Kraljevo and Rudnik. Shifts in climate elements values are usually consequences of climate changes, which manifest in our country and have significant impact to crop yield.

© 2019 EA. All rights reserved.

Introduction

Both, World Meteorological Organization (WMO) and The *United Nations Environment Programme (UNEP)* founded Intergovernmental Panel on Climate Change (IPCC) in 1988, based in Geneva (Switzerland), whose work is done in accordance with principles of previously mentioned organizations. The first report about climate change is published in 1990 and it initiated the founding of UN Framework Convention on climate change. Then, in 1995, the international community was alarmed due to the possible impact of human activity on climate, which hastened the adoption of Kyoto Protocol. The third report from 2001 reaffirmed human impact on climate change, and in the fourth report, in 2007, the urge to prevent releasing of gases which provoked greenhouse effects was emphasized. The fifth report from 2013 showed that human impact on climate change increased, as well as its consequences which could be detected on Planet.

-
- 1 Gordana Petrović Ph.D., Geography teacher, independent researcher, Phone: +381 64 1892281, E-mail: milicakg98@yahoo.com, ORCID iD 0000-0001-5104-2348 (<https://orcid.org/0000-0001-5104-2348>)
 - 2 Bojan Labović, Master economist, High Economic School of Vocational Studies Pec-Leposavic, Phone number: +381 641905599, E-mail: labovic.bojan@gmail.com, ORCID iD 0000-0003-2168-3296 (<https://orcid.org/0000-0003-2168-3296>)
 - 3 Boban Dašić, Ph.D., Assistant Professor, Alfa University, Faculty of Finance, Banking and Auditing, Belgrade, Phone: +381 646265211, E-mail: bobandasickg@gmail.com, ORCID iD 0000-0003-1980-8707 (<https://orcid.org/0000-0003-1980-8707>)

Climate is the primary determinant of agricultural productivity, especially in the cases of developing countries, in which agriculture basically depends on natural circumstances. Possible scenarios of climate change namely temperature increase, precipitation change, extreme climate change such as drought, floods and landslides, and higher CO₂ concentration would directly impact the yield. Generally, temperature increase would lower the yield and also the quality of food crops thus jeopardizing food supplies. Similarly, changes in precipitation pattern, such as intensive rain concentrated in a particular month, has a devastating effect on crop production (Prakash et.al. 2011).

Estimates show that if measures to abate global warming are not carried out, global agricultural productivity will be reduced for 15,9 percent by the 2080s, and when it comes to the developing countries, a disproportionately large decline of 19,7 percent would be experienced (Kelbore, 2012).

Reports of Intergovernmental Panel unambiguously state that climate change exists. The cause for global warming on the Earth is increased concentration of gasses GHG (Greenhouse Gases-GHG) in the atmosphere. In 2015, the Republic of Serbia presented national goals for reduction of CO₂ emission until 2030 for 9,8 percent, in comparison to the referent year 1990. Due to the increasing accumulation of CO₂, which is treated as significant pollutant and causer of greenhouse effect, in the atmosphere, carbon dioxide emission in the world increased for 51,3 percent for the time period 1971–2012, while in Serbia, it decreased for 28,2 percent for the period 1990–2012. (<http://www.euractiv.rs/odrzivi-razvoj/8826-smanjnje-c02-u-srbiji-napredak-ili-varka.html>)

The fifth report of Intergovernmental Panel about Climate Change(IPCC) confirms that human is responsible for climate change and global warming. Human neglect call in question the survival on Planet Earth. Climate change, as well as natural disasters, are result of human negative influence on the environment. According to the best case scenario, global surface temperature by the end of 21st century would exceed 1,5°C, and according to the worst case scenario, global surface temperature would exceed 2°C in comparison to the time period from 1850 to 1900 (The Intergovernmental Panel on Climate Change, 2014). The goal of UN Framework Convention on Climate Change – „Paris 2015” is to achieve new international agreement on climate which will apply to all countries and also to keep the global warming below 2°C (Jayaraman, 2015).

Climate Change prevention is strategic priority of EU. European commission and EU Member States have developed the strategy which should resist to inevitable influence of climate change. The goal of EU is to, through binding regulations, meet three key moments which are also called energy package, by the year 2020. It is necessary to reduce emission of greenhouse gases by 20 percent, in comparison to the year 1990. The share of energy used in EU from renewable resources should be up to 20% and energy efficiency improvement should be 20% (Netherlands Environmental Assessment Agency, 2013).

There are more and more natural disasters in the world as well as in the Republic of Serbia, and they usually occur as consequences of climate change effect. Most often in our country, it is talked about natural disasters in the period of their occurrence

and it is dealt with the consequences, instead of applying precautionary measures in order to potential disaster effects. It is necessary to put precautionary measure focus on dangers that threatens the Republic of Serbia. These dangers are heat waves, forest fires, droughts, floods, tempests and other disasters. „It is esteemed that the total material damage caused by extreme climate and weather conditions in 2000 exceeds 5 billion of EUR, and more than 70% of loss was connected to the droughts and high temperatures. Another main cause for significant losses are floods. In 2014, floods caused enormous damage and it was esteemed that it would be necessary 1,35 billion of EUR for the recovery (Jovović, Jovičić, 2017).” Climate change has significant impact on agriculture, especially extreme climate events such as droughts, heat waves and floods. It is expected that, projected increase of extreme climate events would additionally increase crop-yield variability.

Geographical characteristics of the area

Region of Gruža was selected as the research area. This is a small geographic entity located in Šumadijajwhose territory includes valley of the river Gruža, after which it was named. It extends in a northwest-southeast direction and it is opened to valley of West Morava. The largest part of it belongs to the basin with the same name, which lies between Rudnik (1132 m), Kotlenik (749 m) and Gledić Mountains. Gruža covers an area of 622 km². It includes countryside of boroughs Knić, GornjiMilanovac, Kraljevo and Kragujevac. The largest area in the region of Gruža belongs to the borough Knić. It is the area of 413 km² with 36 settlements with rural characteristics. The borough borders borough of Kragujevac on the northwest, which is 20 km distant, then on northwest borough GornjiMilanovac, 40 km distant, then on the westČačak, 38 km distant, and on the South Kraljevo, 40 km distant. It belongs to the group of undeveloped boroughs whose citizenship are predominantly engaged in agriculture. According to the Regional Development Law, it is a local self-government unit which by degree of development, belongs to the IV group (Official Gazette of the Republic of Serbia, 2015). Development degree in this county is 60% below national average. The most important natural potential of county Knić is available agricultural land that covers about 60% of total area. Fertile land around river Gruža is suitable for crops cultivation. 80% of available agricultural land is being used. According to the manner of use, the most important categories of the land structure, are arable land and gardens which cover 63,5% (12.223 ha). Cereals and vegetables are mostly cultivated.

Data and methodology

Agriculture is the branch of economy which by its nature is closely dependent to climate conditions. Climate features on the territory of Gruža with certain local deviations are showed by comparative observations of nearby weather stations in Kragujevac (185 m; $\varphi=44^{\circ}02'$, $\lambda=20^{\circ}56'$), Kraljevo (215 m; $\varphi=43^{\circ}43'$, $\lambda=20^{\circ}42'$) and on the mountain Rudnik (700 m; $\varphi=44^{\circ}08'$, $\lambda=20^{\circ}31'$). Climate element conditions are shown for the period from 1991 to 2011. Two meteorological parameters, air temperature (yearly,

monthly minimal and maximal) and precipitation quantity (data by month and annual precipitation quantity) were observed. Meteorological data were obtained by using of Meteorological yearbooks of Republic Hydrometeorological Institute for the specific time period and then they were processed by months and year.

Two agricultural crops were chosen for the research on the area of Gruža, wheat and corn. Data about crop yield (kg/ha) were obtained by using data from Statistical Office of the Republic of Serbia. The same period of observation was selected (1991–2011). All data were processed by applying software package SPSS Statistics 25.

The goal of the report is to examine existence of the correlation between air temperature (maximal and minimal) and precipitation quantity which were taken as predictor variables and crop yield (wheat, corn) which were taken as criterion variables. In order to confirm or deny the relationship, Spearman's correlation test was applied.

Results and discussion

In the initial phase of statistical analysis, in order to describe statistical data, the descriptive statistics method was applied. This type of analysis was made for precipitation and temperature for the area of Gruža.

Table 1. Maximal and minimal annual temperature (°C) and annual precipitation quantity (mm) in the area of Gruža for the period 1991–2011.

	Maximal temperature						
	N	Range	Min.	Max.	Mean	Std. Dev.	Variance
Kragujevac	21	3,9	15,9	19,8	17,800	,9088	,826
Kraljevo	21	3,6	15,7	19,3	17,367	,9313	,867
Rudnik	13	2,8	12,3	15,1	13,746	,9052	,819
	Minimal temperature						
	N	Range	Min.	Max.	Mean	Std. Dev.	Variance
Kragujevac	21	2,1	5,5	7,6	6,719	,5750	,331
Kraljevo	21	2,1	5,2	7,3	6,495	,5723	,327
Rudnik	20	2,2	5,8	8,0	6,810	,6512	,424
	Precipitation						
	N	Range	Min.	Max.	Mean	Std. Dev.	Variance
Kragujevac	21	460,7	378,8	839,5	626,238	136,050	18509,84
Kraljevo	21	404,3	499,8	904,1	725,319	118,763	14104,68
Rudnik	20	734,0	519,9	1253,9	933,475	198,056	39226,24

Author processed the data via program SPSS Statistics 25.

Table 1 displays descriptive statistics of maximal and minimal annual temperatures for weather stations Kragujevac, Kraljevo and Rudnik for the period from 1991 to 2011. Meteorological data for certain years from weather station Rudnik are missing. The

sample is processed for the period of 21 years ($N=21$), while for Rudnik it is taken period of 13 to 15 years for maximal temperatures and 20 years for minimal temperatures. Data shows that in the selected time period, the highest maximal temperature was $19,8^{\circ}\text{C}$ (Kragujevac), $19,3^{\circ}\text{C}$ (Kraljevo) and $15,1^{\circ}\text{C}$ (Rudnik). The lowest maximal temperature was $15,9^{\circ}\text{C}$ (Kragujevac), $15,5^{\circ}\text{C}$ (Kraljevo) and $12,3^{\circ}\text{C}$ (Rudnik).

Data in the second column (Range) display differences between maximal and minimal temperatures. Average temperatures are displayed in the fifth column (Mean).

Standard deviations show how big the deviation on average from mean value is. Variance show which part of mean is standard deviation. Variance and standard deviation are in direct relationship because variance is square of standard deviation, and standard deviation is square root of variance.

When we look at the values of minimal and maximal temperatures, we can notice that there is slightly bigger deviation in weather station Rudnik. Temperature is significant factor which impact seed germination of wheat and corn. Optimal temperatures stimulate good germination ability, while too low or too high temperatures have negative effect, because they lead to prolongation or delay of germination period. Low temperatures during fall or extreme heat waves in spring are the biggest cause for yield loss.

When it comes to the precipitation quantity for the period 1991–2011, it could be noticed that there are significantly higher mean, minimal and maximal values of precipitation quantity in weather station Rudnik. Because of significantly bigger precipitation quantities in the previously mentioned weather station in comparison to other two weather stations, it could be noted also bigger deviation from mean precipitation quantity.

The correlation represents statistical procedure for calculation two variables. The correlation value is expressed numerically via „Spearman’s correlation coefficient”. Spearman’s correlation coefficient (r_s) is linear correlation coefficient which values range from -1 to $+1$. The closer the absolute value is to number 1 the bigger correlation is between variables. Small r value, however, could be important and it depends from joined r value. If this r value is below the level of significance ($\alpha=0,05$) then the zero hypothesis will not be rejected, and correlation coefficient would be considered as statistically significant (Zar, 1984).” Correlation coefficient indicates the strength and direction of correlation. Value of correlation coefficient that varies from 0 to 1 shows that the correlation is positive and indicates consistent growth of both variable values. Value of correlation coefficient between 0 and -1 means negative correlation, or to put it differently, increase in value of one variable and decline in value of another one. Complete relationship of correlation coefficient values is ± 1 . When correlation coefficient has value 0, it indicates the absence of linear relationship and points to the fact that if we knew the value of one variable we still would not conclude anything about the value of another one.

The most evident weather conditions for yield productivity are precipitation and temperature during vegetation. However, more weather variables, such as solar

radiation and relative humidity, could also affect the yield, as well as adverse weather periods during growth season (Hollinger, Changnon, 1994). In the paper the starting point is the assumption that there is the correlation between wheat and corn yield and precipitation quantity and maximal and minimal monthly temperature in vegetation period. We selected the crops whose „production represents significant segment of agriculture overall development and basis for the cattle breeding and processing industry, which is ultimately the precondition for agro-industrial expansion in Serbia (Stevanović, et al, 2012).”

The examination of correlation between average yield (y) and monthly precipitation quantity and temperature (minimal and maximal) (x) is done according to the following Spearman's formula:

$$r_s = 1 - 6 \sum_{i=1}^n \frac{d_i^2}{n(n^2 - 1)}$$

Where: $d_i = r(x_i) - r(y_i)$, $i = 1, 2, 3, \dots, N$

Value d_i represents the subtraction of range value of two variables that are in question, and N is the number of different series ($N=21$).

There are several different factors including anthropogenic and natural factors that influence food production. Future changes would condition complex interactions between weather elements that would be connected to the crop production system. Changes in atmospheric temperature and precipitation could significantly impact crop yield. Crop resistance to climate variations such as temperature and precipitation is the most important (Ndawayo, et.al, 2017).

The achieved correlation coefficient for region Gruža as the result of interdependence between precipitation per month and achieved yield of wheat (Table 2) shows significant connection for weather stations of Kragujevac and Rudnik. Correlation coefficient is negative ($r_s = -0,445^*$ Kragujevac–December; $r_s = -0,483^*$ Rudnik–April). Negative correlation coefficient means that two variables are connected in a way that if one variable is rising, another one is falling. In this case, that indicates that increase in precipitation causes decrease of wheat yield. Correlation strength is moderate. Correlation level in weather stations of Kragujevac (0,043) and Rudnik (0,027) is statistically significant because it is lower than 0,05. „Weather condition during the wheat vegetation have great impact on yield. Lack of precipitation, bad precipitation timing, high average temperatures, as well as temperature fluctuations during vegetation have the negative effect. Adaptation to new conditions and choice of breed which are more tolerant to droughts, with shorter vegetation period, and which go through development stages more quickly, represent a defense mechanism from unfavorable climate change (Stojiljković, et al, 2014).”

Unlike wheat whose vegetation period lasts from October to July, vegetation period of corn is much shorter (April-October) (Marković, Jovanović, 2011). Correlation

coefficient is the most important in July and August (Table 3). According to data from weather station Kragujevac, the most important correlation coefficient is between precipitation quantity and yield in July and its value is 0,05. Data from weather stations of Kraljevo and Rudnik show that connection between corn yield and monthly precipitation is the most important in July and August. Correlation coefficient for Kraljevo in July is $r_s=0,657$. The correlation is positive and has statistical significance (0,001) on the level 0,01. Correlation coefficient for August is moderate positive ($r_s=0,507$) and is statistically significant (0,019) because it is lower than 0,05. Correlation for Rudnik is highly positive ($r_s=0,661$) in July and it has statistical significance (0,001) in relation to significance level 0,01. In August, correlation coefficient is moderate positive $r_s=0,472$ and its statistical significance (0,031) is on the level 0,05.

Usually, it is thought that corn is resistant towards drought and that it consumes water economically. However, since it creates great vegetation, gives high yield, has a long vegetation period, the corn consumes large amounts of water. In lack of water, the corn successfully overcomes drought, but also gives smaller yield, because plants consume different water categories and water types from the soil (Pejić, Bošnjak, et al, 2009).

Table 2. Correlation between monthly precipitation (mm) and wheat yield (kg/ha) in the region of Gruža for period 1991–2011.

		Wheat									
		Oct.	Nov	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.
Kragujevac	Cor. Coef.	,32	,17	-,445*	,35	-,19	,02	-,30	,17	,10	,17
	Sig. (2-tailed)	,15	,45	,043	,11	,40	,91	,17	,444	,66	,44
	N	21	21	21	21	21	21	21	21	21	21
* Correlation is significant at the 0.05 level (2-tailed).											
Rudnik	Cor. Coef.	,31	,12	-,30	,39	-,28	-,14	-,483*	,00	-,04	,13
	Sig. (2-tailed)	,16	,60	,18	,08	,20	,53	,027	,98	,84	,57
	N	21	21	21	20	21	21	21	21	21	21
*Correlation is significant at the 0.05 level (2-tailed).											

Author processed the data via program SPSS Statistics 25.

Correlation between maximal temperature in weather station Kragujevac and corn yield (Table 4) shows significant relationship in July ($r_s= -0,538$) and August ($r_s= -0,496$). In both months the correlation is moderate negative. This indicates that increase of maximal temperatures leads to decline of the corn yield. Correlation level (0,012 and 0,022) has a statistical significance and it is lower than 0,05.

According to the data from weather station Kragujevac, maximal temperature correlation and corn yield in vegetation period has negative direction and in July, high negative

correlation is expressed ($r_s = -0,646$) and in August moderate negative correlation ($r_s = -0,541$). The correlation is statistically significant because it is smaller (July = 0,002) than 0,01 and (August = 0,011) 0,05.

Dependent effect analysis of minimal and maximal temperatures during vegetation period on wheat and corn yield is made using Spearman's correlation coefficient for the time period 1991–2011. Correlation analysis showed that dependence of corn is more expressed than dependence of wheat. Regardless of the fact that significant relationship is not expressed, it could be said that small amount of precipitation and high temperatures or „the drought during the period of seeding and germination, as well as in the phases before wheat maturation, leaves the strongest negative impact on wheat yield (Malešević, et al, 2011).”

Table 3. Correlation between monthly precipitation (mm) and corn yield (kg/ha) in region of Gruža in the period 1991–2011.

		Corn						
Weather stations		Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.
Kragujevac	Correlation Coefficient	,319	-,089	,077	,540*	,392	-,155	,193
	Sig. (2-tailed)	,159	,700	,741	,012	,079	,501	,402
	N	21	21	21	21	21	21	21
*Correlation is significant at the 0.05 level (2-tailed).								
Kraljevo	Correlation Coefficient	,205	-,019	,201	,657**	,507*	-,305	,086
	Sig. (2-tailed)	,374	,935	,381	,001	,019	,178	,712
	N	21	21	21	21	21	21	21
**Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed).								
Rudnik	Correlation Coefficient	,068	-,171	,155	,661**	,472*	-,179	,092
	Sig. (2-tailed)	,769	,459	,503	,001	,031	,439	,691
	N	21	21	21	21	21	21	21
**Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).								

Author processed the data via program SPSS Statistics 25.

Correlation coefficient for weather station Rudnik displays that there is significant relation when it comes to corn, in comparison to wheat. In the corn vegetation period, both minimal and maximal temperatures are significant. Minimal temperature impact is the most prominent in April when correlation coefficient has negative direction and moderate strength $r_s = -0,442$; it is much lower (0,045) than significance level 0,05 but it is statistically significant. It is interesting that, for the same month maximal temperature coefficient has a negative direction and moderate strength $r_s = -0,518$, and also significance level (0,048) is much lower than 0,05. The correlation in July $r_s =$

-0,634 between minimal temperature and corn yield has negative direction and high correlation. It is statistically significant (0,015) because it is lower than significance level 0,05.

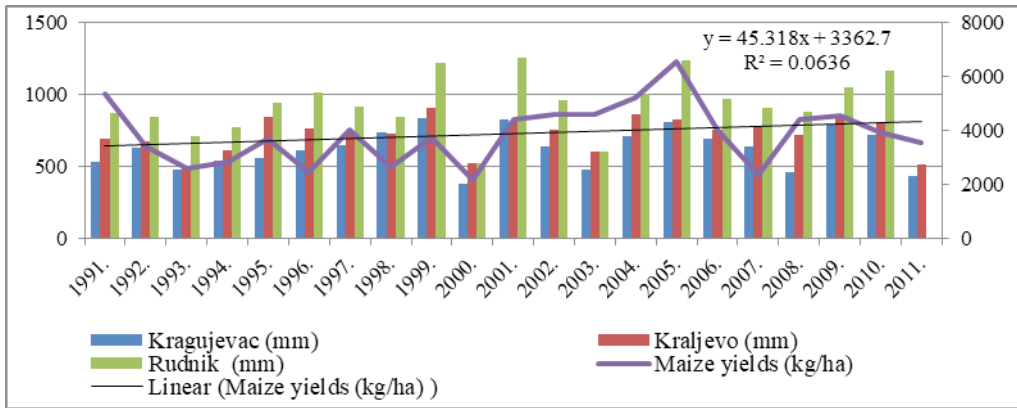
Correlation between selected climate elements (temperature and precipitation) and corn and wheat yield had statistical significance especially for corn yield. Displayed correlations reflect just those climate impacts which were selected. In the cases when temperature and precipitation with applying Spearman's correlation coefficient did not show statistical significance, such as for example wheat yield, there were important impacts of other factors which were not considered in this research and which could possibly contribute in making trends.

Table 4. The correlation between minimal and maximal temperature (°C) and corn yield (kg/ha) in the region of Gruža for period 1991–2011.

		Corn								
Weather stations			Apr.	May	Jun.	Jul.	Aug.	Oct.		
Kragujevac	Max. temp.	Correlation Coefficient	-,398	-,177	-,270	-,538*	-,496*	,015		
		Sig. (2-tailed)	,074	,442	,237	,012	,022	,949		
		N	21	21	21	21	21	21		
		*. Correlation is significant at the 0.05 level (2-tailed).								
Kraljevo	Max. temp.	Correlation Coefficient	-,418	-,256	-,202	-,646**	-,541*	-,008		
		Sig. (2-tailed)	,059	,263	,379	,002	,011	,973		
		N	21	21	21	21	21	21		
		***. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).								
Rudnik	Max. temp.	Correlation Coefficient	-,518*	-,383	-,413	-,634*	-,474	,223		
		Sig. (2-tailed)	,048	,197	,161	,015	,074	,423		
		N	15	13	13	14	15	15		
			*. Correlation is significant at the 0.05 level (2-tailed).							
	Min. Temp.	Correlation Coefficient	-,442*	-,183	-,208	,083	-,393	-,030		
		Sig. (2-tailed)	,045	,428	,366	,721	,078	,897		
		N	21	21	21	21	21	21		
		*. Correlation is significant at the 0.05 level (2-tailed).								

Author processed the data via program SPSS Statistics 25.

Due to increased expression of correlation coefficient in the area of Gruža between corn yield and climate elements (temperature and precipitation); annual precipitation quantity, and annual minimal and maximal temperatures and corn yield in the time period from 1991 to 2011 are graphically showed, as well as trend line for the corn yield (Figure 1. and Figure 2).

Figure 1. Annual precipitation quantity (mm) and corn yield in the area of Gruža for the period 1991–2011.

Source: Author processed data from RHMZ and RZS

Agriculture by its nature is highly dependent on the climate change. Different technological solutions are developing and applying with the aim to reduce dependence of agricultural productivity from unpredictable climate conditions. Primarily, this refers to the protective measures against adverse weather conditions (greenhouses, anti-hail rockets, and anti-hail systems), irrigation, and development of breeds and sorts that are resistant to unstable conditions, use of artificial fertilizers and chemical protection agents. Besides all previously written it could be said that agriculture is still very sensitive to unstable climate conditions and thus to long-term climate changes (World Wild Life Fund for Nature, 2012).

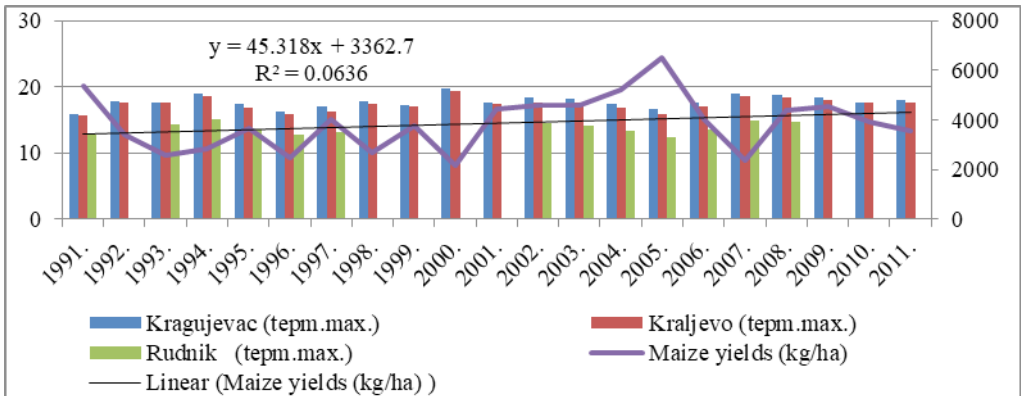
Global climate changes and their scenarios accepted by European Commission for Agriculture, suggest that in the area of South and Southeast Europe where our country is located, temperatures would increase, annual precipitation would be reduced, and the hazard from drought and heat waves would be much bigger, which would mean smaller yield of many agricultural crops (European Environment Agency, 2012). „On the territory of Central Serbia, it is expected that, by 2100, winter wheat yield would be smaller for 6%. When it comes to the corn, previous research showed that in the conditions without irrigation, it could be expected reduction of corn yield for 58% by 2030, or for 73% by 2050. In the case of irrigation, smaller yield reduction could be expected, that is 15% by 2030, or 25% by 2050. According to estimates, changes in corn yield by 2100, without irrigation, range from –52 to –22 and for territory between North and West and East and South parts of Serbia (United Nation Development Programme for Development in Serbia, 2015).”

From previously stated, it could be concluded that „climate changes are great reason for concern from the aspect of sustainable development. Finding a solution for adaptation will be very important in the following years, especially when it comes to agriculture. Adaptation measures must strive to reduce the vulnerability of agricultural sector and

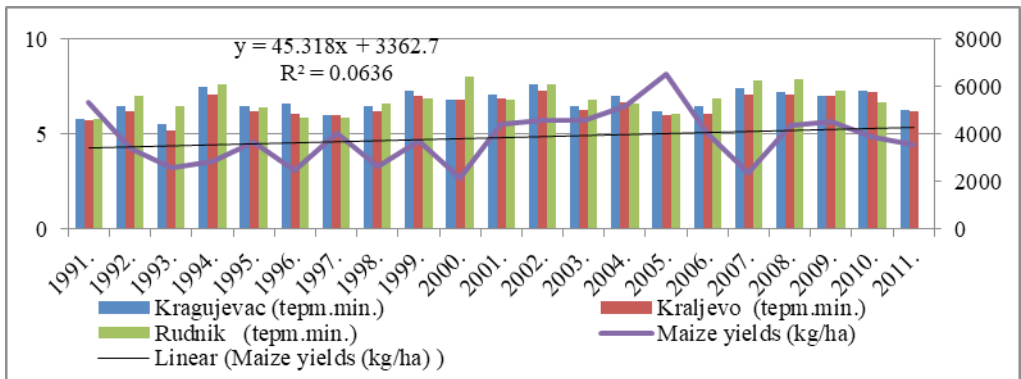
increase sustainability of rural areas, from ecological and economic aspects (European Commission Directorate-General for Agriculture and Rural Development, 2008).” Mitigation and adaptation have the task to reduce the influence of climate changes. The society must adapt to the challenges which arise from climate changes and also it must practice mitigation and adaptation actions. Changes in precipitation quantity and an increasing phenomenon of extreme temperatures, will be one of the most critical factors which determine the overall impact of climate changes to yield of agriculture crops.

Figure 2. Annual (a) maximaland (b) minimal temperatures (°C) in the area of Gruža and corn yield in the time period 1991–2011.

a)



b)



Source: Author processed data from RHMZ and RZS

Conclusion

Both current and future climate changes will influence crop yield. This statement has drawn attention of the world, because different aspects of climate variability (temperature, precipitation) impact the crop growth and their productivity results. This study is important because it helps us to understand how climate conditions (temperature and precipitation) and crops (wheat and corn) are related to the time flow, and also it is an insurance for future food production.

As the field of research, it is taken region of Gruža, more precisely county of Knić, which belongs to the group of underdeveloped counties in which citizenship is mostly engaged in agriculture. Climate conditions of the mentioned area are obtained by monitoring condition of climate elements (temperature and precipitation) for the time period 1991–2011 in weather stations of Kragujevac, Kraljevo and Rudnik.

Descriptive statistics has been used in the initial phase of statistical analysis in order to describe the basic features of data. Analysis is made for precipitation and temperature.

The correlation between chosen climate elements and chosen agricultural crops is examined via Spearman's correlation coefficient. When it comes to the climate elements, the starting point is overall monthly precipitation and maximal and minimal monthly temperature for selected weather stations in the precise observation time period, 1991–2011, and yearly wheat and corn yield on the territory of Knić in the same observation time period.

Correlation between precipitation and wheat yield is negative in certain months. This indicates that increased amount of precipitation in months indicated in the table negatively impact wheat yield. At certain stages of growth and development, wheat need for water is different, so the impact to yield would be different.

Correlation coefficient for corn is positive and mostly expressed in summer period. Although, there is a large amount of precipitation then, this indicates that the biggest need of corn for water is in the summer months, or in the vegetation period.

Correlation between maximal temperature (Kragujevac, Kraljevo) and corn yield in summer months (July and August) is negative. Optimal temperature for corn in vegetation period is 24–28°C. This is due to the extremely high temperatures in that period which could reduce yield and quality. Values of minimal and maximal temperatures in April in weather station Rudnik affect negatively corn yield, as well as the value of maximal temperature in July. Geophysical location of the territory and lower temperatures at higher altitudes unlike for the previous two weather stations have negative influence to the yield of this crop.

Correlation process between maximal temperatures (Kragujevac, Kraljevo, Rudnik) and wheat yield did not show that there were significant correlation when applying Spearman's correlation coefficient. Besides, it could be said that extremely high temperatures in summer period shorten the harvest period and reduce the yield and wheat quality.

Many researches indicate that negative impact of climate changes to agricultural sector would be especially expressed, because agriculture is directly connected with food production and people's health. It could be concluded that agriculture is dependent on climate change as well as crop yield. However, crop yield is not only influenced by temperature and precipitation. Other natural and anthropogenic factors also have big influence on it.

Conflict of interests

The authors declare no conflict of interest.

References

1. Bogdanov, N., & Babović, M. (2014). *Popis poljoprivrede u Republici Srbiji, Radna snaga i aktivnosti poljoprivrednih gazdinstava*. Republički zavod za statistiku, Beograd. [Bogdanov, N., & Babović, M. (2014). *Indexing of agriculture in the Republic of Serbia, Labour force and activities of agricultural holdings*. The Statistical office of the Republic of Serbia, Belgrade.].
2. European Commission Directorate-General for Agriculture and Rural Development (2008). *Climate change: Challenges for agriculture*. Brussels, pp. 30.
3. European Environment Agency (2012). *Climate change, impacts and vulnerability in Europe*. Copenhagen Denmark, pp. 25.
4. Hollinger, S. E., & Changnon, S. A. (1994). *Response of Corn and Soybean Yields to Precipitation Augmentation and Implications for Weather Modification in Illinois*. Southern Illinois University, pp. 4.
5. Jayaraman, T. (2015). The Paris Agreement on Climate Change: Background, Analysis and Implications. *Review of Agrarian Studies*, India, Vol. 5(2), pp. 56.
6. Jovović, A.M., & Jovičić, B. (2017). *Strategija komunikacije za oblast klimatskih promena*. Beograd, pp.17. [Jovović, A.M., & Jovičić, B. (2017). *Communication strategy in the field of climate change*. Belgrade, pp.17.].
7. Kelbore, G. Z. (2012). *An Analysis of the Impacts of Climate Change on Crop Yields and Yield Variability in Ethiopia*. University of Trento, Graduate School of Social Sciences, pp. 2.
8. Malešević, M., Jaćimović, G., & Jevtić, R. (2011). Iskorišćavanje genetskog potencijala pšenice uslovima abiotičkih stresova. *45. Savetovanje agronoma Srbije, Zlatibor, Zbornik referata, Institut za ratarstvo i povrtarstvo, Novi Sad*, pp. 3-14. [Malešević, M., Jaćimović, G., & Jevtić, R. (2011). *The exploitation of genetic potential of wheat under conditions of abiotic stresses*. 45th counseling of Serbian agronomists, Zlatibor, Collections of reports, Institute of Field and Vegetable Crops, Novi Sad, pp.13-14.].

9. Marković, T., & Jovanović, M. (2011). Uticaj količine padavina na prinos pšenice i kukuruza kao proizvodni bazni rizik. *Ratarstvo i povrtarstvo*, No. 48 (1), Novi Sad, pp. 210. [Marković, T., & Jovanović, M. (2011). The effect of precipitation on the yield of wheat and maize as a manufacturing base risk. *Crop farming and vegeculture*, No. 48 (1), Novi Sad, pp. 210.]
10. Ministarstvo poljoprivrede i zaštite životne sredine. (2015). *Zagrevanje useva—kako odgovoriti? Uticaj i promene klime na srpsku poljoprivredu*. Program Ujedinjenih nacija za razvoj (UNDP) u Srbiji, Beograd, pp. 8. [The Ministry of Agriculture and Environment Protection. (2015). *Heating crops—how to respond? The impact of the climate change on the Serbian agriculture*. The United Nations Development Program (UNDP) in Serbia, Belgrade, pp. 8.]
11. Niraj, P. J., & Keshav, L. M. (2011). Effect of climate variables on yield of major food-crops in Nepal. *School for International Development and Cooperation*, Hiroshima University, pp. 1.
12. Ndawayo, B. A., Nasir, B. S., & Alias B. R. (2017). Impact of climate change on maize yield in the maize growing region of Nigeria. *International Research Journal of Environmental Sciences*, Vol. 6(3), pp. 20.
13. Netherlands Environmental Assessment Agency (2013). *EU policy options for climate and energy beyond 2020*. The Hague, The Netherlands, pp. 6.
14. Pejić, B., Bošnjak, Đ., & Mačkić, K. (2009). Response of maize (*Zea mays* L.) to soil water deficit at specific growth stages. *Letopis naučnih radova Poljoprivrednog fakulteta*, Vol. 33(1), Novi Sad, pp. 156. [Pejić, B., Bošnjak, Đ., & Mačkić, K. (2009). *Response of maize (Zea mays L.) to soil water deficit at specific growth stages*. The Yearbook of scientific works of The Faculty of Agriculture, Vol. 33(1), Novi Sad, pp. 156.]
15. Republički zavod za statistiku (2013). *Popis poljoprivrede 2012. godine*. Knjiga 1. [The Statistical office of the Republic of Serbia (2013). *Indexing of agriculture in the Republic of Serbia in 2012*. Book 1.]
16. Republički zavod za statistiku (2014). *Uporedni pregled broja stanovnika 1948, 1953, 1961, 1971, 1981, 1991, 2002. i 2011. godina*. Knjiga 20. [Statistical office of the Republic of Serbia (2014). *Comparative statistics of the population in the Republic of Serbia in the year 1948, 1953, 1961, 1971, 1981, 1991, 2002 and 2011*. Book 20.]
17. Službeni glasnik Republike Srbije br. 63/14; Pravilnik za katastarsko klasiranje i bonitiranje zemljišta. Beograd, čl. 43. [The Official Gazette of the Republic of Serbia no 63/14. Bye law of cadastral classification of land. Belgrade, article 43.]
18. Službeni glasnik Republike Srbije br. 62/06, 65/08 - dr. zakon i 41/09. Zakon o poljoprivredi. Beograd, čl. 2. [The Official Gazette of the Republic of Serbia no 62/06, 665/08 - other laws

- 41/09. The Agriculture Law. Belgrade, Article no 2.].
19. Službeni glasnik Republike Srbije br.10/13. Zakon o podsticajima u poljoprivredi i ruralnom razvoju. Beograd, čl. 4. [The Official Gazette of the Republic of Serbia no 10/13. Law on Incentives in Agriculture and Rural Development. Belgrade, Article no 4.].
 20. Službeni glasnik Republike Srbije (2015). Zakon o regionalnom razvoju. Beograd, čl.11.
[The Official Gazette of the Republic of Serbia (2015). Law of regional development. Belgrade, Article no 11.].
 21. *Stevanović, S., Đorović, M, & Milanović, M. (2012). The development og the market production of cereals in Serbia: Example wheat and corn. Economics of Agriculture, 59(4), pp.618.*
 22. Stojiljković, J., Biberdžić, M., & Pešić, B. (2014). Uticaj klimatskih uslova područja na prinos pšenice. *XIX savetovanje o biotehnologiji. Zbornik radova, 19(21), Čačak, pp.74.*
[Stojiljković, J., Biberdžić, M., & Pešić, B. (2014). *The influence of climatic conditions on the yield of wheat.* 19th Conference on biotechnology. Collection of reports, 19 (21), Čačak, pp 74.].
 23. Svetski fond zaprirodu (2012). *Procena ranjivosti na klimatske promene.* Beograd, pp. 37-38.
[World Wildlife Fund (2012). *Assessment of vulnerability to climate changes.* Belgrade, pp. 37-38.].
 24. The Intergovernmental Panel on Climate Change (2014). *Climate Change 2013. The Physical Science Basis,* Cambridge University, New York. pp.16.
 25. Zar, J.H.(1984). *Biostatistical analysis:* Englewood Cliffs, N.J., Prentice-Hall, pp.718.
 26. http://www.climatechange2013.org/images/report/WG1AR5_ALL_FINAL.pdf (28.8. 2018.)
 27. <http://www.hidmet.gov.rs/latin/ipcc/index.php>(20.6. 2018.)
 28. <http://www.ipcc.ch/>(18.5. 2018.)
 29. <http://popispoljoprivrede.stat.rs/?cat=1&lang=lat> (20.12.2017.)
 30. <http://www.stat.gov.rs/> (15.11.2017.)
 31. https://mpra.ub.uni-muenchen.de/49466/1/MPRA_paper_49466.pdf (8.5.2018.)
 32. <http://www.euractiv.rs/odrzivi-razvoj/8826-smanjenje-c02-u-srbiji-napredak-ili-varka.html> (14. 2. 2018.)
 33. http://www.pbl.nl/sites/default/files/cms/publicaties/PBL_2013-EU-policy-options-for-climate-and-energy-beyond-2020_1082.pdf (19.6.2018.)

COOPERATIVE EVOLVEMENT THROUGH POLITICAL ERA / EPOCH: ALBANIAN'S CASE AND COMPARISONS

Olta Sokoli¹, Reiner Doluschitz²

**Corresponding author E-mail: olta.sokoli@uni-hohenheim.de*

ARTICLE INFO

Review Article

Received: 01 October 2018

Accepted: 28 February 2019

doi:10.5937/ekoPolj1901189S

UDC 310.1:32(496.5)

Keywords:

*Cooperative organization,
developing countries,
governmental impact, trust,
Albania*

JEL: O57, P13, P32, Q18, H30

ABSTRACT

The purpose of this paper is to analyse the structure and state of cooperatives in Albania as a country with a unique history, a post communism country on the development of cooperatives. It is important to understand the way cooperatives are perceived at higher levels. Information strongly influences the development of trust among farmers. Access to information and trust play an important role in the emerging stages of cooperatives. However, the development of cooperatives still remains a very delicate issue in Albania due to misleading of trust issues from the communism era. Cooperatives should not be a 'forbidden' word in the Albanian vocabulary but instead should be considered as a normal and trusted topic at the governmental and organizational levels.

© 2019 EA. All rights reserved.

Introduction

The principles of cooperatives are essential guidelines in determining how a cooperative is initiated and established in developing countries. Due to the non-function in the proper way of cooperatives before 1990, it is likely that not everybody understands the original concept of a cooperative, although everybody talks about them. For instance, in the case of Albania, the first thing that comes to every farmer's mind when mentioning the word "cooperative" is related to the transformation and collectivisation of private land ownership, which is a consequence of the collectivization process that began in 1945. At that time, the state began the transformation of private land ownership, a process in which land originally owned by a large number of farmers was acquired by the state through agrarian reform. Land ownership was transformed from private to collective at that time. This process was a forced changing of the land ownership. Albanian agricultural cooperatives dominated from 1959 until the beginning of 1990. Cooperatives in Albania differed from those in Eastern Europe in their large extent through mountainous areas, plains and in hills (Skreli, 2006). Compared to the main

1 M.Sc. Olta Sokoli (PhD student); Institute of Farm Management, University of Hohenheim, 70599 Stuttgart, Germany, e-mail: Olta.Sokoli@uni-hohenheim.de, ORCID ID: <https://orcid.org/0000-0003-0416-948X>

2 Reiner Doluschitz Prof. Dr.; Head of Institute of Farm Management, University of Hohenheim, 70599 Stuttgart, Germany, e-mail: Reiner.Doluschitz@uni-hohenheim.de

principles of cooperatives such as; one person one vote, democracy, solidarity, self-help, voluntary, self-responsibility, self-administration, etc., in Albania the state had command and an unfavourable role in the cooperative relationship. Cooperative chairmen were chosen by the state and the number of organizational units and the output would be delivered to state; the distribution of income and the provision of a business day were also decided by the state.

The increase in the size of the cooperative was accompanied by a concentration of products deemed “key and strategic”. In this way, other activities such as food processing or infrastructure were neglected. By 2012, most farmers preferred to be registered as a nonprofit organization to avoid taxes and gain market access easily (Data from the Association from Cooperation and Mutual Societies - *Te dhene per Shoqata dhe Shoqeri te Bashkepunimit Reciprok*, 2012)

Material and Methods

Based on the information gathered and analysed, a brief description of the current situation in Albania regarding the offer/supply market of agricultural products will be given. The paper also describes ways to have a consolidated market based on cooperative circumstances. The main objective of the paper is to identify the problems that challenge the partnership between farmers and to determine the potential for the organization of cooperatives in Albania.

Hence, the following research questions were addressed:

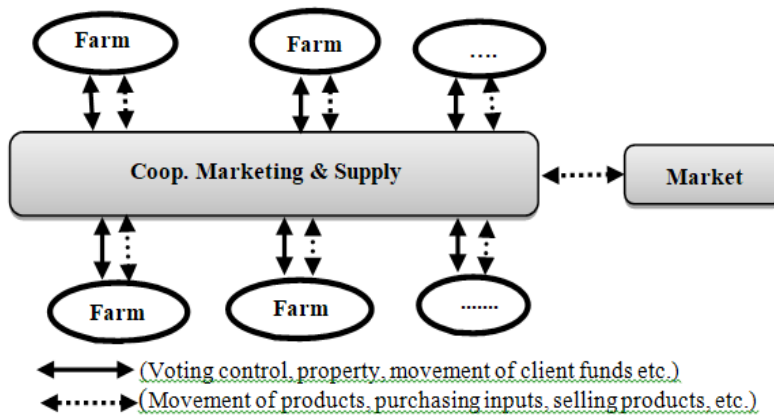
- What are the common items and differences of cooperatives in developed and developing countries?
- Which are key success versus critical factors for cooperatives effectiveness in developing countries?

Our goal is to assess if individuals and/or agribusiness managers have information about the way cooperatives function in Albania, as compared to other Balkan countries and Europe, in order to explain the role of supply and marketing cooperatives (as a bridge between farmers and markets). Cooperatives assist farmers in gaining market access and power.

Subsequently the hypothesis for this paper will be:

- **H1:** Cooperatives are a linkage of farmers’ power with the market

Cooperatives aim to prevent that the strength of their negotiating position decreases in favour of concentrated retailers. Nevertheless, they face challenges adopting the same policy as other corporations because financial funds are primarily acquired by retained earnings. The example shown in Figure 1 is one of the good illustrations of the positive impact that a marketing and supply cooperative can have on every farmer. This illustration makes it clear that cooperative stands are the main linkage with the market as we revealed previously (market access and power).

Figure 1. The role of Marketing and Supply Cooperative

Source: Musabelliu B., Meco M., 2013

- **H2:** Trust in cooperative sector is a sensitive issue in post communism countries

In post communisms countries, the lack of trust is related to the property and common assets management, which seems to be an important factor that has hampered cooperation and creation of cooperative. Sometimes it is important to come back to basics to understand the principle. With time, we will need to change the way things are done to move forward (Parnell, 1999). Parnell (1999) emphasized that a vision statement is important for change; it becomes the focus of the power and activities. It is vital to set the mechanisms that will drive the cooperative organization towards this redesigned future, to make a plan and to have specific work groups.

One major question about providing assistance to cooperatives is how it could be done without creating dependence. The most useful form of assistance may well be the development of local cooperative leaders. Therefore, many so-called cooperatives in Albania have been nothing more than organs of the state or projects driven by state agents; the vital elements of self-help and commitment from the members were never part of the scheme.

Methodology

One purpose of this paper is to analyse the differences of cooperatives evolution in different countries and the second one is to analyse the collaborations of governmental institution to promote and to encourage cooperatives. Therefore, we have considered the countries who promote and encourage cooperatives. To examine and respond to the above objectives, a comprehensive literature review has been done. Thus, this paper includes secondary data collection and analysis.

The secondary data were obtained from various publications accessible through web of science and google scholar, other sources available online and from magazines and publications from governmental websites in Albania.

The search included the following terms: developing countries, cooperative law and governmental support, communism countries, agricultural and property reforms.

In this way, analysis of the literature used a summative content analysis method to understand if the government or any other institution promotes cooperatives as a vehicle for agricultural market improvement. To highlight the adaptability of this method Rapport (2010) has applied summative content analysis across a variety of research studies, on different focus groups. In our case, we had an interactive focus group with experts from the field and policy level.

From this assessment, in the further steps to come, we will use the more appropriate European or Balkan cooperative as an example to adapt to the situation in Albania.

Results

Comparative analysis according to different regions

For many years, there have been different approaches to promoting cooperatives as a way of improving agribusiness and farming systems. The last large-scale promotion of cooperatives took place in 2012, named the Year of Cooperatives by the International Cooperative Association. There have been many conferences and much exchange of knowledge between researchers from various cultural backgrounds. It is essential to point out that different countries perceive cooperatives in different ways. The literature describes several types of cooperatives. A comparison between eastern and western countries will lead to a more specific analysis within eastern countries.

Eastern versus Western Europe: In countries of Eastern Europe the principles of cooperation has gone through a rough history of recognition and even enthusiastic promotion due to the experience of State control of cooperatives (Valentinov V., 2007). In a report done from M-F. Couture, D. Faber, M. Levin, A-B. Nippierd, for the International Labour Office (ILO) in 2002 was analysed the transition of cooperatives in several developing countries. In Eastern Europe, state controlled meant compulsory registration in cooperatives, the directors and staff were prearranged by the government which is in a paradox with one of the six main principles of cooperative (Couture et al., 2002:2).

Cooperative organisation include the creation of a new interface between highly sophisticated and globalized food industries and the primary farms that are seeking sustainable methods in a sustainable rural economy (Gert Van Dijk, 1997). Unlike countries in Eastern Europe, farmers need to establish the cooperative as a form of simply access to bank products. It appears that cooperative banks are the only way farmers can gain access to financial markets. Cooperative banking can contribute to farm adjustment by offering new services and by assisting the members to develop strategies and manage them.

Meanwhile, a new demand from the perspective of the consumer will lead to a need to diversify the product. This affects not only processing but also production methods at the level of the farm. At this point, it is important to point out the role of technology. Access to and implementation of new technology is an irreversible option for cooperatives if they want to penetrate the food chain (Kyriakopoulos, 1996).

In the past, risk management had to do with member solidarity, especially in terms of how surpluses are handled. There is little doubt that the changing conditions within food and agricultural markets have changed the risk profiles for cooperatives and their members. As food markets become more mature, branding and market segmentation plays a vital role. At the same time, integration is a means to reduce risks for farmers as trade liberalization decreases the effect of income protection policies by the government. Again, based on the Van Dijk and Mackel from 1994, cooperatives accepted all products delivered to them by maximizing the use of public support measures to minimize commercial risk, free-trade and optimize price transparency for producers.

There is a wide gap in the information on cooperatives in developing countries, especially Balkan countries and those in Eastern Europe. Sometimes it is not just a missing information but also the information which might be provided is not in English.

Slovenia: Cooperatives in Slovenia, like many other cooperatives in Balkan and Eastern European countries, have a long history with many ups and downs, due to changes in socioeconomic systems and the changing political demarcation of the territory during the last century and a half. The historical development of cooperatives on the territory of what is now Slovenia could be divided as follows:

The first period starts in the middle of the 19th century, when credit cooperatives and later others emerged. The second period began in 1918 with the emergence of the State of Slovenes, Croats and Serbs, which was united and became the Kingdom of Serbs, Croats and Slovenes in the same year. Later on in 1929 it was renamed the Kingdom of Yugoslavia. This period lasted until the end of the Second World War. The early years of this period saw the consolidation of the cooperative movement with the newly established cooperative banks. A study by Avsec and Stromajer (2015) cited from Temeljni, (1949) discussed the political campaigns for setting up what were called agricultural working cooperatives (1948–1953); these cooperatives were dissolved and the land and other assets were returned to farmers. Thus, the major part of agricultural land and forests remained in private ownership. However, the administrative pressure brought a long-lasting, negative image of cooperatives among the rural population (Miokovic, V. B., and Sljukic, S., 2012).

Yugoslavian countries: The history of these countries is similar when it comes to politics and may be the main reason for the differences in several aspects as compared Europe. Boyd (1987) emphasis that socialist cooperatives are not inherently inefficient and can perform better than private producers. Most importantly, his results have shown that cooperatives are not inherently incapable of taking advantage of opportunities and generating high productivity and rates of technological change. Based on a study

of Yugoslavian countries, we can conclude that from 1955 to 1990, the number of cooperatives decreased drastically in Yugoslavia (Avsec, F., and Stromajer, J., 2015). *Albania*: The situation in Albania is taking virtually the same route as the Yugoslavian countries. During the first period from 1950 until 1990, there has been a malfunction of cooperatives in Albania. The image of cooperation has deteriorated during this period (Musabelliu, 2009). It is important to note that Albania comes from a post-communism governmental system where everything is derived from and decided by the government. The second period began in 1990 and is ongoing today. There are several countries which have been involved in this “whirlpool”.

As it is shown on the table 1, in difference from Albania, Czech Republic and Hungary the case of Poland and Bulgaria are the good examples of a successful transition. In countries like Bulgaria where land distribution had been rather egalitarian due to former land reforms these criteria were more or less compatible. Restitution of land improved both historical justice and social equity. However in countries with unequal distribution of land property before the socialist era, such as Albania, historical justice and social equity proved to be mutually exclusive leading to land distribution on an equal per capita basis (Hagedorn, 2014). This was due to the different policy that Poland had on public property. Which means that a large portion of private property was not returned to public ownership.

Table 1: Different cases, different countries

Albania	Hungary	Czech Republic	Poland	Slovenia
Easter Countries - Past political System: <i>Communism</i> The administrative pressure brought a long-lasting negative image of cooperatives				
Two most important laws have been issued on 1996 and 2012. Cooperatives (including the property issue) remains a very complex subject.	1991: fix of the damage and property for citizen to which it was taken on 1949 1992: partial reward for the property taken on 1939-1949 (Qafa, 2015)	Gradual transition Transform - ation from Planned (Regional) economy to Market (national) economy. (Avsec & Stromajer, 2015).	Less cases of privatization Transition passed easily and quicker (Ganev, 2001).	On 1990s these cooperatives were dissolved and the land was returned to farmers (Avsec & Stromajer, 2015).

Source: Data elaborated from authors

Major development and cooperative perspective in Albania

- Cooperation in Albania after 1990s – (post communism)

Situation of cooperatives in Albania seems to be more complex than the one from the groups we have analysed so far. Land privatizations started in 1991 and during the last two decades, production maximization through private property exploitation has been the dominant mentality among Albanian farmers. There have been only a few initiatives for cooperation during this period. However, this mentality of working together in a cooperative has been not so much successful due to the small farm size (average farm size range from 0.9 ha to 1.3 ha of land). Under these circumstances, only a few farmers have been able to become important actors in the agricultural market in Albania, to produce efficiently, reduce land fragmentation and increase farm size by renting or buying land (Musabelliu and Meco, 2011). The current situation indicates that most of the family farms in Albania operate for own consumption (subsistence farming) and a low number produce for domestic market.

Meanwhile during this period, some donations and projects have been the only attempt in supporting initiatives for the creation of cooperatives and production associations in Albania (Ministry of Agricultural, Rural Development and Water Administration in Albania).

- Current situation in Albania

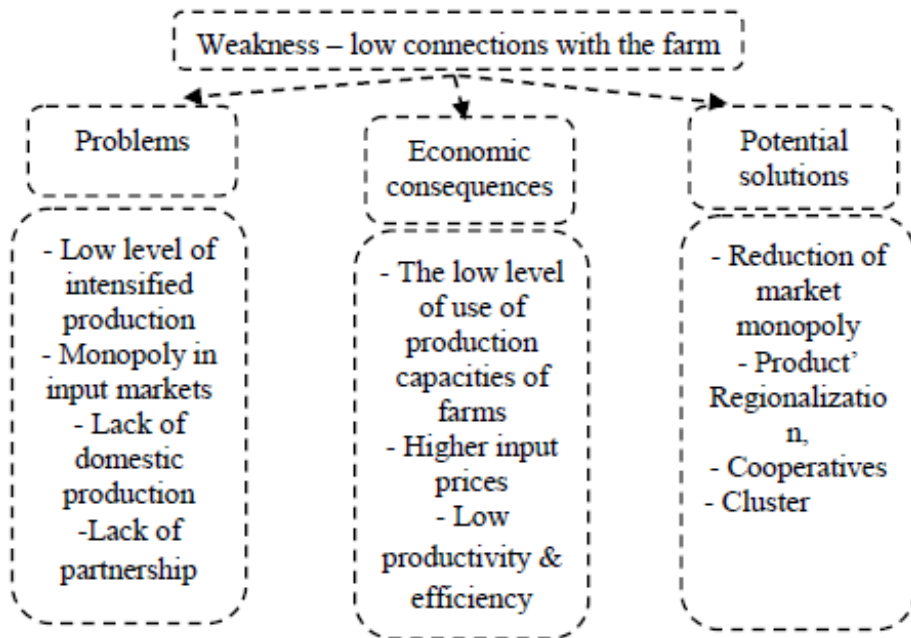
In addressing the situation regarding the cooperatives in Albania, specific conditions there have to be considered. Referring to Albanian economic growth and stability, development of cooperatives and farming is conditional on the growth and sustainable development of agricultural sector. Above all, this development means rational use of production capacities in agriculture in order to increase the supply of agricultural products. Contrary to what is already known, the realization of this objective is conditional on the presence of a number of factors sensitive to the effects of agricultural development, such as: the uncertainty of farmers' land ownership, the presence of very small farms with very little land and that is highly fragmented, the low level of lending to agriculture, the low level of use of inputs, problems related to irrigation and drainage, inadequate number of agriculture mechanics, high costs of labour, lack of transport and poor road infrastructure, the lack of security of energy resources and others.

No less significant are the problems related to marketing, infrastructure, information on markets, lack of partnership between producers and markets, lack of regionalization and specialization of production in agriculture in the face of fierce competition with farmers to import products, the opportunities for farmers to compete in local and regional markets, no stimulation and support for horizontal cooperation among farmers and others.

Certainly these problems are very broad and complex. In this paper, we make no attempt to analyse and provide solutions for the entire range of problems noted above; instead, we concentrate on evaluating the situation and potential for cooperatives. Taking the example of weaknesses in the farm supply in correlation with the connectivity of the farm.

Figure 2 explains the weaknesses that characterize the farm supply sector based on low connection to farms. This is taken from the most recent analysis by Musabelliu and Meco (2013) on farm management and farm difficulties in terms of access and presence in the market with the same rights as any other conventional business. As we can see from the above analysis there is a needed impact from institutions and governmental bodies to support cooperatives as a great vehicle in developing of agriculture in Albania. It is important to remind that Albania comes from a post-communism governmental system where everything is derived from and decided by the government.

Figure 2: Analyses of Albanian Farm sector



Source: Musabelliu B., Meco M., 2013

- Cooperative legislation evolvement and governmental role in Albania

The two major and most important laws on cooperative organization have been issued in 1996 and 2012 (as presented in Table 2). It is important to point out the fact that not only has the name slightly changed to get closer to the concept of agricultural cooperatives but there also have been words used in the law that describe cooperatives based on the International Cooperative Alliance definition as follows: “A co-operative is an autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through a jointly-owned and democratically-controlled enterprise.”

Table 2: Two main laws on cooperatives in Albania

Year	1996	2012
Name	Mutual Cooperation Societies	Agricultural Cooperation Societies
Law problematic	<ul style="list-style-type: none"> ➤ Incomplete laws ➤ Frequent changes of laws ➤ Non-implementation of laws from the state administration and farmers 	
	<ul style="list-style-type: none"> • Organizations have difficulties in the implementation of economic activities and operate under legal requirements of doing activities in public interest. • The non-profit organizations considered to be not the appropriate form for the development of economic activity within the agricultural cooperation. 	

Source: Sokoli O., Musabelliu B., Doluschitz R., 2016

It was not only the bad image that cooperatives have on farmer's mentality: there have also been frequent changes on the law of cooperatives due to the conceptualization of cooperatives. An especially important fact is that the laws have not been implemented on the right terms of approval from all the dependent institutions

Furthermore, Albanian farmers also had the option to register their companies as non-profit organizations, as provided by the Civil Code and the Law no. 8788 on "non-profit organizations", dated 05.07.2001. Based on their mission, non-profit organizations are exempt from taxation: they only pay personal income tax of 10%, and employers insurance (at least one person has to be employed as executive director). According to the law, when these organizations conduct any economic activity, they will be taxed on this part of the activity as any other enterprise. For this purpose, these organizations submit monthly budgets to the tax authorities.

In 2012 the Albanian Parliament with the help of the Spanish Cooperation approved a supportive law for cooperatives; Law Nr. 38 dated 05. 04. 2012 on "Agricultural Cooperation Association" which is a different expression of cooperative associations. The idea behind this terminology was to remove the negative connotation of the name "cooperative" inherited from communist times. Despite the law, the problems that go along with cooperation during market economy period (after 1990) have been the same.

It is important to emphasize that for instance, the history of cooperatives in Germany dates from 1864, when Friedrich Wilhelm Raiffeisen has created the first aid association to support poverty in rural areas (History of cooperatives in Germany, <https://www.dgrv.de>). However, the law contains two essential differences from the principles of cooperatives:

- Firstly, the main principle of cooperatives "one person, one vote". In the Albanian law is stated that vote is associated with the capital invested, so a member with more capital invested has more votes than someone with less.
- Secondly, the law does not require and does not mention the existence of the Managing Council in determining the cooperative body, unless otherwise decided by the statute.

As the organizational model is designed to be implemented in different areas of the economy, such as the credit sector, insurance, constructions, etc., this results in the complication of the model and somewhat prohibitive if it is applied to agriculture or industry sector (Manual on Organization and Functioning of Agricultural Cooperation Organization, Extension Service Department, Research and Agriculture Information in the Ministry of Agriculture Food and Consumer Protection), due to the sensitivity of agriculture in Albania.

- Results achieved by experts' discussion

Besides legal problems and lack of initiatives by the policy-makers to promote cooperation development between farmers, there are many obstacles that have negatively influenced the cooperation and cooperative creation in Albania:

- A farmer and its family members aim to carry out every farming activity starting from production to the sale of the products into the market. They do not trust having their capital invested in common assets and someone outside of the family being in charge of managing these assets. Thus, the level and extent of available social capital involve in formal/informal collective action and their extent of involvement is very low. Whereas, Hansen and Morrow (2003) stress out that members can trust the cooperative organization since it has two crucial qualities: competency and reliability in making the best decisions and Theuvsen and Franz (2007) and Didier, Henninger and Akremi (2012) state that members of a cooperative decide to trust the cooperation based on their beliefs several positive reasons about its competence, reliability and carefulness in order to satisfy their needs and create added value as their advantage.
- In Albania, there is an inherited mentality about cooperatives that dates from the communist times under the name of “socialist cooperatives”. There is a common and comprehensive understanding among farmers that being under cooperative organization means that they merge private property and consequently lose it under common management and group proprietorship. There is a tremendous lack of knowledge among farmers in Albania about capitalist cooperatives, their role in maximizing farmer’s revenue and their success.
- Lack of leadership and management skills and competencies related to cooperative organization among farmers. Several farmers understand that doing business under market economy conditions means specialization and job separation. As a consequence, no one can do everything by themselves from production to marketing. As part of a supply chain, farmers must be focused on production, while other people with appropriate knowledge and skills must do the marketing and sales. What farmers still do not understand is that marketing operations are activities with high added value and they must cooperate in order to penetrate into the market (Carroll B., McCarthy O., and O’Shaughnessy M., 2012).
- Small farm size negatively affects the willingness of the farmers to cooperate. Recent studies indicate that bigger farms have positive impact on farmer’s

willingness to cooperate. According to the study, the chances of apple farms (in Korça region) to be involved in cooperative increases by 5.8% if the number of planted apple increase by 1,000 trees. The results of this study suggests that when switching from subsistence farming to commercial farming, cooperation seems to be more important and attractive (Musabelliu and Meco, 2011).

- Despite recently increased awareness, there is still a lack of financing in the form of grants or preferential credits from different sources towards cooperation in the farming sector in Albania (Livestock and Rural Development Center). Banking system credits have high interest rates, often unaffordable by most of the farmers. Peterson and Anderson (2012) underline the fact that, “a cooperative maximizes [member] value when it produces an optimal differential return to members over what they would receive in the absence of cooperative membership”.
- A high level of informality exists in the agricultural markets in Albania. Once a farmer is participating alone in the market, he is not part of any fiscal system, and the opposite happens when the farmer is part of a cooperative. By law, they become part of a fiscal system, and being part of a cooperative is considered as excessive cost by the farmers.

- Key success and critical factors

The relation of trust and cooperative performance. One research group in the Netherlands analysed the relationship between trust and the performance of cooperatives, both in terms of general trust (trust in other people), as well as trust in political institutions. In addition, they studied the relationship between the performance of cooperatives, the level of engagement in voluntary work and the general feeling of satisfaction with life (a prerequisite for trust) which has also been discussed by Valérie Barraud-Didier, Marie-Christine Henninger and Assâad El Akremi (2012). Based on some reports written by the Albanian Agricultural Cooperative Association there is a lack of trust among farmers. The lack of trust is related to property and common assets management, which seems to be an important factor that hampers cooperation and cooperative creation. A farmer and their family members aim to carry out every activity in farm starting from production and up to the sale of the products to market. This comes due to the above discussed factors and as pointed out by the Plunkett Foundation (1995), the use of the word “cooperative” in Central and Eastern Europe will not only create the wrong impression, it will also create barriers to progress. Following with the statement of Curtiss et al. (2004) and Schulze et al. (2001) the term “cooperative” seems to be a misleading term for farms in transition countries.

Cultural perception and cooperative relation. Cooperatives represent social capital networks and engagement in collective action, which is intended to produce potential benefits at the group level, exceeding simple self-interest (Bijman J., et al. 2012). Low levels of self-organization and networking have far more consequences for these countries than simply constraining cooperative development. For instance in Albanian case there is a lack of leadership and management skills and competencies related to cooperative organization among farmers. As a consequence, no one can do everything by themselves from production to marketing.

The need for a cooperative, in Balkan countries, is crucial due to small-sized farms, thanks to their capacity to accumulate. Something quite surprising in Albania is the fact that the bigger a farm is, the higher their willingness to be part of a cooperative. In contrast, in western countries, for instance, smaller farms are more likely to be part of a cooperative. Another positive aspect of cooperatives is that during the years of conflict in Europe, when fertilizers were scarce and their prices rose steeply, farmers began to see cooperative purchasing as the best (and sometimes the only) way to obtaining fertilizers (Hendrikse, G.W.J. & Veerman, C.P. 1997). However, the main role played by these cooperatives was to strengthen the social group that acted as their driving force: farmers of peasant origin operating mid-sized farms in regions such as Valencia or Catalonia were promoting a new agrarian capitalism (Calatayud and Millan, 1994 cited by Garrido, 2007). In France, cooperation played a decisive role in the expansion of mid-sized farms (Simpson, 2000); Spanish cooperation only did so in places where mid-sized landowning had already been present before the arrival of cooperatives (Garrido, 2007). It is important to show that combining explanations from different disciplines is the best way to understand the motives behind cooperation, its rhythms and its morphology. The success or failure of cooperatives depends not only on economic factors, but also on other factors that are social or political in nature. In the early twentieth century, a significant portion of European agrarian cooperation was sponsored by large landowners, claiming to have an ‘antisocialist’ vocation and showed themselves to be especially active as far as economic issues were concerned.

Discussions

By the time self-organized cooperative organizations’ were substituted by the collective ones the progress and development of cooperatives was interrupted. The assumption that new cooperatives could renew the former cooperative traditions was not very realistic because people’s collective memory had become weak as discourses on alternative modes of organization were suppressed in socialist countries (Theesfeld and Boevsky 2005). Hagedorn (2004) points out that it is rational to assume that the historical farming structure before socialist intervention and the ensuing changes during the transition process may have influenced the emergence and survival of new cooperatives. The term “cooperative” thus give the impression to be an inaccurate term for farms in these countries. This may explain why comparative productivity studies consistently fail to detect any performance differences between agricultural production cooperatives and other corporate farms (Curtiss et al., 2004).

As already mentioned, most of the farmers operate subsistence farms. These include the ambiguity of farmers’ land ownership. The presence of very small and fragmented land parcels, low level of lending to agriculture and use of inputs, problems related to irrigation and drainage, insufficiency of agriculture mechanisation, low labour productivity and thus high costs of labour, lack of transport and poor road infrastructure, absence of security of energy resources, etc.

In Albania, the small farmers are more afraid to be part of a cooperative organization.

This means that they have their land for own consumption and they are uncertain to be part of agricultural markets. Based on these very important and key factors, a radical change / support in many different aspects of the agricultural sector is needed. Cooperatives, at least most of them, should be product-oriented, not capital-oriented and this is something that still needs to be taken into account in terms of the perception of farmers. The common interest is to maximize the return on the resources owned by the members. Different markets means members are heterogeneous. Farmers control not only fixed resources but also capital goods with higher rates of depreciation and turnover. New balances between solidarity, democracy and competition will appear. However, it is likely that a considerable time period is required before we dare to speak of principles (Michael L. Boyd, 1987).

Reflecting on the farming situation the role of governmental institution is needed. The training of farmers on the established concept of cooperation may have a major impact (based on the German example mentioned above). It is vital that the law has to be defined and approved by all institutions which have direct and indirect impact on the implementation. Additional demonstration and assessment of the current laws on cooperative organization have to be shown and explained to farmers. As well, the establishment of a cooperative as a good example of the main improvement vehicle in the agriculture sector.

Last but not least important in developing countries such as Albania: it is vital to point out the importance of trust among farmers. In Albania, the trust people have for cooperatives is still low and there is a lot of work to be done.

Conflict of interests

The authors declare no conflict of interest.

References

1. Albanian Law no. 38/2012 “On Agricultural Cooperative Companies”, (<http://80.78.70.231/pls/kuv/f?p=201:Ligj:38/2012>), Accessed on 20 June 2016
2. Albanian Law no. 8788 “On non-profit organizations”, dated 05.07.2001 (http://www.akdie.org/sites/default/files/ligj_per_ojf.pdf)
3. Albanian Law No. 8088, dated 3/21/96 On Mutual Collaboration Associations [Societies]”, (<http://www.akdie.org/.pdf>)
4. Avsec, F., and Stromajer, J. (2015). Development and socioeconomic environment of cooperatives in Slovenia. *Journal of Co-operative Organization and Management*, <http://dx.doi.org/10.1016/j.jcom.2015.02.004>.
5. Bijman, J., Iliopoulos, C., Poppe, K.J., Gijssels, C., Hagedorn, K., Hanisch, M., Hendrikse, G.W.J., Kühl, R., Ollila, P., Pyykkönen, P. and van der Slangen, G. (2012). Support for Farmer’s Cooperatives - Final Report. Wageningen.

6. Boyd, M. L. (1987). *The Performance of Private and Cooperative Socialist Organization: Postwar Yugoslav Agriculture*.
7. Carroll B., McCarthy O., and O'Shaughnessy M. (2012), *Social enterprise in Ireland: a people's economy? Co-operatives - What relevance now?* P.115-126, Oak Tree Press
8. Couture, M.-F., D. Faber, M. Levin, and A-B. Nippierd (2002). *Transition to Cooperative Entrepreneurship: Case Studies from Armenia, China, Ethiopia, Ghana, Poland, Russia, Uganda, and Vietnam*. Geneva: International Labour Office.
9. Curtiss, J., T. Medonos, and T. Ratering (April 2004). "Ownership Form Effect on Large-Scale Farms' Performance: Case of Czech Agriculture", in *From Households to Firms with Independent Legal Status*. 94th EAAE Seminar, Ashford, UK.
10. Didier V.B., Henninger M-Ch and Akremi El A. (2012) "The Relationship between Members' Trust and Participation in the Governance of Cooperatives: The Role of Organizational Commitment", *International Food and Agribusiness Management Association (IFAMA) Volume 15, Issue 1*.
11. Ganev, A. (2001). "Bulgaria", in *Proceedings of Workshop, Promotion of Rural Development through Agricultural Cooperatives*, ICAO-ICA Europe, Budapest
12. Garrido, S. (2007, October). *Why Did Most Cooperatives Fail? Spanish Agricultural Cooperation in the Early Twentieth Century*. *Rural History*, pp. 183-200.
13. Gert Van Dijk. (1997). *Implementing the Sixth Reason for Co-operation: New Generation Co-operatives in Agribusiness*. Netherlands: Van Gorcum & Comp. B.V., P.O. Box 43, Assen.
14. Hagedorn K. (2004): 'Property rights reform on agricultural land in Central and Eastern Europe', *Quarterly Journal of International Agriculture*, 43(4), 409-438.
15. Hagedorn, Konrad (2014). "Post-socialist farmers 'cooperatives in central and eastern Europe.'" *Annals of Public and Cooperative Economics* 85.4: 555-577.
16. Hansen, Mark H. and J.L. Morrow Jr. 2003. *Trust and the decision to outsource: Affective Responses and cognitive processes*. *International Food and Agribusiness Management Review* 6(3):p.1-30.
17. Hendrikse, G.W.J. & Veerman, C.P. (1997). *Marketing cooperatives as a system of attributes*. In J. Nilsson & G. van Dijk (Eds.), *Strategies and Structures in the Agro-food Industries* (p. 111-130). Assen: Van Gorcum & Comp.
18. *History of cooperatives in Germany*, (<https://www.dgrv.de/>), Accessed on 27 July 2016
19. Hofstede, G., Hofstede, G.J., and M. Minkov. (2010). *Cultures and Organizations: Software of the Mind* (3rd Edition). McGraw-Hill, USA.

20. International Co-operative Alliance (<http://ica.coop/en/what-co-operative>), Accessed on 8 June 2016
21. Kyriakopoulos, K. G. (1996). Agricultural Research in Agribusiness Sector: Multinational and Cooperatives. NETHERLAND: 4th Conference of European Society for Agronomy - ESA.
22. Livestock and Rural Development Center (BZHR) www.bzhr.org, Accessed on 30 July 2017
23. Manual on Organization and Functioning of Agricultural Cooperation Organization, Extension Service Department, Research and Agriculture Information in the Ministry of Agriculture Food and Consumer Protection/ Tirane, financed by Promali/SNV, 2015.
24. McCarthy O. & Ward M. (2012). 'Sustaining the co-operative approach in an era of change: A Case study from Cork Ireland' In: The Co-operative Model in Practice: International Perspectives. Aberdeen: Community Enterprise Trust Soctland.
25. Miokovic, V. B., and Sljukic, S. (2012). Destruction of Social Capital: the Case of Agrarian Policy in Socialist Yugoslavia (1945–1953). Yugoslavia: Kultura polisa, 18(Year IX).
26. Ministry of Agricultural, Rural Development and Water Administration in Albania (<http://www.bujqesia.gov.al/al/programi/konsultimi-i-strategjise-kombetare-per-zhvillim-dhe-integrim-2015-2020>)
27. Musabelliu, B. (2009). Agribusiness Management [*in Albanian: Drejtim Agrobiznesi*], p.189-205, Publisher: "Dita 2000", Tirane (ISBN978999435793-2)
28. Musabelliu, B. and Meco, M. (2011). Agriculture business management [*in Albanian: Drejtim I Biznesit Bujqesor*], p.153, Publisher:"Dita 2000", Tirane
29. Musabelliu B., Meco M. (2013). Economy in front of Challenges [*in Albanian: Ekonomia perballe Sfidave*]. Tirana, Publisher: Grand Print
30. Ostrom, E. (2009): A General Framework for Analysing Sustainability of Social-Ecological Systems. VOL 325 24 JULY 2009 (www.sciencemag.org)
31. Parnell, E. (1999). Reinventing Co-operation, The challenge of the 21st century. Plunkett Foundation.
32. Peterson, C. and B. Anderson (1996). Cooperative Strategy: Theory and Practice. Agribusiness: An International Journal. 371-384.
33. Plunkett Foundation (1995). Review of 1994 Activities. Plunkett Foundation, Oxford.
34. Qafa, Arjan (2015). "The Issue of Ownership during Transition Period in the Former Communist Countries of Eastern Europe, as Poland, Hungary, Czech Republic and Albania." Academic Journal of Interdisciplinary Studies 4.2: 175.

35. Rapport F. 2010 “Summative Analysis: A Qualitative Method for Social Science and Health Research”, International Journal of qualitative methods. <https://journals.sagepub.com/doi/pdf/10.1177/160940691000900303>
36. Reports from the Ministry of Agricultural, Rural Development and Water Administration, Albania (<http://www.bujqesia.gov.al/al/programi/konsultimi-i-strategjise-kombetare-per-zhvillim-dhe-integrim-2015-2020>)
37. Reports from the Ministry of Economy and Finance, Albania (<http://www.financa.gov.al/al/raportime/strategjia-per-menaxhimin-e-financave-publike-2014-2020>)
38. Simpson, J. (2000). ‘Cooperation and Cooperatives in Southern European Wine Production’. *Advances in Agricultural Economic History*, 1, 95–126.
39. Skreli, E. (2006). *Agricultural and Food Policy, Theoretical and Practical aspects [in Albanian: Politikat e Bujqesise dhe Ushqimit, Aspekete teorike dhe praktike]*, p.175-180, Publisher: “Ngjyrat e Kohes”, Tirane
40. Sokoli O., Musabelliu B., Doluschitz R., (2016). The interaction and impact of government to promote and encourage cooperation in Albania. *Cooperative Identity and Growth (IGT-ICCS)* (pp. 620-628). Luzern: Verlag Raiffeisen Schweiz St. Gallen.
41. Schulze, E., P. Tillack, and K. Frohberg (2001). “Factors determining profitability of large scale farms in the Volgograd region”, *Quarterly Journal of International Agriculture*, 40(1):67-96.
42. Temeljni (1949). *Basic Act on Cooperatives*. Republic of Yugoslavia: Official Journal of the Federal People’s Republic of Yugoslavia, Nr. 49.
43. Theesfeld I. and BOEVSKY I. (2005): ‘Reviving pre-socialist cooperative traditions: the case of water syndicates in Bulgaria’, *Sociologia Ruralis*, 45(3): 171–186
44. Valentinov, Vladislav. “Why are cooperatives important in agriculture? An organizational economics perspective.” *Journal of Institutional Economics* 3.01 (2007): 55-69.
45. Van Dijk, G. and C.J. Mackel. (1994). ‘A New Era for Co-operatives in the European Agro- Food Industries’. Oxford: The World of Co-operative Enterprise, Celebratory Edition, the Plunkett Foundation.

RURAL TOURISM IN THE FUNCTION OF LIFE QUALITY IMPROVEMENT OF RURAL POPULATION ON GOČ MOUNTAIN

Milena Podovac¹, Nataša Đorđević², Snežana Milićević³

*Corresponding author E-mail: milena.podovac@kg.ac.rs

ARTICLE INFO

Review Article

Received: 28 November 2018

Accepted: 28 December 2018

doi:10.5937/ekoPolj1901205P

UDC

338.48-44(1-22):330.59(497.11 Goč)

Keywords:

*rural tourism, local community,
mountain Goč*

JEL: L83, Z32

ABSTRACT

The aim of the paper is to determine the possibilities for improving rural tourism on the mountain Goč, as well as how this type of tourism can affect the quality of life of the rural population in this area. The methods used in this paper include fieldwork and cabinet research. The survey was carried out on random sample by sending a questionnaire via e-mail. The research involved 150 respondents. Mountain Goč has resources for the development of rural tourism. It is necessary to improve the quality of accommodation capacities and the quality of additional content of rural tourism. The development of rural tourism on the mountain Goč can have favorable impacts on the quality of life of the rural population.

© 2019 EA. All rights reserved.

Introduction

Modern way of human living is characterized by a fast pace, stress, alienation, lack of time for themselves and their families, unhealthy and fast food, specific diseases and unproductiveness at work. Precisely because of this, the motives for coming to the village such as: peace, clean environment, interaction with new people (local villagers), healthy food, slow food (slow eating, enjoying the food), slower pace of life and leisure, are responsible for the development of and survival of rural tourism as a tourism oriented towards an individual customer and his needs (Đenadić et al., 2016).

Rural tourism today is not the only means of revitalization of the abandoned rural areas, but it certainly is one of the major factors of the development of rural areas, which ensures their future sustainability through preservation, and opening of new job opportunities,

-
- 1 Milena Podovac, teaching assistant, University of Kragujevac, Faculty of Hotel Management and Tourism in Vrnjačka Banja, Vojvođanska 5A, 36210 Vrnjačka Banja, 036/5150024, milena.podovac@kg.ac.rs, (<https://orcid.org/0000-0002-0709-2927>)
 - 2 Nataša Đorđević, teaching assistant, University of Kragujevac, Faculty of Hotel Management and Tourism in Vrnjačka Banja, Vojvođanska 5A, 36210 Vrnjačka Banja, 036/5150024, natasa.djordjevic@kg.ac.rs ORCID ID (<https://orcid.org/0000-0002-3630-6867>)
 - 3 Snežana Milićević, associate professor, University of Kragujevac, Faculty of Hotel Management and Tourism in Vrnjačka Banja, Vojvođanska 5A, 36210 Vrnjačka Banja, 036/5150024, snezana.milicevic@kg.ac.rs, ORCID ID (<https://orcid.org/0000-0002-1972-9585>)

increasing the diversity of occupations, preservation of landscape and nature as well as support to the rural crafts and tourist attractions (Maksimović et al., 2015).

The subject of this paper is the analysis of the possibilities for rural tourism development as a factor of improving life quality of rural population on the Goč mountain. In addition to the fact that it is situated in the vicinity of one of the most visited tourist destinations in Serbia, Vrnjačka Banja, the basis for tourism development on Goč mountain are the diversity of flora and fauna, climatic predispositions and hydrographic potential. Basic research questions are whether Goč mountain has the potentials for rural tourism development and in what manner the tourism development affects the rural population in this area. Main hypothesis of this paper is: *Rural tourism can contribute to the improvement of rural population's life quality on Goč mountain.*

Literature review

At the beginning of the XXI century, in accordance with specific requirements of the users of tourist services, there are new forms of tourism developed, within which rural tourism occupies a significant place. Rural tourism is a form of tourism which includes all tourist activities which can take place in rural regions and which can be included in tourist offer of those regions (Njegovan et al., 2015). Rural tourism should be based in those areas which are rural in all aspects (Lane, 1994). The term „rural area“ means the area whose main feature is primarily the use of land for agriculture and forestry (Prentović et al., 2012). Rural areas have a special position as areas of excellence, as well as ecological oases which are the foundations of traditional culture and ethno-cultural heritage (Štetić, 2012).

The elements of rural regions, which are included in tourist product are based on natural values, as well as anthropogenic resources and infrastructure in general (Milićević, Podovac, 2012). According to Garrod (2006), constituent elements of countryside capital are: Landscape, Wildlife (both fauna and flora), Biodiversity, Geology and soils, Air and air quality, Hedgerows and field boundaries, Agricultural buildings, Rural settlements, Historical features, Streams, rivers, ponds and lakes, Water and water quality, Woods, forests and plantations, Distinctive local customs, languages, costumes, foods, crafts, festivals, traditions, ways of life. Rural tourism is complex and is divided to several segments: natural, rural environment (rivers, lakes, forest), rural cultural and spiritual things (architecture, churches and monasteries), ethno tourism (traditional food, music, customs) and rural activities such as horseback riding, fishing, hunting (Molera, Albaladejo, 2007).

The authors represent different views when it comes to activities that make rural tourism product (Milićević et al., 2015). Rural tourism encompasses a variety of tourists activities including direct participation in agricultural activities (e.g. harvesting berries), indirect enjoyment of farm activities (e.g. enjoying meals on site), recreational activities (e.g. ride a bicycle) and activities in which the farm premises only serves as the landscape (e.g. wedding in a vineyard), as well as a variety of on-farm accommodations services and food services (Barbieri, 2013; Phillip et al., 2010; McGehee, Kim, 2004).

Most studies stress the value of various economic, sociocultural and environmental benefits of rural tourism that, although primarily concern the farm household, also extend to surrounding communities (Barbieri, 2013). Rural tourism is a significant factor of recovery and development of rural areas and a significant generator of the income for rural households (Milićević et al., 2015), i.e. a significant factor of revitalization and diversification of rural economy (Saarinen, Lenao, 2014). Economic effects of rural tourism development in rural areas primarily reflect themselves through the possibility of employment of rural population, and consequently the growth of their life standard (Mitchell, Hall, 2005). Rural tourism provides additional income to people in rural areas through the placement of agricultural products in the market in their own yards, as well as placement of the handicraft products. Rural tourism provides valorization of women's work in rural households, as well as employment of labour-inactive categories of people (Njegovan et al., 2015). Furthermore, revitalized local economies foster youth retention in rural communities who work in either agriculture or other local businesses (Sharpley, 2002).

Tourism contributes to meeting different cultures, lifestyles, and consequently better understanding of different people. The socio-cultural effects of rural tourism are reflected through interactions among urban dwellers, rural villagers and the rural areas, but above all through the revitalization of local crafts, customs and cultural identities (Košić et al., 2015), ie preservation of local cultural heritage. An increased interest in heritage can be satisfied through rural tourism as rural areas are often the repositories of remnant heritage (Irshad, 2010). Traditional festivals, events and folklore can also be an important part of tourist offer of rural areas (Grossman, 2013). Ecological effects of rural tourism reflect themselves in improvement of the quality of rural environment, as well as protection of the nature beauty and eco-system (Liu, 2002). Rural areas are perceived as healthier, offering fresher air, cleaner water and the opportunity for outdoor recreation. Rural areas offer fresh foods (Irshad, 2010).

Rural tourism and local community – Examples of good practice

In practice, there are numerous examples of rural areas, where material position of population is improved by the development of rural tourism. In the Cluj County in Romania, to help development of the rural tourism, there is cooperation with local producers (suppliers). These local producers provide the touristic units with meat and dairy products, forest fruits and mushrooms, lavender, strawberry, honey, wine, oil, traditional fabrics (cloths - hats, fur coats; carpets; wood carvings) or equestrian services. In most cases, tourists are allowed to visit households of local producers, having the opportunity to see traditional production methods and to find out the story which lies behind the technique. Also, in this area there is a cooperation between similar units. For example, in the village Măriel accommodation unit is cooperating with another guesthouse in organizing events, sharing tourists and marketing activities. In the village Sâncraiu over 40 small accommodation units are organized in a rural tourism network. The whole activity is coordinated by a travel agent, who creates the

tourist packages, brings the tourists, organizes the activities and promote the village as a tourist destination, sharing all the costs with the network members. These 40 small touristic units in the village Sâncraiu compete on the global touristic market by co-operating locally. They attend national and international tourism fairs, promoting Sâncraiu as a tourism destination and inviting tourists to spend their holidays in one of the most natural traditional regions in Europe (Toader et al., 2013).

According to the Jaszczak and Žukovskis (2010) research about tourism business of European rural areas, the income from tourism in agritourism farm in Finland and Poland is additional for the family running the farm, but it is often higher than the income from husbandry. As they noticed rural tourism and agritourism in countries they analysed – Finland, Italy and Poland, are related to the development of the whole farm offering the services as well as with the economical and social development of rural areas. The livelihood of country people and stopping their migration to cities have become important factors determining this development. Activating the society, cultivating traditions and customs as well as environmental protection have been decisive in the success of the planned touristic enterprises. Also the development of touristic products for the whole region has been of great importance.

The idea of developing rural tourism can encourage local people to innovate. Good example for this is ethno village “Latkovac” in Serbia. A hamlet in which there is a cultural-tourist center “Latkovac” situated, which is over 200 years old. At this place, two centuries ago, there was a center of the parish at the time, while in the oldest house in the village, there was a court house. The owners of the facility in this hamlet have decided to direct the function of these old objects towards tourism. The offer of this ethno village is diverse and innovative and based on a great number of activities (concerts, festivals, shows, interactive workshops), and tourists are offered a stay in nature with a possibility to walk along marked hiking trails, sports and recreation activities, hunting, picking forest fruits and herbs; there is a possibility of learning some of the foreign languages, taking part in art workshops (painting, pottery, calligraphy, etc), or educational camps on the subject of ecology and ethnology, performance of daily tasks in the village and the like (Simić, 2015). In the research about forecasts of the rural tourism development in Kosjerić and Gornji Milanovac municipalities the authors states that the economic effects of rural tourism are really high, because the hosts realize revenue from the sale of local products, as well as other service providers (the multiplicative effect) (Pavlović, Đorđević, 2013).

Resources of the mountain Goč in the function of rural tourism development

Although the structure of resources is compatible to the concept of rural tourism development, this form of tourism still hasn't reached the appropriate level so that the region of Goč mountain could become a rural destination. Goč mountain is geographically positioned south from West Morava river in the vicinity of Vrnjačka Banja at the elevation ranging from 300 m to 1.154 m (available at: www.vrnjackabanja.co.rs). Its highest peak is Krnja jela, which is at elevation of 1.127 m (Kostić, Petrović, 2013). In addition to being

in the vicinity of the leading spa destination in Serbia, comparative advantage of Goč mountain is reflected in its natural predispositions. Ecologically preserved environment, which is specific for extreme woodiness, natural landscapes and diverse flora and fauna, are the characteristics that classify Goč mountain as one of the destinations that are still insufficiently explored and involved in tourist flows. Therefore, the existing resources are a significant precondition of a rural tourism development on Goč mountain in order to achieve a more intensive tourism inclusion of rural population.

Natural characteristics of Goč mountain have, to a greater extent, determined its further development in order to encourage agricultural production, but with an insufficient inclusion of tourism as an activity which can contribute to a better material position of the population. The region of Goč mountain is characterized by moderate continental climate. Due to the existence of a great number of woody and hilly areas, there are no sudden alterations of temperature (Sustainable Tourism Development Program on the Mountain Goč, 2018). The diversity of flora and fauna is reflected in the existence of 650 plant species, among which over 200 are medicinal and aromatic herbs. For the development of rural tourism, it is significant that Goč mountain region mainly consists of woods, grasslands, meadows as well as plowed lands, orchards and gardens, which can be used for growing a large number of agricultural products. Hydrographic potential of Goč mountain is based on streams and streamlets, which flow towards West Morava on the north and Rasina on the south. Hydrogeographic network also includes artificial accumulation lake Selište, which includes the space of about 8 ha (Milićević, Đorđević, 2015). Of all the other hydrographic resources, the significant are Vrnjačka river, Novoselska river, Zagrža as the left tributary of Rasina with the basin of 23 km² etc. (Sustainable Tourism Development Program on the Mountain Goč, 2018).

In the forest area of Goč mountain there are different game species, which makes hunting one of the potentially significant activities for the tourists (Podovac, Milićević, 2013). In the region of Goč mountain there are the following game species: deer, wild boar, marten, rabbit, wolf, fox, etc. In addition to a great number of game species, animal world includes 317 insect types, among which 57 species are rare and endangered species at national and international level. There were recorded 129 types of birds with the presence of many species which are of international significance. Among 27 types of mammals, the highest value has the otter, which is protected by law as natural rarity (Sustainable Tourism Development Program on the Mountain Goč, 2018).

One of the aggravating circumstances in rural tourism development is certainly the unfavourable demographic structure of population. According to the census from 2011, on Goč mountain there exists 32 households, among which the greatest number of households include one or two members (available at: <http://popis2011.stat.rs/>). The villages Goč and Stanišinci are particularly attractive for the development of rural tourism and a small number of people live in them even though there exists basic infrastructure required for functioning of rural environment (Milićević, Đorđević, 2015).

Material base for development of rural tourism of Goč mountain is not sufficiently developed. The existing offer of accommodation on Goč mountain is extremely modest. Accommodation offer of Goč mountain includes guest houses („Kačunak“, „Goč“, „Gočka kuća“), mountain houses („Goč“, „Pecić“, „Radulović“), apartments („Horizont“, „Velja“, Đurovski“, „Nikola i Barbara“) and villas („Slavica“). On Goč mountain, there is also a children's resort „Dobre vode“, which is next to ski slope. Next to children's resort, there also is a private accommodation in a form of two ethnic wooden cottages („Goč“, „Metikoši“) (available at: <https://www.goc.rs/smestaj/>).

Crucial tourist products of Goč mountain are: winter tourism, sports and recreation, excursion, hunting and fishing (Podovac, Miličević, 2013). Development of winter tourism is based on the existence of a cable car and a ski slope, at the distance of 10 km from Vrnjačka Banja. The foothill of ski slope is at the elevation of 1.123 m. Sports and recreation tourism is developed due to the existence of the playing grounds for different sports activities. Goč mountain disposes with the potentials for a more intensive development of hunting and fishing. Two settled hunting grounds are the carriers of hunting tourism development. Hunting ground „Vrnjačka reka“ occupies the surface of 13.775 ha from Goč to Morava with the reservation surface of 2.900 ha. In its territory, which is 95% in private ownership, there are different game species such as wild boar, rabbit, squirrel, etc. Hunting ground „Beli izvor“ occupies the surface of 8.768 ha, where the surface of 8.713 ha is settled as a hunting surface, while the rest territory is arranged as a part for intensive hunting management (fenced surface of 615 ha, where deer and wild boar are bred). In the hunting ground you can find: roe deer, rabbit, pheasant, wolf, fox, deer, wild boar, etc. Development of sport fishing is present on West Morava and Podunavacke bare, where in addition to sport competitions, there are also the conditions for recreational fishing (Sustainable Development Strategy of the Municipality of Vrnjačka Banja, 2013). Excursions are also present on Goč mountain and they are manifested in a form of tourist activities, which do not impair its ecological integrity (hiking, active holiday, picking of herbs and mushrooms and other forest fruits, flowers, etc.)

Research methodology and hypothesis

The subject of the study in this paper is rural tourism as a factor of life quality improvement of rural population on Goč mountain. The study of the respondents' attitudes regarding the significance of rural tourism for the rural population life quality improvement on Goč mountain was carried out in the period from 14.10.2018. to 02.11.2018. by sending a questionnaire to e-mail addresses of respondents, who are mainly from the territory of Vrnjačka Banja and its direct vicinity. The study was proceeded by the preparation of a questionnaire, which consists of the 10 questions of opened and closed type. Questionnaire is divided in two parts. The first type of questionnaire consists of 5 questions, which refer to socio-demographic characteristics of respondents. In the second part of the questionnaire, which also consists of 5 questions, respondents have given the answers to questions on the quality of the existing offer of rural tourism on Goč mountain and manners to improve it, as well as level of including rural population

in rural tourism development and manners for its more active engagement in order to provide a better material position. The questionnaire was distributed to 500 addresses, where 220 answers were gathered. In further study, there were analyzed exclusively the answers of 150 respondents who visited Goč mountain. In this manner, it was ensured that the respondents were familiar with the existing state of offer of rural tourism on Goč mountain, as well as the life quality of rural population. The main goal of the implemented study refers to examining the possibilities for the improvement of rural tourism in order to provide better material position through its development, as well as life quality of rural population on Goč mountain.

In the paper, descriptive statistical analysis and Mann-Whiney's U-test are used. Main hypothesis, which says: Rural tourism can contribute to rural population's life quality improvement, is operationalized into the following special hypothesis:

H1: Goč mountain possesses the potentials for rural tourism development.

H2: There is a statistically significant difference between the attitudes of respondents, who live in the territory of Vrnjačka Banja and out of it in the aspect of the existence of potentials for development of rural tourism on Goč mountain.

H3: There is a statistically clear difference between the attitudes of respondents who live on the territory of Vrnjačka Banja and out of it regarding the involvement level of rural population on Goč mountain in rural tourism development.

H4: Rural population is not sufficiently included in development of rural tourism on Goč mountain.

H5: Respondents agree in the attitude that rural tourism development can contribute to the improvement of rural population life quality on Goč mountain.

Results and discussion

The study included 150 respondents, where 113 were females (75,3%) and 37 males (24,7%). Within the question regarding the age, there were 5 age groups defined. The highest participation in the sample have the respondents who belong to the age group from 20 to 25 years, more precisely 64 of them (42,7%), as well as respondents aged 26-35, i.e. 47 respondents (31,3%).

According to education level, the majority are those respondents with MA or PhD degree, more precisely 51 respondent (34%). In addition, a significant participation in the sample also take the respondents with bachelor degree, i.e. 50 respondents (33,3%). When it comes to the professional status, 87 respondents (58%) are employed, while 49 respondents (32,7%) have the status of the student. The greatest number of respondents, i.e. 96 (64%) live outside the territory of Vrnjačka Banja, where the majority were the respondents from towns which are situated in the vicinity (Kraljevo, Trstenik, Kruševac, Kragujevac etc.). The question *Does Goč mountain possess the potential for rural tourism development?*, was affirmatively answered by 148 respondents (98,7%) (Table 1.).

Table 1. Socio-demographic characteristics of respondents

		Frequency	Percentage (%)	Mean	Standard deviation
Gender	Male	37	24,7	1,75	,433
	Female	113	75,3		
Age	20-25	64	42,7	1,95	1,064
	26-35	47	31,3		
	36-45	27	18		
	46-55	6	4		
	More than 55 years	6	4		
Level of education	High school	43	28,7	2,73	1,209
	College	6	4		
	University degree	50	33,3		
	Master/Magistar/ PhD	51	34		
Professional status	Unemployed	13	8,7	2,25	,615
	Employed	87	58		
	Student	49	32,7		
	Retired	1	0,7		
Place of permanent residence	In the territory of Vrnjačka Banja	54	36	1,64	,482
	Out of the territory of Vrnjačka Banja	96	64		
Does mountain Goč have the potential to develop rural tourism?	Yes	148	98,7	1,01	,115
	No	2	1,3		

Source: Authors, based on research

To the question which required the evaluation of the existing state of some elements of the offer of rural tourism of Goč mountain, the respondents gave grades on Likert scale from 1-Very bad to 6-Excellent. Based on the data, which are presented in Table 2, it was obvious that average evaluations of offer elements of rural tourism on Goč mountain move within the range from 2,48 to 3,83. The highest grades have the following elements: *Hospitality and kindness from the part of local population* (AS=3,83), as well as *Attractiveness of natural attractions* (AS= 3,63). On the other hand, the poorest grades have the following elements of rural tourism offer: *Presence, number and quality of accommodation offer* (AS= 2,48) and *Presence and quality of tourist signalization* (AS=2,60) (Table 2).

Table 2. Respondents' answers to the question of the quality of rural tourism supply on mountain Goč

Answers	Very poor	Poor	Average	Very good	Excellent	AS	SD
Attractiveness and soundness of rural area	3,3	14	38,7	33,3	10,7	3,34	,961
Attractiveness of natural attractions	2,7	7,3	36,7	31,3	22	3,63	,994
Soundness of village architecture	4	21,3	43,3	22	9,3	3,11	,980
Quality and diversity of gastronomic specialties	2,7	22,7	37,3	26,7	10,7	3,20	,997
Presence and diversity of cultural and historical localities	5,3	19,3	38,7	26,7	10	3,17	1,026
Presence, number and quality of accommodation offer	9,3	47,3	31,3	10	2	2,48	,873
Presence, number and quality of offer in restaurants	10	37,3	34	12,7	6	2,67	1,020
Quality and development of communal infrastructure	10	30,7	50,7	9,3	3,3	2,73	,841
Quality and development of transport infrastructure	2,7	28	44,7	20	4,7	2,96	,881
Existing sports and recreational content	10,7	35,3	39,3	12	2,7	2,61	,926
Presence and quality of tourist signalization	9,3	38,7	38	10,7	3,3	2,60	,920
Arrangement and cleanness of Goč mountain	3,3	12,7	38,7	33,3	12	3,38	,967
Hospitality and kindness from the part of local population	2	4,7	30,7	34,7	28	3,83	,963

Source: Authors, based on research

Respondents were asked *How can the rural tourism offer of Goč mountain be improved?*, and there were 10 questions offered, as well as the possibilities for the respondents to choose only one answer. The greatest number of respondents believe that the rural tourism offer of mountain Goč can be improved through *Improvement of sports-recreational and entertainment content for tourists* – 58 respondents (38,7%) as well as through *Integration of the offer of Goč mountain in tourist offer of Vrnjačka Banja* – 22 respondents (14,7%). In addition, respondents had the possibility to add another answer to this question, in addition to the offered. Under the option *Other*, 3 respondents have mentioned that they believe that answers offered cannot be significant for the offer improvement of Goč mountain, as well as the introduction of new tourist attractions. The attitudes of respondents are in agreement also when it comes to the fact that offer

can be improved with a more active support of local self-government, education of local population on the significance of tourism as one of the leading economic activities today, etc. Other answers are shown in Table 3.

Table 3. Respondents' answers to the question about improving rural tourism offer on mountain Goč

Answers	Frequency	Percent	Valid percent	Cumulative percent
Improvement of sports-recreational and entertainment content for tourists	58	38,7	38,7	38,7
Raising the awareness and education of local population on the tourism significance for development of rural area of Goč mountain	15	10	10	48,7
Financial and institutional support of local government in order to strengthen agriculture and tourism	16	10,7	10,7	59,3
Development of rural tourism on the principles of sustainable development	14	9,3	9,3	68,7
Integration of the offer of Goč mountain in tourist offer of Vrnjačka Banja	22	14,7	14,7	83,3
Greater share of local agricultural products in the preparation of gastronomic specialties for tourists	1	0,7	0,7	84
Improvement of the quality of existing and construction of new accommodation capacities	10	6,7	6,7	90,7
Inclusion of local population in providing accommodation through engagement of their households	7	4,7	4,7	95,3
Hunting and fishing as additional activities for tourists	3	2	2	97,3
Other	3	2,0	2	99,3
I don't know	1	0,7	0,7	100
Total	150	100	100	

Source: Authors, based on research

As for the question *To what extent is the local population included in rural tourism development on Goč mountain?*, the majority of respondents, i.e. 109 of them (72,7%) believe that local population is not sufficiently included in development of this form of tourism on Goč mountain. On the other hand, 12 respondents (8,%) believe that they are not included, while 24 of them (6%) don't know the answer to this question. Only 5 respondents (3,3%) believe that they are included in development of rural tourism on Goč mountain.

Having in mind that respondents have expressed their opinion regarding the level of involvement of rural population, they were also asked about the manners in which rural population of Goč mountain can be included in rural tourism development. When it

comes to manners for the inclusion of local population in rural tourism development on Goč mountain, respondents were offered 8 answers with the possibility to provide the answers themselves, the answer which is not among the offered ones and they believe that it can contribute to the inclusion of local population in development of rural tourism. The greatest number of respondents, i.e. 33 respondents each (22 % in case of both answers), have chosen the following answers: *Production and sale of agricultural products to tourists* and *Providing the accommodation in private households*. In addition, even 32 respondents (21,3%) believe that the offer of rural tourism on Goč mountain could be improved by the *Organization of attractive manifestations (gastronomic manifestations, country parties, folklores)* (Table 4.). Under the option *Other*, 3 respondents have mentioned that most of the answers offered can enable the inclusion of local population in development of rural tourism on Goč mountain.

Table 4. Respondents' answers to questions about including the local population in the development of rural tourism on the mountain Goč

Answers	Frequency	Percent	Valid percent	Cumulative percent
Production and sale of agricultural products to tourists	33	22	22	22
Providing agricultural products to catering facilities	9	6	6	28
Providing accommodation in private households	33	22	22	50
Picking mushrooms, herbs and forest fruits with a tourist guide	16	10,7	10,7	60,7
An active contact with tourists in a form of performing agricultural works	5	3,3	3,3	64
Organization of attractive manifestations (gastronomic manifestations, country parties, folklore)	32	21,3	21,3	85,3
Learning about the old crafts	4	2,7	2,7	88
Opening an ethno restaurant	15	10	10	98
Other	3	2	2	100
Total	150	100	100	

Source: Authors, based on research

Testing of the hypotheses

In this paper, there is a main hypothesis set, which says: *Rural tourism can contribute to the improvement of rural population's life quality on Goč mountain*. The exactness of this hypothesis was verified by the application of appropriate statistical analysis: descriptive statistical analysis and Mann-Whiney's U-test. A special hypothesis H1, which says: *Goč mountain has the potentials for rural tourism development*, is considered confirmed having in mind that 148 respondents (98,7%) have said that Goč mountain owns the potentials for rural tourism development.

In order to choose an appropriate statistical test for the verification of special hypotheses, there was performed the evaluation of the normality of allocation due to the fact that majority of statistical tests are based on the assumption of the normality of the dependent variable (Pallant, 2009). Based on the results of Kolmogorov-Smirnov test (Sig. .000), the assumption on normality of allocation is rejected and for that reason, instead of t-test, which is a parametric test, Mann-Whiney's U-test is used (Table 5.).

Table 5. Result of Mann-Whineyjev U-test

	Does mountain Goč have the potential to develop rural tourism?
Mann-Whitney U	2538,000
Wilcoxon W	4023,000
Z	-1,064
Asymp. Sig. (2-tailed)	,287

Source: Authors, based on research

A special hypothesis H2, which says: *There is a statistically significant difference between the attitudes of respondents who live on the territory of Vrnjačka Banja and out of it on the existence of the potentials for development of rural tourism on Goč mountain*, was tested by Mann-Whiney's U-test. Based on the Asymp. Sig. (.287), which is higher than 0,05, we can conclude that special hypothesis H2 is not confirmed. Based on the results of the test applied, it was determined that there is no statistically significant difference between the attitudes of respondents who live on the territory of Vrnjačka Banja and out of it regarding the potentials for the development of rural tourism on Goč mountain.

In addition, special hypothesis H3, which says: *There is a statistically clear difference among the attitudes of respondents who live on the territory of Vrnjačka Banja and out of it regarding the inclusion level of rural population on Goč mountain in rural tourism development*, was also tested through Mann-Whiney's U-test. Having in mind that the value on Asymp. Sig (.002) is less than ,005, this hypothesis can be taken as true. It was determined that there is a statistically significant difference between the attitudes of respondents on the inclusion level of rural population on Goč mountain in rural tourism development.

Table 6. Result of Mann-Whineyjev U-test

	To what extent is the local population involved in the development of rural tourism on the mountain Goč?
Mann-Whitney U	1977,500
Wilcoxon W	3462,500
Z	-3,076
Asymp. Sig. (2-tailed)	,002

Source: Authors, based on research

Special hypothesis H4 which says: *Rural population is not sufficiently included in rural tourism development on Goč mountain*, is confirmed by respondents answers, 109 of which (72,7%) from the total number have said that rural population is not sufficiently included in development of this form of tourism. Based on the answers of respondents to the question regarding the manners of improving the inclusion of rural population in rural tourism development of Goč mountain, the special hypothesis H5 is accepted, which says: *Respondents agree that rural tourism development can contribute to the improvement of rural population's life quality on Goč mountain*, as true. Respondents have said that there are different manners for the inclusion of population in development of this form of tourism. In the greatest number of cases, there were given the answers that rural population can be included in development of rural tourism through: production and sale of agricultural products to tourists (33 respondents), providing accommodation in private households (33 respondents), organization of attractive manifestations (32 respondents) etc.

Conclusions

The subject of the study in this paper refers to the analysis of the possibilities for rural tourism development on Goč mountain as a factor of the improvement of rural population's life quality on this mountain. Based on the analysis of the existing resources, we can conclude that Goč mountain offers potentials for rural tourism development although this form of tourism is still not present in its overall tourist offer. In this paper, there is an empirical study carried out in order to analyze the attitudes of respondents on development of rural tourism and manners for the inclusion of rural population in its development in order to obtain a better material position and life quality. Main hypothesis, from which empirical study has started, and which says: *Rural tourism can contribute to the improvement of rural population's life quality on Goč mountain* is confirmed having in mind that four of the set five hypotheses, based on which main one was operationalized, are confirmed by appropriate statistical methods. The implemented research has confirmed the existence of the resources for rural tourism development, as well as the fact that rural population is not sufficiently included in its development. In addition, by this study there were confirmed the manners for the improvement of rural tourism offer, as well as more intensive engagement of rural population in its development.

For a more successful development of rural tourism, it is required to set a good communication between all the crucial stakeholders of Goč mountain, particularly between local population that takes part in development of rural tourism and public and private sector. Local population can have a crucial role in the development of rural tourism of Goč mountain and it should be in many ways included directly in its development. First of all, local population can sell its products to catering facilities and tourists, they can also rent their private households to tourists, they can organize attractive manifestations such as gastronomic and/or manifestations that refer to folklore and the like. Success in development of rural tourism on Goč mountain can be achieved by joining of the local population that directly takes part in development of this tourism form for the sake of creation and promotion of tourist offer like it is done in Cluj County in Romania.

Acknowledgements

Paper is a part of research within the project no. III 46006 - Sustainable agriculture and rural development in the function of accomplishing strategic objectives of the Republic of Serbia in the Danube region, financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia. Project period: 2011-2018.

Conflict of interests

The authors declare no conflict of interest.

References

1. Accommodation on Goč mountain, Retrieved from <https://www.goc.rs/smestaj/> (November 19, 2018). [*in Serbian*: Smeštaj na planini Goč].
2. Barbieri, C. (2013). Assessing the sustainability of agritourism in the US: a comparison between agritourism and other farm entrepreneurial ventures, *Journal of Sustainable Tourism*, 21(2), 252–270.
3. Đenadić, M., Muhi, B., & Jovanović, V.D. (2016). Rural tourism – Serbia’s missed chance, *Economics of Agriculture*, 63(2), 515-529.
4. Garrod, B., Wornell, R., & Youell R., (2006). Re-conceptualising rural resources as countryside capital: The case of rural tourism, *Journal of Rural Studies*, 22, 117-128.
5. Grossman E. (2013). *Kurokawa No: Shaping the Image and Perception of Japan’s Folk Traditions, Performing Arts and Rural Tourism*, Global Oriental.
6. Irshad, H. (2010). *Rural tourism – An overview*, Government of Alberta, Agriculture and Rural Development, Retrieved from, [https://www1.agric.gov.ab.ca/\\$Department/deptdocs.nsf/all/csi13476/\\$FILE/Rural-Tourism.pdf](https://www1.agric.gov.ab.ca/$Department/deptdocs.nsf/all/csi13476/$FILE/Rural-Tourism.pdf) (October 12, 2018)
7. Jaszczak, A., & Žukovskis, J. (2010). Tourism business in development of European rural areas. *Management theory and studies for rural business and infrastructure development*, 20(1), 35-44.
8. Košić, K., Demirović, D., Pejanović, R., Lazić, L., & Stamenković, I. (2015). Key principles of rural tourism households development strategy - Case study of Vojvodina, *Economics of Agriculture* 62(4), 975-988.
9. Kostić, M., & Petrović, M. (2013). The importance of biodiversity conservation as a factor of ecotourism development at the Goč mountain. *Hotel and Tourism Management*, 1(1), 56-66.
10. Lane, B. (1994). *What is Rural Tourism? In: Bramwell B, Lane B, editors. Rural Tourism and Sustainable Rural Development*. Clevedon: Channel View Publications.
11. Liu, C.Z. (2002). A Study on Leisure Agriculture and Rural Development. *The Journal of Rural Development Perspectives*, Vol. 3, 19-33.

12. Maksimović, M., Urošević, S., & Mihajlović, D. (2015). The Effects of the Development of Rural Tourism on Stara Planina, *Ekonomika*, 61(2), 83-92.
13. McGehee, N.G., & Kim, K. (2004). Motivation for agri-tourism entrepreneurship. *Journal of Travel Research*, 43(2), 161–170.
14. Milićević, S., & Đorđević, N. (2015). Potentials for the development of Goč mountain as a rural tourism destination. *Ekonomija teorija i praksa*, 8(4), 86-97. [in Serbian: Milićević, S., & Đorđević, N. (2015). Potencijali za razvoj planine Goč kao destinacije ruralnog turizma].
15. Milićević, S., & Podovac, M. (2012). Potentials for rural tourism development on Goč, 1st Professional Conference about Rural Tourism and Sustainable Development, Kragujevac, November 23, 2012. 75-83. [in Serbian: Milićević, S., & Podovac, M. (2012). Potencijali planine Goč za razvoj ruralnog turizma].
16. Milićević, S., Podovac, M., & Čavlin, M. (2015). Resources for development of the Rača municipality as rural tourism destination, *Economics of Agriculture*, 62(3), 751-765.
17. Mitchell, M., & Hall, D. (2005). Rural Tourism as Sustainable Business: Key Themes and Issues, in *Rural Tourism and Sustainable Business*, Hall D., Kirkpatrick I. and Mitchell M. (eds), Channel View Publications, 3-14.
18. Molera, L., & Albaladejo, I. P. (2007). Profiling segments of tourists in rural areas of South-Eastern Spain, *Tourism Management*, 28, 757–767.
19. Municipality of Vrnjačka Banja (2018). *Sustainable Tourism Development Program on the Mountain Goč*, 2011-2021, revised edition.
20. Municipality of Vrnjačka Banja. (2013). *Sustainable Development Strategy of the Municipality of Vrnjačka Banja*. Vrnjačka Banja.
21. Njegovan, Z., Demirović, D., & Radović, G. (2015). Managing sustainable development of rural tourism in Vojvodina, *Škola biznisa*, 1/2015, 68-79.[in Serbian: Njegovan, Z., Demirović, D., and Radović, G. (2015). Upravljanje održivim razvojem ruralnog turizma u Vojvodini].
22. Pallant, J. (2009). *SPSS Survival Manual*. Mikro knjiga, Beograd.[in Serbian: Pallant, J. (2009). *SPSS: Priručnik za preživljavanje*]
23. Pavlović, S., & Đorđević, T. (2013). Forecasts of the rural tourism development in Kosjerić and Gornji Milanovac municipalities. *Journal of the Geographical Institute Jovan Cvijic*, SASA, 63(1), 47-64.
24. Phillip, S., Hunter, C., & Blackstock, K. (2010). A typology for defining agritourism. *Tourism Management*, 31(6), 754–758.
25. Podovac, M., & Milićević, S. (2013). Entrepreneurship in function of rural tourism development of mountain Goč, *5th Scientific Conference RISE 2013-Entrepreneurship as a Chance*, Faculty of Business in Valjevo, Singidunum University, November 18-19, 2013, Valjevo, 155-161. [in Serbian: Podovac, M., and Milićević, S. (2013). Preduzetništvo u funkciji razvoja ruralnog turizma planine Goč].

26. Prentović R., Kurjački A., & Cvijanović D. (2012). Hunting in Rural Areas of Bačka, *Economics of Agriculture*, 59(3), 385-400.
27. Saarinen, J., & Lenao, M. (2014). *Integrating tourism to rural development and planning in the developing world*, *Development Southern Africa*, 31(3), 363–372.
28. Sharpley, R. (2002). Rural tourism and the challenge of tourism diversification: The case of Cyprus. *Tourism Management*, 23(3), 233–244.
29. Simić, V. (2015). Entrepreneurship in tourism on the example of good practice: Ethno villages Latkovac in Serbia. *Ekonomski signali: poslovni magazin*, 10(2), 57-69.
30. Statistical Office of the Republic of Serbia, *2011 Census of Population*, Retrieved from <http://popis2011.stat.rs/>, (October 16, 2018)
31. Štetić, S. (2012). Specific Features of Rural Tourism Destinations Management, *Journal of Settlements and Spatial Planning*, Special Issue, vol. 1, 131-137.
32. Toader, V., Sofica, A., Petrescu, C. D., Negrusa, A. L., & Balint, C. (2013). Best practices in developing rural tourism in Cluj County, Romania. *In Proceedings of The International Conference on Tourism, Transport, and Logistics 2013*, 513-517.
33. Vrnjačka Banja, *Goč mountain*, Retrieved from <http://www.vrnjackabanja.co.rs/srpski/sadrzaj/turizamglmeni/planinagocglmeni>, (October 16, 2018).

THE PERSPECTIVES OF SUSTAINABLE DEVELOPMENT OF SERBIA'S AGRICULTURE IN GLOBALIZED ENVIRONMENT

Dušan Aničić¹, Olgica Nestorović², Nataša Simić³, Slavomir Miletić⁴

*Corresponding author E-mail: anicic.dusan@yahoo.com

ARTICLE INFO

Review Article

Received: 18 December 2018

Accepted: 24 January 2019

doi:10.5937/ekoPolj1901221A

UDC 502.131.1:338.43(497.11)

Keywords:

agriculture, sustainable development, cooperative movement, family farms, globalization

JEL: Q13, Q17

ABSTRACT

This paper has a goal to point out causes and consequences of wrong agricultural policy in transitional period which caused that agriculture of Serbia suffers a huge damage which manifested itself through falling apart of big agricultural combinats, enterprises from food industry, agricultural cooperatives and small family farms. Big changes at the end of XX and at the beginning of XXI century reflect of agriculture, too, and demand a new conceptual approach to new situation. Authors of paper point out necessity of revitalization of cooperative system and other was of joining and connecting of agricultural producers, as well as need of bigger support to small family farms, by model in developed EU countries. On that way, agriculture of Serbia would successfully respond to complex requirements of globalized environment and turn its comparative advantages into competitive ones.

© 2019 EA. All rights reserved.

Introduction

During the 1970s there was a decrease in mass production industry profitability, and therefore unemployment and inflation appeared as well as market saturation with the standardized products. Fiscal crisis hit numerous countries so the capital owners managed to undermine the system that imposed different limits to capital. Flexible production systems are developed, as well as specialization, intensified fragmentation of

-
- 1 Dušan Aničić, Phd, assistant professor, Union – Nikola Tesla University, Cara Dušana Street no. 62-64, Belgrade, Serbia, phone: +381 64 408 26 92, e-mail: anicic.dusan@yahoo.com; ORCID ID: <https://orcid.org/0000-0003-1201-0532>;
 - 2 Olgica Nestorović, Phd, assistant professor, International University Travnik, Faculty of Economics, Aleja Konzula / Meljanac BB 72270 Travnik, Bosnia and Hercegovina, e-mail: olgica.n@yahoo.com phone: 064 8143000; ORCID ID: <https://orcid.org/0000-0001-5039-9353>;
 - 3 Nataša Simić, Phd, associate professor, Union – Nikola Tesla University, Cara Dušana Street no. 62-64, Belgrade, Serbia, Phone: +381 64 167 82 68; e-mail: nsimic68@gmail.com; ORCID ID: <https://orcid.org/0000-0002-1196-891X>;
 - 4 Slavomir Miletić, Phd, University of Priština, Faculty of Economics, Kolašinska street 156, Kosovska Mitrovica, Serbia, phone: +38163424987, e-mail: mil.slavko@gmail.com, ORCID ID: <https://orcid.org/0000-0003-2433-0867>;

labor division and product differentiation. Industries became high technology, advanced products and financial service oriented. Companies reorganized, their headquarters remained in the developed countries, but the production was transferred to the countries with cheap labor.

The state becomes the strategic partner in the creation of globalization order and reorganizes territorial organization according to global economy requirements. Large cap remains the only important actor in the world scene: winners are rare in this system, while most of the world population falls into hopelessness and poverty. Sustainable development represents a harmonious relation between the economy and environment, which is a prerequisite for the preservation of natural resources on our planet for future generations. It is a tendency to create a better world through the balance of the economic and social factors with the environment protection.

Sustainable agriculture is based on technology usage for maximum production that tends to minimize the negative effects on natural and human resources at the same time, accepting the social cohesion. Serbia adopted the National Sustainable Development Strategy in 2008, where agriculture takes an important place. During the transition period Serbia lost agricultural development leaders: large agribusiness companies, food industry, agricultural cooperatives and smallholders also suffer the consequences of such agricultural policy. Therefore, it will be very difficult to renew and revitalize lost agricultural capacities in the future, taking into account low participation of agrarian budget in the total national budget, which has been about 4% in the recent years.

The aim of this paper is to point to the negative consequences of the policy conducted in the sector of agriculture during the transition period when all the leaders in agricultural development in Serbia virtually disappeared, as well as the necessity and opportunity for the revitalization of this sector in the complex environment under the pressure of further globalization process and sustainable development requirements based on market principle as well as environment protection principles and sustainable management of the natural resources. In addition to the existing comparative advantages, it is necessary to increase the competitiveness of the entire sector, renew agricultural cooperatives and stimulate small family agricultural households which will help achieve more balanced regional development.

Globalization process and its influence on agriculture

A crisis of fordism started in the 1970s, the Bretton Woods agreement failed, there was oil crisis and intensive economic competition from the newly developed countries. Mass production industry profits declined, unemployment, inflation as well as market saturation appeared. Technological changes and fiscal crisis in many countries also contributed to the big turn. This was the situation where labor movement was losing its power, and the bourgeoisie succeeded in undermining the system that imposed various restrictions on capital.

That was the time when flexible production systems started to develop, as well as

specialization, intensive labor fragmentation and product differentiation. Industries were becoming high technology, advanced production and financial service oriented. Companies reorganized, their headquarters remained in the developed countries, but the production was transferred to the cheap labor countries. Once strongly integrated companies with a large number of workers were converted into global networks with a multitude of supply and production units. Labor force was broken and scattered around the world, divided by ethnic, religious and language barriers. Metropolitan regions were situated in various national territories, separated from their national environment, and therefore the 'archipelago economy' was created (Samardžić, 2018).

International financial market deregulation and credit system that was created after the Brenton Wood agreement breakdown undermined the national demand management and monetary policy conduct by the state. National level became a 'geographical arena' within which global space was shaped and subordinated to capital accumulation needs, the territoriality no longer remained the basic organization principle. The state became a strategic partner in globalization order creation, it reorganized the organization of the territories according to global economy requirements, basically disassembling itself in the process.

The key idea of neoliberalism is that open, competitive and unregulated market free from all types of government intervention is the most optimal mechanism in economic development achievement. A decrease in corporate taxes is demanded as well as public sector privatization. The state intervenes on the supply side in the interest of globalization capital (it helps those selling, that is, the wealthy, not those buying), imposes market discipline on most of the population, grants numerous privileges to private companies. National legislation is restricted to national issues alone, while the international institutions such as IMF, the World Bank and others negotiate only with the executive authorities thus creating an alliance between the government and global corporate capital (Samardžić, 2018).

Only certain parts of the national economy and some regions are integrated into the global networks, those competitive in the world market. As a consequence, spatial differentiation appears within the national borders, increasing the differences in development between the regions integrated into the global processes and those not integrated, which remain on the margins. Local economies are unable to resist the crises in globalization order conditions, on the contrary, the countries should fit into the global space shaped by capitalism, decisively influencing their actions and determining their functions. Global order is disorganized in a controlled way in order to make the large cap the only significant actor in the world scene; there are few winners in this system, while most of the world population falls into hopelessness and poverty (Samardžić, 2018).

The great financial crisis of 2008 did not call into question the globalization order. The absence of regulation at the national and world level have caused the greatest economic crises in history, but the power relations have not changed. 'The cream' of the world bourgeoisie succeeded in mobilizing the national state capacities in order to

overcome the crisis, and then everything was the same. When the crisis broke out, the bourgeoisie reached out for the national state management capacities in order to temporarily suppress it, until a new and even greater crisis appeared.

Development of agriculture in modern environment is caused by natural, economic and political factors. The importance of agriculture is increased in the complete system of the national and international economic development, primarily due to the increasing numbers of human population that will be over 10 billion people at the end of this century according to United Nations estimates (UN, 2013). Modern world is faced with numerous problems such as: economic and financial crisis, population increase, inequality, poverty, terrorism, migrations, environmental problems, overindebtedness, unemployment, etc. Global environmental problems are caused by the economic development which influences the changes in climate, water cycle and biodiversity.

Specific features of agricultural production are great dependence on natural conditions, land, relief, climate, new technologies, etc, and all that lead to less or more fluctuations in annual production, greater business risk and income instability for agricultural producers. When we speak of the international market order in agriculture, globalization resulted in income reduction for farmers, increasing reliance on subsidies and huge profits for mediators controlling the market thus preventing any type of competition in favor of the producers (Sol, Ralston, 2011). High percentage of food production and other commodity industry is nowadays under the control of multinational companies. A lot of authors consider the industrialized agriculture the most destructive form of modern dumping because it undermines the farmers' ability in both production and consumer societies to earn enough to remain in business.

Nowadays, agriculture and food conglomerates organized as multinational companies or regional monopolies and oligopolies dominate the area of agriculture (as well as other industries). There is a convergence, that is, vertical integration where these organizations control the industry and eliminate competition because they determine all market aspects. The extended arm of these processes are large shopping malls that use 'social dumping' to eliminate retailer competition. This is the way to circumvent free market principles, and globalization period brings low economic growth rate and high unemployment rate.

The common European Union market includes both agriculture and trade in agricultural products. Agriculture represents the area closely related to the entire national economy in the EU member states. The EU common agricultural policy goals are: productivity increase in agriculture through technical development, agricultural production rationalization and optimal production factor usage, especially workforce; this is the way to provide the appropriate living standard for agricultural population, especially through salary increase for employees in agriculture; market stabilization, guarantees and provision of reasonable prices for consumers.

The concept of sustainable development in agriculture

Sustainable development represents harmonious relationship between economy and environment, which is a prerequisite for saving our planet's natural resources for future generations. It is a tendency to create a better world through the balance between the economic and social factors as well as environment protection. The constant aspiration for the economic growth puts a strong pressure on the environment with the possibility of causing negative consequences for the future of mankind. Therefore, the concept of sustainable development is introduced into all areas of human life, so world organizations, politicians, economists, various civil society organizations deal with these issues. According to such world tendencies, RS government adopted the National Sustainable Development Strategy in 2008.

All the countries are required to adjust their development to sustainable development principles and goals, new development strategies and policies that put long-term, complete and balanced needs and interests of the present and future generations first. The main aspects sustainable development concept is based on are even economic growth (economic aspect), social aspect and environment protection and preservation (environmental aspect). The starting point of sustainable development concept is based on development and environment interdependence, their mutual relations, as well as development policy and environment protection complementarity, respecting the environmental principles.

Sustainable usage of natural resources in economy should enable the aggregate productivity of the factors used to surpass the losses due to resource exploitation, as well as their possible replacement with other resources due to the exhaustion (Goodstein, 2003). According to Giddens (2007), sustainable development implies that the growth relies on physical resource recycling, with minimal environment pollution, whereby the balance between economic and social goals, environmental protection and natural resources should be established.

The government of the Republic of Serbia adopted the National Sustainable Development Strategy for the period between 2008 and 2017. This strategy defines sustainable development as goal oriented, long-term, uninterrupted, comprehensive and synergetic process influencing all the aspects of life (economic, social, environmental and institutional) at all levels. The National Sustainable Development Strategy goal is to lead to the balance of the three pillars of sustainable development: sustainable economic growth with economic and technological development, sustainable development of the society based on the social balance and environment protection with the rational disposal of natural resources, connecting them into a unity supported by the appropriate institutional framework.

The basic sustainable development goals, according to the strategy, are the essential national economy transformation in the direction of strengthening the place and role of the most successful sectors, which means service and industry sector domination based on the innovative activities of entrepreneurial individuals and high investment

share provision in GDP distribution, primarily on the basis of the national savings increase. Also, the priority is the creation of modern and efficient educational system, that will be able to serve as a support of the future efficient and competitive economy based on knowledge as well as the implementation of the Program for innovative and entrepreneurial behavior encouragement, and entrepreneurial culture development among the wide layers of population.

The National Sustainable Development Strategy of the Republic of Serbia, defines, among others, competitive market economy development and balanced economic growth, infrastructure development and balanced regional development, as well as environment improvement and rational natural resource usage as the national priorities. European experiences show that environment protection does not contradict the economic growth and development because there is no healthy economy without healthy environment and vice versa.

Globalization is a set of political, social, cultural and economic factors. It led to global decision concentration in a few world centers as an irreversible social and economic process. This concentration of power disabled the balance of its economic influence. There is a disbalance in social and environment development as a result of the institutionally unprepared environment for the response to the above mentioned challenges, especially in the countries with the low level of awareness of environment protection and natural resource maintenance.

Agriculture development technologies at the end of the twentieth century supported the intensive way of production with natural resource excessive usage and neglect of basic environmental principles. Such resource management led to a lot of problems in environment pollution and the question of what we had to leave for the future generations. A possible alternative to this type of agriculture development is labeled as 'sustainable development' (Kovačević, Milić, 2010). The negative effects the conventional agriculture produced led to a number of alternative directions in future development of agriculture, so-called ecologic or organic production being one of them.

The characteristic of the conventional agriculture in the modern world is the usage of large quantities of fertilizers, pesticides, soil improvers, biostimulators, plant hormones and a number of other chemicals. Agro-technical measures are almost completely mechanized, and heavy machinery, which uses a lot of petroleum products, is used in soil processing. In addition to all that, there is a mandatory hybrid usage that provides high yields (Perković et al, 2017). Agricultural production, as it is now in the modern world, significantly endangers the environment. It is considered that agriculture, the changes with the aim of obtaining new arable land included, emits carbon-dioxide, methane and nitrogen suboxide, causing the greenhouse effect (Praća, et al, 2017).

Sustainable development is based on the usage of the technologies for simultaneous productivity maximization and negative effect minimization on natural (soil, water and biodiversity) and human resources (rural population and consumers). Sustainable agriculture accepts social cohesion with the aim of the most efficient resource usage.

Thus, for example, the priority of EU agriculture is sustainable agricultural and rural development which implies natural resource management and preservation, technology and institutional change direction in order to provide achievement and continuous satisfaction of needs for the present and future generations. It is consistent with the EU Strategy for sustainable growth and work places (Europe 2020, A strategy for smart, sustainable and inclusive growth).

When we speak of sustainable agriculture concept, we should always think of its long-term goal, which is to provide stable enough production of good-quality food and plant products for other technical purposes, with basic natural resource and energy preservation, environment protection, as well as simultaneous economic efficiency and individual and community standards improvement. Agricultural system sustainability must be based on smart renewable resource usage and/or resource regeneration. However, agriculture development technologies supported intensive development at all costs in the last decades, with excessive natural resources usage, neglecting much of the basic postulates of the environment.

It is necessary to reconsider the opinions on ecology and economy as opposed goals in order to achieve global sustainability in agriculture. Global reflections on the subject led to the first results related to agriculture, with the tendency to relieve the conventional production in the world and eliminate the negative effects through pointing to other alternatives based on biological, that is, ecological elements (Kovačević, 2010). Numerous changes at the end of the twentieth and the beginning of the twenty-first century also refer to agriculture, and require new concept approach in the new situation (Fransis, 1991).

A large number of negative changes in the environment is the result of human actions, therefore the last decades of the last century as well as the first decades of the new century are marked by various programs and activities in environment protection, reconstruction and improvement. Starting from the principle that the best environment protection policy is the one based on prevention, the activities of the experts in all areas of agricultural production must be directed towards finding rational solutions with the aim of preserving fertile soil capacity to produce necessary quantities of high health value food, simultaneously favorably influencing people, animal and plant life, soil, water and air.

Unlike the conventional, intensive agriculture period, the contemporary development moment in food production and natural resource management can be determined as multifunctional agricultural production with Precision Farming defined on one hand, and Low External Input/Low Input Sustainable Agriculture on the other, where Conservation Farming Systems and No-tillage System represent the most widely accepted way of alternative tillage, because of the energy efficiency and profitability above all, but also because of agroecosystem protection, preservation and improvement. The necessity for as healthy environment as possible led to numerous alternative directions of future agriculture development, integral agriculture and so-called ecological or organic production among them (Kovačević, 2010).

Current situation in agriculture in Serbia

The development of agriculture in Serbia is the result of the situation left after the post-war period and agricultural policy led at the time. Agrarian development was mostly based on the social sector, through agricultural cooperatives and large agribusiness companies. Agriculture was neglected during the whole post-war period in relation to other areas of the economy, especially through price disparities at the expense of agriculture which still remain to this day. Slower agriculture growth is also the result of the inconsistencies in development concept formulation and private sector neglect in the economic policy. We should still emphasize the importance of agriculture in the foreign trade balance of Serbia as well as total employment regardless of this situation, in view of the country's indebtedness problems as well as high unemployment rate (Aničić et al, 2016).

A lot of attention is paid to agriculture development in developed countries. For example, agriculture and food industry provide over 15 million work places in the EU, that is, 8.3% of all the people employed in the European Union. There is an average worth of 4% in so-called 'old' members (15 industrially developed countries of the Western Europe), while more than 12% of the total labor force works in agriculture and food industry in the 'new' EU members (Romania, Bulgaria, Slovakia, Hungary) (Vapa-Tankosić, Stojsavljević, 2014). The participation of agricultural production in the European countries GDP is 2-3%, but in the countries such as Bulgaria and Romania it can reach up to 10% of the national GDP. The total worth of production in the sector of agriculture is estimated at 635 billion euros in 2008 (the European Commission, 2012).

The agriculture is expected to be economic development carrier, increase gross domestic product and chief support of the total economic stability. This is all because it is the real economic area which directly carries almost 15, and indirectly even up to 40 percent of domestic product, while its participation in exports is 23 percent (Gulan, 2016). Thus, agriculture should not represent a symbol of poverty, but the country's wealth. This is the reason for agriculture encouragement in order to maximally valorize natural, human and processing capacities used only with the third of their possibilities. Therefore, it is necessary to connect small agricultural producers with the markets in such a way that they can generate higher income and other benefits (Zakić et al, 2014).

The most significant causes for slower agriculture growth compared to other industries are (Devetaković et al, 2009):

- Permanently unfavorable business conditions,
- Inconsistency in development concept formulation and implementation,
- Long-term application of restrictions, primarily for private property,
- Neglect of agriculture, especially private sector in the economic policy,
- Lack of consistent land policy,
- Slow irrigation and melioration inclusion.

The government and local institutions have not yet created an encouraging social and economic environment for rural and agriculture development, especially in certain poor regions of Serbia. There are still numerous weaknesses: unfavorable age structure, outdated mechanization, unregulated market and uncertain placement, undeveloped basic infrastructure, price disparities, etc. Small and medium enterprise and entrepreneurship development in agriculture can reduce the weaknesses to a great extent and turn them into development chances for our country, especially with the tendency of increased demand for organic produce in mind. Modern agriculture development requires knowledge and innovations in technology, institution, politics and organization areas (Asenso-Okyere, Davis, 2009).

Serbia's involvement in the international integration processes imposes the need for companies and other subjects in agricultural economy to create and perform knowledge transfer with the aim to build, preserve and strengthen the competitive advantage. It is only logical to approach the European business model, so three most important reform segments are defined in the Strategy for agriculture and rural development of the Republic of Serbia from 2014 to 2024: 1. Agricultural policy reform; 2. adoption and complete implementation of the legal framework and 3. institutional reforms. Knowledge as the source of innovations and successful adaptation to changes is the key determinant for successful dealing with competition, preservation of the existing and conquest of new markets (Vasiljević, Savić, 2014).

The data in Table 1 show that Serbia had foreign trade surplus in the complete period observed, and the amount ranges from 785 million euros in 2010 to 1624 million euros in 2016.

Table 1. Foreign trade commodity exchange of agriculture and food produce from 2010 to 2016 (millions of euros)

DESCRIPTION	2010	2011	2012	2013	2014	2015	2016
Agriculture exports	1.688	1.937	2.106	2.104	2.315	2.819	2.898
Agriculture imports	903	1.010	1.163	1.227	1.310	1.950	1.275
Surplus	785	927	943	877	1.005	869	1.624
Coverage of imports by exports (%)	186,9	191,8	181,1	171,5	176,6	144,5	227

Source: Statistical Office of the Republic of Serbia, 2018; Serbian Chamber of Commerce, 2018

There are great possibilities for export structure improvement in terms of higher final processing products participation with a higher added value in comparison to primary products. The characteristics of imports is frequent import of suspicious products with lower prices, although we have production surplus in our market (meat, milk, corn, certain vegetable products, etc).

Table 2. The most important export products of agricultural origin, January – December 2016

Products	Exports (tones)	Exports in billions of euros
Corn – the rest	2.277.008	336,6
Cigarretes containing tobacco	29.289	250,8
Raspberries, the rest	86.061	223,9
Wheat and share farming, the rest	917.828	131,8
Apples, fresh, the rest	220.348	113,9
White sugar	211.358	112,8
Sunflower oil, edible	72.410	62,2
Water, the rest	120.842	54,1
Smoking tobacco, the rest	4.474	48,0
Soybean oil, raw	66.393	46,0

Source: Serbian Chamber of Commerce, based on the Customs Bureau data 2018

The necessity for cooperative revitalization

Privatization process in the area of agriculture and agricultural cooperatives was not accompanied by the appropriate legislation, which led to further decline of large agricultural companies, leaders in production in pre-transition period. The situation is the same in agricultural cooperatives, where the legislation was late in comparison to other social development processes. The consequence of such economic policy was the collapse of the leaders in agricultural development with great negative results for agricultural households as well. Consequently, the policy of agriculture development in the future must rely on the solutions from the developed countries as well as the revitalization of cooperatives and other types of agricultural producer associations.

The implementation of the Ministry of Regional Development action '500 cooperatives in 500 villages' is in progress in Serbia, which represents a support program for equal regional development implementation in the Republic of Serbia by granting non-refundable incentives for newly founded and existing cooperatives. This project should amend for huge damage to all participants in agriculture (agricultural companies, cooperatives, food industry, especially individual agricultural households...) using irresponsible policy in the privatization process which brought them to the verge of existence and survival, ending in bankruptcy and liquidation process for many of them.

Even as far as the 1930s, the members of the cooperative in Sicevo put a slogan on their cooperative center which is still up-to-date today: 'Cooperative is a law of life and the complete progress is based on it.' A cooperative is expected to stop further fall in agricultural production and many other negative aspects present in the field of agriculture.

One of the greatest problems in agriculture is high presence of 'Grey economy' in agriculture produce turnover, which damages both the producers and the state. Due to the unorganized purchase of agricultural produce, the producers are forced to sell their produce to 'dealers' at very low prices, depriving the state of tax income on the

produce turnover. The return of agricultural produce turnover within the regular trade flows can be provided only if the government suppresses the 'Grey economy', and if the cooperatives take over their function of organization and turnover in agriculture.

Rural development is only possible in the modern world if there are such subjects in villages that can carry development, such as cooperatives, small and medium enterprises, and other forms of business associations and activities. These business subjects can hold back the critical intellectual mass in rural areas through the employment of young, highly professional personnel, providing the modern technology application at the same time, the influence on culture, education, sport, rural tourism and other forms of village life. Thus, cooperatives and other subjects mentioned could become the leaders in complete progress in agriculture and village life.

The project of cooperative return to business in agriculture is coordinated by the Cooperative Union of Serbia (www.zss.rs), offering expert and other help from the cooperative foundation to all other activities necessary for their successful business. The Union represents the cooperatives' interests before the government bodies and organizations, takes part in preparation and adoption of laws and other acts in the field of agricultural production, protects the interests of cooperatives and producers from processing industry monopoly, helps cooperatives in connections to financial institutions. This union also organizes symposiums, conferences and seminars in the field of agriculture and cooperatives, helps with marketing activities and other types of business in the field of cooperatives and agricultural producers.

Important business improvement in the field of agriculture is also expected from the National cooperative information system implementation. In fact, the international organizations ICA – the International Cooperative Association and ILO – the International Labor Organization at the United Nations have insisted on information system implementation since 2005; so-called horizontal and vertical systems practically connect cooperative unions to cooperatives, and to the agricultural households through them, which will enable production monitoring and its conditions until final realization on one hand; on the other hand, the connection will take the direction of the Serbian Cooperative Union and Serbian Chamber of Commerce, government and other subjects relevant for agriculture and cooperatives (ministries, statistics, banks, academic and professional organizations and institutions).

The role of small family agricultural households in sustainable development of agriculture

Sustainable agriculture is an important segment of the complete rural area development, developed through the establishment and development of the competitive types of production and agricultural households, agricultural land and environment protection and preservation, as well as integration into the goals of local community total development. In the Republic of Serbia, in most local communities sustainable development implies restructuring and diversification of the existing agricultural production and agricultural

households, with the aim of the harmonization with the EU standards, produce and productivity quality increase, competition development and qualifications for the performance at the open (global) market in the EU accession process.

This process also involves the following goals and tasks based on the practice of the EU member countries:

- development of specialized, competitive and long-term sustainable households;
- creation of conditions for household maintenance of as much small and mixed households as possible, through modernization or new product orientation and activities with better conditions in local community, creating increased new value (diversification);
- organization and development of new forms of local producer connection and joint performance for local produce joint production and placement purposes (local trademarks development).

The achievement of such goals implies active local government engagement that should design and offer specific programs and solutions to local producers, to design and encourage activities connected to local potential involvement, to develop stimulative business environment, connection and partnership among development leaders on the launch and successful realization line for sustainable development project realization. In this case, the role of local economic development office and agricultural professional services created at local government level in Serbia is very important.

Small family agricultural households have a very important social, economic, ecological and cultural role around the world. As a separate sector, these households are the largest employer in the world, and they provide more than 80% of the world food in terms of value (Đurić, 2017). At the EU level, family households have a wide range of positive features, such as relations to the basic family values, relations to entrepreneurial skills, management, risk management, individual achievements, business transfer from one generation to another, tradition, experience, etc. Family households are better adjusted to technology changes, economic changes, social and political conditions. They do not take high amounts in credits and they keep debts at reasonable levels compared to the property they own (Darnhofer, 2010).

Small family households should use their development chance in perspective through vertical associations of small family households (producer connection to the market) and horizontal (mutual connections among the producers), as well as financing possibility through IPARD – the Instrument for Pre-Accession Assistance for Rural Development; this instrument will help the implementation of the common EU agricultural policy in Serbia. Also, IPARD II measures for 2014 – 2020 program will be implemented in two stages, and they are:

Stage one: investments in households' physical property; investments in processing and marketing of agricultural and fishing produce; investment in activity diversification and business development in households; technical help;

Stage two: local action strategy preparation and implementation – LEADER approach; agri-environmental measures – organic agriculture.

Conclusion

Agriculture of Serbia lost, in transitional period, main development bearers: large agricultural combinats, food industry factories and farmer's cooperatives. Consequently, small family farms found themselves in a difficult economic position. In accordance with mentioned, authors of paper give recommendations and guidelines to people in charge of agricultural policy for achieving sustainable development of this economic branch in future. The paper emphasizes significance that agricultural production has for country's foreign-trade balance, unemployment reduction and a more even regional development. What is suggested is a timely reaction of responsible institutions to challenges and fast changes in globalized environment, in order to valorize in the best way comparative advantages that agriculture of Serbia has.

In front of Serbia there is a complex task of development of sustainable agriculture which implies restructuring and diversification of current agricultural production, reconstruction of cooperatives and small agricultural farms, in order to increase products' quality, develop competitiveness and prepare for appearance on a global market. Unfavorable circumstance is a low participation of agriculture in national overall national budget which is, during last years, around 4%. On the other hand, there are positive signals of development such as bigger financial (and non-financial) support to small family farms and their education in order to develop an entrepreneurial way of thinking. According to authors of this paper, campaign "500 cooperatives in 500 villages" is particularly important, because it will significantly contribute to a more even development of country and stop unfavorable migrations from villages to cities or abroad.

Conflict of interests

The authors declare no conflict of interest.

References

1. Asenso-Okyere, K., Davis, K., (2009). Knowledge and Innovation for Agricultural Development, IFPRI Policy Brief 11; Retrieved from <http://indiaenvironmentportal.org.in/files/bp011.pdf> (December 12, 2018).
2. Aničić, J., Vukotić, S., Krstić, (2016). The Strategic Aspects and Results of Agriculture Development in Serbia in Transition Period, *Economics of Agriculture*, Vol. LXIII, no. 1, p. 175-189. DOI: <https://doi.org/10.5937/ekoPolj1601175A>.
3. Darnhofer, I., (2010). Strategies of Family Farms to Strengthen their Resilience; Presented at the 8th International Conference of the European Society for Ecological Economics, June 2009 in Ljubljana (Slovenia); doi:10.1002/eet.547; Retrieved from <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.517.5059&rep=rep1&type=pdf> (December 17, 2018).

4. Devetaković, S., Gavrilović, Jovanović, B. i Rikalović, G. (2009). *National Economy [In Serbian: Nacionalna ekonomija]* Faculty of Economics, Belgrade.
5. Đurić, Z., (2017). Small Family Farms as a Big Developmental Potential of Agriculture of Serbia and Russia [In Serbian: Mala porodična gazdinstva kao veliki razvojni potencijal poljoprivrede Srbije i Rusije], International Scientific Conference Challenges of Sustainable Development – Economic and Social Aspect [In Serbian: Međunarodni naučni skup Izazovi održivog razvoja – Ekonomski i društveni aspekt], Faculty of Economics, University in Priština, p. 503-514; Retrieved from <http://www.efpr.edu.rs/IOR-EDA2017/IOR-EDA%202017%20zbornik.pdf> (December 07, 2018).
6. Gidens, E. (2007). *Sociology [In Serbian: Sociologija]*, Faculty of Economics, Belgrade.
7. Goodstein, E. (2003). *Economics and Environment (second edition) [In Serbian: Ekonomika i okoliš (drugo izdanje)]*, Zagreb, MATE.
8. Gulan, B. (2016). COUNTRY AND VILLAGE 1 Rescuing Village and Agriculture (DRŽAVA I SELO 1 Spasavanje sela i poljoprivrede) Retrieved from <https://www.makroekonomija.org/0-branislav-gulan/drzava-i-selo-ii/> (December 01, 2018).
9. European Commission (2012). *Agriculture and Rural Development*, available at: http://ec.europa.eu/agriculture/index_en.htm (November 22, 2018).
10. Francis, A. C., (1991). *Plant Breeding and Sustainable Agriculture: Considerations for Objectives and Methods*; CSSA Special Publication No. 18; p. 83-94, Madison, Wisconsin, USA.
11. Kovačević, D., Milić, V. (2010). Contemporary Directions of Agriculture in the Function of Sustainable Development [In Serbian: Savremeni pravci poljoprivrede u funkciji održivog razvoja], First Scientific Symposium of Agronomists with International Participation AGROSYM [In Serbian: Prvi naučni simpozijum agronoma sa međunarodnim učešćem AGROSYM], 2-11, Jahorina.
12. Kovačević, D. (2010). *Environment Protection in Crop and Vegetable Farming [In Serbian: Zaštita životne sredine u ratarstvu i povrtarstvu]*, Monography, Faculty of Agriculture, Zemun.
13. Mandić, S., Mirjanić, B., Lekić, S. (2017). *Eco-social-economic Determinants of Sustainable Development [In Serbian: Eko-socijalno-ekonomske determinante održivog razvoja]*, International Scientific Conference Challenges of Sustainable Development – Economic and Social Aspect [In Serbian: Međunarodni naučni skup Izazovi održivog razvoja – Ekonomski i društveni aspekt], Faculty of Economics, University in Priština, p. 109-119. Retrieved from <http://www.efpr.edu.rs/IOR-EDA2017/IOR-EDA%202017%20zbornik.pdf> (December 07, 2018).

14. Perković, G., Berjan, S., Govedarica, B., Đurđić, I., Bodiřoga, R., Tomić, A. (2017). Organica Production in the Function of Sustainable Development of Rural Areas of the Republic of Srpska [In Serbian: Organska poljoprivreda u funkciji održivog razvoja ruralnih područja Republike Srpske], XXII Counseling on Biotechnology [In Serbian: XXII SAVETOVANJE O BIOTEHNOLOGIJI], Čačak, Collection of Articles, Book 1, p. 153-158. Retrieved from <https://arhiva.nara.ac.rs/bitstream/handle/123456789/2123/21%20SB%202017%20Ratarstvo%20Goran%20Perkovic%20i%20saradnici.pdf?sequence=1&isAllowed=y> (December 16, 2018).
15. Praća, N., Paspalj, M., Paspalj, D. (2017). Economic Analysis of Contemporary Agriculture's Impact on Sustainable Development [In Serbian: Ekonomska analiza uticaja savremene poljoprivrede na održivi razvoj], *Oditor*, Vol. III, No. 01/2017; p. 37-50. Retrieved from <https://scindeks-clanci.ceon.rs/data/pdf/2217-401X/2017/2217-401X1701037P.pdf> (December 22, 2018).
16. Samardžić, M. (2018). Geography of Capitalism [In Serbian: Geografija kapitalizma], *New Serbian Political Thought*, Belgrade, Retrieved from <http://www.nspm.rs/savremeni-svet/geografija-kapitalizma.html> (December 18, 2018).
17. Sol, R., Dž. (2011). *Downfall of Globalism and Transformation of the World* [In Serbian: Propast globalizma i preoblikovanje sveta], Archipelago, Belgrade.
18. UN (2013). Department of Economic and Social Affairs Population Division. Retrieved from <http://www.un.org/en/development/desa/population/publications/database/index.shtml> (December 17, 2018).
19. Vapa-Tankosić, J. And Stojsavljević, M. (2014). EU Common Agricultural Policy and Pre-accession Assistance Measures for Rural Development, *Economics of Agriculture*, Vol. 61, No. 1, p. 195-210. DOI: <https://doi.org/10.5937/ekoPolj1401195V>
20. Vasiljević, Z., Savić, B., (2014). Knowledge and Intellectual Capital – Sources of Competitive Advantage of Serbian Agriculture [In Serbian: Znanje i intelektualni kapital – izvori konkurentske prednosti srpske poljoprivrede], *Economic Views*, XIX, No. 1, p. 11-24, Belgrade. Retrieved from <http://www.deb.org.rs/casopis-ekonomski-vidici/> (October 25, 2018).
21. Zakić, N., Vukotić, S. and Cvijanović, D. (2014). Organisational Models in Agriculture with Special Reference to Small Farmers, *Economics of Agriculture*, Vol. 61, No.1, p. 225-239. DOI: <https://doi.org/10.5937/ekoPolj1401225Z>.

SUPPORT TO YOUNG FARMERS THROUGH AGRICULTURAL POLICY MEASURES – THE EXPERIENCE OF THE EU AND SERBIA

Katarina Djuric¹, Boris Kuzman², Radivoj Prodanovic³

*Corresponding author E-mail: katarina.djuric@polj.uns.ac.rs

ARTICLE INFO

Review Article

Received: 23 October 2018

Accepted: 12 March 2019

doi:10.5937/ekoPolj1901237D

UDC

338.246.027:323.333(4-672 EU)(497.11)

Keywords:

agricultural policy, young farmers, support measures, rural regions

JEL: Q13, Q18, R51

ABSTRACT

The purpose of this paper is to analyze agricultural policy measures aimed at young farmers and to compare the support system of the European Union and the Republic of Serbia.

The dominant method in the research is the descriptive analysis. The comparative analysis method is used for investigating advantages and limitations of the support to young farmers in the EU and the Republic of Serbia.

The unfavorable age structure of farmers represents the essential limitation for the sustainable development of agriculture and rural areas. In order to solve this problem, it is necessary to improve and strengthen agricultural policy measures of support to young farmers, which will lead to property increase, diversification of income and higher standards of living and consequently to the decision of young people to stay in the village and work in agriculture.

© 2019 EA. All rights reserved.

Introduction

In 2015 the European Commission proclaimed the support to young farmers as one of the priorities of agricultural policy. The EU Commissioner for agriculture Phil Hogan stressed that “generational renewal is an issue that goes far beyond a reduction in the average age of farmers in the EU. It is also about empowering a new generation of highly-qualified young farmers to bring the full benefits of technology to support sustainable farming practices in Europe (EC, 2017a). Key questions regarding our near future are: who will cultivate the land; how to provide sustainable development of rural regions and why is the number of young farmers decreasing?

- 1 Katarina Djuric, PhD, Associate Professor, University of Novi Sad, Faculty of Agriculture, Trg Dositeja Obradovića 8, 21 000 Novi Sad, Serbia, Phone: + 381 (21) 4853 232, E-mail: katarina.djuric@polj.uns.ac.rs ORCID: 0000-0003-4587-4855
- 2 Boris Kuzman, PhD, Associate Professor, Institute of Agricultural Economics, Volgina Street no. 15, 11 060 Belgrade, Serbia, Phone: +381 63 590 129, E-mail: kuzmanboris@yahoo.com ORCID: 0000-0002-8661-2993
- 3 Radivoj Prodanovic, PhD, Assistant Professor, University Business Academy in Novi Sad, Faculty of Economics and Engineering Management in Novi Sad, Cvecarska Street no. 2, 21 000 Novi Sad, Serbia, Phone: +381 21 400 484, E-mail: rprodanovic@fimek.edu.rs ORCID: 0000-0002-7088-8506

Numerous studies have been dealing with issues of unfavorable economic and social changes among rural population (Zagata, 2017; Zagata, Sutherland, 2015; Stockdale, 2004; Rovny, 2016). Farmers, local stakeholders, policy makers and researchers have been trying to find the reasons and analyze potential implications, primarily, unfavorable demographic trends.

The analysis of agricultural structure in EU countries indicates that due to structural changes, that is, merging smallholdings to large holdings, the number of holdings is decreasing while their average size is increasing (Đurić, 2018). Data gathered from EU countries indicate that a drop in the share of farm managers aged 65 and over is proportional to the increase of the holding size and decrease of their total number. Consequently, countries where smallholdings prevail are significantly affected by a slow generational renewal in agriculture. The impact of the farm size on the farmer age structure is so distinctive that some authors even argue that “the young farmer problem” can be regarded as “the small holding problem” (Zagata, Sutherland, 2015). This problem is particularly emphasized in the countries of Eastern Europe which have major restrictions regarding the approach of young farmers to agricultural land. The Republic of Serbia is one of the countries whose agricultural sector is characterized by unfavourable ownership structure where small scale holdings are more prevalent (Đurić et al, 2016). In addition, major depopulation of rural areas raises doubts about the possibility of generational renewal.

Social and economic restrictions regarding rural area development, caused by unfavourable age structure of farmers, represent a burden to all European countries. For this reason, support measures to young farmers have become one of the priorities, both within rural development and agricultural policy. Incentives to young farmers and young rural population in general are a condition sine qua non for sustainable development of village and agriculture.

The primary aim of this paper is to present support measures of the agricultural policy intended for young rural population, primarily young farmers. Furthermore, the paper compares the system of support to young farmers in the European Union and the Republic of Serbia. The effort has been made to explore the impact of agricultural policy measures on generational renewal in agriculture. The evaluation of effectiveness of agricultural policy support measures for young farmers, which have been applied so far, represents the basis for analyzing the impact of such support, when it comes to the decision of young people to work in agriculture and live in rural areas.

Materials and methods

The dominant method in the research is the descriptive analysis. The comparative analysis method is used for exploring advantages and limitations of the support to young farmers in the EU and the Republic of Serbia. Also, indicators, logic and other standard scientific methods are used.

Published scientific papers have been used as a reference for current research and experience related to measures of agricultural and rural development policy aimed at young farmers. The legislation of the European Union together with legislation and development documents of the Republic of Serbia have also been explored. Publications of the Statistical Office of the Republic of Serbia are used in order to gain insight into the demographic structure of rural regions in Serbia.

Young farmers and young rural population in EU countries

One of the most important dimensions of structural changes in agriculture of the European Union is the aging of farming population (Rovny, 2016). Only 6% of farmers in the European Union are younger than 35, while more than a half is older than 55 (Happe et al, 2008). Data on age structure of farm managers in EU-28 in the period between 2005 and 2013 show the decrease in the number of managers younger than 35 and increase in the number of farmers aged 54 and over (Table 1).

Table 1. Distribution of farm managers in EU-28 by age

Year	Farmers under 35 years of age	Farmers 54 years and over
2005	6.9%	54.1%
2007	6.2%	55.5%
2010	7.5%	53.2%
2013	6.0%	55.8%

Source: Matthews, 2018

The question is if a decreasing potential for generational renewal is a problem of European agriculture and agricultural policy. Are longer schooling period and longer longevity reasons which contribute to increasingly unfavourable age structure or there are some other factors involved? (Matthews, 2018).

SWOT analysis of the rural regions within the EU emphasizes that rural areas in the EU meet various development restrictions originating from demographic structure (EC, 2017b).

According to data from 2017, 28% of the EU-28 population lives in rural areas. There are also considerable differences regarding the share of rural population in certain member countries (from 45% to 56.2% in Lithuania, Denmark, Croatia, Latvia, Hungary, Slovenia and Luxemburg and 14.7% to 22.4% in Germany, Italy, Belgium, Great Britain and Holland, to only 0.3% in Malta (Eurostat, 2017).

Rural population dynamics differ in different EU countries and regions. Countries of Central and Eastern European Union are characterized by depopulation of rural areas and concentration of people in larger urban centers. Contrary to this group of countries, there is an increase in population in the so-called peri-urban areas in western part of the EU. These areas are populated by people from urban regions who would like to enjoy the benefits of living in the countryside compared to the life in cities (EC, 2017b).

The share of female population in rural regions is lower than in peri-urban and urban areas. This trend is particularly visible after 2004 that is, after the admission of countries from Central and Eastern Europe in the European Union (EC, 2017). The decrease in the share of female population in rural areas has a negative effect on the survival and development of rural areas, both in terms of birthrate and in terms of development of some agricultural branches, which traditionally employ women (Bogdanov, 2015).

Rural areas have a large share of population aged 65 and over as compared to the share of the same population living in urban and peri-urban areas. The greatest share of young population (between 15 and 24 years of age) in rural regions is in Estonia, Lithuania, Latvia, Poland, Ireland, the Czech Republic, Romania and Slovakia (Eurostat, 2009). Apart from Ireland, all other countries with the highest share of young people in rural areas are from Eastern Europe, that is, former socialist countries. Specific features of agricultural development and differences in the structure of agricultural holdings in this group of countries in comparison with old member countries (EU-15) also cause differences in the structure of labour force in agricultural sector (Rovny, 2016). As opposed to this group of countries, the lowest share of young people in the total number of rural population is present in France, Italy, Germany, Denmark and Holland (Table 2).

Table 2. The share of young rural population in the total population in EU countries

	Predominantly urban regions	Mixed rural-urban regions	Predominantly rural regions	All rural regions
	% proportion of population aged 15 to 24 in the total population			
Austria	10.9	11.8	11.9	11.4
Belgium	12.1	12.0	12.5	12.2
Bulgaria	12.4	12.9	12.5	12.7
Czech Republic	11.6	13.0	13.5	12.8
Germany	11.4	11.4	11.6	11.4
Denmark	11.9	12.4	11.7	12.0
Estonia	14.3	14.4	16.8	14.6
Spain	10.6	11.0	11.5	10.9
Finland	12.6	12.1	12.3	12.4
France	13.9	13.0	10.9	12.9
Greece	13.6	14.2	14.1	14.0
Hungary	10.7	13.0	13.1	12.7
Ireland	16.2	-	14.4	14.9
Italy	9.8	10.5	10.6	10.2
Lithuania	14.3	15.9	16.9	15.7
Latvia	14.0	16.0	16.5	15.6
Holland	12.1	12.5	11.2	12.2
Poland	12.9	14.9	16.0	14.9
Portugal	11.0	11.7	10.6	11.1
Romania	13.3	14.6	14.3	14.4
Sweden	12.3	13.4	13.5	13.2
Slovenia	-	12.4	11.6	12.0
Slovakia	13.0	15.5	14.5	15.0
Great Britain	12.3	11.8	12.5	12.1

Source: Eurostat, 2009

One of the crucial challenges of sustainable development of rural communities within the European Union is the exodus of young people (Shucksmith, 2010). Stockdale (2004) believes that it is not the out-migration of young people which is responsible for the survival of rural areas, but the in-migration, that is a small number of people who come to live in rural areas. Namely, he thinks that the main reason for rural out-migration is education of young people. Young and educated people find jobs in cities and do not return to rural areas they came from.

Parents who are farmer managers usually encourage their children and provide them higher education so that they get the opportunity to work outside agriculture and away from rural areas, thus eventually enabling them higher standards of living. This behavior pattern is stated by many authors who studied young rural population problems. For example, Kasimis et al (2010) write about situation in Greece: “Rural regions in Greece face the problem of rejection by the younger generation of badly paid jobs in agriculture. Improvements in the level of education and the standard of living as well as the spread of urban consumption patterns in the past three decades have led to the creation of high expectations in the younger generation. This led to migration from rural areas and from agriculture.”

Comprehensive survey was carried out in EU countries as part of the project “Policies and Young People in Rural Areas” in 1999 and 2000. It deals with young population and their attitude regarding the life in rural areas. Advantages and restrictions of living in rural areas expressed by young people from the EU are shown in Table 3.

Table 3. Positive and negative characteristics of rural areas

Positive characteristics	Negative characteristics
Rural landscapes, natural environment	Difficult access, remoteness
Calm, peacefulness, security	Lack of social activities, isolation
Existence of attractive towns nearby	No public transport
Good housing conditions	Ageing population
Many job opportunities	Restricted job market
Large offer of sport activities	Lack of activities for young women

Source: Shucksmith, 2010

The level of development of physical and institutional infrastructure and availability of public services, situation on the local job market, level of development of social networks and the role of family represent key aspects which determine the perception of young people of rural areas and their survival. Young rural population is worried about economic and social survival of their local communities and insist on higher level of participation in decision making process, creation of rural development policy and programme and their implementation.

Demographic characteristics of rural regions in Serbia

The 2011 Census of the Republic of Serbia recorded a significant population decline, especially in rural areas of the country. The negative birthrate, rural out-migration to cities and abroad resulted in a drop of rural population in Serbia of below three million (Table 4).

Table 4. Changes in the population number according to the type of settlement

	2002 census	2011 census	2011/2002 index
Total	7,498,001	7,189,862	95.9
Urban settlements	4,225,896	4,271,872	101.1
Other settlements	3,272,105	2,914,990	89.1
Rural population in total (in %)	43.6	40.6	

Source: OG RS, 2014

Observed at the regional level, the depopulation process and demographic exodus of villages is mostly present in the least developed regions of southern and eastern Serbia, which saw a decline of as much as 19% in the nine year period (OG RS, 85/2014). Gender differences are also increasing. Data from 2011 census confirm that the decrease in number of residents is higher with female than with male population, both in urban and rural regions. Such unfavourable aging and gender structure represents one of the key restrictions of structural reform in agriculture. It also results in the growth of hidden unemployment on agricultural holdings.

Potentials of human capital, that is, labour force in agriculture of the Republic of Serbia, can be best observed by monitoring the change in number of certain age groups (Table 5).

Table 5. Age structure according to the type of settlement

Age structure	Share of individual age groups in the total population (in %), 2011		Changes in the population in 2011 compared to 2002	
	Urban regions	Other regions	Urban regions	Other regions
0-14	14.5	13.9	-6.0	-21.6
15-29	19.0	17.6	-10.3	-16.1
30-49	28.3	25.2	-2.8	-15.7
50-64	22.7	23.2	20.0	13.3
65+	15.6	20.1	12.7	-10.0
TOTAL	100	100	100	100

Source: OG RS, 2014

The share of future (0-14 years) and potential labour force (15-29 years) in total population in rural regions is 31.5% (33.5% in urban regions), which is lower compared to the share of population ceasing active employment (50-64 years and over 65), whose share accounts for 43.3% (38.3% in urban regions). This kind of population structure, observed according to age groups and their working potential, questions the possibility of generational renewal in the agriculture of our country, particularly in rural areas.

Even more unfavorable demographic picture is obtained if observed by a trend change of population according to certain age groups. Compared to the previous census, the population decline was most significant in the category of working population and in the group which presents a potential labor force. Also, higher negative change rate of people living in rural areas as compared to urban areas, visible in all population categories up to the age of 49, are an indicator of the necessity to introduce a set of measures which will prevent further and more drastic out-migration of young working people from villages, and hence from agriculture.

EU support for young farmers

In general, the system of agricultural policy support makes it more difficult for new entrants to farming. CAP support pushes up land prices and thus adds to the time required for new entrants who are not inheriting to put together the necessary capital (Matthews, 2013).

Ex-post analysis of LEADER+ program pointed to certain drawbacks in terms of participation of young farmers in the decision making process. In addition, it has been estimated that the role of local action groups (LAG) was overemphasized in the process of implementation of development project and that LAGs are the ones who restrict direct participation of young rural population in projects aimed at them (Đurić, Njegovan, 2015).

In order to efficiently support young farmers through a subsidy system it is necessary to understand their problems (Zagata, 2017). It was necessary to develop CAP measures and directed funds exclusively to the category of young farmers. These measures are essential for providing their successful economic and social integration. Young people, who wish to engage in agriculture, abandon the traditional way of production and in the effort to modernize production they have certain demands for information, education, retraining and institutional support.

A set of measures of support to young farmers was introduced in the 2007-2013 programming period within CAP Pillar 2, with a dominant M 112 *Setting-up of young farmers*, targeting directly young farmers (Reg. 1698/2005). Almost 200 000 young farmers received EU aid for setting up in the 2007-2013 period (ECA, 2017). Potential users of funds granted under M 112 have to meet the following conditions:

- be up to 40 years of age and set up an agricultural holding for the first time,
- have adequate occupational skills and competence;
- submit a business plan for the development of their farming activities.

Indirectly, young farmers were also supported under the following Pillar II measures:

- *Vocational training and information actions* (M 111),
- *Use of advisory services* (M 114),

- *Modernisation of agricultural holdings* (M 121),
- *Rural infrastructure* (M 125).

Early retirement schemes, introduced as far back as in 1960, have not contributed as expected to the intergenerational transfer in agriculture of European Union. Therefore, the implementation of this scheme has been abandoned in the present programme (Zagata, Sutherland, 2015; Davis et al, 2013).

In the current 2014-2020 period, M 112 *Setting-up of young farmers* is followed by corresponding measure M 06 *Farm and business development measure* (sub-measure 6.1 – *Business start-up aid for young farmers*). This measure is implemented in 92 out of the 118 Rural Development Programmes (RDPs) across 24 out of the 28 EU Member States (ECA, 2017).

Furthermore, under the CAP Pillar 2 in the 2014-2020 period, the support to young farmers has been provided in the form of following measures (Reg. 1305/2013):

- *Knowledge transfer and information actions* (M 01),
- *Advisory services, farm management and farm relief services* (M 02),
- *Investments in physical assets* (M 04),
- *Cooperation, drawing up a business plan* (M 16).

Income support to young farmers was introduced under the Pillar 1 by *Payment for young farmers* (a top-up payment of 25% of the direct payment). Users of funds are young farmers commencing their agricultural activity who are no more than 40 years of age in the year of the first submission of the application under the basic payment scheme or under the single area payment scheme (Reg. 1307/2013).

The total EU budget allocated specifically for the support to young farmers 2007-2020 is 9.6 billion euro. It doubled from 3.2 billion euro in 2007-2013 provided under the Pillar 2 setting-up measure to 6.4 billion euro in 2014-2020, mainly due to the introduction of an additional direct payment to young farmers under Pillar 1. Total public expenditure, including national co-financing of Pillar 2 setting-up measure, is 18.3 billion euro. Nevertheless, the European Court of Auditors (ECA) found that this aid is based on a poorly-defined intervention logic, with no expected result and impact specified and that it should be better targeted to foster effective generational renewal (ECA, 2017).

Support measures to young farmers in the Republic of Serbia

Agriculture and Rural Development Strategy 2014-2024 (OG RS, 85/2014) provides strategic directions for rural and agricultural development in the Republic of Serbia for the 2014-2020 period. In addition to other development priorities, the Strategy stipulates that the welfare of rural population should be improved in order to stop negative demographic trends. In addition, special attention is given to the unfavourable

situation of women and youth on rural job market. The job market analysis has shown that it is the category of young people in rural regions which is to a high level excluded from this market and faced with inability to find jobs. Young people aged between 15 and 24 are employed in non-agricultural sectors only in 21% cases.

The development program of AP Vojvodina 2014-2020 (OG APV, 13/2014) defines four priority axes: 1. Development of human resources, 2. Development of infrastructure and conditions for decent life and work, 3. Sustainable economic growth, 4. Development of institutional infrastructure.

The second priority axis contains a measure which deals with the improvement of quality of life in order to increase employment and stop depopulation. Better connectivity among institutions, improvement of utility and information infrastructure, as well as more public and private investments in rural areas should be recognized as an initial incentive for provision of better living and working conditions in rural areas. More emphasis is laid on the position of marginal groups - women and youth and therefore on the need to organize their formal and informal education and reinforce their empowerment in the field of self-employment and entrepreneurship.

Implementation of support to young farmers in Serbia, both on the national and provincial level, started in 2017. Users of this support are young farmers aged 18 to 40. The provision of incentives aimed at young farmers in terms of “start-up” programme has been realized through grants for development and improvement of agricultural production and agricultural production and processing.

Incentives for diversification of income and improvement of quality of life in rural areas through support to young farmers have been envisaged in the Republic of Serbia (Official Gazette RS 45/2018 and 50/2018). The purpose of these incentives is to support investments for the development and improvement of primary plant and animal production, as well as for the purchase of breeding farm animals for agricultural holdings of young farmers. The beneficiaries of these incentives can be farm holders and/or members of commercial family farms if the farm is registered in the Farm Register for the first time and if the applicant is between 18 and 40 years of age.

When ranking applicants who applied for financial support, priority is given to:

- Investments intended for the production of veal and beef, lamb and kid, followed by vegetables, flowers, fruit, grapes, aromatic and medicinal herbs;
- Female applicants;
- Applicants with the degree in agriculture, veterinary medicine and/or food processing technology;
- Applicants who are the residents of underdeveloped municipalities;
- Applicants who are employed only in agriculture;
- Large families.

Table 6. Criteria for granting subsidies to young farmers in rural regions of AP Vojvodina

Criteria	Scoring mode	Points
Age of applicant	From 18 to 25	25
	From 25 to 35	20
	From 35 to 40	15
Applicant is a woman	Yes/No	10/0
Agricultural holding is in a less-favoured region	Yes/No	10/0
Applicant has appropriate expert knowledge	At least three years of experience in production – registered in the Farm Register	5
	High school	10
	Faculty	15
Evaluation of sustainability of the investment	Low/medium/high	10/20/40
Total		100

Source: Provincial Secretariat for Agriculture, Water Management and Forestry, 2018
Potential users of this support at provincial level are obliged, in addition to other stipulated criteria, to submit a business plan as an evidence of the economic sustainability of their project. A part of the grant in the amount of 75% is paid in advance, whereas the outstanding 25% of the funds is paid once the investment has been realized. Criteria for allocating grants to young farmers at provincial level are presented in Table 6.

In addition to funds from republic and provincial agricultural budget, young farmers can apply for self-employment subsidies which are realized in cooperation with the National Recruitment Agency. The Development Agency of Serbia also has resources for encouraging women and youth entrepreneurship in rural regions (Jovanović, 2016).

Conclusions

The share of young rural population in total population as well as the share of young farmers in the total number of agricultural producers is constantly decreasing both in EU countries and in the Republic of Serbia. Unfavourable age structure of farmers is the crucial limitation of the sustainable development of agriculture and rural regions.

The analysis of experience of EU countries shows that the decision of young people to stay on the farm and engage in agriculture depends on numerous factors. Firstly, the size and economic stability of the holding affects the decision of new generations to take over the holding and work in agriculture. Another important factor is the degree of diversification of rural economy. High degree of diversification of the rural economy and engaging in non-agricultural activities provides higher standards of living and positively affects the decision of young people to stay in the village. Rural infrastructure and services also enable more secure future to young people.

Generational renewal in agriculture is supported through implementation of appropriate agricultural policy measures. The European Union has set the support to young farmers as one of the CAP priorities. According to the European Court of Auditors (ECA), this support needs to be better targeted to foster effective generational renewal. Since 2017,

the Republic of Serbia has started implementing measures for giving incentives to young population to work in agriculture and their effects are yet to be evaluated.

Acknowledgements

Paper is a part of research within the project no. 114-451-2601/2016-2 “The analysis of production and economic results of business entities in the field of agriculture and food industry of AP Vojvodina”, financed by the Provincial Secretariat for Higher Education and Scientific Research of the AP Vojvodina.

Conflict of interests

The authors declare no conflict of interest.

References

1. Bogdanov, N. (2015). *Rural Development and Rural Policy*. Faculty of Agriculture, University of Belgrade. [in Serbian: Богданов, Н. (2015). „Рурални развој и рурална политика”, Пољопривредни факултет, Универзитет у Београду].
2. Council Regulation (EC) No. 1698/2005 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD).
3. Davis, J., Caskie, P., & Wallace, M. (2013). Promoting structural adjustment in agriculture: The economics of New Entrant Schemes for farmers. *Food Policy*, 40, 90-96.
4. Đurić, K. (2018). *Agriculture and rural development of the Republic of Serbia in the process of European integration*. Faculty of Agriculture, University of Novi Sad. [in Serbian: Ђурић, К. (2018). Пољопривреда и рурални развој Републике Србије у процесу европских интеграција. Пољопривредни факултет, Универзитет у Новом Саду].
5. Đurić, K., Milović, S., Hyba, H., Prodanović, R., & Bošković, J. (2016). Comparative Analysis of Agricultural Farms Property Structure in the Republic of Serbia and EU. *Economics Theory and Practice*, 9 (2), 19-32. [in Serbian: Ђурић, К., Миловић, С., Hyba, H., Продановић, Р., Бошковић, Ј. (2016). Компаративна анализа поседовне структуре пољопривредних газдинстава у Републици Србији и ЕУ].
6. Đurić, K., & Njegovan, Z. (2015). Mechanisms of support for young rural population in the European Union, *Economics of agriculture*, 62 (4), 1003-1016.
7. European Commission (2017a). *Generational Renewal through Rural Development*. Speech by Commissioner Phil Hogan at JOINT ENRD/CEJA Workshop - 25th January 2017, Brussels, Retrieved from
8. https://ec.europa.eu/commission/commissioners/20142019/hogan/announcements/speech-commissioner-phil-hogan-joint-enrdceja-workshop-25th-january-2017-brussels_en (Mart, 02 2019)

9. European Commission (2017b). *Modernizing and Simplifying the CAP. Socio-Economic challenges facing EU agriculture and rural areas*. Background Document. Retrieved from
10. https://ec.europa.eu/agriculture/sites/agriculture/files/consultations/cap-modernising/soc_background_final_en.pdf (Mart, 02 2019)
11. European Court of Auditors (ECA). (2017). *EU support to young farmers should be better targeted to foster effective generational renewal*. Special Report No 10/2017, Retrieved from https://www.eca.europa.eu/Lists/ECADocuments/SR17_10/SR_YOUNG_FARMERS_EN.pdf (Mart, 02 2019)
12. Eurostat regional yearbook (EUROSTAT), Retrieved from http://ec.europa.eu/regional_policy/en/newsroom/news/2017/09/14-09-2017-eurostat-regional-yearbook-2017 (September 08, 2018)
13. European Statistics (EUROSTAT), Statistics on rural areas in the EU, Retrieved from https://ec.europa.eu/eurostat/statisticsexplained/index.php/Statistics_on_rural_areas_in_the_EU (September 08, 2018)
14. Happe, K., Balmann, A., Kellerman, K., & Sahrbacher, C. (2008). Does structure matter? The impact of switching the agricultural policy regime on farm structures. *Journal of Economic Behavior and Organization*, 67 (2), 431-444.
15. Jovanović, O. (2016). *Institutional support to the development of entrepreneurship in agriculture during structural changes in Serbia*, In: Directions of structural change in the process of accession to the European Union (Eds. Minović, J., Stošić, I., Bodroža, D., Drašković, B.), Institute of Economic Sciences, Belgrade, 393-404. [in Serbian: Јовановић, О. (2016). Институционална подршка развоју предузетништва пољопривреде током структурних промена у Србији].
16. Kasimis, C., Papadopoulos, A., & Pappas, C. (2010). Gaining from Rural Migrants: Migrant Employment Strategies and Socioeconomic Implications for Rural Labour Markets. *Sociologia Ruralis*, 50 (3), 258-276.
17. Matthews, A. (2013). *Wasting money on young farmers?* Retrieved from <http://capreform.eu/wasting-money-on-young-farmers/> (September 08, 2018)
18. Matthews, A. (2018). *Is there a particular generational renewal problem in EU agriculture*, Retrieved from <http://capreform.eu/is-there-a-particular-generational-renewal-problem-in-eu-agriculture/> (September 05, 2018)
19. Ministry of Agriculture, Forestry and Water Management - MAFWM. (2018). *For the measure of supporting young farmers three times more money in 2018* [in Serbian: За меру подршке младим пољопривредницима три пута више новца у 2018. години], Retrieved from <http://www.minpolj.gov.rs/za-meru-podrske-mladim-poljoprivrednicima-tri-puta-vise-novca-u-2018-godini/> (September 08, 2018)

20. Official Gazette of the Republic of Serbia - OG RS, no 85/2014. Agriculture and Rural Development Strategy 2014-2024 [in Serbian: Службени гласник Републике Србије, бр. 85/14. Стратегија пољопривреде и руралног развоја Републике Србије за период 2014-2024. године].
21. Official Gazette of the Republic of Serbia – OG RS, no 45/2018 and no 50/2018. *Incentives for diversification of income and improvement of quality of life in rural areas through support to young farmers* (in Serbian: Службени гласник Републике Србије, бр. 45/2018 и бр. 50/2018. Правилник о подстицајима за диверзификацију дохотка и унапређење квалитета живота у руралним подручјима кроз подршку младим пољопривредницима).
22. Official Gazette of the Autonomous Province of Vojvodina - OG APV no 24/2018. *Rulebook on allocation of funds for support to young people in rural areas on the territory of AP Vojvodina in 2018* [in Serbian: Службени лист АПВ, бр. 24/2018. Правилник о додели средстава за подршку младима у руралним подручјима на територији АП Војводине у 2018. години].
23. Official Gazette of the Autonomous Province of Vojvodina - OG APV no 13/2014. *Development program of AP Vojvodina 2014-2020* [in Serbian: Службени лист АПВ, бр. 13/2014. Програм развоја АП Војводине 2014-2020].
24. Regulation (EU) No. 1305/2013 of the European Parliament and of the Council on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) and repealing Council Regulation No. 1698/2005.
25. Regulation (EU) No. 1307/2013 of the European Parliament and of the Council establishing rules for direct payments to farmers under support schemes within the framework of the CAP and repealing Council Regulation (EC) No. 637/2008 and Council Regulation (EC) No. 73/2009.
26. Rovny, P. (2016). The analysis of farm population with respect to young farmers in the European Union. *Procedia – Social and Behavioral Sciences*, 220, 391-398.
27. Shucksmith, M. (2010). *How to promote the role of youth in rural areas of Europe*. Directorate General for internal policies, Policy Department for Structural and Cohesion policies, Retrieved from [http://www.europarl.europa.eu/RegData/etudes/note/join/2010/438620/IPOL-AGRI_NT\(2010\)438620_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/note/join/2010/438620/IPOL-AGRI_NT(2010)438620_EN.pdf) (July 10, 2018)
28. Stockdale, A. (2004). Rural Out-Migration: Community Consequences and Individual Migrant Experience. *Sociologia Ruralis*, 44 (2), 167-194.
29. Zagata, L. (2017). *Young farmers – Policy implementation after the 2013 CAP reform*. Presentation for the Committee on Agriculture and Rural Development, Retrieved from http://www.europarl.europa.eu/cmsdata/133190/Study_Lukas%20Zagata-Policy%20implementation_13-11-2017.pdf (July 10, 2018)
30. Zagata, L., & Sutherland, L.A. (2015). Deconstructing the „young farmer problem in Europe“: Towards a research agenda. *Journal of Rural Studies*, 38, 39-51.

SELF-EMPLOYMENT OF WOMEN THROUGH ASSOCIATIONS IN THE RURAL AREAS OF SIRINICKA ZUPA

Goran Maksimović¹, Tatjana Ivanović², Aleksandra Vujko³

*Corresponding author E-mail: goran.maksimovic@pr.ac.rs

ARTICLE INFO

Review Article

Received: 28 December 2018

Accepted: 14 March 2019

doi:10.5937/ekoPolj1901251M

UDC 331.57-055.2:316.334.55
(497.115 Sirinička župa)

Keywords:

*rural tourism, self-employment,
the associations for the
empowerment of women*

JEL: J16, J21

ABSTRACT

In order to empower and become independent in their tending, women have established the associations (the associations for the empowerment of women – AEW). Women in these associations have becoming aware that, if they had performed united, they could radically change their personal lives, their families' lives, as well as of the communities they have lived in. Therefore, the associations can play a role of giving a woman “a chance” to be independent both in the economic and social sense. This paper aims to show effects of the women's empowerment in rural areas, i.e. the influence of the AEW on the female entrepreneurship and self-employment. Empirical research was done on a free sample of 420 women from 10 villages in the Serbian enclave Sirinicka Zupa in Kosovo and Metohija by the personal communication technique, i.e. using a questionnaire. The results analysis shows a unique formula for the empowerment of women: self-employment as a goal for the women's empowerment depends directly from the motive for starting a business (25%), business environment (20.24%), as well as the support of AEW (54.76%).

© 2019 EA. All rights reserved.

Introduction

Social systems and cultures interpret the biological differences between women and men in different ways and sum them up into the sets of social norms in form of desirable and

1 Goran Maksimović Ph.D., Associate Professor, University of Priština, Faculty of Agriculture, Kopaonička Street nn, 38219, Lešak, Serbia, Phone: +381 63 419 757, E-mail: goran.maksimovic@pr.ac.rs

2 Tatjana Ivanović Ph.D., Assistant Professor, University of Priština, Faculty of Agriculture, Kopaonička Street nn, 38219, Lešak, Serbia, Phone: +381 66 005 605, E-mail: tatjana.ivanovic@pr.ac.rs

3 1) Novi Sad Business School (Vladimira Perića Valtera 4, 21000 Novi Sad, Serbia, Tel. 00381 64 914 26 45, e-mail: aleksandravujko@yahoo.com)

2) South Ural State University, Institute of Sports, Tourism and Service, (76 Lenin Ave, Chelyabinsk 454080, Russia)

3) University of Business Studies, Faculty of Tourism and Hotel Management (Jovana Dučića 23a, Banja Luka 78000, Republic of Srpska)

acceptable activities and behaviours. The social institutions, social norms, social customs and laws, as well as the economic institutions (the job market and similar) shape the relations and the social models of behaviour, the share of roles between women and men, and in that way determine a range of rights and possibilities the specific groups dispose with (Vujko, Maksimovic, 2018). Today labour market characterize rising an automated jobless society (Grossman, 2018), job displacement caused by workplace automation (Sorells, 2018), or digital labor market (González, 2018) and generally automation will transform the labor market (Chessell, 2018) which means that consumers facing varying product offer from different countries (Šapić et al., 2018).

Theoretically, women can get a chance to realize themselves, but only in case if their total status is improved. This type of the status improvement is called “the women’s empowerment”. The women’s empowerment is one of the most important issues in the process of the emancipation of women (Agarwal, 1997). “The empowerment of women is the process in which women become active independently and collectively, have more knowledge and become the target-oriented active participants, who undertake/support the initiatives for overcoming the gender inequalities” (Rao, 2011). Therefore, the empowerment of women starts the strategy for the achievement of gender equality (Floro-Maria, 1995; Reddy et al., 2003).

The empowerment of women has been mostly expressed through different forms of the women’s associations (the associations for the empowerment of women – AEW). Such associations provide women to have greater control over their lives (Hashemi et al., 1996; Orser et al., 2006). Membership in these associations gives women “the ability to see and to be seen”, and also provides them the feeling of control over their lives. The AEW focuses on improving skills, innovativeness, the approach to financial institutions for the micro enterprises/projects, introduction of savings and credit control for economically poor, mainly rural areas (Vujko, Maksimovic, 2018).

During the past two decades the issue of the women’s empowerment has developing (Kabeer, 2005; Narayan, 2002). Three interconnected dimensions for the empowerment of women are: 1) Approach to resources, including preconditions; 2) Agencies, including processes; and 3) Achievements, including outcomes (Kabeer, 2005). It is important to know that “the empowerment of women” the most often starts by trying to understand how and why women have been “non-empowered” (Bhatt-Datta, Gailey, 2012). The empowerment of women means “giving women the right to make choices in their lives and influencing change and ability that a woman controls her life over the key material and non-material resources” (Moser, 1991).

“Social welfare, self-estimation and independence in combination with the aspiration or achievement of economic independence” defines the empowerment of women (Osirim, 2001). Regarding further considering of the definition of this term, we can conclude that the empowerment of women is a process through which women get greater control over their lives (Seguino, 2000; Soroushmehr et al., 2012). It means also more self-confidence and „the spine“ for their ideas and creativity (Batliwala,

1994). The empowerment has four aspects: first, in order a woman to be empowered, she has to be “free”; second, the empowerment cannot be achieved by a third person, but directly, from the inside; third, the definitions of empowerment usually include a subjective attitude of people who make decisions on the important issues in their lives and are capable to implement them, and finally, the empowerment is the process that takes place, and not a stagnant product (Mosedale, 2005). Dimensions of the women’s empowerment include: a sense of self-confidence and a vision of the future, mobility and visibility, economic security, making decisions in a household, ability of more efficient interaction in the public sphere and the participation in non-family groups. There is a general attitude that the empowerment of women is a course that manifests in several directions (Hashemi and Shuler, 1993).

One of the most important forms of the term is absolutely the welfare of women, where the empowerment of women is considered the process of women’s and girls’ prosperity improvement (Ali, Hatta, 2012). Finally, the conclusion can be drawn that the empowerment of women is defined as the achievement of “unwritten rules” including: education, economic self-confidence, ownership and the inheritance of property, political participation and the elimination of all forms of discrimination concerning the gender, violence and abuse, harassment and exploitation (Harriet, Sen, 2003).

The meaning of the female entrepreneurship and self-employment

The field of entrepreneurship increases its theoretical focus to the unique contribution of women to business and society (De Bruin et al., 2006; 2007). The female entrepreneurship is a multi-dimensional phenomenon that can be approached from various aspects: From the female activism point of view, when it is considered a way to activate female resources in favour of women (Calás et al., 2009); from the economic development aspect, when it is treated as a way to activate female resources, especially in the field of small and medium enterprises (Heilman, Chen, 2003; Hania et al., 2012); from the social policy point of view, when tries to decrease the women’s unemployment by strengthening the women’s entrepreneurship, especially middle-aged women, who have been exposed to a great risk of losing a job during the transition (Godwyn, 2009); from the aspect of providing the sustainable development – the female entrepreneurship can be a way to harmonize the economic development with the ecological and social development, through the socially responsible business (Markantoni, Van Hoven, 2012).

Analysts ask questions why the micro-financing programs are more affecting women, as well as why women are not treated the same as men (Tassel, 2004). International donations, governments and other experts for development pay more attention to micro-financing as a strategy that could reach women and engage them in the developmental process (Ali, Hatta, 2012). The women’s entrepreneurship has mostly been viewed from the social welfare point of view, although it has been essentially “par excellence” individual strategy of the women’s emancipation. Every woman who decides to be an entrepreneur, or is an entrepreneur, at the same time a self-realized, self-aware and self-strengthened woman.

The situation in Serbia

Serbian society can be described as patriarchal. In this environment, women often lose their self-confidence and become victims of the social “silent violence” (Ramanathan, 2004). In these cases, the entrepreneurship and self-employment can empower women and help them feel important and useful (Calás et al., 2009; Bhatt-Datta, Gailey, 2012). The female entrepreneurship in Serbia had been mentioned for the first time in the first half of ‘90ies of the 20th Century, through the supporting programs of international institutions that have aimed to include women refugees faster economically and socially. Education for these women had been organized aiming to raise awareness on self-employment, especially on the independent trade shops and trades, in order women to become entrepreneurs and insure their families. In the last 10-15 years things have been gradually changing. The number of women’s enterprises has increased, while the structure has changed, so besides the exclusively “female” jobs, women have become visible in other fields such as providing various services, bookkeeping, intellectual services (financial consulting, managing human resources, education) etc. Rural tourism has become particularly interesting.

Rural tourism in Serbia is a new phenomenon in which farmers and people who live in rural areas search for some alternative sources of income (Vujko et al. 2016; Petrović et al. 2017). Enterprises engaged in rural tourism have been connected to a local regional community through the procurement of materials (raw materials and finished products), business services and employment (Ateljevic 2009). Some rural households are on agricultural land, and the owners rarely stop their work while being engaged in rural tourism. The others, more common type is the rural households that aren’t engaged in agriculture, which can point out to a fact that agriculture is not a necessary factor for growth and development of rural settlements. It is considered that especially rural tourism provides women a chance to upgrade themselves through self-employment (Vujko et al. 2017).

The research methodology

The area of research

In the Serbian enclave Sirinicka Zupa in Kosovo and Metohija lives around 13000 non-Albanian population, prevalently of Serbian nationality, and it is located on 250 km² with one urban and fifteen rural settlements. It is the mountain area with the specific jagged entirety and the altitude range from 900 m in the Lepenac valley to 2500m at the highest peak Ljuboten on Sar-mountain. Altitude and climatic conditions show that the area of Sirinicka Zupa is extremely suitable for the development of livestock breeding, fruit and crop growing, as well as for the development of rural tourism. In the structure of agricultural land of Sirinicka Zupa prevails: pastures (38.8%), meadows (25%), which means that this area is favourable for the development of livestock breeding, especially the organic sheep and goat breeding. Putting the existing cheese factories in function, as well as by organizing the supply of population with the registered herds

of sheep and goats, the preconditions for the production of high-quality dairy products could be created, and also the possibility for making the Sar-cheese brand, well-known by its quality throughout ex-Yugoslavia.

Sources of data and the methods of research

Research was conducted in September and October 2018 on a sample of 420 women in 10 rural areas in Kosovo and Metohija in Sirinicka Zupa. In this paper was explored an effect of the AEW on women's entrepreneurship and self-employment. The empowerment concepts have the overlapping dimensions, especially in the context of the female entrepreneurship and self-employment. The paper was trying to come to a formula for the women's empowerment, i.e. was using the research results to obtain data in order to support female members of the AEW to start their own enterprise and self-employ. The associations should be established aiming to empower women of different ages within the associations, as in economic as well as in social sense, to be engaged in humanitarian work and activities in the field of culture and folk art (making handicrafts and food products, as well as souvenirs). They should take part in country parties, fairs and other events related to food preparation (cooking) and other products of the female folk art. All interested female respondents in the observed villages were taking part in this research. The only condition was to have a domicile address in these villages. Research of a target group was done by interviewing (using the „face to face“ technique), by applying a questionnaire. Results of the survey were shown in the table.

It was necessary to answer some questions and set up certain sub-hypothesis aiming to test an initial X hypothesis that self-employment is the final goal of the women empowerment and to establish what would be an adequate stimulus for women to start their own enterprise (setting a formula). One of the most important questions that should be answered are: which factors affect the women's empowerment? In order to answer the question, 3 sub-hypotheses were set: x1 – the motive „unemployment and dissatisfaction with the previous job“ mostly affect the women's empowerment for starting own business; x2 – lack of an initial capital as a part of the business environment have most effect on the women's empowerment for starting own business; and x3 – support of the AEW strongly affects the female empowerment. Besides a question if some of these factors have an effect on the empowerment, this paper was focused on the importance of influence, if it was present. The focus was on the AEW support to the women's empowerment. In order to check the x3 sub-hypothesis, it would be necessary to set several more sub-hypotheses: x4- members of the AEW have been empowered; x5 – members of the AEW have been empowered for starting their own business in the field of rural tourism, the production of cheese from Sar-mountain, the production of medicinal herbs; x6 – the greatest significance of the AEW is in the information-financial support (Vujko, Maksimovic, 2018).

The study tried to measure the women's empowerment. Exactly 420 women were interviewed for this study, and their qualitative answers were providing a base for drawing some conclusions (Eisenhardt, Graebner, 2007). These scores of assessments

and the evaluation of results were used for further analysis (Calás et al. 2009; Bhatt-Datta & Gailey, 2012). After the conducted survey analysis, there has come to a conclusion on the role of the AEW and the female empowerment to self-employment.

Results and discussion

As for the age structure, the highest percentage of female respondents (197) 47% is in the age group between 20 and 50 years, and then in the group from 51 to 70 (29) 7%. The most of female respondents (248) 59% has only the secondary school education, 80 of them (19%) has the university education, 59 (14%) are college educated, and 33 women (8%) is with the elementary school education. Data related to the family and parental status of women and was processed in this paper. The research has shown that 256 women (61%) have been married, 113 women (27%) have been in extramarital community, 38 women (9%) have been divorced, and 13 (3%) have been widows. At the same time, the research showed that 366 women (87.14%) were mothers, while 54 women (12.86%) didn't got children.

Table 1 – Results of an interview

Enclosure 1 – What would motivate you to establish your own enterprise?		
	Frequency	Percent
Taking care of others	126	30
Quest for achievements	13	3
A higher degree of freedom and independence	29	7
Unemployment, dissatisfaction with the previous job (workplace, associates, work conditions)	231	55
Something else	21	5
Total	420	100.0
Enclosure 2 – How do you see the business environment in Sirinicka Zupa?		
Women have more responsibilities in families and the education of children	50	12
The problem lies in lack of an initial capital	336	80
Unfavourable attitude of society for a woman who starts a new business	21	5
Problem of marginalization, humiliation of women and sexual harassment	0	0
Deficiencies as the results of a high level of corruption and the strong male network	13	3
Укупно Total	420	100.0
Enclosure 3 – Would you feel more empowered as a member of the AEW?		
Yes	399	95
No	8	2
I don't know	13	3
Total	420	100.0

Source: own research

Table 2 – The interview results

Enclosure 4 – In which areas is the strongest empowerment?		
Humanitarian work and the care for a local community	0	0
Preparation and production of a cheese from Sar-mountain	147	35
Traditional trades and handicrafts	0	0
Ecology and environment	0	0
Rural tourism	244	58
Agricultural activities: the products made of (medicinal) herbs	29	7
I don't feel any empowerment	0	0
Total	420	100.0
Enclosure 5 – Would you start a new business and what business would you do?		
I would like to produce the embroidered materials	0	0
I would like to make souvenirs	0	0
I would like to deal with weaving and crochet	0	0
I would like to produce jewellery	0	0
I would like to deal with the production of cheese from Sar-mountain	147	35
I would like to make the plant products	29	7
I would like to deal with the rural tourism	244	58
No	0	0
Total	420	100.0
Enclosure 6 – What is the key role of the AEW?		
Organizing meetings, trade fairs and other manifestations	13	3
Taking part in projects	0	0
Providing info on credits and the other forms of financing	273	65
Providing documentation necessary for starting a new business	0	0
Empowerment through education and the organization of forums	8	2
The possibility of joint sale on the market	126	30
I don't know	0	0
Укупно Total	420	100,0

Source: own research

In the table no.1 and the enclosure no.1 can be seen that the most explored motive for starting the women's own business was the motive „unemployment, dissatisfaction with the previous job“, which have meant that women entered entrepreneurship in order to do something for their selves and their families, unemployment, dissatisfaction with the previous job (55%). The care of others motive was the ground for starting their own business for 30% of female respondents. Besides the financial motivation, the motivation related to self-realization was also very important (Dur, Glazer, 2008), i.e. proving their own abilities (a higher degree of freedom and independence – 7%). Unlike the previous motive with the focus on the desire to make a profit in order to help the others, this motive is a driving power for women to achieve the human essence. Self-realized people are “what they really are”, and not what they possess. Hence, everything previously said had confirmed the sub-hypothesis x1 that the motives

“self-employment and the care for their families” are the main motives that affect the women’s empowerment for starting their own business. According to the statements of women who helped in realizing this research, the motives in their decision whether or not start their own business have participated proportionally with 25%.

Business environment

The research has shown that women haven’t got enough information on credits, even the other information necessary for starting own business. Generally, only a number of women had their personal assets to invest in a new business. This is the reason why women have a great interest in the possibilities of various types of support and assistance, which have occurred in institutions such as the AEW. The research has shown that women have many obstacles for the development of their own businesses, and all these obstacles have proved to be the typical problems for women in business (Shabbir, Di Gregorio, 1996; Heilman, Chen, 2003).

The table no.1 and the enclosure no.2 show that the business environment has a significant effect on starting own business in several ways. The first example is the lack of financial resources to run a larger business (80%). The second circumstance is the fact that women in Sirinicka Zupa still have major obligations in families and raising children (12%). The third circumstance is an unfavourable attitude of the society about a woman who is starting her own business (5%). This is more important reason for women from smaller communities, where this obstacle is more expressed. Disadvantages lie in the high level of corruption and strong male networks (3%). All of these data prove the sub-hypothesis x2 that the lack of an initial capital, as a part of the business environment, strongly affect the women’s empowerment for starting their own businesses. According to the women’s statements, who helped in realizing this research, the **business environment** participates with the percentage of 20.24% in their decision whether to establish their own enterprise or not.

Support of the AEW

The AEW suggests jobs to women, but primarily jobs related to the manual production: weaving, crochet, embroidery, making jewellery, figurines and gypsum fridge magnets, drying plants for tea, making cookies, etc. After the association approves the business, they have one third of joint financing. The associations neither have offices nor the assets at the moment; the members of the association meet and work in houses of other members. They know better and support each other. It is noticeable almost family relations among members of the associations. The benefits of such relations are the opportunity for the collective identification of women and the exchange of individual experiences.

The table no. 1 and the enclosure no.3 point out to the fact that even 95% women considered themselves very empowered as the AEW member. This data has confirmed the sub-hypothesis x4 that the AEW female members have been empowered. The table no.2 and the enclosure no.4 show that the women’s empowerment within the AEW is the most intensive in the field of rural tourism (58%), the production and

preparation of cheese from Sara-mountain (35%), and the agricultural activity: products made of herbs (7%). This information is very important, while it points out to those opportunities, which women can use the most in the process of self-employment (Swanson, Timothy, 2012). Data from the table no.2 and the enclosure no.5 are proving the above mentioned, i.e. they show that even 58% of women would be engaged in rural tourism, while 42% of women would start their own business in the field of agricultural activity: the production of cheese from Sara-mountain, the production of medicinal herbs, etc. These data confirm the sub-hypothesis x5 that the AEW members have been empowered for starting own business in the field of rural tourism and the agricultural production. The table no.2 and the enclosure no.6 show the role of the AEW in the women's empowerment. The members of AEWs consider these institutions as the stronghold where they can get the adequate information and financial support for starting their business (65%). It is very important considering that it relies on the sub-hypothesis 2 (Table 1 and Enclosure 2). Hence, herewith was confirmed the hypothesis x6 that the greatest significance of the AEWs was exactly in the information and financial support. The sub-hypothesis x3 (the support of the AEWs have an effect on the women's empowerment) was also confirmed by confirming the sub-hypotheses x4, x5, and x6. According to the statements of women who helped in realizing this research, the *support of the AEWs* in making their decision whether to establish their own enterprise or not participates with 54.76%.

Conclusion

The women's empowerment in starting their own business in Sirinicka Zupa is mostly motivated by "self-employment and the care for their families". When it is about the business environment, the research has shown the series of its unfavourable conditions for the development of female entrepreneurship, as well as the opinion of women entrepreneurs that the environment has been unsuitable for female entrepreneurship. Along with unfavourable economic conditions, which follow the trends of delayed and difficult transition in Serbia, and few years ago the effects of the world economic crisis as well, as an aggravating circumstance for the women entrepreneurship has occurred also the significant gender inequalities, which have represented an obstacle when starting a business, as well as later, during the business development. That is why we are not surprised by the essentially unfavourable perception of business climate among women entrepreneurs, which can be noticed in the survey sample: 80% of women entrepreneurs considered that is hard to start a business in Sirinicka Zupa due to the inaccessibility of a financial capital.

Besides deficiencies in education, one of the hardest challenges many women face when they start/enlarge their business is to balance their business obligations with their responsibilities in households. Although the only way to overcome these problems is to share responsibilities among men and women in a household, it cannot be expected in a short time. Hence, the task of the women's empowerment in the women's associations is to show the positive examples of female entrepreneurship to members of a group, and

the final goal of this empowerment is the women's self-employment and starting their own businesses, the decrease of unemployment, the employment on own holdings, and the self-sustainable development of Sirinicka Zupa and survival of the Serbian population in Kosovo and Metohija.

The conclusion can be drawn that the most important factors that affect the women's empowerment are: motives, business environment and support of the AEW. Nonetheless, this paper imposes a conclusion that the members of AEW are strongly empowered: the empowerment can be manifested in a form of starting a new business in the field of rural tourism and the production of agricultural products; as well the fact that the greatest significance of the AEW is in the information-financial support. It has confirmed the main hypothesis X that self-employment is the final goal of the women's empowerment. This has produced a formula of the women's empowerment that has been also the final goal of this paper: self-employment as the final goal of women's empowerment depends directly from motives for starting an own enterprise (25%), the environment business impacts (20.24%), and the AEW support (54.76%).

Conflict of interests

The authors declare no conflict of interest.

References

1. Ali, I., Hatta, A.Z. (2012): Women's Empowerment or Disempowerment through Microfinance: Evidence from Bangladesh. *Asian Social Work and Policy Review* 6, 111-121.
2. Agarwal, B. (1997): Bargaining and gender relations: within and beyond the household. *Feminist Economics*, 3(1), 1-51.
3. Ateljevic J. (2009): *Tourism entrepreneurship and regional development: Example from New Zealand*. *International Journal of Entrepreneurial Behaviour and Research*, 15(3), 282-308
4. Batliwala, S. (1994): *The meaning of women's empowerment: New concepts from action*, In G. Sen, A. Germain & L. Chen (Eds.), *Population policies reconsidered: Health, empowerment and rights*. Cambridge MA: Harvard University Press.
5. Bhatt-Datta, P., Gailey, R. (2012): Empowering Women Through Social Entrepreneurship: Case Study of a Women's Cooperative in India. *Entrepreneurship theory and practice*, 36(3), 569-587.
6. Calás, M., Smircich, L., Bourne, K. (2009): Extending the boundaries: Reframing "entrepreneurship as social change" through feminist perspectives. *Academy of Management Review*, 34(3), 552-569.
7. Chessell, D. (2018). The Jobless Economy in a Post-Work Society: How Automation Will Transform the Labor Market. *Psychosociological Issues in Human Resource Management*, 6(2), 74-79.

8. Dur, R., Glazer, A. (2008): The desire for impact. *Journal of Economic Psychology*, 29(3), 285– 300.
9. De Bruin, A., Brush, C., Welter, F. (2006): Towards building cumulative knowledge on women’s entrepreneurship. *Entrepreneurship Theory and Practice*, 30(5), 585–594.
10. De Bruin, A., Brush, C., Welter, F. (2007): Advancing a framework for coherent research on women’s entrepreneurship. *Entrepreneurship Theory and Practice*, 31(3), 323–339.
11. Eisenhardt, K.M., Graebner, M.E. (2007): Theory building from cases: Opportunities and challenges. *Academy of Management Journal*, 50, 25–32.
12. Floro-Maria, S. (1995): Economic restructuring, gender and the allocation of time. *World Development*, 23(11), 1913–1929.
13. Godwyn, M. (2009): This Place Makes Me Proud to be a Woman”: Theoretical explanations for success in entrepreneurship education for low-income women. *Research in Social Stratification and Mobility*, 27, 50–64
14. González, S. M. (2018). What Do Consumers Appreciate about On-Demand Economy Workers?. *Psychosociological Issues in Human Resource Management*, 6(2), 29-43.
15. Grossman, T. (2018). The Rise of an Automated Jobless Society: Do Cutting-Edge Technologies Expel Workers Swifter than the Economy Can Identify New Jobs for Them?. *Psychosociological Issues in Human Resource Management*, 6(2), 62-67.
16. Heilman, E.M., Chen, J.J. (2003): Entrepreneurship as a solution: the allure of self-employment for women and minorities. *Human Resource Management Review*, 13(2), 347-364
17. Harriet, B., Sen, G. (2003): *Women’s empowerment and demographic processes: Moving beyond Cairo*. New York, NY: Oxford University Press.
18. Hania, U., Rachmaniaa, I.N., Setyaningsiha, S., Putria, R.C. (2012): Patterns of Indonesian Women Entrepreneurship. *Procedia Economics and Finance* 4, 274 – 285
19. Hashemi, S.M., Schuler, S.R. (1993): *Defining and studying empowerment of women: A research note from Bangladesh*. JSI Working Paper No. 3. Arlington, VA: JSI.
20. Hashemi, S.M., Schuler, S.R., Riley, A.P., (1996): *Rural credit programs and women’s empowerment in Bangladesh*. *World Development*, 24(4), 635– 653.
21. Kabeer, N. (2005): *Is Microfinance a ‘Magic Bullet’ for Women’s Empowerment: Analysis of Findings from South Asia*. *Economic and Political Weekly*, 40(44): 4709-4718.
22. Markantoni, M., Van Hoven, B. (2012): Bringing ‘invisible’ side activities to light. A case study of rural female entrepreneurs in the Veenkoloniën, the Netherlands. *Journal of Rural Studies*, 28, 507–516

23. Mosedale, S. (2005): Assessing women's empowerment: towards a conceptual framework. *Journal of International Development*, 17, 243–257.
24. Moser, C. (1991): *Gender planning in the Third World: Meeting practical and strategic gender needs*. In T. Wallace, C. March (eds.) *Changing Perspectives: Writings on Gender and Development*, Oxford: Oxfam.
25. Narayan, D., (Ed.) (2002): *Empowerment and Poverty Reduction: A Sourcebook*. Washington, DC: World Bank.
26. Orser, J.B., Riding, L.A., Manley, K. (2006): Women Entrepreneurs and Financial Capital. *Entrepreneurship Theory and Practice*, 30(5), 643-655.
27. Osirim, J.M. (2001): Making good on commitments to Grassroots Women: NGO's And Empowerment for women In Contemporary Zimbabwe. *Women's Studies International Forum*, 24(2), 167-180.
28. Petrović, M., Blešić, I., Vujko, A., Gajić, T. (2017): The role of agritourism impact on local community in a transitional society: a report from Serbia. *Transylvanian Review of Administrative Sciences*, 50/2017, 146-163.
29. Ramanathan, M. (2004): Women and empowerment: Shri Mahila Griha Udyog Lijjat Papad. *Economic and Political Weekly*, 39(17), 1689–1697.
30. Rao, S. (2011): Work and Empowerment: Women and Agriculture in South India. *Journal of Development Studies*, Vol. 47, No. 2, 294–315
31. Reddy, S., Galab, S., Rao, P. (2003): Trends and determinants of poverty: 1973 to 1999–2000. *Economic and Political Weekly*, 38(12–13), 1262–1274.
32. Swanson, K.K., Timothy, J.D. (2012): Souvenirs: Icons of meaning, commercialization and commoditization. *Tourism Management*, 33(3), 489-499
33. Shabbir, A., di Gregorio, S. (1996): *An examination of the relationship between women's personal goals and structural factors influencing their decision to start a business: The case of Pakistan*. *Journal of Business Venturing*, 11(6), 507-529.
34. Seguino, S. (2000): Gender inequality and economic growth: a cross-country analysis. *World Development*, 28(7), 1211–1230.
35. Soroushmehr, H., Kalantari, K., Fami, H.S., Sarani, V. (2012): Investigation of Self-help Groups (SHGs) Effect on Rural Women Empowerment (Hamedan County, Iran). *Journal of Agricultural Science*, 4(1), 1–13
36. Sorells, B. (2018). Will Robotization Really Cause Technological Unemployment? The Rate and Extent of Potential Job Displacement Caused by Workplace Automation. *Psychosociological Issues in Human Resource Management*, 6(2), 68-73.
37. Šapić, S., Furtula, S., & Durkalić, D. (2018). Prestige and national identity as predictors of food products purchase. *Economics of Agriculture*, 65(2), 643-657.
38. Tassel, E.V. (2004): Household bargaining and microfinance. *Journal of Development Economics*, 74, 449–468.

39. Vujko, A., Petrović, M., Dragosavac, M., Gajić, T., (2016): *Differences and similarities among rural tourism in Slovenia and Serbia - perceptions of local tourism workers*. Ekonomika poljoprivrede, 63(4)/2016, 1459-1469.
40. Vujko, A., Gajić, T., Dragosavac, M., Maksimović, B., Mrkša, M. (2017): *Level of integration among rural accommodation sector and travel agencies*. Ekonomika poljoprivrede 64(2)/2017, 659-670
41. Vujko,A., Maksimović,G. (2018): *Empowerment of women's status in the rural surroundings through self-employment*, Sustainable agriculture and rural development in terms of the Republic of Serbia strategic goals realization within the danube region, Institute of agricultural economics, Belgrade, Serbia. ISBN 978-86-6269-061-6 COBISS.SR-ID 257428748 pages:1-18

ORGANIC AGRICULTURE AS AN INDICATOR OF SUSTAINABLE AGRICULTURAL DEVELOPMENT: SERBIA IN FOCUS

Mirela Tomaš Simin¹, Vesna Rodić², Danica Glavaš-Trbić³

*Corresponding author E-mail: mirela.tomas@polj.edu.rs

ARTICLE INFO

Review Article

Received: 28 November 2018

Accepted: 14 March 2019

doi:10.5937/ekoPolj1901265T

UDC

631.147:502.131.1(497.11)

Keywords:

Organic agriculture, sustainable development, indicators, Republic of Serbia

JEL: Q00, Q01, Q15, Q56

ABSTRACT

Sustainable development is a concept which has not yet been uniquely defined at the international level. As a result, it is difficult to define the indicators which could “measure” the achievement of sustainability. The paper deals with organic agriculture as a commonly used indicator of sustainable agricultural development. The organic farming in Serbia is legally a well-regulated area, but still not developed to the necessary and possible extent. Following the practice of the most developed countries, the area under organic production is distinguished as one of the indicators in the National List of Indicators for Sustainable Development of the Republic of Serbia. Nowadays, organic farming occupies only about 0.45% of total UAA in Serbia (approx 15,000 ha), which is relatively low in comparison with the EU countries. Therefore, the development of Serbian agriculture cannot be assessed as sustainable. Although the authors of this paper support the use of organic agriculture as an indicator of agricultural sustainability, they endorse it in conjunction with other indicators in the matter, whenever possible

© 2019 EA. All rights reserved.

Introduction

Sustainable development is a concept that has not yet been unambiguously defined, despite a decades-long discussion in the relevant literature (Lele, 1991, Bell and Morse, 2003, Kates et al, 2005, UNEP, 2015). A definition most often used in the literature is from 1987, provided by The Brundtland Commission, by which sustainable development is “... a set of activities that allow meeting the needs of today without compromising the possibilities of future generations to meet their own needs” (UN, 1987). The National

-
- 1 MSc Mirela Tomaš Simin, teaching assistant, Faculty of Agriculture Novi Sad, Trg Dositeja Obradovića 8, 21000 Novi Sad, +381214853514, mirela.tomas@polj.edu.rs, ORCID ID (<https://orcid.org/0000-0003-1833-9857>)
 - 2 PhD Vesna Rodić, full prof., Faculty of Agriculture Novi Sad, Trg Dositeja Obradovića 8, 21000 Novi Sad, +381214853313, rodicv@polj.uns.ac.rs.
 - 3 MSc Danica Glavaš-Trbić, teaching assistant, Faculty of Agriculture Novi Sad, Trg Dositeja Obradovića 8, 21000 Novi Sad, +381214853508, danicagt@gmail.com.

Strategy of Sustainable Development of Serbia (2007) defines sustainable development as a “goal-oriented, long-term, continuous, comprehensive, and synergistic process that affects all life aspects (economic, social, environmental and institutional) at all levels.”

One of the first definitions of sustainable development was given by Repetto, who said that in the core of the sustainability idea lies an assurance that decisions made today should not jeopardize perspectives for preservation or improvement of living standards in the future (Repetto, 1985). If the development is defined as enhancement of well-being, then sustainable development means that there is no reduction in welfare during time (Jovanović-Gavrilović, 2003). Harris (2009) also states that “the road of sustainable development can be understood as the way in which total funds of fixed assets remain the same or increase over time.”

When we talk about sustainable development, it is clear that we need to take economic, technological, social, political, physiological and environmental aspects into consideration. These systems are connected in different and often very significant ways in a complex system (Bossel, 1999, Munitlak-Ivanović 2005, Raskin et al., 2002, Rigby et al, 2001b). Today’s fast development and industrialization is not very friendly when it comes to sustainability. According to Baćanović (2004), industrial society has never been an “ally” to the environment. She cited Amery (1978) who said that, “Either the industry is going to destroy the environment, or the environment will destroy industrial society.”

What needs to be considered when assessing sustainable development is how to determine if development of a certain community or territory is sustainable and based on which quantitative or qualitative indicators can we draw the conclusion on sustainability.

Indicators of sustainable development are the link with reality. They reduced its complexity to a satisfying level of important information, and to small number of sets that assist us in decision making process and directs our actions (Bossel, 1999, Hezri and Dovers, 2006, Moreno Piers et al, 2014). Parris and Kates stated (2003) that a large part of the literature relating to the issues of sustainability suggests that indicators are “led” by the axiom “what gets measured gets managed”. Sustainable development indicators should provide us with the information about the system that we are interested in. Since the state of the system is significantly affected by the environment, indicators must reliably represent the connections that exist between the system and its environment. Indicators should make a complex system understandable, and give us meaningful information (van Asselt et al, 2014). Based on the literature review, one can say that both the definition of sustainable development and its indicators are still a bit “confusing”. That is why we need to be careful when trying to explain certain indicators, including those related to agriculture. The aim of this paper is to justify the role given to organic agriculture as an indicator and to explain its use in Serbia.

Modern agricultural production, as part of the socio-economic sub-systems, has proven adverse effects on the environment (Rodriguez et al., 2004, Lazić and Lazić, 2008, Kovačević et al., 2011, Pejanović, 2013; Praneetvatakul et al, 2013, Krajewski, 2016, Gomiero, 2018), as a consequence of increasing dependence on the industry (in

terms of fertilizers and pesticides) and the introduction of monoculture, for the sake of profit. For example, Peyraud et al (2014) argue that one of the main problems of modern agriculture is specialization. They infer that, “Specialized livestock systems and territories face problems of waste disposal leading to nutrient accumulation in the soil (P) and emission of N to water and air. Meanwhile, territories specialized in crop-growing face soil impoverishment and have to import mineral fertilizer and pesticides.” Hall and Crowther (1998) discuss water pollution with nitrate and pesticides, methane and nitrogen oxide emissions, fossil fuel usage, soil erosion and degradation, reduction of biodiversity etc. as negative environmental impacts of intensive agricultural practices. Some authors (Lewalter and Leng, 1999; Sarkar et al, 2012) found adverse effects of modern agriculture on human health. Casado and Molina (2009) go a step further and argue that conventional agriculture is leading to the loss of income for farmers and thus forcing them to leave agricultural production.

A possible solution of these issues is development of alternative means of agricultural production in order to mitigate their impacts. These alternative means of agricultural production are often categorized as sustainable agriculture. Hinrichs and Welsh (2003) stated that, “Sustainable agriculture offers an encompassing banner under which groups and individuals have gathered to address the environmental, social, and economic equity problems they associate with conventional, industrial agriculture”. One of the alternative methods is the system of organic farming. Given the positive aspects of organic production compared to conventional production (Stolze et al., 2005 Kasperczyk and Knickel 2006, Kichler, 2007, Küstermann et al, 2008, Hinrichs and Welsh, 2003, Biao and Xiaorong, 2003b, Galiardi and Pettigrove, 2013, Bell et al, 2014, Meng et al, 2017), the development of organic agriculture could be and nowadays is seen as an important indicator of sustainable agriculture. Overall it can be said that the aim of the paper was to determine whether the land under organic agriculture can be considered as an indicator of sustainable agricultural development.

Materials and methods

In this research special focus was on the Republic of Serbia and the current situation was presented. Extensive analysis of existing scientific literature was used to conclude if organic agriculture is sustainable and as such can it be used as an indicator of sustainable development. Descriptive method was used to study the problem, combined with the method of abstraction. With the deduction model, existing theoretical knowledge was considered. Method of induction was used in generalization of the data and conclusion. Secondary sources of literature were used as well as primary data resulting from the research in mentioned projects.

Results with discussions

Organic production as an indicator of sustainable agriculture

Steady growth in population (United Nations, 1992; Azar et al, 1996) has caused an increase in the area used for agricultural production. The increased demand for food has altered the mode of agricultural production. "It is obvious that the conventional (industrial) methods of agricultural production, in addition to providing enough food and other various products, lead to a number of negative, not only environmental but also social and economic consequences" (Kovačević et al., 2011).

Hodge (1993, cit. according to Rigby and Caceres, 2001a) has summarized some negative trends in modern agriculture which led to the review of the long-term sustainability of such production system. According to him, agriculture is put in a position to use inputs from distant sources; an increasing amount of energy from non-renewable sources; depends on fewer gene bases and has an increasing (negative) impact on the environment. This is particularly evident in increasing reliance on chemical industry (in the form of fertilizers and pesticides), dependence on subsidies and price support and increasing externalities, such as habitat disturbance and destruction of various animal and plant species, environmental pollution and risks to human health and welfare.

The simplification of crop rotation (introduction of monocultures) and the growing importance of agricultural technology, synthetic fertilizers and pesticides have led to the fact that agriculture has become one of the main reasons for changes in the habitats of many plants and animals (Knauer, 1993, cit. according to Stolze et al, 2000). Although there is a wide range of understanding and definition of sustainable agriculture, "... there is no doubt that unsustainable farming practices are a reality that urgently needs to be addressed" (Aerni, 2009).

All the negative effects of modern agricultural production, mentioned above, have led to the increase of importance given to other alternative production systems. These alternative systems are primarily characterized by a different approach to the environment. In the context of agricultural production, Ikerd (1993, cit. according to Rigby and Caceres, 2001a) defines sustainable agriculture as a production that has "... the ability to maintain a certain level of productivity and usefulness to society over a long period of time ... it must be suitable for the environment, aimed at conservation of resources, economically and socially sustainable and commercially competitive." Sustainable agriculture is also defined as an "ecologically sound, economically viable, and socially just" (Appleby, 2005) or as a farming method "... concerned with preventing the degradation of some aspect of farm" (Mason, 2003) regardless of whether it is the degradation of natural resources or profitability. Rodić et al. (2008) reported that agricultural land is one of those resources which indicate that "... without sustainable use one cannot talk about sustainable development of agriculture and society as a whole." Hayati et al. (2010) stated that "... sustainable agriculture is a dynamic rather than static concept."

Organic farming is one of alternative systems of production that is considered to be more suitable for the environment compared to conventional production (Kasperczyk and Knickel, 2006). The often stated reason is that (Rigby and Caceres, 2001a, Mann and Gairing, 2012) organic agriculture dates earlier than the other systems that we call environmentally friendly as well as the rapid growth and development of the organic market in the last decades (Bryła, 2015). Some authors (Stolze et al., 2000; van Elsen, 2000; Kasperczyk and Knickel 2006; Pacini et al., 2003) suggest that organic production systems create acceptable conditions for the development of the ecosystem and the diversity of flora and fauna as compared to conventional systems.

As with sustainable development, organic agriculture has many definitions. Lampkin and Padel (1994) define organic agriculture as "...approach to agriculture where the aim is: to create integrated, human, environmentally and economically sustainable agricultural production systems, which maximize reliance on farm-derived renewable resources and the management of ecological and biological processes and interactions, so as to provide acceptable levels of crop, livestock and human nutrition, protection from pests and diseases, and an appropriate return to the human and other resources employed."

A question which often arises is whether organic farming can be considered a sustainable production system. The literature is full of different explanations – some think that organic production can not feed growing population (Connor, 2018), but in general, the prevailing view is that organic farming is sustainable (Stolze et al., 2000; Kasperczyk and Knickel 2006; Pacini et al., 2003; Kilcher, 2007; Azadi et al, 2011, Delić, 2012, Argyropoulos et al, 2013, Demiryürek et al., 2008, Roljević Nikolić et al, 2017).

When measuring the impact of organic agriculture on the environment, there is the question of indicators and key aspects of sustainability which should be considered and monitored. Stolze et al. (2000) adapted the OECD set of indicators⁴, using only those indicators which are directly related to the organic production system. According to this research, organic agriculture can be considered as environmentally friendly. Patil et al (2014) stated that reasons for considering organic agriculture as sustainable can be found in the fact that organic agriculture requires less financial inputs and places more reliance on the natural and human resources available. This statement is of great importance in countries where farmers have limited financial resources.

In order to achieve self-sufficiency, which is one of the primary principles of sustainability (and organic agriculture), Denmark, for example, decided to phase out the usage of conventional organic and mineral fertilizers in production (Oelfose et al, 2013). They have established a set of governmental strategies that will help the producers to reduce and finally ban the usage of conventional fertilizers and manure. Biao et al. (2003a)

4 For the OECD indicators, Rennings and Wiggering (1997) state that "... these indicators are not related to the objectives of sustainability and provide little information about the most important functions and ecosystem structure. Yet the OECD system can be used as a first step to implementing more advanced indicators in the future. "

stated that organic agriculture contributes to the sustainability of agriculture through environmentally friendly production, soil fertility, nutrient management, biodiversity and product quality.

As a result of the analysis, the literature states that, despite the disadvantages, organic farming is a sustainable farming system. If the area under organic production increased, the results would entail better agricultural performance in terms of environmental protection and resource use. Organic farming is characterized as a system with less negative impacts (per ha) on the environment and resources compared to conventional production. Therefore, considering an area under organic production system as an indicator of sustainability is reasonable and possible, in combination with other indicators. Consequently, certain regions or states may be characterized as those which more or less follow the way of sustainable development in agriculture.

The ambiguous issue of limits is ever-present, i.e. what total area under organic production or what share of organic production in the total agricultural production of a region/country could be considered sustainable? There is no recipe and it has to be determined (evaluated) with a case-by-case approach, given that every country or a region has its own special features. Besides, it should be noted that some authors (Dantsis et al, 2009) discuss that organic agriculture should not "...aim to evaluate whether a farm is sustainable or not because sustainable development is a process, in which agricultural practices move towards sustainability."

Experiences in the Republic of Serbia

During the last ten years, Serbia has made significant efforts to address the problems of environmental pollution. Environmental Protection Indicators for Serbia are created according to the methodology of the European Environmental Agency – EEA, based on the comparison between environment and human activity. These relations are presented in the DPSIR model (Driving forces - Pressure - State - Impacts - Responses) where indicators within the model reflect consequential connection (Ministry for Environmental Protection, 2007, Kostić and Rodić, 2009).

The legislative framework for sustainable development, in agriculture and general, has its basis in the Constitution of the Republic of Serbia, which defines the rights of citizens to a healthy environment, and the duty of citizens to protect and improve the environment in accordance with the law. Fundamental laws relating to environmental protection are The Law on Environmental Protection from 2004 (amended in 2009) and the Nature Protection Act from 2009⁵.

5 In addition to the Law on Environmental Protection and Nature Protection Act, other relevant legislation in the field of biodiversity include the Law on Strategic Environmental Impact Assessment (2004), the Law on Environmental Impact Assessment (2004, 2009), the Law on National Parks (1993), the Law on Protection and Sustainable Use of Fish Stocks (2009), and others.

The national list of indicators for Serbia covers 12 thematic areas: 1) air and climate change, 2) water, 3) nature and biodiversity, 4) soil, 5) waste, 6) noise, 7) non-ionizing radiation, 8) forestry, hunting and fishing, 9) sustainable use of natural resources, 10) social and economic resources and activities relevant to the environment, 11) international and national legislation, and measures (strategies, plans, programs, agreements), reports and other documents and activities related to environmental protection, and 12) entities in the system of environmental protection.

Guided by the above described criteria for indicator selection, the creators of national lists, as one of the indicators in the thematic sections 10 - Social and economic resources and activities relevant to the environment (agriculture), included “areas under organic agriculture”, with two sub-indicators (Table 1):

The total area under organic farming and

Proportion of land area under organic agriculture in the total agricultural area.

Table 1. Area under organic farming indicator

Theme unit	10 SOCIAL AND ECONOMIC RESOURCES AND ACTIVITIES RELEVANT TO THE ENVIRONMENT
AGRICULTURE	
No.	Name of the indicator
10.67.	<i>10.67. Area under organic farming</i>
The thematic area	Reactions of society
Definition and description of indicators	The indicator shows trends of the area under organic farming and its share in the total agricultural production. Organic farming is sustainable agriculture which optimally uses soil fertility and available water, the natural properties of plants and animals, allowing for increased yield and plant resistance with prescribed (and limited) use of fertilizers and pesticides and animals protection chemicals. Sub-indicators: 1. The total area under organic farming; 2. Proportion of land area under organic agriculture in the total agricultural area.
Calculation methodology and data collection¹	The indicator is prepared on the basis of the data on the total area under organic farming and its share in the total agricultural area, and it is displayed numerically in tables and graphs as: - The share of the area with organic production methods in relation to the total agricultural area in %; - The share of farms applying organic methods of agriculture in the total number of farms in %; - The share of allocated incentives for the implementation and development of organic agriculture in the total amount of incentive in %.
Measure unit	The indicator is expressed in hectares (ha) and percentage (%).
Legal coverage with national and international regulations and reporting obligations	- The Law on Organic Production (“Official Gazette of RS”, No. 30/10); - 1804/1999/EEC Council Regulation amending the Regulation on organic production of agricultural products and labeling of such agricultural products and foodstuffs, including livestock production; - Council Regulation 2092/91/EEC on organic production of agricultural products and labeling of such agricultural products and foodstuffs; - European Environment Agency (EEA) - Indicator CSI 026 - Area under organic farming.

Theme unit	10 SOCIAL AND ECONOMIC RESOURCES AND ACTIVITIES RELEVANT TO THE ENVIRONMENT
The source and availability of data and frequency of data collection	Ministry of Agriculture, Trade, Forestry and Water Management Frequency of data collection: annually.
Method and deadlines for data, information, indicators and reports to information system	Submission deadline: 31 March of the current year for the previous year.

Source: Regulation of the national list of environmental protection indicators, Official Gazette of RS 37/2011.

Organic production in Serbia is becoming more popular and economically important. Due to the resources such as soil, which in most cases is not contaminated with heavy metals and organic pollutants, and the fact that organic farming is justified and even valorize successful production on smaller holdings (which dominate in the production structure of the Republic of Serbia (Bogdanov and Rodić, 2014)), this type of agriculture can contribute significantly to the development of rural areas, and thus agriculture in general. Consequently, organic production has been set as a priority of the development of agriculture and is an integral part of the strategy for agricultural and rural development of the Republic of Serbia (Ministry of Energy, Development and the Environment, 2012). The organic production in Serbia is also legally a well-regulated area. In addition to the Law on Organic Production mentioned above, numerous by-laws governing organic agriculture are adopted.

Currently, the organic agriculture in the Republic of Serbia is underdeveloped. According to the official data of the Serbian Ministry of Agriculture, in 2015 there were 15,298 hectares in the organic production system in the country, as presented in Table 2.

Table 2. Organic area (certified organic + in-conversion) in Serbia in 2015

Production type	Certified organic area + in-conversion area (ha)
Crop production	4,252
Fruit production	2,895
Industrial plant	2,674
Forage	1,440
Vegetable production	170.5
Medicinal and aromatic plants	71
Other	1,895
Total	15,298

Source: Ministry of Agriculture and Environment. Directorate for national reference laboratories

Since 2010, the areas under organic management showed modest growth, as shown in Table 3.

Table 3. Organic area in Serbia 2010-2015

Years	2010	2011	2012	2013	2014	2015
Areas under organic management (ha)	5,855	6,335	6,340	8,228	9,547.8	15,298

Source: Ministry of Agriculture and Environment. Directorate for national reference laboratories

According to the Census of Agriculture, the total utilized agricultural area (UAA) in Serbia is 3.355.859 ha, which means that the share of organic area in the total UAA is 0,45%, whereas in the EU-27 in 2011 the total organic area amounted to an estimated 5.4% of the total UAA (EC, 2013).

The situation is not much better when it comes to organic animal sector. According to the same sources and Simić (2017) there are in total 2,984 organic bovine heads (cattle, buffaloes, horses, donkeys), 6,766 organic small livestock heads (sheep, goats, pigs), 1,380 organic poultry (chickens, geese, ducks, turkeys, guinea fowls) and 2,504 organic beehives in Serbia. Due to the lack of data, which allows comparison between the different types of animals (number of organic livestock units), the conclusion on the share of organic in the total animal heard in Serbia cannot be deduced, but it is for sure far from the level in the EU-27 (which is about 1%).

Therefore, if organic agriculture is solely used as an indicator of sustainable agricultural development, it is highly debatable whether the Serbian agriculture can be considered sustainable. It is true that the above-stated number of hectares does not include area used for the collection of wild berry fruits, mushrooms and medicinal herbs (since there is such practice in Serbia, but there is no official methodology based on which reliable data can be obtained) and that in reality the situation is not as bad as it looks according to the official data. Nevertheless, one can say that there is still a lot of room for sustainability improvement in Serbia, at least regarding organic agriculture as one of its indicators.

Admittedly, none of the indicators by itself is sufficient for assessing sustainability. Thus, in order to obtain a more complete picture about agricultural sustainability, organic production should be considered in conjunction with the indicators from the other thematic units (such as soil, consumption of fertilizers and pesticides, etc.).

Conclusions

There are many definitions of sustainable development in the literature. The main differences arise from the authors' conception of sustainability, the expression of sustainability, and primarily the time horizon in which the sustainability is measured. A reliable indicator is one that points to a problem before it becomes too serious and it helps to understand what should be done to resolve the problem. Sustainable development indicators indicate where the cause-effect relationship between the economy, environment and society is weak and show us guidance on how to solve these problems.

Negative trends that follow the conventional agricultural production, in terms of its impact on the environment, have led to the questioning of this concept of production and the search for other forms, which will have less negative impact. Organic farming is among so-called sustainable agricultural systems. After measuring the impact of organic farming on the environment, the prevailing view in the literature is that organic farming can be considered sustainable. For this reason, the area under organic farming systems in a particular region may contribute to a better understanding of the development of that region. In combination with other indicators of sustainable agriculture, the area under organic production would help in assessing agricultural production and land use in terms of sustainability.

In Serbia, the share of the organic area in the UAA is relatively low, only around 0.45%, thus based solely on this indicator agricultural sustainability cannot be positively assessed. Perhaps the better “image” of sustainability would be obtained if the indicator was observed in conjunction with other indicators, which exceeds the scope of this paper.

If we accept the opinions of Moran et al. (2008) that measurable results, rather than intentions, determine whether mankind is moving on the path of sustainable development, we can say that quantification of human development and environmental sustainability is, to some extent, possible with the currently available indicators, but we must continue to develop them in future. Despite some claims that sustainable development is an elusive concept, one could say that the minimum conditions for sustainable development (and sustainable agriculture) can be measured. In this light, organic agriculture in Serbia is showing a rather “slow” process of development, which leads to a conclusion that more has to be done on macroeconomic level, related to this subject.

Moreover, one should also bear in mind what John Ikerd once said (quoted according to Goldberger, 2011): “Sustainable agriculture is a question rather than an answer... It is a direction rather than destination, like a star that guides the ships at sea but remains forever beyond horizon. The question of sustainability can be asked of any ongoing activity or process, including conventional agriculture and any proposed alternative.” In other words, sustainable agriculture is a long-term goal (a “direction”) not a set of specific farming practices.”

Acknowledgements

The paper is a part of research projects No TR 31095, OI 179028 and III 46006 financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia.

Conflict of interests

The authors declare no conflict of interest.

References

1. Aerni, P. (2009). What is sustainable agriculture? Empirical evidence of diverging views in Switzerland and New Zealand. *Ecological Economics* 68: 1872-1882, doi:10.1016/j.ecolecon.2008.12.016
2. Appleby, M. (2005). Sustainable agriculture is humane, humane agriculture is sustainable. *Journal of Agricultural and Environmental Ethics* 18: 293-303, DOI 10.1007/s10806-005-1490-9
3. Argyropoulos, C., Tsiafouli, M., Sgardelis, S., & Pantis, J. (2013). Organic farming without organic products. *Land Use Policy* 32: 324-328.
4. Azadi, H., Schoonbeek, S., Mahmoudi, H., Derudder, B., De maeyer, P., & Witlox F. (2011). Organic agriculture and sustainable food production system: Main potentials. *Agriculture, Ecosystems and Environment* 144: 92-94, doi:10.1016/j.agee.2011.08.001
5. Azar, C., Holmberg, J., & Lindgren K. (1996). Socio-ecological indicators for sustainability. *Ecological Economics* 18: 89-112.
6. Baćanović, D. (2004): Indicators of sustainable development and assessment of the level of sustainability of AP Vojvodina development. *doctoral dissertation, ACIMSI Environmental Engineering*. Novi Sad (in Serbian: Indikatori održivog razvoja i procena nivoa održivosti razvoja AP Vojvodine, doktorska disertacija, ACIMSI Inženjerstvo za zaštitu životne sredine).
7. Bell, M.J., Cloy, J.M., & Rees, R.M. (2014). The true extent of agriculture's contribution to national greenhouse gas emission. *Environmental Science & Policy* 39:1-12, <http://dx.doi.org/10.1016/j.envsci.2014.02.001>
8. Bell, S., & Morse, S.(2003). Measuring sustainability-learning by doing. *Earthscan Publication Limited*, London.
9. Biao, X., Xiaorong, W., Zhuhong, D., & Yaping Y. (2003a). Critical impact assessment of organic agriculture. *Outlook on Agriculture* 38(3): 161-164.
10. Biao, X., & Xiaorong, W. (2003b). Organic agriculture in China. *Journal of Agriculture and Environmental Ethics* 16: 297-311.
11. Bogdanov, N., & Rodić, V. (2014). Agriculture and Agricultural Policy in Serbia. *Chapter B.VII in: Agricultural Policy and European Integration in Southeastern Europe* Ed. by Volk, T., Erjavec, E., & Mortensen, K., FAO, Budapest pp. 153-171, ISBN 978-92-5-108612-4
12. Bossel, H. (1999). Indicators for Sustainable Development: Theory, Method, Applications. A Report to the Balaton Group. *International Institute for Sustainable Development*. Winnipeg, Canada.
13. Bryła, P. (2015). The Development of Organic Food Market as an Element of Sustainable development Concept Implementation. *Problems of Sustainable Development* 10(1): 79-88.

14. Casado, G., & De Molina, G. (2009). Preindustrial agriculture versus organic agriculture – The land cost of sustainability. *Land Use Policy* 26: 502-510.
15. Connor, D. J. (2018). Organic agriculture and food security: a decade of unreason finally implodes. *Field Crops Research*, 225, 128-129.
16. Demiryürek, K., Stopes, C., & Güzel A. (2008). Organic agriculture: the case of Turkey. *Outlook on Agriculture* 37(4): 261-267.
17. Dantsis, T., Loumou, A., & Giourga C. (2009). Organic Agriculture's Approach towards Sustainability; Its Relationship with Agro-Industrial Complex, A Case Study in Central Macedonia, Greece. *J Agric Environ Ethics* 22: 197-216.
18. Delić, S. (2012). Factors of sustainable development of agriculture of AP Vojvodina, *doctoral dissertation, University of Novi Sad, Faculty of Agriculture. (in Serbian: Faktori održivog razvoja poljoprivrede AP Vojvodine, doktorska disertacija, Univerzitet u Novom Sadu, Poljoprivredni fakultet.)*
19. Galiardi, B., & Pettigrove, V. (2013). Removal of intensive agriculture from landscape improves aquatic ecosystem health. *Agriculture, Ecosystem and Environment* 176: 1-8, <http://dx.doi.org/10.1016/j.agee.2013.05.020>
20. GIZ (2014). Organic agriculture in Serbia 2014, *National Association „Serbia Organica“*, Beograd.
21. Goldberger, J.R. (2011). Conventionalization, civic engagement, and the sustainability of organic agriculture. *Journal of Rural Studies* 27: 288-296.
22. Gomiero, T. (2018). Agriculture and degrowth: State of the art and assessment of organic and biotech-based agriculture from a degrowth perspective. *Journal of Cleaner Production*, 197, 1823-1839.
23. EC – European Commission (2013). Facts and figures on organic agriculture in the European Union, *DG Agriculture and Rural Development, Unit Economic Analysis of EU Agriculture*.
24. Hall, J., & Crowther, S. (1998). Biotechnology: the ultimate cleaner production technology for agriculture? *Journal of Cleaner Production* 6: 313-322.
25. Harris, J. (2009). Economics of Environment and Natural Resources - Contemporary Approach, *Datastatus, Belgrade (in Serbian: Ekonomija životne sredine i prirodnih resursa-savremeni pristup, Datastatus, Beograd)*.
26. Hayati, D., Rajnbar, Z., & Karami E. (2010). Measuring Agricultural Sustainability in Lichfouse E. (ed.). *Biodiversity, Biofuels, Agroforestry and Conservation Agriculture, Sustainable Agriculture Reviews* 5.
27. Hezri, A., & Dovers, S. (2006). Sustainability indicators, policy and governance: Issues for ecological economics. *Ecological Economics* 60: 86-99, doi:10.1016/j.ecolecon.2005.11.019
28. Hinrichs, C., & Welsh, R. (2003). The effects of the industrialization of US livestock agriculture on promoting sustainable production practice. *Agriculture and Human Values* 20: 125-141.

29. Ikerd, J.E. (1993). Two related but distinctly different concepts. *Small Farm Today*. USA.
30. Jovanović-Gavrilović, B. (2003). Sustainable Development - Conceptual and Methodological Issues, *Ecologica 10*: 39-40 (in Serbian: Održivi razvoj – konceptualna i metodološka pitanja, *Ecologica 10*: 39-40).
31. Kasperczyk, N., & Knickel, K. (2006). Environmental impacts of organic farming in Kristiansen, P., Taji, A., Reganold, J.: *Organic Agriculture A Global Perspective*, CABI, United Kingdom, pp. 259-295.
32. Kates, R., Parris, T., & Leiserowitz, A. (2005). What is Sustainable Development? Goals, Indicators, Values, and Practice. *Environment: Science and Policy for Sustainable Development 47* (3): 8–21.
33. Krajewski, P. (2016). Agricultural Biodiversity for Sustainable Development. *Problems of Sustainable Development 12*(1): 135-141.
34. Kilcher, L. (2007). How organic agriculture contributes to sustainable development. *JARTS. Supplement 89*. University of Kassel at Witzenhausen, Germany, pp. 31-49.
35. Kostić, S., & Rodić, V. (2009). The P-S-R Framework and its modified (extended) versions as the environmental management means. *Proceedings of XIII International ECO-conference „Environmental Protection of Urban and Suburban Settlements“*. Novi Sad, 23-26 September 2009, pp. 429-436.
36. Kovačević, D., Lazić, B., & Milić, V. (2011). The impact of agriculture on the environment. *International Scientific Meeting of Agronomists*. Jahorina (in Serbian: Uticaj poljoprivrede na životnu sredinu. Međunarodi naučni skup agronoma. Jahorina).
37. Küstermann, B., Kainz, M., & Hülsbergen, K.J. (2008). Modeling carbon cycles and estimation of greenhouse gas emission from organic and conventional farming systems. *Renewable Agriculture and Food Systems 23*(I): 38-52.
38. Lampkin, N., & Padel, S. (1994). The Economics of Organic Farming, an International Perspective. *CAB International*, London.
39. Lazić, B., & Lazić S. (2008). Organic Agriculture in Lazić B. et al. : *Organic Agriculture, Institute of Field and Vegetable Crops* (in Serbian: Organska poljoprivreda u Lazić B. i sar.: Organska poljoprivreda, Institut za ratarstvo i povrtarstvo) Novi Sad, str. 7-38.
40. Lele, S. (1991). Sustainable Development: A Critical Review. *World Development 19* (6): 607-621.
41. Lewalter, J., & Leng, G. (1999). Consideration of individual susceptibility in adverse pesticide effects. *Toxicology Letters 107*: 131-144.
42. Mann, S., & Gairing, M. (2012). “Loyals” and “Optimizers”: Shedding Light on the Decision for or Against Organic Agriculture Among Swiss Farmers. *J Agric Environ Ethics 25*: 365-376, DOI 10.1007/s10806-011-9309-3

43. Mason, J. (2003). Sustainable Agriculture, *Landlinks Press*, Australia.
44. Meng, F., Qiao, Y., Wu, W., Smith, P., & Scott, S. (2017). Environmental impacts and production performances of organic agriculture in China: A monetary valuation. *Journal of environmental management*, 188, 49-57.
45. Ministry of Energy, Development and Environmental Protection (2012). Environmental Report of the Republic of Serbia for 2011. Environmental Protection Agency. Belgrade. (in Serbian: Izveštaj o stanju životne sredine u Republici Srbiji za 2011. godinu, Agencija za zaštitu životne sredine, Beograd).
46. Moran, D., Wackernagel, M., Kitzes, J., Goldfinger, S., & Boutaud, A. (2008). Measuring sustainable development — Nation by nation. *Ecological Economics* 64: 470-474, doi:10.1016/j.ecolecon.2007.08.017
47. Moreno Piers, S., Fidélis, T., & Ramos, T. (2014). Measuring and comparing sustainable development through common indicators: Constrains and achievements in practice. *Cities* 39: 1-9, <http://dx.doi.org/10.1016/j.cities.2014.02.003>
48. Munitlak-Ivanović, O. (2005). Ecological Aspects of Sustainable Development-International and Regional Comparison, *Doctoral Dissertation, Faculty of Economics*, Subotica. (in Serbian: Ekološki aspekti održivog razvoja-međunarodna i regionalna komparacija, doktorska disertacija, Ekonomski fakultet, Subotica).
49. National Sustainable Development Strategy, “*Official Gazette of RS*”, no. 55/05, 71/05 - and correction 101/07. (in Serbian: Nacionalna strategija održivog razvoja, „Službeni glasnik RS”, br. 55/05, 71/05-ispravka i 101/07).
50. Oelfose, M., Stoumann Jensen, L., & Magid, J. (2013). The implications of phasing out conventional nutrient supply in organic agriculture: Denmark as a case. *Org. Agr.* 3: 41-55, DOI 10.1007/s13165-013-0045-z
51. Pacini, C., Wossink, A., Giesen, G., Vazzana, C., & Huirne, R. (2003). Evaluation of sustainability of organic, integrated and conventional farming systems: a farm and field scale analysis in Pacini, C.: *An environmental-economic framework to support multi-objective policy-making-a farming systems approach implemented for Tuscany*, University of Florence, Italy and Wageningen University, str. 27-47.
52. Parris, T., & Kates, R. (2003). Characterizing and measuring sustainable development. *Annu. Rev. Environ. Resour.* 28:13.1–13.28, doi: 10.1146/annurev.energy.28.050302.105551
53. Patil, S., Reidsma, P., Shah, P., Purushothaman, S., & Wolf, J. (2014). Comparing conventional and organic agriculture in Karnataka, India: Where and when can organic farming be sustainable. *Land Use Policy* 37: 40-51.
54. Pejanović, R. (2013). Views on the agricultural and rural economy, *Faculty of Agriculture*, Novi Sad. (in Serbian: Ogledi iz agrarne i ruralne ekonomije, Poljoprivedni fakultet).

55. Peyraud, J.L., Taboada, M., & Delaby, L. (2014). Integrated crop and livestock systems in Western Europe and South America: A review. *Europ. J. Agronomy* 57: 31-42, <http://dx.doi.org/10.1016/j.eja.2014.02.005>
56. Rulebook on the National List of Environmental Indicators, "Official Gazette of RS" no. 37/2011. (in Serbian: Pravilnik o nacionalnoj listi indikatora zaštite životne sredine, „Službeni glasnik RS“ br. 37/2011).
57. Praneetvatakul, S., Schreinemachers, P., Pananurak, P., & Tipraqsa, P. (2013). Pesticides, external costs and policy options for Thai agriculture. *Environmental Science & Policy* 27: 103-113, <http://dx.doi.org/10.1016/j.envsci.2012.10.019>
58. Raskin, P., Banuri, T., Gallopin, G., Gutman, P., Hammond, A., Kutes, R., & Swart, R. (2002). Great Transition. *SEI*, Stockholm.
59. Rennings, K., & Wiggering, H. (1997). Step towards indicators of sustainable development: Linking economic and ecological concepts. *Ecological Economics* 20: 25-36.
60. Reppeto, R. (1985). The Global Possible-Resources, Development and New Century. *World Resources Institute Book, Yale University Press*, New Haven, 1985.
61. Rigby, D., & Caceres, D. (2001a). Organic farming and the sustainability of agricultural systems. *Agricultural Systems* 68: 21-40.
62. Rigby, D., Woodhouse, P., Young, T., & Burton, M. (2001b). Constructing a farm level indicator of sustainable agricultural practice. *Ecological Economics* 39: 463-478.
63. Rodić, V., Bošnjak, D., & Vukelić, N. (2008). Sustainability of agricultural land management in AP Vojvodina. *Agroekonomika*. (in Serbian: Održivost upravljanja poljoprivrednim zemljištem u AP Vojvodini) vol. 37-38, str. 15-23.
64. Roljević Nikolić, S., Vuković, P., Grujić, B. (2017). Measures to Support the Development of Organic Farming in the EU and Serbia. *Economics of Agriculture* 64(1), 323-337.
65. Rodriguez, E., Sultan, R., & Hilliker, A. (2004). Negative Effects of Agriculture on Our Environment. *Ef Agric Traprock*, 3, pp. 28-32.
66. Sarkar, A., Aronson, K.J., Patil, S., Hugar, L.B., & Vanloon, G.W. (2012). Emerging health risks associated with modern agricultural practices: A comprehensive study in India. *Environmental Research* 115: 37-50, <http://dx.doi.org/10.1016/j.envres.2012.03.005>
67. Simić, I. (2017). Organic agriculture in Serbia 2017, *National Organization Serbia Organica*. (in Serbian: Organska poljoprivreda u Srbiji 2017, Nacionalno udruženje za razvoj organske proizvodnje Serbia Organica) Beograd.
68. Stolze, M., Piorr, A., Haring, A., & Dabbert, S. (2000). Environmental impacts of organic farming in Europe. *Organic Farming in Europe: Economics and Policy, Department of Farm Economics*. University of Hohenheim. Germany.

69. UN-United Nations (1987). Report of the World Commission on Environment and Development: Our Common Future.
70. UN-United Nations (1992). Long-range World Population Projections, Two Centuries on Population Growth 1950-2050. *Department of International and Social Affairs, United Nations*. New York.
71. UNEP-United Nation Environmental Program (2013). Embedding the Environment in Sustainable Development Goals, *UNEP Post-2015 Discussion Paper 1*, available at <http://www.unep.org/pdf/embedding-environments-in-SDGs-v2.pdf>
72. Van Asselt, E.D., Van Bussel, L.G.J., Van Der Voet, H., Van Der Heijden, G.W.A.M., Tromp, S.O., Rijgersberg, H., Van Evert, F., Van Wagenberg, C.P.A., & Van Der Fels-Klerx, H.J. (2014). A protocol for evaluating the sustainability of agri-food production systems - A case study on potato in peri-urban agriculture in The Netherlands. *Ecological Indicators 43*: 315-321, <http://dx.doi.org/10.1016/j.ecolind.2014.02.027>
73. Van Elsen, T. (2000). Species diversity as a task for organic agriculture in Europe. *Agriculture, Ecosystems and Environment 77*: 101-109.

LIVELIHOOD DIVERSIFICATION STRATEGIES AND FOOD INSECURITY STATUS OF RURAL FARMING HOUSEHOLDS IN NORTH-EASTERN NIGERIA

Bayero Sule Gani¹, Joseph Kayode Olayemi², Odjuvwuederhie Emmanuel Inoni³

*Corresponding author E-mail: inoniemma@gmail.com

ARTICLE INFO

Review Article

Received: 29 January 2019

Accepted: 15 March 2019

doi:10.5937/ekoPolj1901281G

UDC 338.439.4:338.33(669.1)

Keywords:

Rural household, North-eastern Nigeria, livelihood diversification strategies, food insecurity, dietary Allowance

JEL: O15, Q12, Q15

ABSTRACT

The study examined the effects of households' livelihood diversification strategies on food insecurity in rural North-eastern Nigeria. In order to realise the objectives of the study, primary data were obtained from 444 farmers with the aid of structured questionnaire. Descriptive statistics, Tobit regression model, Cost of Calorie Function and ANOVA were used to analyse the data. The findings showed that farmers adopted five livelihood strategies of which Cropping, Poultry and Livestock Keeping (CPL) was predominant, accounting for 37.39% of respondents. However, 7.43% of the households practising Cropping, Fishing, Livestock keeping and Off-farm (CFLO) had the highest surplus and least shortfall indices of 0.75 and 0.20 respectively; implying that food secure households in this category exceeded daily RDA of 2250kcal of energy/adult equivalent/day by 75%; but food insecure households fell short of same by 20%. Head count ratio indicated that 58% and 42% of individuals in this category are food secure and food insecure respectively. Thus, a significant relationship between households' food insecurity and livelihood diversification strategies is established.

© 2019 EA. All rights reserved.

Introduction

World Food Summit (1996) defined food security as 'a situation when all people at all times have both physical and economic access to sufficient food to meet their dietary needs for a productive and healthy life'. Within the context of this definition, four distinct variables are central to the attainment of food security which include, food

-
- 1 Gani, B.S., Ph.D., Lecturer, Department of Agricultural Economics & Extension, Faculty of Agriculture, Taraba State University, Jalingo. Nigeria. email: bsegani@yahoo.co.uk
 - 2 Olayemi, J.K., Ph.D., Professor, Department of Agricultural Economics, Faculty of Agriculture, University of Ibadan, Ibadan. Nigeria. email: j.olayemi@mail.ui.edu.ng
 - 3 Inoni, O.E., Ph.D., Professor, Department of Agricultural Economics & Extension, Faculty of Agriculture, Delta State University, Abraka. Nigeria. email: eoinoni@delsu.edu.ng; inoniemma@gmail.com

availability and access to food (short-term dimension of food security), sustainability of access to food (long-term dimension) and food utilization. These four dimensions are pointer to the complexity of the concept of food security. At one level the concern is with national food security, which is the ability of countries to produce or import adequate food all year round to meet their requirements for both public and private distribution; while at another level, the concern is more about food security among individuals, and households. Food insecurity or lack of access to nutritionally adequate diet in a household or country exists in two forms, namely, chronic and transitory food insecurity. According to Gautam and Anderson (2016), chronic food insecurity exists when food supplies are persistently insufficient to ensure adequate nutrients for all individuals while transitory food insecurity exists when there is a temporary decline in access due to perturbations such as instability in food production, food price variations and income shortfalls (Oluwatayo, 2009; Tantu, Gamebo, Sheno and Kabalo, 2017). National food security is distinguishable from household food security, for aggregate food supply from domestic sources or import or both are a prerequisite but not a sufficient condition (Idachaba, 2006). In other words, adequate food availability in Nigeria on per capita basis does not necessarily translate into adequate food for all citizens. Food security at household level is a subset of national food security and it requires that all individuals and households have access to sufficient food either by producing it themselves or purchasing it by generating sufficient income to demand for it ideally through livelihood diversification strategies. Despite Nigeria's food-producing potential characterized by her vast agricultural endowment, food insecurity remains a very serious problem. This finds expression in the country's colossal annual food importation bill varying from N=113.63 billion in 2002 to ₦348 billion in 2007. This figure got increased to a humongous N=1.31 trillion in 2010. In 2011 the figure got reduced to a whopping N=1.1trillion which got further reduced to still a staggering N=0.648 trillion in 2012 (The Nation, 2011; Ships and Ports, 2013). At the World Food Summit of 1999, Nigeria alongside 185 other countries of the world made a commitment to reduce the number of chronically undernourished persons by half in the year 2015 (Ashagidigbi and Yusuf, 2013). In Nigeria, the rate of increase in poverty is alarming. Statistics from the National Bureau of Statistics have shown that poverty incidence in Nigeria had risen from 54.4% in 2004 to 69% in 2010. Giving an estimated population figure of 163 million, this translates into 113 million Nigerians living below the poverty line, with an estimated 94% of them living in the rural areas (National Bureau of Statistics, 2010). By implication, a large percentage of Nigerians and still a larger percentage of Nigerian rural dwellers are food insecure because they are poor. Therefore, in order to formulate effective policies aimed at ensuring sustainable food security a comprehensive study of factors that determine rural households' food insecurity becomes imperative (Hoang and Pham, 2014; Amao and Ayantoye, 2015); Mada and Menza, 2015). Besides, identifying those who are food insecure as target groups and having a better understanding of the factors engendering food insecurity are critical to designing efficient and effective food security programs (Mutenje *et al*, 2010). The study thus addressed the following research questions; what are the

livelihood diversification strategies and food security profile of households? What are the determinants of livelihood diversification strategies among households? What is the food security status of households? And what is the linkage between livelihood diversification strategies and food security in the study area?

A number of interrelated factors have made this study necessary. Following the World Food Conference in 1974, the concept of food insecurity has evolved, developed, and has become multi-faceted and diversified. The main focus has shifted from global and national to household and individual food insecurity and from food availability to food accessibility and sustainability of accessibility. This trend informs the current strategy of the Nigerian Government in ensuring food security and elimination of hunger through sustainability of accessibility to food among the rural populace. Therefore, this study which is focused on household livelihood diversification strategies and food insecurity in rural North-eastern Nigeria is consistent with current government food security focus. Livelihood constitutes household's capability, assets and economic activities to secure basic needs (Loison, 2015). The accompanying increase in poverty levels has compelled residents of rural economies to embark on livelihood diversification strategies including on-farm, (crop, fisheries and livestock) and off-farm activities or market and non-market activities to mitigate risks inherent in unpredictable agro-climatic and politico-economic circumstances (Ifeoma and Agwu, 2014; Glory and Nsikak-Abasi, 2017; Asfaw, Simane, Hassen and Bantider, 2017). Agricultural insurance is a veritable instrument to mitigate the multitudinous risks farmers are exposed to in the agricultural production process. However, this has remained underdeveloped in Nigeria given the hazardous nature of agricultural production, particularly amongst smallholder farmers who are subject to severe resource and credit constraints. The significance of agricultural insurance in reducing production risks in agriculture has been reported by Vojinovic, Zarkovic and Arambasic-Camprag (2015) in Serbia; although still underdeveloped, the great potentials for crops insurance are accentuated. The inability of small scale farmers to take premium for crops insurance has made livelihood diversification strategies the most viable coping and risk reduction alternatives accessible to farmers in the study area. Livelihood diversification centres on a portfolio of diverse activities to achieve robust livelihood outcomes to fall back on in the face of unexpected shocks. It is a rational response by households to lack of opportunities for specialization which was considered not the most desirable option. Recent studies have, however, indicated that rather than promoting specialization within existing portfolios, upgrading them to augmenting income could be more realistic and relevant for poverty reduction (Babatunde and Qaim, 2010; Alkaakahol and Aye, 2014). Accordingly, an investigation of the livelihood portfolio of rural households in relation to the diverse decisions which they take with a view to enhancing their livelihood when faced with pressure on scarce available resources was made. The essence was to have an insight into both the asset status and livelihood diversification profile in order to assist in knowing areas to which social protection/safety nets could be directed.

There are limited data on household livelihood diversification strategies and food insecurity changes over time in Nigeria. This is due to lack of available panel data to capture such a trend over time. As a result, the study of chronic food insecurity and its determinants has not been in-depth in Nigeria. Even though results of previous studies have identified factors affecting food security, available evidence points to the fact that there is still much to be learnt through the pursuit of more analysis to increase the understanding of the dynamics of household food insecurity, in terms of changes over time and over space. According to Olayemi, (1998), in as much as food insecurity problems are dynamic, changing in scope and nature over various phases of economic development, research on the subject has to be on a sustained basis. As such, this study on household livelihood diversification strategies and household food insecurity is expected to fill some of the existing knowledge gap by using empirical data to examine the food insecurity status of households in the North eastern part of Nigeria and identify the influence of livelihood diversification strategies variables on households' food insecurity.

A number of studies have been carried out in developing countries on rural livelihood diversification strategies and household food security. Tantu, Gamebo, Sheno and Kabalo (2017) in a study of household food insecurity and associated factors among households in southern Ethiopia found single household head with greater than two dependent members, households headed by daily labourers and low monthly food expenditure had negative and significant effects on household food insecurity. The authors recommended implementation of policies and programmes to stabilize food markets as well as livelihood diversification strategies that will provide opportunities for urban households to improve their income and reduce food insecurity.

In a study of household livelihood strategies and poverty reduction in Nepal, Khatiwada, et. al., (2017), collected primary data from 453 households from three villages which were analysed based on sustainable livelihood framework. The results indicated that only 13% of the sample diversified their livelihood into commercial farming while majority of the respondents diversified their income into non-farm sources which were more beneficial and aided in poverty reduction than commercial agriculture. In spite of the effects of non-farm livelihood strategies in improving the well-being of the poor, the study found that they are not as effective in mitigating household food security as market-oriented agro-enterprises. The authors advocated supporting poor farming households to embrace market-oriented farm and off-farm vocational activities through improved access to credit, markets and vocational skills to enhance food security and reduce household poverty.

In order to examine the impact of livelihood diversification strategies on household well-being, in Humla, Nepal, Gautam and Andersen (2016) collected data from 313 rural households in three villages with proportional allocation to the size of the three major ethnic groups in the area. The findings imply some level of uniformity in the number of livelihood activities adopted by households, though their effects on household overall well-being are diverse. The results further showed that well-being may not have a direct

link with livelihood diversification per se but rather on a households' involvement in 'high return sectors' such as trade in Non-Timber Forest Products (NTFP) or salaried employment. Due to the poor financial standing of rural households many are unable to garner the social and economic resources required to participate in these highly profitable livelihood activities. Therefore, agro-based livelihood strategies such as improved farming system, diversification into high-value crops, high-yielding and short duration crops as well as pest and disease tolerant varieties of food crops should be promoted to cater for the needs of the vulnerable rural households.

Research has also shown that though on-farm livelihood diversification activities help to reduce the adverse impact of both short-term and long-term shocks on farmers yield and income, livelihood diversification beyond farm-based enterprises will play significant role in reducing poverty and enhancing food security. Using data drawn randomly from a cross-section of 384 rural households in North Central Ethiopia, Asfaw, et. al., (2017) studied the determinants of non-farm livelihood diversification. The results indicated that relying on on-farm agricultural enterprises alone will make the goal of achieving food security and improving the welfare of smallholder subsistence farmers difficult. They therefore recommended the creation and re-invigoration of rural based institutions such as co-operative societies, farmers training centres as well as effective agricultural extension programme to integrate non-farm livelihood activities into the overall livelihood diversification strategies in order to achieve the overall goal of reducing rural poverty and improving food security among rural households.

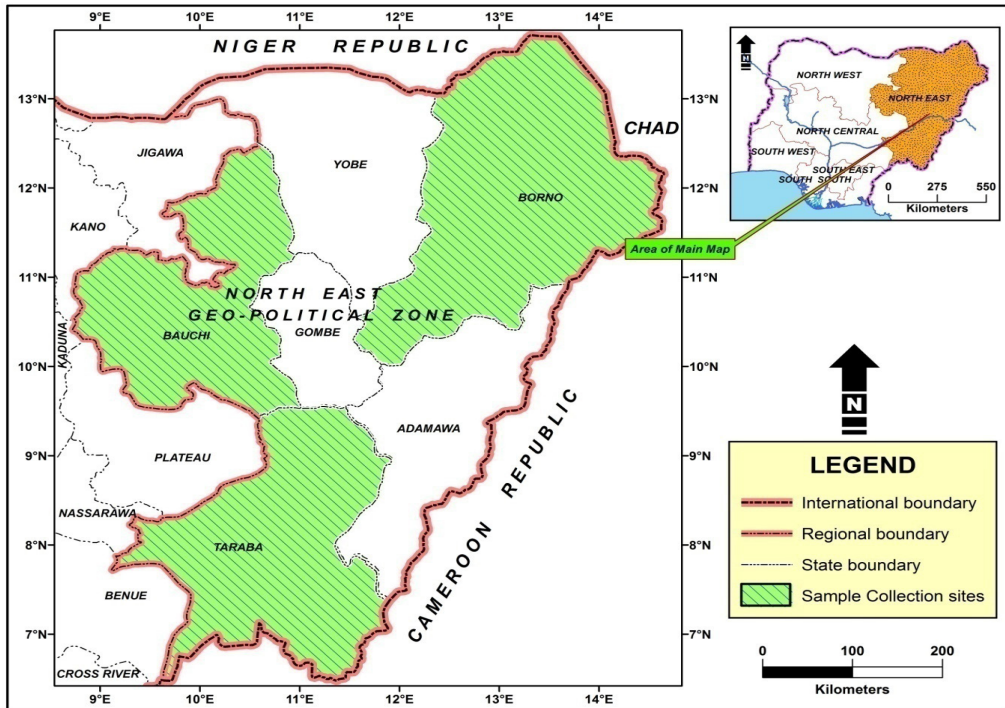
Materials and Methods

The Study Area and Data Collection

The study was carried out in the North East geopolitical zone of Nigeria (Fig. 1). It comprises of six (6) states, namely: Adamawa, Bauchi, Borno, Gombe, Taraba and Yobe. The area lies between latitudes 7° 30" and 14° North of the equator and between longitudes 9° and 15° East of the Greenwich Meridian. It shares boundaries with Cameroon and Chad Republic to the east; Benue, Plateau and Taraba States to the South; Jigawa and Kano states to the West and Niger Republic to the North. The number of inhabitants of the area was put at 18,971,965 based on the 2006 Census (Federal Republic of Nigeria, 2007). Its projected population by 2013, using 3.5% growth rate, is 24,137,639. The mean annual rainfall in the area ranges from 260mm around Nguru (Borno State) to about 1400mm around Sugu (Adamawa State), while mean annual temperature ranges from 20°C to 40°C (Shehu, 2013). The cropping season in the study area lasts between two months in the Northern part to about 5.5 months in the Southern part. Major crops grown include rice, maize, millet, sorghum, cowpea, cotton, groundnut, yam, potato, cassava and water melon (Oganuga, 2006). Artisan, bakery, blacksmithing, mechanic, bricklaying, charcoal burning, vulcanizing, driving, security, clergy, African ethno-medical practices, carpentry as well as fishing, poultry and livestock husbandry are practiced in the study area. Table 1 shows a breakdown of respondents as reflected by the number of questionnaire per state, the number of Local Government Areas and

villages involved in the study. The study was targeted at the rural populace with a view to extrapolating their socioeconomic characteristics as captured by the independent variables to urban agriculture. In the first round of the survey, 450 rural respondents were sampled. In the second round of the survey, only 444 respondents were able to return their completed questionnaire. The remaining were either wrongly completed or their owners were dead.

Figure 1: Map of North-East Geopolitical Zone Showing Sampled States



Source: Bureau for Land and Survey, Jalingo, Taraba State, 2012

Table 1: Distribution of Questionnaire by Sampled States in Rural North-eastern Nigeria

Sampled States	No. of sampled LGAs	No. of sampled villages	Copies of questionnaires administered	Copies of questionnaires retrieved	Mean Response rate
Bauchi	5	25	150	148	98.67
Borno	6	30	180	177	
Taraba	4	20	120	119	
Total	15	75	450	444	

Source: Field Survey, 2017

Conceptual Framework

In order to address household food insecurity, the Foster, Greer and Thorbecke (FGT) food energy intake method was used to generate food insecurity indices and, hence, food insecurity line to guide in identifying both the food secure and food insecure respondents (Ravallion and Bidani 1994; Aigbokhan, 2000; Okurat *et al*, 2002). The study adopted this method due to its simplicity and ease of computation as follows:

The Value of food (F_{*j}) per adult equivalent consumed by each household, which is equal to the sum of the value of purchased food (V_{*j}) and the value of donated food to the household or own production consumed (C_{*j}) was determined as follows.

$$F_{*j} = V_{*j} + C_{*j} \dots \dots \dots (1)$$

$$\text{But } V_{*j} = D_{ij} P_{ij}$$

Where,

V_{*j} = value of purchased food consumed by the j th household

D_{ij} = the quantity of i th food item purchased by j th household.

P_{ij} = the local price paid by the j th household for the i th food item consumption.

But,

$$C_{*j} = M_{*ij} P_{ij} \dots \dots \dots (2)$$

The adult equivalent H_j for each household was obtained by converting household size on the basis of age, sex and activity levels into adult equivalent scale calculated by World Health Organization. Total value of food consumed per adult equivalent (F_{*j}) was derived by dividing the total value of food consumed by household adult equivalent:

$$F_{*j} = \frac{F_j}{H_j} \dots \dots \dots (3)$$

Where,

F_j = Total value of food consumed by j th household

H_j = Adult equivalent for j th household

F_{*j} = Total value of food consumed per adult equivalent,

The different types and quantities of foods consumed by the different households were converted to calories (C_j) using the caloric equivalents table.

A regression model was fitted to estimate parameters (a) and (b) to be used in determining food insecurity threshold (line)

$$\ln F_{*j} = a + bC_j \dots \dots \dots (4)$$

Where,

F^*j = Total food expenditure per adult equivalent by household j

C_j = Total calorie consumption per adult equivalent by household j

a and b are parameters to be estimated

The food insecurity line, Z , which is the estimated cost of acquiring the caloric recommended daily allowance (RDA), was estimated as follows:

$$Z = e^{(a+bR)} \dots\dots\dots(5)$$

Where Z = food insecurity threshold.

R = recommended daily allowance of calories per adult equivalent of 2250 Kcal (WHO, 1985).

Determinants of Food Insecurity in the Study Area

Tobit regression model was used to determine the factors influencing food insecurity among households in the study area. The model which is as expressed in equation (6) following McDonald and Moffit, (1980) as adopted by Omonona, (2001) as follows:

$$V_{i^*} = \beta T X_i + e_i \dots\dots\dots(6)$$

$$V_i = 0 \text{ if } V_{i^*} \leq 0$$

$$V_i = V_{i^*} \text{ if } V_{i^*} > 0$$

$$i = 1, 2, 3, \dots\dots\dots n.$$

Where,

V_{i^*} = Limited dependent variable which expresses the depth of household food insecurity defined as;

$$(Z - Y_i) / Z \text{ and}$$

Z = Food insecurity line

X_i = vectors of independent variables

bT = vectors of parameters to be estimated

Y_i = per adult equivalent food expenditure

e_i = Independently distributed error term

The above method was used to determine the food secure and food insecure households in the study area. However, the extent of household livelihood diversification (HLD) among respondents was measured using Herfindal index (HI) of concentration, given

as follows:

$$HI = \sum_{i=1}^n P_i^2 \dots\dots\dots(7)$$

$$\text{But } P_i = \frac{A_i}{\sum_{i=1}^n A_i} \dots\dots\dots(8)$$

Combining (7) and (8),

$$HI = \sum_{i=1}^n \left(\frac{A_i}{\sum_{i=1}^n A_i} \right)^2 \dots\dots\dots(9)$$

Where,

P_i = proportion of enterprise in household livelihood strategies

A_i = share of farm revenue from enterprise i practiced by the respondent.

$\sum_{i=1}^n A_i$ = Total revenue from all enterprises engaged in by household

$i = 1, 2, 3 \dots, n$

n = number of enterprises owned by the respondent.

Therefore, household livelihood diversification (HLD) is given as;

$$HDL = 1 - \sum_{i=1}^n \left(\frac{A_i}{\sum_{i=1}^n A_i} \right)^2 \dots\dots\dots(10)$$

Results and Discussion

Household Livelihood Diversification Strategies of Respondents

The study identified five different livelihood diversification strategies adopted by farming households in the study area as adapted from Agbola (2014) (Table 2).

Table 2: Distribution of Households by Diversification Strategies

Livelihood Diversification Strategies	Number of Households	Percentage (%)
Cropping only (C).	95	21.40
Cropping and off-farm only (CO).	115	25.90
Cropping, poultry and livestock production only (CPL).	166	37.39
Cropping, fishing, livestock production and off-farm only (CFLO).	33	7.43
Cropping, poultry, livestock production and off-farm only (CPLO).	35	7.88
	444	100

Source: Field Survey, 2017

As shown in Table 2, about 37.39 % of the farming households derived their livelihood from a combination of cropping, poultry and livestock production (CPL) strategy, while 21.40 %, 25.90 %, 7.43 % and 7.88 % of respondents were engaged in cropping (C) only; cropping and off-farming (CO); cropping, fishing, livestock production and off-farming (CFLO); and cropping, poultry, livestock production and off-farming (CPLO) strategies respectively.

Construction of Food Poverty Line

Per adult equivalent household expenditure was computed as the sum total of per adult equivalent household expenditure on purchased food items, value of received food and own produce consumption on the basis of prevailing local market prices (Amao and Ayantoye (2017). By so doing, a relative food poverty line was constructed based on the Mean Monthly Expenditure on Food Items per Adult Equivalent (MMEFIPAE = N=14, 144.19 of sampled respondents (Oni and Fashogbon (2013). Food secure and food insecure categories were then established using the (N=9429.46) food poverty line so generated. Accordingly, households that spent less than two thirds of the MMEFIPAE were classified as food insecure while those that spent two thirds or more of the MMEFIPAE were classified as food secure (Omonona and Adetokumbo, 2007). Based on the result of the analysis, the area could be said to be food insecure as about 44% of the sampled households were unable to meet the basic minimum requirements (Table 3) of 2250 kcal of energy per adult equivalent per day in food intake; with an average food expenditure of N=198.85 per day per adult equivalent which fell below the cost of recommended calorie per adult equivalent per day of N=302.18. About 56% of the sampled households were food secure, with an average food expenditure of N=526.00 per adult equivalent per day which is over and above the cost of recommended calorie per adult equivalent per day of N=304.18 (Table 4). This implies that about 56% of these households were subsisting either

Table 3: Regression Results for Food Insecurity Thresholds

$\ln F_{i,j} = a + bC_j$
$\ln F_{i,j} = 9.1495 - 0.00000092C_j$
$Z = e^{(a+bR)}$
R = 2250 (Daily Recommended Dietary Allowance- DRDA).
e = 2.71828
Hence, $Z = 2.71828^{(9.1495+0.00000092(2250))} = N=9429.46$ per month
Daily recommended calorie intake (R) = 2250 kcal.
Food insecurity line (Z):
Cost of daily recommended calorie intake per adult equivalent per day = N=304.18
Cost of daily recommended calorie intake per adult equivalent per month = N=9429.46

Source: Field Survey, 2017.

on or above the daily recommended dietary requirement of 2250 kcal of energy per adult equivalent per day. The table also showed a head count ratio of 0.56 and 0.44 for the food secure and food insecure households respectively. However, the shortfall/surplus indices which symbolize the extent of deviation from the food insecurity line revealed that food secure households exceeded the daily recommended

Table 4: Food Poverty Lines for the Study Area

Indices	Food Poverty Status	
	Food secure	Food insecure
Percentage of households	56.00	44.00
Average household size (Adult equivalent)	7.21	12.20
Food Poverty lines (Z):		
Mean	1.64	0.62
Std Dev.	0.43	0.79
Shortfall/Surplus index (P)	0.64	-0.38
Average per adult equivalent food expenditure Per day (₺)	526.00	198.85
Calorie availability(kcal/adult equivalent/day)	3690.02	1394.98
Head count ratio (H)	0.56	0.44

Source: Field Survey, 2017.

calorie intake by 64% while food insecure households fell short of the recommended dietary requirement by 38%. Table 5 presents a profile of food insecurity of households by their livelihood diversification strategies. It indicates that households that derived livelihood through a combination of cropping, fishing, livestock and off-farm (CFLO) activities ranked best compared to all other categories.

Table 5: Household Food Security and Diversification Strategies

L/hood Category	Ranking	Household Status	Percentage H/holds (%)	Shortfall/Surplus Index	Head count Ratio	FI(Z)Index (mean)	PerAEFood Exp.PerDay (N=)	PerAE Calorie Availability PerDay (Kcal)	Average Adult Equivalent Size
A	1 st	FI	3.15	-0.2	0.42	0.80	256.59	1800.04	7.18
		FS	4.28	0.75	0.58	1.75	561.28	3937.52	6.30
B	2 nd	FI	3.38	-0.32	0.43	0.68	218.10	1530.03	9.12
		FS	4.50	0.68	0.57	1.68	538.83	3780.03	8.21
C	3 rd	FI	11.49	-0.37	0.44	0.63	202.06	1417.50	9.47
		FS	14.41	0.64	0.56	1.64	526.00	3690.02	6.1
D	4 th	FI	16.89	-0.41	0.45	0.59	189.23	1327.50	9.51
		FS	20.50	0.62	0.55	1.62	519.59	3645.05	8.11
E	5 th	FI	9.91	-0.45	0.46	0.55	176.40	1237.49	10.8
		FS	11.49	0.60	0.54	1.60	513.17	3600.01	7.3

FI = Food Insecure; FS = Food Secure, AE = Adult Equivalent
A = Cropping, Fishing, Livestock and Off-farm (CFLO) activities.

- B = Cropping, Poultry, Livestock and Off-farm (CPLO) activities.
- C = Cropping and Off-farm (CO) activities.
- D = Cropping, Poultry and Livestock (CPL) enterprises.
- E = Cropping (C) only.

Source: Field Survey, 2017

Households that were involved in CFLO were better off with the highest surplus index of 0.75 and the least shortfall index of 0.20, implying that food secure households in this group exceeded the daily recommended dietary allowance of 2250kcal of energy per adult equivalent per day by 75% while the food insecure households fell short of the recommended calorie intake by 20%. The head count ratio revealed that 58% of individuals in this group were food secure while 42% were food insecure. The same explanation goes for the second, third, fourth and fifth categories respectively. The chi-square test in Table 6 shows that food insecurity is statistically related with livelihood diversification strategies of farmers at the 1% level of significance.

Conclusion

The study examined livelihood diversification strategies and food insecurity status among farming households in rural North-eastern, Nigeria. It revealed, on the basis of the food insecurity line, that there was a high level of food insecurity (44%) in the study area. Furthermore, diverse aspects of the rural populace characteristics

Table 6: Test Statistics

Test	Livelihood Strategies	Food Insecurity Status
Chi-square	149.94	196.31
Df	4	10
Asymp. Sig	0.00	0.00

Source: Field Survey, 2017.

captured by the different variables were instrumental to the high level of food insecurity found in the area. However, since non-farm activities (trading, African ethno-medical practice, bricklaying, soap making, food hawking, blacksmithing, charcoal burning, fuel selling, vulcanizing and carpentry) were found to support food security strategies, diversification into such non-farm activities is key to tackling food insecurity problems (Tantu, et. al., 2017; Khatiwada, et. al., 2017; Asfaw, et. al., 2017). To this end, it is recommended that policy options (with support from relevant NGOs) be directed at the education of farmers in this regard and, hence, their empowerment in not only promoting and sustaining same to ensure sustainability of accessibility to food, but also orienting their general outlook on farming (both on-farm and off-farm) towards urban agriculture.

Conflict of interests

We, the authors do not find any conflict of interests as regards the conception of the study, and preparation of the manuscript for publication.

References

1. Agbola, P.O. (2014). Factors Influencing Food Insecurity among Small Farmers in Nigeria. *African Journal of Agricultural Research*, 9 (27), 2104–2110.
2. Aigbokhan, B.E.(2000). Poverty, Growth and inequality in Nigeria: A Case study. *African Economic Research Consortium, Research Paper 102*.AERC, Nairobi. pp.74.
3. Alkaakohol, M. A. & Aye, G. C. (2014). Diversification and Farm Household Welfare in Makurdi, Benue State, Nigeria. *Development Studies Research*, 1 (1), 168–175.
4. Amao, J.O. & Ayantoye, K. (2015). Correlates of Food Insecurity Transition and its Determinants among Farming Households in North Central, Nigeria. *Journal of Economics and Sustainable Development*. 6 (24), 230–244.
5. Amao, J. O. & Ayantoye, K. (2017). Analysis of food insecurity status among farming households in North Central Nigeria. *International Journal of Advance Agricultural Research*, 5, 10–22.
6. Asfaw, A., Simane, B., Hassen, A. & Bantider, A. (2017). Determinants of non-farm livelihood diversification: evidence from rainfed-dependent smallholder farmers in north central Ethiopia (Woleka sub-basin). *Development Studies Research*, 4 (1), 22–36. DOI: 10.1080/21665095.2017.1413411
7. Ashagidigbi, W. M., Yusuf, S. A. & Omonona, B.T. (2013). *Households' Food Demand and Food Security Status in Nigeria*. Lap-Lambert Publishers, Frankfurt, Germany.
8. Babatunde, R. O. & Qaim, M. (2010). Impact of Off-farm Income on Food Security and Nutrition. *Food Policy*, 35 (4), 303–311.
9. Federal Republic of Nigeria (FRN) (2007). Official Gazette: Federal Government Printers, Lagos. Nigeria. pp. 24.
10. Gautam, Y. & Andersen, P. (2016). Rural livelihood diversification and household well-being: Insights from Humla, Nepal. *Journal of Rural Studies*, 44, 239–249.
11. Glory, E. E. & Nsirik-Abasi, A. E. (2018). Factors Influencing Rural Livelihood Diversification: Implications for Poverty Reduction. *International Journal of Agriculture, Forestry and Fisheries*, 6 (2), 23–28.
12. Hoang, T. X., Pham, C. S. & Ulubasoglu, M. A. (2014). Non-farm Activity Household Expenditure and Poverty Reduction in Rural Vietnam 2002 - 2008 *World Development*, 64, 554–568.
13. Idachaba, F.S. (2006). *Strategic and Policies for Food Security and Economic Development in Nigeria*. Central Bank of Nigeria, Lagos.
14. Ifeoma, J. I. & Agwu, E. A. (2014). *Assessment of Food Security Situation among Farming Households in Rural Areas of Kano State, Nigeria*. *Journal of Central European Agriculture*, 15 (1), 94–107.

15. Khatiwada, S. P., Deng, W., Paudel, B., Khatiwada, J. R. Zhang, J. & Su, Y.(2017). Household Livelihood Strategies and Implication for Poverty Reduction in Rural Areas of Central Nepal. *Sustainability*, 9, (612), 1-20. doi:10.3390/su9040612.
16. Loison, S. A. (2015). Rural Livelihood Diversification in Sub-Saharan Africa: A Literature Review. *Journal of Development Studies*, 51 (9), 1125 –1138.
17. Mada, M. & Menza, M. (2015). Determinants of Rural Livelihood Diversification among Small-scale Producers: The case of Kamba District in Ethiopia. *Asian Journal of Research in Business and Economics Management*, 5 (5), 44 – 52.
18. McDonald, J.F., Moffit, R.A.(1980). The Uses of Tobit Analysis. *Review of Economics and Statistics*. 62, 318–321.
19. Mutenje, M. J., Ortmann, G. F., Ferrer, S. R. D. & Darroch, M. A. G. (2010). Rural Livelihood Diversity to Manage Economic Shocks: Evidence from South East Zimbabwe. *Agricultural Economics Research Policy and Practice in Southern Africa*. 49 (3), 338–357.
20. National Bureau of Statistics (NBS) (2010). Poverty Profile for Nigeria 2010. NBS, Abuja.
21. Oganuga, A. G. (2006). Agro-ecological Zone of Nigeria, edited by Berding, F., Chude, V.O. *Ships and Ports: Nigeria's Food Import Bill Crashes. A Publication of National Special Programme for Food Security, Abuja Nigeria*.
22. Okurat, F.N., Odwee, J.O. & Adesina, A. (2002). Determinants of regional poverty in Uganda: *African Economic Research Consortium AERC RP 122*, pp. 43.
23. Olayemi J.K. (1998). *Food security in Nigeria*. Research Report No. 2, Development Policy Centre, Ibadan, Nigeria. pp. 85.
24. Oluwatayo, I. B. (2009). Poverty and Income Diversification among Households in rural Nigeria: A Gender Analysis of Livelihood Patterns. A paper presentation at the 2nd Instituto de Estudos Sociais Economicos (IESE) Conference on 'Dynamics of Poverty and Patterns of Economic Accumulation in Maputo, Mozambique, pp.23.
25. Omonona, B.T.(2001). Poverty and its Correlates among Rural Farming Households in Kogi State, Nigeria. Ph.D thesis, University of Ibadan, Department of Agricultural Economics, Ibadan, Nigeria.
26. Omonona, B.T. & Adetokumbo A.G.(2007). An Analysis of Food Security Situation among Nigerian urban Households: Evidence from Lagos State, Nigeria. *Journal of Central European Agriculture*, 8 (3), 397–406.
27. Oni, O. A. & Fashogbon, A. E. (2013). Food Poverty and Livelihoods Issues in Rural Nigeria. *African Journal of Agricultural and Resource Economics*, 8 (2), 1–28.
28. Ravallion, M. & Bidani, B. (1994). How Rebutts is a Poverty Profile? *World Bank Economic Review*, 8 (2), 75–102.

29. Shehu, J. F. (2013). Production Efficiency Differentials and Innovative Behaviour among Rice Farmers in North-East Nigeria. Ph.D thesis, University of Nigeria, Nsukka, Department of Agricultural Economics, Nsukka, Nigeria.
30. The Nation Newspaper (2011). Nigeria Spent N99.2trn on Food Importation. <http://ination@thenationonlineng.net>
31. Tantu, A. T., Gamebo, T. D., Sheno, B. K. & Kabalo, M. Y. (2017). Household food insecurity and associated factors among households in Wolaita Sodo town, 2015. *Agriculture and Food Security*, 61(9), 1–8. DOI 10.1186/s40066-017-0098-4
32. Vojinovic, Z., Zarkovic, N. & Arambasic-Camprag, B. (2015). Problems and alternative insurance agricultural production in Serbia. *Anali Ekonomskog fakulteta u Subotici*, (33), 247-264.
33. World Health Organisation (1985). Energy and Protein Requirements, *WHO Technical Report Series 724*, WHO, Geneva.

FINANCIAL SUPPORT TO FRUIT AND VEGETABLES GROWING AND IMPACT ON B&H TRADE BALANCE

Vanja Ćosović¹, Vesela Vlašković², Budimir Stakić³

**Corresponding author E-mail: vcurkovic@regionalnirazvoj.org*

ARTICLE INFO

Review Article

Received: 13 February 2019

Accepted: 14 March 2019

doi:10.5937/ekoPolj1901297C

UDC 336.563:634/635(497.15)

Keywords:

competitiveness, trade balance, agriculture, financial support, clusters

JEL: Q14, Q17

ABSTRACT

Data on global competitiveness and trade balance fall within the most important indicators regarding the shape of economy in a specific country. Data for Bosnia and Herzegovina (B&H), are not very good according to either of the said indicators. In regard to competitiveness, the World Economic Forum (WEF) classifies B&H below the average, while the trade balance shows deficit for the past few years in a row. The goal of this paper is, in such situation, to point to one of the bright points, the agricultural sector, primarily fruit and vegetable growing, which, with financial assistance, in a relatively short time period could significantly change B&H's trade balance. Since the largest volume of fruit and vegetables export is realized on a choosy European Union (EU) market, the increase of export can be achieved only by honoring the strict standards and having adequate certificates. A chance for increase in production and competitiveness is in interconnecting into clusters which have proven to be the best way of increasing the market competitiveness and survival in an era of globalization and rule of multinational companies.

© 2019 EA. All rights reserved.

Introduction

There are numerous reasons for state intervention in the agriculture area. One of the main arguments in favor of subventions in agriculture is necessity to keep farmers income on the certain level. Besides, state is consider as a subject which through economic policy in the field of agriculture has significant influence on achieving national food security, as well as preserving production volumes on the satisfying level (Đurić et al., 2016).

-
- 1 Vanja Ćosović, Ph.D. Candidate, Singidunum University, Danijelova 32, Belgrade, Serbia, representative "Drina river bridge corp. ad." Belgrade, Phone: +381 64 23 65 892, E-mail vanjacosovic@hotmail.com, ORCID ID (<https://orcid.org/0000-0002-0081-7788>)
 - 2 Vesela Vlašković, Ph.D., Researcher and Analyst, Institute for Territorial Economic Development (InTER), Vlajkovicева no. 29, 11000 Belgrade, Serbia, Phone: + 381 32 46766, E-mail: vcurkovic@regionalnirazvoj.org, ORCID ID (<https://orcid.org/0000-0002-6573-1600>)
 - 3 Budimir Stakić, Emeritus Professor, Slobomir P University, PF 70 Pavlović put 76, 76300 Slobomir, Republic of Srpska, B&H, Phone: +387 55 231 180, E-mail: budimir.stacic@gmail.com, ORCID ID (<https://orcid.org/0000-0002-7507-2805>)

According to data for the 2017, the agricultural land in FB&H has the surface area of 1,165.00 ha out of which 46,000 ha are orchards and 36.000 ha vegetable gardens, (FB&H in numbers, 2018), in RS agricultural land has the surface area of 967.000 ha, out of which 52.000 ha are orchards and 30.942 ha vegetable gardens (Statistical Annual Almanac, 2018) and Brčko District (BD) has around 30,000 ha of agricultural land, out of which 4.000 ha are the orchards and vegetable gardens have the area of around 418 ha (Statistical data BD B&H, 2018). On the basis of the said data it can be concluded that B&H has significant area with fruit and vegetables, around 170.000 ha, which makes a solid basis for substantial increase of output for export, if the sector of agriculture is supported by the measures suggested in this paper.

According to (unofficial) population census from 2013, B&H had the total population of 3,531.159, out of which the B&H Federation had 2,219.220, RS 1,228.423, while BD had a population of 83.516 (Agency for Statistics of B&H, 2013). On the basis of the above information, the agricultural land per one inhabitant in FB&H is 0,52 ha, in RS 0,78 ha and in BD 0,24 ha. In light of the fact that the smaller land parcels are more suitable for fruit and vegetable growing, it may be concluded that this agricultural sector needs strong support in relation to crop husbandry, and thereby a

Status of agriculture in B&H

In the past three decades, agro-food sector in B&H has been influenced by the changes in economy transition, institutional restructuring and political development. The complexity of B&H economy is the result of separate entities of the RS and Federation of B&H, as well as by separate management of natural resources that are the basis for agriculture and food industry development (Milovanović et al., 2018).

Due to insufficient domestic capacity utilization in B&H, there is a high import of all types of food products, especially the products of lower quality than the domestic ones. The largest import of food products originates from the neighboring countries such as Croatia and Serbia, with which B&H and RS have concluded free trade agreements, with 0% tariff rate for the import (Radosavac et al., 2015).

Global competitiveness

Each year WEF is publishing the „Global Competitiveness Report“ for 140 countries. Report defines competitiveness „as the set of institutions, policies and factors that determine the level of productivity of a country“. This report is made on the basis of 114 indicators, grouped in 12 areas, so-called pillars of competitiveness: institutions, infrastructure, macroeconomic environment, health and primary education, higher education and training, labour market efficiency, financial market development, technological readiness, market size, business sophistication and innovation.

According to WEF data, published in October 2018, B&H is ranked 91st having thereby the worst result among all the countries in the region, with competitiveness grade 54,2. B&H has been ranked as the worst-positioned country according to the innovation

criterion (114th place) and for labor market and institutions, while it obtained the best mark for health (52nd place). According to the same source, B&H has a low average ten-year GDP growth of only 1,8%, low five-year 2,2 growth of direct foreign investments and high 25,6% unemployment rate. Among the countries in the region, Slovenia ranked the best, holding the 35th place, followed by Serbia on the 65th place, Croatia 68th, Montenegro 71st and Macedonia 84th (WEF 2018).

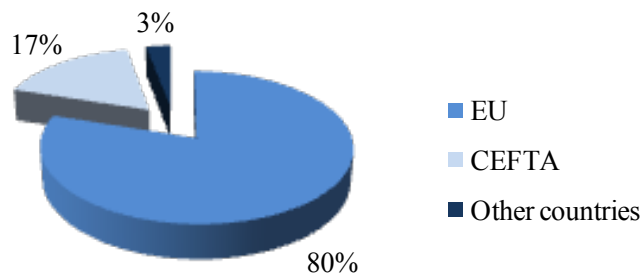
Materials and methods

The paper was written on the basis of the following material: national and EU legal acts in the field of agriculture, B&H Statistical office database and other relevant literature. All obtained data were analyzed by using scientific descriptive methods, methods of analysis and synthesis and comparative analysis method. While writing this paper, we faced certain methodological difficulties due to specific constitutional structure of B&H, since the powers and authority to pass some legislation is at the B&H level, while other legislative powers are at the entity level, B&H Federation, RS and BD. The coordination of legislation which is promulgated at the B&H level sometimes lasts for several years and it is hard to follow the continuity of regulations and statistical data.

Results

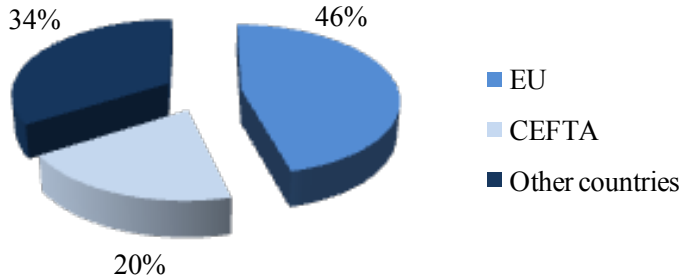
Upon entry into force of the Stabilization and Association Agreement (SAA) in June 2015 a free access to EU was gained for the products of B&H origin, whereby a free trade zone is being gradually established. Hence more favorable conditions have been met for increased exports to EU market, which has about half a billion inhabitants. Statistical data for fruit and vegetables export to EU in the period from 2008 to 2015 show that this sector has a permanent export growth both into EU and CEFTA countries. In 2015 the largest export of fruit and vegetables was to EU (Figure 2 and Figure 3).

Figure 1: Fruit exports share in 2015 per regions



Source: Guide for export of fruit and vegetables to EU

Figure 2: Vegetables export share in 2015 per regions

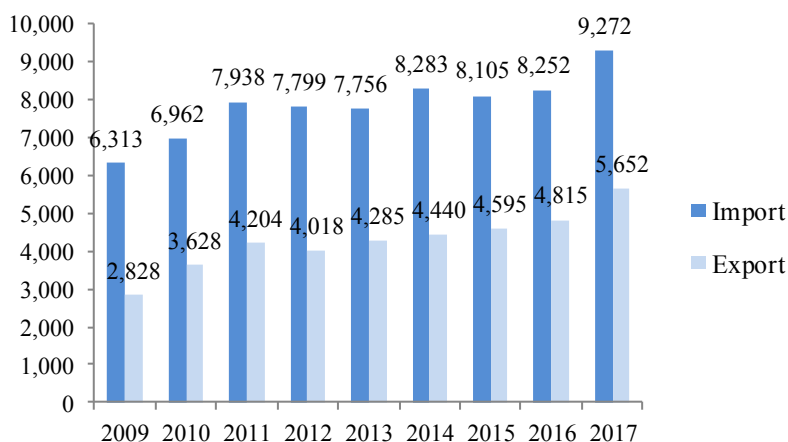


Source: Guide for export of fruit and vegetables to EU

Annual average growth of fruit and vegetables export to all the countries of the world in the course of eight years (2008-2015) was 26%, and the largest part pertains to plums, apples, strawberries, raspberries and other fresh and frozen berries. These fruits have a very good export perspective since the share of export accounts for around 42% in relation to total output in B&H (Guide, 2016).

Trade deficit

Although B&H is not a World Trade Organisation (WTO) member, belonging to a group of 23 observers, B&H has a free foreign trade regime, in compliance with the WTO regulations, while the prohibitions and constraints relate only to import and export that would be contrary to public moral, policy or public security. Passing of unilateral measures in relation to foreign trade as well as the agreements with third countries is within the competence of B&H, while the foreign policy is determined by B&H authorities with the competent organs of both entities (WTO, 2018). Ministry of foreign trade and economic relations is tasked to provide a required number of bilateral and multilateral permits, quotas and similar items for the organizations doing business in B&H. They are allocated to entities, and the entities allocate them further to end users. In the case of endangerment to domestic production, the B&H Council of Ministers prescribes the application of protective measures. It also prescribes the definitions, requirements and procedures of anti-dumping investigation as well as measures and deadlines for anti-dumping protection. As a legal framework defining the foreign trade regime, Law on Foreign Policy Trade regulates free flow of goods and services in international trade and prescribes the conditions for performing cross-border business activities (B&H Law). Liberal foreign trade policy in B&H is in large part brought into compliance with WTO principles, since with its rules, it secures the national treatment and most favored nation status (the Export-Led Growth Strategy 2012). However, due to hasty liberalization of import, B&H deficit is for a long time now very high, and in 2017 reached EUR 3,620 billion (Figure 1.).

Figure 3: Foreign trade statistics in EUR millions

Source: B&H Agency for Statistics

If we look at the balance of export and import as per product category, we will see that the importation is three times greater than the export of agricultural products and foodstuffs (Table 1.).

Table 1: Import and export per products in 2017.

Product group	Export mil. €	%	Import mil. €	%
Food and livestock	374	6,6	1.201	13,0
Beverages and tobacco	46	0,8	203	2,2
Raw materials, except fuel	601	10,6	276	3,0
Mineral fuels and lubricants	472	8,4	1.324	14,3
Animal fat, vegetable oil and lard	87	1,6	124	1,3
Chemical products	460	8,1	1,159	12,5
Products classified per material	1,269	22,5	2,161	23,3
Machines and means of transportation	816	14,4	1,922	20,7
Various finished products	1,527	27,0	901	9,7
Other products and transactions	-	0,0	1	0,0
TOTAL	5.652	100%	9.272	100%

Source: B&H Agency for Statistics

EU is the largest trade partner of B&H (nearly 80%) followed by Serbia, China, Turkey and other countries (Table 2.). Since the share of agricultural products and foodstuffs accounts for one third of such trade, it is necessary to observe the strict standards for export of goods from that sensitive sector.

Table 2: The most important trade partners of B&H in 2017.

Country	%	In '000 EUR
Trade total	100	14,923.517
Germany	12,67	1,891.511
Italy	11,21	1,672.509
Serbia	10,70	1,597.092
Croatia	10,66	1,590.778
Slovenia	6,46	964.348
Austria	5,20	776.130
China	4,19	626.003
Turkey	4,10	612.359
Russian Federation	3,44	512.716
Hungary	2,42	361.837
Poland	2,34	349.644
USA	2,25	336.467
France	2,00	298.618
The Netherlands	1,77	263.769
Czech Republic	1,69	251.928
TOP 15	81,10	12,105.709

Source: B&H Agency for Statistics

Financial support to agricultural sector

One of the reasons for lack of competitiveness of domestic agricultural products is in significantly lesser subsidies and price support granted in B&H entities-B&H Federation, RS and BD as opposed to producers and exporters from EU member states (Budgets of B&H Federation, RS and BD).

The annual budgets in B&H entities and BD have provided for certain types of subsidies to stimulate production, investments, employment or non-refundable means for flood damage compensation in BD, but these sums significantly lag behind those received by farmers in EU countries (Table 3).

Table 3: Subsidies in B&H and EU in the 2015-2018 period

Government budget	Subsidy type		2015.	2016.	2017.	2018.
F B&H	Financial support in 000 KM		65,800	65,800	65,700	65,700
RS	Development subsidies for agriculture and countryside u 000 KM		60,000	60,000	60,000	60,000
BD	Grants to private individuals (reclamation after flood) u 000 KM		7,510	8,977	0,0	9,000
Total	Subsidies and grants	in 000 KM	133,310	134,777	125,700	134,700
		in 000 €	68,364	69,116	64,462	69,077
EU	Agriculture in EU budget in € mill.		41.623	41.029	40.420	39.618
Per capita subsidies and grants	B&H	in €	19,36	19,57	18,25	19,56
	EU		83,25	82,60	80,84	79,23

Source: Authors

Although the attained level of agri-food sector development in EU is incomparably higher than the B&H level, the annual EU budgets allocate about four times larger per capita amount for the same purpose, which may be seen from the data taken from the EU Financial Framework for 2014-2020 period, in the part provided for agriculture subsidies (EU Financial Framework).

It should be pointed out that the annual aggregate amounts of all subsidies and grants provided for in the budgets of B&H Federation, RS and BD are converted to euros according to the exchange rate 1 EUR=1,95 KM, and divided by (unofficial) 2013 population census. Annual amounts of funds planned in the EU budget for the 2014-2020 period are divided by 500 million which is the approximate EU population, including the population of Great Britain, which belonged to EU in the mentioned period. Thus the following data were obtained, from which it can be seen that the per capita allocations in EU are about four times larger than the average funds earmarked in B&H.

In the RS budget for the year 2018 total subsidies for development of agriculture and countryside amounted to 60 million KM. A special regulation has prescribed the subventions to organic agriculture clusters. Article 38 paragraph 3 of the Regulation on Terms and Conditions for Receiving Subsidies for the Development of Agriculture and Countryside, passed by the Minister for Agriculture, Forestry and Water Management, prescribed as follows: „Subsidies earmarked for the purpose from this Article are set in the sum of up to 50% from the amount of invested funds or submitted cost estimates and may not be larger than the sum of 40.000 KM per one beneficiary during one

year“ (RS Regulation). This is a clear indicator that the authorities are aware of the importance of the clusters for the advancement of agricultural production.

Discussion

EU legislation on food safety is voluminous and the gist of all rules is that the food safety needs to be assured in the whole chain. Production is the starting point, followed by food processing, storage, distribution, putting into market, then sale and keeping by the consumers until final consumption.

Basic rules regarding fresh fruit and vegetables are contained in the Regulation (EC) No.178/2002 of the European Parliament and Council of 28 January 2002, laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety (Regulation 178/2002). Said Regulation has set up a rapid alert system in the event that bad foodstuffs are found at any of the EU member state market.

EU legislation determines the maximum permitted residue level in foodstuffs to be put on the market. It is however possible that some of the EU member states or supermarket chains require even more stringent conditions than the ones provided for in the EU legislation.

Existing laboratories in B&H do not meet the requirements to conduct laboratory quality control tests for products to be put into B&H market, and even less to satisfy the needs of producers and exporters, the exporters thus being compelled to make a large number of analyses in the neighboring countries, most often in Serbia and Croatia. As an example, minimal testing for the needs of internal market control implies testing of around 180 analytes, while fruit and vegetables exporters are often required to ask the residue levels analyses for 400 and even more analytes, with all domestic laboratories (Sarajevo, Mostar, Pale, Bijeljina etc.) having less than 100 accredited methods. Similar situation is in relation to capability of laboratories to conduct physical-chemical tests of food and agricultural products, testing of residues and contaminants in the food, microbiological analysis of food and quality tests for genetic modifications in food, fodder and agricultural products, so that due to insufficient capacity or lack of adequate laboratories the assistance is sought in neighboring countries, primarily Serbia and Croatia (Guide, 2016).

Opportunities for agriculture development

The research shows that B&H has several competitive advantages that can contribute to the development of the agriculture. The natural resources and geographical position, as well as human resources, are the key ones. B&H has favorable climate conditions, unpolluted and fertile uncultivated land (50% of agriculture land is still uncultivated), water resources, which all together create the perfect environment for agricultural production. Furthermore, skilled low cost labor (much cheaper than EU laborers) with a long tradition in agriculture is abundantly available, as well as developed education system along with agronomic and veterinary support.

In order to increase competitiveness of the agri-food sector in B&H it is necessary to invest in the new equipment, education, research and development, to stimulate processing of the agriculture products, to facilitate obtaining relevant certification and inputs (seeds, fertilizers, etc.) at competitive prices. The existing state of three time higher importation than the exports of agricultural products and foodstuffs is untenable in a long time-period.

EU financial assistance

COSME programme supporting micro, small and medium-sized enterprises and entrepreneurs in EU has a budget EUR 2,3 billion for the 2014-2020 period. The funds from COSME programme may be used by entrepreneurs from B&H as well, on the basis of the Agreement signed by and between EU and B&H on 2 June 2016 in Brusells. Funds are available for the purpose of strengthening the competitiveness and sustainability of start-up enterprises due to easier access to funds, in view of growth and development as well as starting-up new business for the purpose of self-employment, in particular of young people and women.

Another instrument that plays a key role in financing the projects intended to bring into compliance the national legislations with the Community acquis (*acquis communautaire*) is Instrument for Pre-Accession Assistance (IPA). Pursuant to Regulation (EU) No 231/2014 of the European Parliament and of the Council of 11 March 2014 establishing an Instrument for Pre-accession Assistance (IPA II), a provisional sum was set in the amount of EUR 11,698.668.000 to attain the goals determined in the said Regulation, relating to assistance to: Albania, B&H, Island, Kosovo-UN Security Council Resolution No.1244, Montenegro, Serbia, Turkey and FRY Macedonia (EU Regulation 231/2013).

Indicative Strategy Paper for B&H (IPA II) for the 2014-2017 period makes the allocation of aggregate funds, 165, 8 million EUR in total, for the following goals:

- a) Reform on preparation for EU membership EUR 64 million, out of which EUR 31 milion for democracy and management, and EUR 33 million for the rule of law and basic human rights;
- b) Socio-economic and regional development EUR 63,8 milion (including competitiveness and innovations);
- c) For employment, social policy, education, research and innovations, promotion of gender equality and human resources development the total of EUR 38 million.

B&H has benefited from significant EU assistance related to capacity building and supplies in the fields of agriculture, rural development, food safety, veterinary and phytosanitary for which IPA 2007-2013 allocated approximately EUR 27 million.

European Commission has adopted the Annual Action Programme for B&H for the year 2018, listing the actions foreseen for the competitiveness, innovation, agriculture and rural development sector (Table 4).

Table 4: List of actions foreseen in 2018. IPA II assistance

Indirect management by entrusted entity		Direct management	
		9. EU Support to trade	EUR 2 000 000
10. EU Support to Agriculture and Rural Development, Food Safety, Veterinary and Phytosanitary Standards	EUR 20 000 000	10. EU Support to Agriculture and Rural Development, Food Safety, Veterinary and Phytosanitary Standards	EUR 10 000 000
Total	EUR 20 000 000	Total	EUR 12 000 000

Source: IPA II 2014-2020 Country Action Programmes

However, the agriculture sector did not receive the needed support under IPA II yet because of the lack of a country-wide sector strategy. Insufficient knowledge of the public and of interest groups when it comes to the implications, processes and opportunities related to EU accession also contributed to slowing down its development (IPA II 2014-2020 Country Action Programmes). Due to these challenges only a limited number of donors' programmes are currently ongoing (e.g. Swedish International Development Cooperation Agency (SIDA)/The United States Agency for International Development (USAID)/Czech Republic).

Accessing IPA and other available funds can play an important role in the agriculture development in B&H. However, several preconditions have to be fulfilled:

- Development of the legal, technical and institutional settings necessary for the efficient absorption of the financial means;
- Support to the human resources development in the field of the project development and management, for the entrepreneurs and farmers as well as for representatives of the public administration on the national and local level;
- Access to the financial funds necessary for the co-financing of the projects (bank loans, subsidiaries, etc.).

However, only synergy of foreign and domestic assistance (both financial and non-financial) towards the agriculture sector can lead to the sustainable and rapid development.

Conclusions

In the globalization era, each and every business entity, and even the countries irrespective of their level of development intend to offer their goods and services according to competitive prices but under other conditions as well, which are more favorable than that of the competition. From the first statements in this paper it can be deduced that the economic environment in B&H does not meet the competitiveness conditions as it is in the lower section of the competitiveness index of the WEF 140 countries in 2018.

After the foundation of the WTO in 1995 an ever increasing number of countries, want to become full members besides 164 countries that account for 95% of the international GDP, but are required to meet certain conditions demanded from them by the rules of that organization. B&H is close to complete the negotiations and it is expected to become a full WTO member in the course of 2019. The basic condition is liberalization of legislation reflected in four basic freedoms: freedom of movement of goods, services, people and capital over borders. B&H signed the Stabilization and Association Agreement with EU in 2008, which went into force in 2015 and since then the intensive approximation of legislation with the Community *Acquis* has begun. Taking into account the constitutional structure of B&H, promulgation of legislation at B&H level is very slow, which additionally decelerates B&H's entry into WTO and EU. At the same time, due to liberalization of importation, B&H is from year to year running a growing trade deficit, which also means ceding the market over to foreign companies, to the detriment of employment of domestic population.

Agriculture is the bright point in this situation, with possibilities for increased export in a short time-span, primarily the exports of fruit and vegetables as there is market for these products. However, in order to increase the exports, the investment should be directed in the common good instead of subsidies, then the regulatory framework should be brought into compliance with EU legislation, regarding the strict control of the whole production chain with adequate certificates and certificates of origin of goods, thereafter the reference laboratories should be properly equipped and finally substantial funds need to be provided from domestic and foreign sources available for agriculture and rural development. From data given in this paper it could be learned that EU is investing about four times more per capita in its agriculture than B&H, so a lot of time is still needed to reach real competitiveness.

Conflict of interests

The authors declare no conflict of interest.

References

1. Agency for Statistics of B&H, Data on export and import for 2017, available at <http://www.bhas.ba/>
2. Budget of Brčko District, available at <http://www.bdcentral.net/index.php/ba/budzet-brcko-distrikta-B&H>
3. Budget of Federation of B&H, available at <http://www.fB&Hvlada.gov.ba/bosanski/budzet/>
4. Budget of RS, available at <http://www.narodnaskupstinars.net/?q=la/akti/bud%C5%BEet>
5. Cosme Programme: Programme for the Competitiveness of Enterprises and SME 2014-2020, available at https://ec.europa.eu/growth/smes/cosme_en

6. Đurić, K., Vukoje V., Tomaš Simin M. (2016). Agrarian budget as a form of agricultural financing in the Republic of Serbia and Croatia, *Agroekonomika*, Faculty of Agriculture, Department for Agriculture Economic and Rural Sociology, 2016, issue 71, p. 29., Novi Sad
7. EU financial framework 2014–2020, available at http://ec.europa.eu/budget/library/biblio/documents/fin_fvk1420/proposal_council_regulation_COM398_en.pdf
8. Federal Office of Statistics FB&H - F B&H in numbers, 2018, p. 37
9. Foreign Trade Policy Act, „The Official Journal of B&H“, No. 7/98, 35/04
10. Guide for import and export of fruit and vegetables in EU, pp.7-8. available at <https://fmpvs.gov.ba/wp-content/uploads/2017/12/Vodic-za-izvoz-voca-i-povrca-u-EU.pdf>
11. Milovanović, M., Radosavac, A., Knežević, D. (2018). State of agro-food foreign trade in Bosnia and Hercegovina, *Economics of Agriculture*, No 3 (885-1328), 2018. p. 1065
12. Radosavac, A., Rosandić, A., Demirović, D., Knezević, D. (2015). The share of food products in foreign trade of Bosnia and Herzegovina, *International Journal of Scientific Research*, 4(8), p. 3-5.
13. Regulation (EC) No 178/2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety
14. Regulation (EU) No 231/2014 establishing an Instrument for Pre-accession Assistance (IPA II)
15. Regulation on terms and conditions for receiving price support for development of agriculture and countryside, “Official Journal of RS”, No. 25/2018, 46/2018, 71/2018, 82/2018, 97/2018, 102/2018 and 116/2018.
16. Statistical Yearbook of RS for 2018 p. 272.
17. Statistical data for BD B&H, Bulletin No. 1 for 2018, pp. 55-56.
18. Strategy for export growth of B&H from 2012 to 2015., draft, pp. 46-47, available at <http://komoraB&H.ba/wp-content/uploads/2013/06/bhepa-nacrt-strategija-rasta-izvoza-B&H.pdf>
19. WEF. The Global Competitiveness Report 2017 – 2018, World Economic Forum, available at <https://www.weforum.org/reports/the-global-competitiveness-report-2018>
20. www.wto.org

ANALYSIS OF THE ATTITUDES OF THE POPULATION ON THE NEED FOR ANIMAL INSURANCE

Tatjana Piljan¹, Tomislav Brzaković², Jasmina Šmigić-Miladinović³

* Corresponding author E-mail: tanja.piljan@gmail.com

ARTICLE INFO

Review Article

Received: 28 February 2019

Accepted: 14 March 2019

doi:10.5937/ekoPolj1901309P

UDC 316.644:368.52

Keywords:

agriculture, insurance of agricultural, insurance of animals, risk, policy.

JEL: G21, G22, G23

ABSTRACT

Agriculture in the Republic of Serbia is a sector of economy that is vital for the overall social and economic development of the country. The position of the agrarian sector in Serbia is specific, since, besides the economic importance, there is also a special social and ecological significance, and agriculture contributes to the national wealth with significant participation in the creation of GDP. Animal insurance involves a large number of risks and is classified as risk insurance. It belongs to the group of short-term insurance or insurance for up to one year, and even shorter. The subject of insurance is the animal itself, and not just certain parts of the animal's body or manufactures that can be obtained from it. The subject of this research is to examine the attitudes of the respondents regarding the necessity of animal insurance and the problems that arise in this case.

© 2019 EA. All rights reserved.

Introduction

Animal insurance in recent years is an increasingly frequent topic in agricultural holdings and farms. Despite careful and diligent breeding of domestic animals, farmers face a large number of unwanted events. Animals are prone to injuries, illnesses, and often occur and die. Also, in recent years, Serbia has been struggling with floods (floods in May 2014), and a large number of animals have been struck by water torrents. This is a big loss for farmers, or it causes high costs.

-
- 1 Tatjana Piljan, PhD, Assistant professor, Faculty of Business Economics and Entrepreneurship, Mitropolita Petra No. 8, 11000 Belgrade, Republic of Serbia, Phone:+381642535160, E-mail:tanja.piljan@gmail.com, ORCID ID: <https://orcid.org/0000-0003-2144-3073>.
 - 2 Tomislav Brzaković PhD, Full Professor, Faculty of Applied Management, Economics and Finance, Jevrejska No. 24, 11000 Belgrade, Republic of Serbia, Phone:+38163218220, E-mail:tomislavbrzakovicmef@gmail.com, ORCID ID: <https://orcid.org/0000-0001-9187-7251>.
 - 3 Jasmina Šmigić-Miladinović, PhD, Professor of applied studies, High Economic School Peć, Dositeja Obradovića nn, 38218 Laposavić, Phone:+381643376666, E-mail:jasnacs0411@yahoo.com, ORCID ID: <https://orcid.org/0000-0001-7059-5431>.

These circumstances can't be prevented, but domestic animals can be secured, and thus the farmers are provided with losses. The object of insurance of animals will be all domestic animals, cattle, sheep, goats, pigs and more often pets and dogs and cats are provided. Only healthy animals, that is, able-bodied animals for a particular purpose, are in good physical condition, animals that live in normal conditions and eat healthy, but above all the animals that are identified.

Livestock insurance belongs to the insurance of agriculture. This type of insurance is carried out by insurance companies that deal with non-life insurance. In Serbia, livestock insurance is underdeveloped. In general, a very small number of agricultural holdings are deciding on the conclusion of a livestock insurance contract. (Cogoljević et al., 2017)

Livestock manufactures is exposed to different dangers compared to plant production. An insurance contract is concluded on the basis of an oral or written offer, and it is concluded when the contractors sign the insurance policy. Animal insurance contracts are signed for a shorter period of up to one year or for a period longer than one year and are long-term animal insurance contracts. It often happens that contracts are signed for a shorter period of time, then they are extended from year to year.

The subject of the research in this research is the insurance of domestic animals. This insurance area in our country has not yet been developed individually. More attention is paid to ensuring crop protection than animal protection. In recent years, owners of dogs and cats have been increasingly choosing to provide their pets. It should be borne in mind that every larger farm should ensure its herds and in this way secures itself from possible risks or losses. The insured is entitled to receive compensation, if the secured case is realized. When the insured event occurs, the owner is obliged to take appropriate actions, both for the purpose of treatment, and in order to maximize the utilization of the saved remains in death/forced slaughter.

The main goal of the research is to show what people think about the insurance of domestic animals. It should also show the percentage of insured domestic animals in recent years in Serbia.

The basic task of this research is to find the answer to the question why there is no interest of the owners of domestic animals for their insurance? It should also be determined why this type of insurance is still linked to insurance in agriculture. It is then necessary to explore what role a state can have to contribute to the owners' interest in securing their domestic animals.

Independent variables in the survey are the owners of domestic animals by gender, age, education level and professional education. Dependent variable are the views on the need for domestic animals in the Republic of Serbia. Whether domestic animals will be insured depends primarily on the needs of the owner, conditions in which animals are raised, financial resources, offers of insurance companies, climatic conditions, etc.

The general hypothesis can be defined as: Insurance companies in Serbia should, through various insurance policies, motivate primarily farmers, and then the owners of pets to ensure their domestic animals from possible damage.

Specific hypotheses:

- Animal insurance provides financial protection against various risks characteristic of livestock production;
- It is necessary to harmonize domestic regulations on the insurance of domestic animals with the regulations of the European Union;
- The state must provide assistance when it comes to insurance of animals, through various subsidies and tax cuts for farmers;
- Farmers must take into account that their domestic animal insurance can greatly benefit and reduce the damage that is caused by any form of animal loss;
- With the entry of foreign insurers, the level of quality of insurance services raises and the conditions for further liberalization of the market are created;
- Changes in insurance can have a positive impact on the further development of the insurance market in Serbia and contribute to its accelerated approach to the European Union.

The concept of animal insurance

Animal insurance means the financial protection of the owners of animals from the various risks that occur in the breeding of animals. The subject of this insurance is all farmed domestic animals (cattle, sheep, goats, pigs, poultry, horses), as well as pets such as dogs, cats, parrots. The insurance covers the risks of death or forcible slaughter of animals caused as a result of: an accident (basic narrow cover), an accident or illness (a basic wider coverage). (Kočović, Šulejić, 2016)

The amount of insurance premiums will depend on the type of animal that is the subject of insurance, the number of animals to be insured, the conditions and the method of breeding the animal, the risks for which the animals are insured, as well as their estimated value and amount of coverage as defined by the contract.

Payment of the insurance premium can be done on a monthly basis, then quarterly, semi-annually or advance. If contracts and participation are detrimental when it comes to the normal death of the animal, it is possible that the owner will receive a discount on the insurance premium up to 50%. Then, depending on the number of insured throats and the method of payment of the premium, it is possible to achieve a discount of up to 30% on the basic insurance premium. (Piljan et al., 2015)

In the case of animal insurance, a number of additional benefits can be achieved. For example, for owners of animals who conclude an insurance contract and premium pay advance above a certain amount, additional benefits are provided in the form of free

insurance against the consequences of an accident. This insurance is usually given for a period of one year, and from the consequences of the accident, it is ensured by the complete agricultural holding or all its members.

The state also encourages animal owners to provide them by subsidizing this type of insurance. To the registered farms, the state repays a certain portion of the paid premium insurance, where the provisions are more closely defined by the competent ministry.

Domestic animal insurance. Livestock insurance belongs to the insurance of agriculture. This type of insurance is carried out by insurance companies that deal with non-life insurance. In Serbia, livestock insurance is underdeveloped. In general, a very small number of agricultural holdings (5-10% of the total number) are deciding on the conclusion of a livestock insurance contract.

When it comes to insurance of livestock in Serbia, the general conditions for livestock insurance adopted by a more successful insurance company are analyzed, while paying special attention to the way subsidies for insurance premiums for agriculture and livestock insurance are supported by the Government of Serbia.

On the other hand, considerable attention is paid to livestock insurance in Mongolia, India, Mexico and Ireland, which have defined livestock insurance programs that have contributed to the number of contracts concluded in this area. In Mongolia, this program is implemented through integrated risk insurance, in India this insurance is implemented at the level of the local community (villages), in Mexico through self-insurance funds and the so-called. Stop-loss reinsurance, and in Ireland, various programs for controlling animal diseases and their eradication are defined. (Manić, 2012)

It should be said that livestock insurance does not have the place that it should have in the field of agricultural insurance. And in the world, livestock insurance represents a relatively small segment of total agricultural insurance, even in highly developed countries.

Subject of insurance. In the case of plant manufactures, the subject of insurance is usually a product or a product, and in rare situations and a tree, in the case of animal protection, the animal is ensured in its entirety, and not products that give it to us, such as milk, eggs, wool, and skin.

Therefore, in the case of animal insurance, the animal itself is the subject of insurance, and not certain parts of the body or products that animals give us. (Brkanić, Katrinka, 2016)

Sick animals or animals that are prone to illness, as well as extinct and exhausted animals can't be provided. Also, the subject of insurance can't be domestic animals that are not in good physical condition or their living conditions are poor. (Stojković, 2018)

Types of insurance. Animal insurance is a special branch of insurance for agriculture. Given the many types of animals and the risks involved in cultivating them, this insurance occurs in various ways: (Žarković, 2016)

- basic insurance of animals,
- supplementary and special insurance and
- sample insurance for those types of animals and the risks that are being secured for the first time.

Supplementary types of animal insurance. Additional insurance of animals includes insurance of animals for which there is very little interest, that is, animals that are not covered by basic insurance, or specific situations in which animals can be found and which can be risky for their lives (death of animals during labor, etc.). (available at: www.general.rs)

Animal Insurance Status in the Republic of Serbia

On a global scale today, plant production insurance accounts for 90 percent of the total agricultural insurance premium.

Due to the emergence of new diseases that are currently present in animals, the need for livestock insurance is growing. In order to achieve complete economic protection, “a stronger link between farmers, insurance companies and the state is needed in order to create an integrated risk management system in livestock breeding”. (Marković, Jovanović, 2018)

It is considered that the costs of insurance of agriculture, that is crops, fruits and animals are almost negligible compared to the benefits of the farmers or the insured. Although theoretical views are different, in practice, in a large number of countries, animal insurance as a part of agricultural insurance is underdeveloped. The same situation is in Serbia where the insurance of animals is underdeveloped both in terms of volume, but also by type of protection.

Opportunities for insurance development in Serbia are much higher than the current level of development. The development of animal insurance in Serbia is now at a very low level, regardless of the support of the state and the introduction of subsidies on the insurance premium. It further indicates that the subsidy it holds is not sufficient to achieve a greater expansion of animal insurance in our market. (Piljan, Cogoljević, 2015)

Insurance is primarily necessary for the development of agriculture in general, but also for rural development of the country, but above all in order to ensure food safety. This is especially important in domestic conditions, primarily due to the fact that rural areas make up as much as 85% of the total area of our country, that the percentage of agriculture in the gross domestic product is large, but also in the export and overall employment of the population.

The results of the last census in agriculture in 2012 show that there are 631,522 agricultural holdings in Serbia, of which 99.5% are family farms that are also food security operators.

Looking objectively, the need for animal insurance exists and is very pronounced, given the fact that plant and animal production in Serbia is exposed to numerous risks, which are increasing year after year, especially when it comes to climate change. (Radivojević et al., 2018)

The subjective need for securing agriculture in domestic conditions isn't sufficiently developed due to low payment power, that is, economic underdevelopment of agricultural entities, as well as low awareness of the importance of insurance. The underdevelopment of agricultural insurance on the micro level determines its underdevelopment in the macro level, as a result of the underdevelopment of agriculture, as an economic activity of national importance.

Analyzes of the four largest insurance companies in Serbia that together cover the entire agricultural insurance market in the Republic of Serbia, in addition to the basic conditions, there are also numerous conditions for insurance of crops and fruits, but also for animal insurance.

Regarding the special conditions for the insurance of crops and fruits, it is necessary to look at the insurance of seed corn from the loss of seed quality due to autumn frost, the insurance of table grapes from loss of quantity and quality, ensuring the trees of fruit trees and vineyard vineyards, as well as in the genus, and there is also a trial of rapeseed winter rape.

Based on this analysis of agricultural insurance in our market, we come to the conclusion that the most significant risks of plant and animal production are covered by the conditions of insurance of agriculture of insurance companies operating in the territory of the Republic of Serbia. What can be said that the lack of these insurances is the insurance against drought and loss of income due to drought, which is offered only by one insurance company in the Republic of Serbia.

The state of Serbia, in cooperation with the Ministry of Agriculture, regress the agricultural insurance premium starting in 2006. Number of agricultural holdings, which are in the period from 2006-2015. used the right to a premium for agricultural insurance premiums, it was very variable. In the last observed year, 2015, the right to regress insurance premium was realized by 19,799 agricultural holdings, 18,268 farms for insurance of plant production, and only 1,531 farm for animal insurance.

It is clear that 19,799 agricultural holdings were provided in 2015, which represents only 3,13 percent of the total number of agricultural holdings in the Republic of Serbia. The total number of agricultural holdings in the Republic of Serbia was determined in the last agricultural census in 2012 and amounts to 631,552 households.

In order to develop insurance in agriculture in the territory of our country, it is necessary to introduce partially compulsory insurance in agriculture. It is therefore necessary to define this type of insurance legally as partially mandatory, as well as to adopt a strategy for the development of agricultural insurance in the Republic of Serbia. The proposed model of partially compulsory agricultural insurance is based on

public-private partnership, and its implementation would enable the development of agricultural insurance, but also provide the necessary financial resources for ongoing and investment financing of this important economic activity.

Partially compulsory insurance of agriculture implies compulsory insurance of agriculture for all agricultural entities, users of some state resource, from those risks that are most represented in a certain area.

According to the suggested model, insurance of agriculture should be mandatory:

- a. for users of incentive funds for the development of agriculture that are paid from the republic, provincial or local government budgets;
- b. for users of loans that are granted with subsidized interest from the state budget;
- c. for users of loans approved by state financial institutions and which are placed at low (subsidized) interest;
- d. for tenants of state agricultural land.

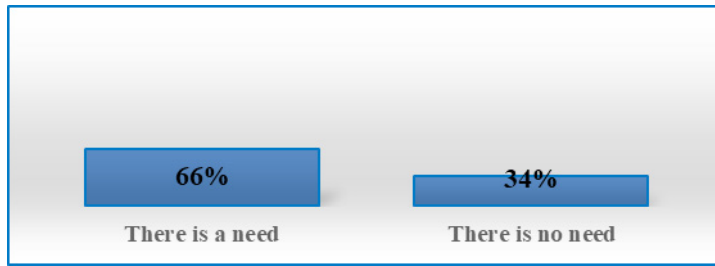
Agricultural insurance should take place in Serbia in the modern market economy. Modern, market-oriented agriculture can not even be imagined without well-organized and developed insurance. The perspective of the development of agricultural insurance in domestic conditions should imply a much more active role of the state than so far.

The state role could also be seen in the introduction of partially compulsory insurance of agriculture, as well as in securing funds from the agrarian budget for higher subsidies of insurance premiums. At the same time, insurance companies should play a key role in the domestic agricultural insurance market through the development of supply and demand, as well as in informing and educating agricultural entities on the importance of economic protection of their production.covered

Results

For needs of this research was carried out on the attitude and opinion of the citizens of Lazarevac regarding the insurance of an animal. The survey was conducted at the territory of Lazarevac municipality, by survey method. The aim of the survey is to find out how much animal insurance is in our country, primarily in this city. 70 people were surveyed, 38 of whom (54%) were men and 32 (46%) women. Of the 70 respondents, aged 20-30, there were only 14%, aged between 31-40 years 19%, age 41-50 years 31%, then 51-60 years old 26% and age 61-70 years 10% which implies that the highest percentage of surveyed mature people. Regarding education in the sample, 4% were interviewed with elementary education, 29% had secondary education, 40% were with higher education, and 27% had higher education. 10% of students participated in the survey, 54% were employed, 20% were surveyed and 16% retirees.

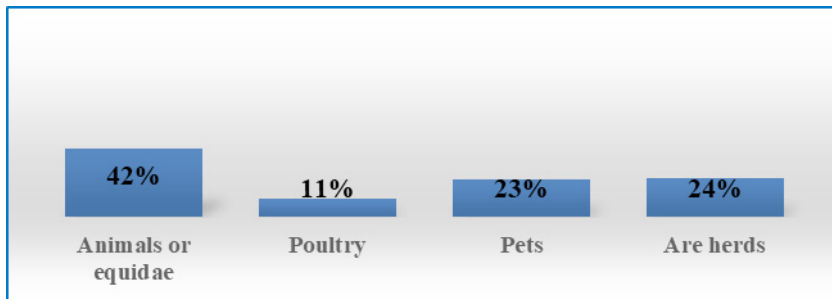
Figure 1. Needs for animal insurance



Source: Authors' calculations

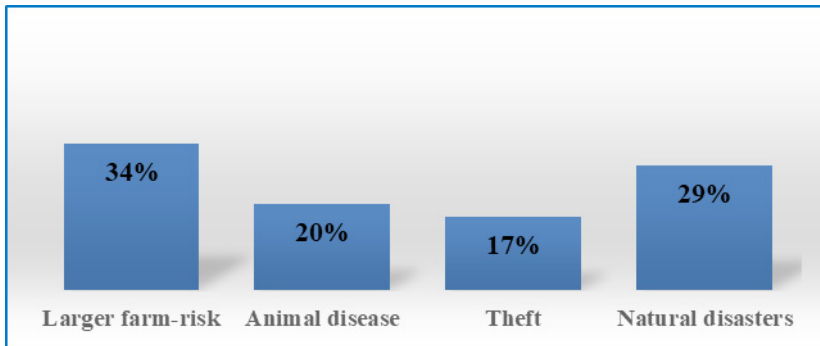
The first question was about attitudes on animal insurance. 66% of the respondents expressed their opinion on the need for animal insurance, while 34% of the respondents considered it unnecessary to provide cattle, which is, first of all, not profitable for the owner of the agricultural household. Respondents who believe that there is a need to provide animals, primarily cattle on farms, do not see much benefit from it, but it is definitely one type of protection for the owner.

Figure 2. Animals that are subject to insurance



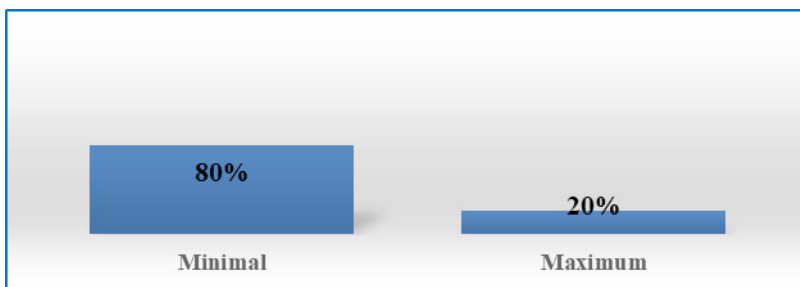
Source: Authors' calculations

The next question was about which animals are the subject of insurance, or which animals are most often insured with us. The situation is as follows: 42% of the respondents consider that the most commonly used are domestic animals or equidae, primarily horses, which are among the most expensive animals on the farm, then cows and cattle. The following species of animals, which are most often assured in the opinion of the respondents, are herds (sheep, goats), and 24% of those who are washed out have been declared for this. The following group includes pets, above all dogs, which in recent years are increasingly subject to insurance when the animals are in question and that is considered by 23% of those surveyed, and finally, the last group is poultry or feathered animals, or 11% of the respondents said that way.

Figure 3. Reasons why owners decide to insure animals

Source: Authors' calculations

Some of the most common reasons why owners decide to secure their animals are the following: the risks of large farms, animal diseases, theft and weather. 34% of the respondents consider that the main reason why the owners insure their animals is to cover the loss, especially when it comes to larger farms with a large number of animals. The following reason is a natural disaster. We are witnesses that in recent years our country has often been hit by floods and landslides. After the May 2014 floods that affected our country, most notably the Municipality of Obrenovac, many owners of the households wondered if they could find themselves in such a situation tomorrow. A large number of animals were killed in May's floods, and even less than 2% of them were insured. 29% of the respondents consider that the reason why it is necessary to provide animals of natural disasters. The next reason is animal disease, and 20% of the respondents said that, while the theft of domestic animals is the last one for a variety of reasons, which is why it is necessary to ensure that 17% of the respondents consider it.

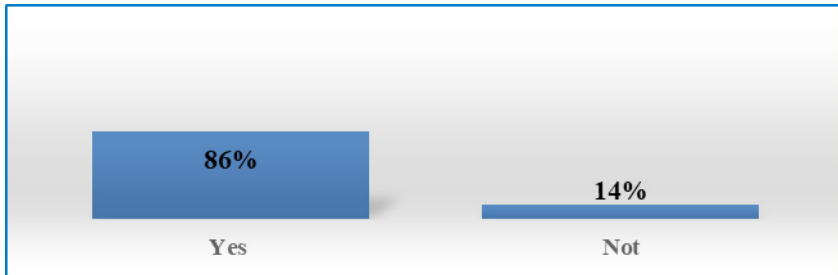
Figure 4. The degree of popularity of animal insurance in Serbia

Source: Authors' calculations

The next question in the survey concerns the “popularity” of domestic animal insurance in our country. The question arises, is the insurance of animals in our country in general. According to the data 80% of the respondents believe that the insurance of animals in our country is at the minimum, while 20% of the respondents consider that domestic

animals are often provided as part of insurance in agriculture, but only in serious agricultural farms, which animals exploit the animals.

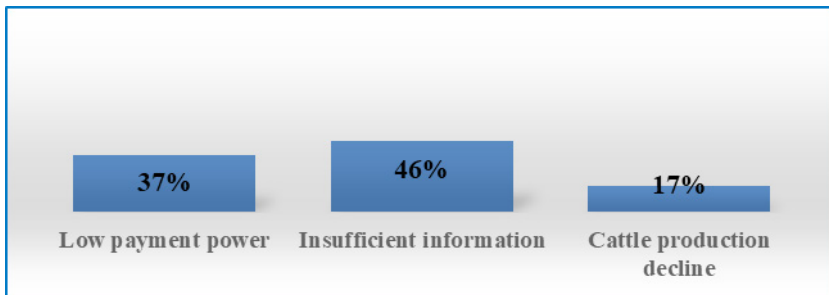
Figure 5. Easy and simple insurance decision



Source: Authors' calculations

The next question was about whether people easily decide to provide animals and whether they are assisted by an expert or someone who is more concerned about the positive aspects of animal insurance. Based on the information we received, it is clear that people find it difficult to secure their animals and thus consider 86% of those surveyed, while 14% consider that if all the conditions are specified by the insurance company and if the state is included with subsidies, so that people can easily decide to secure their domestic animals.

Figure 6. The reason for insufficient development of animal insurance in Serbia

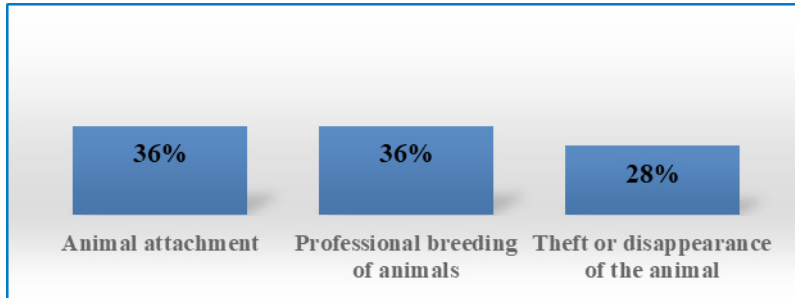


Source: Authors' calculations

What is the biggest reason why owners do not insure their animals was the next issue. Out of the total number of examinees, 46% think that one of the main reasons is insufficient information about the importance and need for animal insurance. The next reason is a relatively low payment power, and this is considered by 37% of respondents, while 17% consider it to be the reason for the drop in the volume of livestock production. All of the above reasons lead to the fact that the insurance of animals in our country is negligible, and that in a number of agricultural insurance, it is much more popular and demanding insurance of crops and fruits. That people aren't informed about how much animal insurance is needed and useful, is the fact that they often do not know that this type of insurance exists. Insurance companies, in cooperation with the state that would

subsidize this type of insurance, should organize education and lectures on the topic of usefulness of animal insurance, in order to teach the owners of all the positive aspects and benefits that they can have.

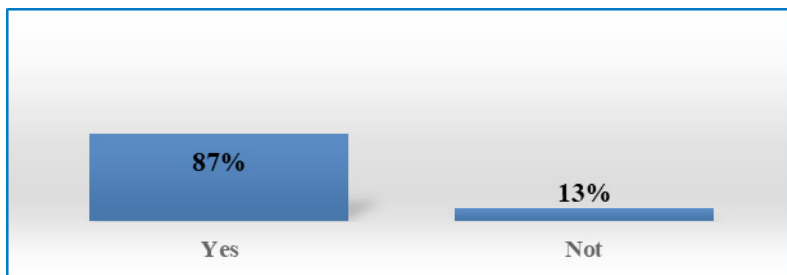
Figure 7. Why owners insure pets (dogs)



Source: Authors' calculations

In recent years, it has become increasingly common for owners to provide their pets, primarily dogs. What are the reasons why owners insure pets was a question in the survey. Opinions on pet insurance were given, so 36% believe that the main reason for animal attachment, that is, personal reasons, the same percentage 36% believe that the reason is in fact professional breeding of animals, and 28% of the respondents consider that the reason for the insurance of pets theft or the disappearance of an animal.

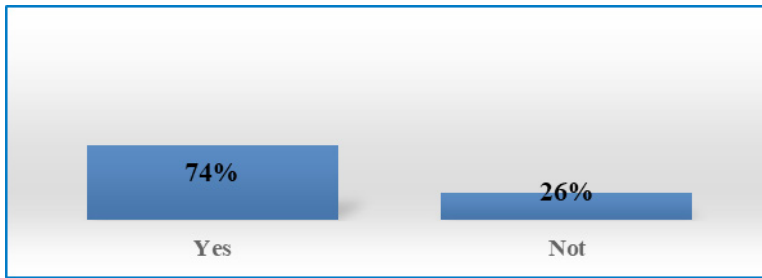
Figure 8. The state encourages owners to insure animals



Source: Authors' calculations

The next question was whether the state was involved when it comes to animal insurance, or whether it encouraged owners to insure animals. The subsidies given by the state to farmers in agricultural holdings are State aid and this is the reason why 87% of the respondents stated that the state is helping the owners, while 13% think that the state is not involved or not sufficiently and that is the main reason why animal insurance in our country on the other.

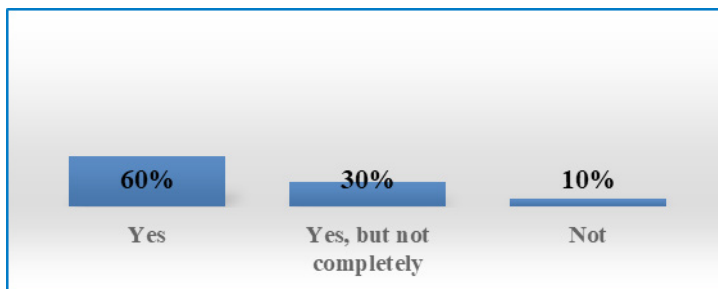
Figure 9. The need for changing the legal regulations



Source: Authors' calculations

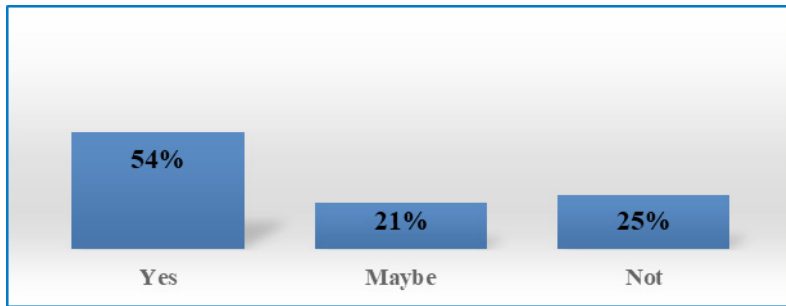
The next question was whether there was a change in legislation when the insurance of animals concerned helped. If it is necessary to change the laws or certain legal items when the insurance of animals is in question, 74% of the respondents consider it, while 26% think that there is no need to change the law, but that the state needs to influence the change of attitudes of the farmers, take the measures needed to motivate owners and see the need for animal insurance.

Figure 10. State subsidies solve the problem



Source: Authors' calculations

One of the last questions in the survey was whether subsidies given by the state would solve the problem. The answers we received from the respondents say that 60% of the respondents consider the influence of the state, ie the subsidization, will help and encourage farmers to ensure the animals, 30% think that the situation would change for the better, but not to a large extent, and 10% of the respondents think that the state's influence would not help solve this problem, due to the underdevelopment of agricultural production or the small profits that farmers have.

Figure 11. Improvement of animal insurance in the future

Source: Authors' calculations

In the end, the last question in the survey was the attitude of the respondents about the improvement when the insurance of the animals concerned. In the future, the situation in this area will change for better considered 54% of respondents, 25% think that nothing will change greatly from the current situation, while 21% of the respondents remain optimistic about the insurance of animals in our country.

Conclusions

In the Republic of Serbia, insurance of agriculture is in the category of insufficiently developed insurance. The perspective of its development in domestic conditions should also imply a much more active role of the state than so far.

The main objective of animal insurance is the economic protection of animal owners who keep healthy animals, while ensuring that all conditions are met for the quality cultivation of animals and the exploitation of their products.

Although the animals are insured against certain risks, this doesn't relieve the insured of the obligation to approach the production with the care of a good host, as the Law prescribes as obligatory relations.

Due to the many risks and types of animals, animal insurance occurs in various forms: basic insurance, a large number of supplementary and special insurance, sample insurance for certain types of animals that are being insured for the first time, or for the dangers for which the insured is covered for the first time.

Animal insurance belongs to short-term insurance that lasts a year or less and is usually linked to a single production cycle. The subject of insurance is an animal in its entirety, and not a product or part thereof. Insurance coverage can only be provided for animals of certain ages, which are healthy, in good condition and cultivated under acceptable conditions.

The importance of agricultural insurance is also reflected in the provision of economic protection to farmers against various adverse effects arising from the risks involved in insurance. Agricultural insurance is an important factor in the protection and improvement of agricultural production.

One of the good solutions that could accelerate the market is a model in which a country's obligation to obtain a subsidy in agriculture by the state would be obliged to pre-contract appropriate insurance coverage.

It concludes that only positive engagement and synchronized action by the public sector and the insurance industry can make visible positive progress in this area. Insurers in their domain should offer the market an adequate product in terms of comprehensiveness (higher risk coverage), clear and simpler definition of insurance and tariff conditions and easier accessibility for insureds, which will be unambiguous to everyone, including agricultural producers, the state sector and the industry insurance.

Following the example of the developed world markets, the second part of the job would have to be taken over by the state through appropriate subsidization schemes, models of public-private partnership for the adoption of appropriate laws and by-laws in this area.

In the coming time, the establishment of quality cooperation between the insurance industry and the public sector to improve the current situation in the Republic of Serbia will be crucial for the exploitation of development opportunities that certainly exist in this extremely important area.

The state role could also be seen in the introduction of partially compulsory insurance of agriculture, as well as in securing funds from the agrarian budget for higher subsidies of insurance premiums. At the same time, insurance companies should play a key role in the domestic agricultural insurance market through the development of supply and demand, as well as in informing and educating agricultural entities on the importance of economic protection of their production.

The proposed model of partially compulsory agricultural insurance is based on public-private partnership, and its implementation would enable the development of agricultural insurance, but also provide the necessary financial resources for ongoing and investment financing of this important economic activity.

Through empirical research, a general hypothesis was confirmed that insurance companies in Serbia should, through various insurance policies, motivate farmers, and then pet owners to provide their domestic animals against possible damage.

In addition to the general hypothesis, research has also confirmed the specific hypotheses that animal insurance provides financial protection against the various risks characteristic of livestock production, that it is necessary to harmonize domestic regulations on the protection of domestic animals with EU regulations, that the state must provide assistance when the insurance of animals is concerned, through various subsidies and tax deductions for farmers, that farmers must take into account that their domestic animals can benefit greatly from them and reduce the damage caused by any form of animal loss, that the entry of foreign insurers raises the level of quality of insurance services and creates the conditions for further liberalization of the market, that changes in insurance can have a positive impact on the further development of the insurance market in Serbia and contribute to its accelerated approach to the European Union.

Conflict of interests

The authors declare no conflict of interest.

References

1. Brkanić, M., & Katrinka, Z. (2016). *Animal insurance - Practice guide for insurance and reinsurance*, DDOR Novi Sad, Novi Sad.
2. Cogoljević, D., Piljan, I., & Piljan, T. (2017). *Insurance*, Faculty of Business Economics and Entrepreneurship, Beograd.
3. Generali ad, General animal welfare conditions, available at <http://www.general.rs>. (16.01.2019)
4. Kočović, J., & Šulejić, P. (2016). *Insurance*, Center for publishing at the Faculty of Economics, Beograd.
5. Manić, V. (2012). Insurance in agriculture: the role of the public sector, the insurance industry and development directions, *Second Agricultural Forum: Food for Europe - to meet the new Strategy for the development of agro-tourism in Serbia*, Subotica.
6. Marković, T., & Jovanović, M. (2018). Livestock Insurance as a Factor of Economic Stability in the Agriculture, *Contemporary Agriculture*, Vol. 59, No. 3-4., Madison, USA.
7. Piljan, I., & Cogoljević, D. (2015). The insurance market of Serbia from 2005 to 2014, *Entrepreneurship: Economic development and finance*, No.1-2, p.435-451, Faculty of Business Economics and Entrepreneurship, Beograd.
8. Piljan, I., Cogoljević, D., & Piljan, T. (2015). The role of insurance companies in the financial market, *International Review*, No.1-2, p.94-102, Faculty of Business Economics and Entrepreneurship, Beograd.
9. Radivojević, N., Ćurčić, N., & Marčetić, M. (2018). Quantifying extreme market risks in selected Western Balkan countries, *Industry*, Vol.46, No.2, p.99-115, Economic institutes, Beograd.
10. Stojković, V. (2018). *Cattle security*, Printing office "Sveti Sava", Beograd.
11. Žarković, N. (2016). Agriculture insurance in Serbia - Inadequately developed, and even less used, *Farmers' agricultural calendar*, Novi Sad.

**PAPER TITLE – USE CAPITAL LETTERS, CENTER, BOLD, TIMES
NEW ROMAN, SIZE 12**

First Author Name (10pt italic, center align)¹, First Co-Author Name (10pt italic, center align)², Second Co-Author Name (10pt italic, center align)³

**Corresponding author E-mail: (10pt italic, center align)*

ARTICLE INFO	ABSTRACT
Original/Review Article	The abstract should contain a maximum of 150 words.
Received: <i>xx May 2018</i>	The abstracts should avoid any abbreviations and mathematical formulas.
Accepted: <i>xx September 2018</i>	The abstract is a summarization of the full report, written in one paragraph, and should include next elements:
doi:xxx	
UDC xxx	1. Purpose
	2. Methodology
	3. Results
	4. Conclusions
	5. Recommendations
	6. Additional data
Keywords:	
<i>should include 4-6 key words that summarize the contents of the paper /Times New Roman, Italic, 10/</i>	
JEL: (www.aeaweb.org/jel/jel_class_system.php) /Times New Roman, Italic, 10/	
	© 2018 EA. All rights reserved.

Introduction

Page setup: Paper size: width 170 mm x height 240 mm; Margins: top/bottom 20 mm, left/right 18 mm; Layout: header 1,25cm, footer 1,25cm; Orientation: Portrait.

Articles should be written only in English. It is advisable to write the article in the third-person singular or plural with the use of active form. Before paper submission, please check grammatical and spelling mistakes by the spellchecker for the English language.

Paper volume up to 30.000 characters (without spaces) or 15 full pages including the text, figures, tables, references list and appendices. Articles should not be shorter than 10 pages. Depending on papers' quality, Editorial Board could also accept longer articles. Article has to be prepared electronically (on computer), in program MS Word 2003 or some later version of this program.

-
- 1 Name, academic position, institution, address, phone number, e-mail, ORCID ID (<https://orcid.org/>)
 - 2 Name, academic position, institution, address, phone number, e-mail, ORCID ID (<https://orcid.org/>)
 - 3 Name, academic position, institution, address, phone number, e-mail, ORCID ID (<https://orcid.org/>)

Introduction is the first section of an IMRAD paper. Its purpose is to state clearly the problem investigated and to provide the reader with relevant background information. State the objectives of the work and provide an adequate background, avoiding a detailed literature survey or a summary of the results.

The purpose of the Introduction should be to supply sufficient background information to allow the reader to understand and evaluate the results of the present study without needing to refer to previous publications on the topic. Much of the Introduction should be written in the present tense. /Times New Roman, 11/

Please define abbreviations and acronyms during their first occurrence within the text, even in case that they were previously defined in article summary. Do not use abbreviations in article title, unless they can not be avoided.

Sub-headings should be written by font **Times New Roman, font size 11, bold, centred**, only first letter capital, interspace between sub-heading and paragraph above 6 pt (**before 6 pt**), and interspace between sub-heading and paragraph below 6 pt (**after 6 pt**). Please use the writing style presented in this template.

Materials and methods

Materials and methods are the second section of an IMRAD paper. Its purpose is to describe the experiment in such detail that a competent colleague could repeat the experiment and obtain the same or equivalent results. Provide sufficient detail to allow the work to be reproduced. Methods already published should be indicated by a reference: only relevant modifications should be described.

For equations and formulas use the Microsoft Equation Editor or addition for equations writing MathType (www.mathtype.com). Use of built-in equation editor within the program Word 2007 is not recommended. Please check if all symbols within the equations/formulas are defined (forthwith after equation/formula). The equations are written using Microsoft Word (MathType); they are consecutively numbered and centered.

Results

Results are the third section of an IMRAD paper. Its purpose is to present the new information gained in the study being reported. It should be clear and concise. The Results are core of the paper. You shouldn't start the Results section by describing methods that you inadvertently omitted from the Materials and Methods section. The Results must be written in past tense.

Discussions

The final section of an IMRAD paper. Its purpose is to fit the results from the current study into the preexisting fabric of knowledge. The important points will be expressed as conclusions. This should explore the significance of the results of the work, not repeat them. A combined *Results and Discussion* section is often appropriate. Avoid extensive citations and discussion of published literature.

Many papers are rejected by journal editors because of a fault Discussion.

Conclusions

The main conclusions of the study may be presented in a short Conclusions section, which may stand alone or form a subsection of a *Discussion* or *Results and Discussion* section. Conclusions should provide a summary of important findings and their implications to the area of research that is the focus of the article.

Acknowledgements

Collate acknowledgements in a separate section at the end of the article before the references and do not, therefore, include them on the title page, as a footnote to the title or otherwise. List here those individuals who provided help during the research (e.g., providing language help, writing assistance or proof reading the article, etc.). They should be brief.

Conflict of interests

The authors declare no conflict of interest.

References

All manuscripts should be formatted using the [American Psychological Association \(APA\)](#) citation style. For additional examples, consult the most recent edition of the Publication Manual of the American Psychological Association.

Reference (author(s) of quotes) has to be entered directly in the text of article in next form (Petrović, 2012; or Petrović, Marković, 2012; or Mirković et al., 2012). Please do not write them as indexes in square brackets [3] or in footnote. Try to use a footnote only in the case of closer explanation of certain terms, or clarification of real and hypothetical situations. ***Do not numerate the pages.***

Reference list should only include works that have been published or accepted for publication. Unpublished works should be only mentioned in the text. Reference list should be with the bibliographic details of the cited books, book chapters, or journal articles.

References in not-English languages should be translated in English, and the original language has to be mentioned in brackets, for example: Maksimović, G., Sekulić, D., Petrović, A., & Dragičević, D. (2017). Contemporary trends and new competitiveness strategies in hotel industry. *Hotel and Tourism Management*, 5(2), 27-35. [*in Serbian: Maksimović, G., Sekulić, D., Petrović, A., & Dragičević, D. (2017), Савремени трендови и нове стратегије конкурентности у хотелијерству*].

Literature units have to be written in font TNR, font size 11, alignment Justified, with mutual interspace of 3 pt - before/after. In all literature units only surnames are written as a whole, while all authors' names has to be shorten on to initial (initials have to be set after surnames). Please, write surnames of all authors (do not use the style

Petrović et al.). Do not combine literature units (under each ordinal number can be only one literature unit) and always write complete titles of used literature units. If used/cited literature was taken over from the internet publication, after adequate writing of literature unit, in brackets has to be note complete link from which material was taken over (available at: www.fao.org).

Citation of Books

Author's surname Initial(s) of the given name(s). (Year of Publication) *Title of Book*, Volume number (if relevant), edition (if relevant). Publisher, Place of Publication

Citation of Articles

Author's surname Initial(s) of the given name(s). (Year of publication) Title of article. *Journal Volume number* (and issue number if issues within a volume number are not consecutively paginated): Number of first and last page of article, DOI

If the cited paper is given a DOI number, it should also be included.

Citation of Websites

Author's surname Initial(s) of the given name(s). (if known) title, type of document (if relevant), date of issue (if available), web address and date of access, if the document or the website may be subject to change.

Citing a journal article found online

Author, A. (Publication Year). Article title. Periodical Title, Volume(Issue), pp.-pp. DOI:XX.XXXXX or Retrieved from journal URL

Example:

1. Cvijanović, D., Trandafilović, S., & Imamović, N. (2013). Marketing concept in terms of agricultural enterprises development in transitional countries. *Economics of Agriculture*, 60(1), 113-122.
2. Hjalager, A. M., & Richards, G. (Eds.). (2003). *Tourism and gastronomy*. Routledge, London.
3. Mićović, A. (2017). Tourism Development and Evolution of Tourism Related Rules, *2nd International Scientific Conference – Thematic Proceedings II*, Faculty of Hotel Management and Tourism, Vrnjačka Banja, 181-202. Retrieved from http://www.hit-vb.kg.ac.rs/conference/images/thematic_proceedings/2017_II.pdf
4. Stošić, L., & Stošić, I. (2013). Diffusion of innovation in modern school. *International Journal Of Cognitive Research In Science, Engineering And Education (IJCRSEE)*, 1(1), 12-24.

5. Domanović, V., Vujičić, M., & Ristić, L. (2018), Profitability of food industry companies in the Republic of Serbia, *Economic of Agriculture*, 65(1), 11-32. doi:10.5937/ekoPolj1801011D
6. The Food and Agriculture Organization of the United Nations (FAO), Retrieved from <http://www.fao.org> (July 31, 2018)

TABLES AND FIGURES

All tables are to be numbered using Arabic numerals.

Tables have to be created within the text of article, not taken in the form of images from other documents. Tables should be numerated according to order of their appearance. Titles of the tables have to be given immediately above the table to which they relate. Please use following style during their formatting. Title of the table should be set with the interspace 6 pt - before and 3pt - after, in font TNR, font **size 10**, alignment **Centered**. Text within the table should be written in the font TNR, font size 9. Bold the text in the heading. Start with next paragraph at the interspace of 6 pt from the table source or note (after). During the article writing please mark in the main text all calls to a certain table (*Table 5.*). Try to fit all tables in article within the specified format of the page (Table properties – preferred width – max 97% - alignment: center). Complete text within the table cells has to be entered in next form (paragraph - spacing: before/after 0 pt, line spacing: single). In case when table breaks on next page, broken part of the table on next page has to be accompanied by a table header.

Identify any previously published material by giving the original source in the form of a reference at the end of the table caption.

Footnotes to tables should be indicated by superscript lower-case letters (or asterisks for significance values and other statistical data) and included beneath the table body.

For the best quality final product, it is highly recommended that you submit all of your artwork – photographs, line drawings, etc. – in an electronic format.

Example:

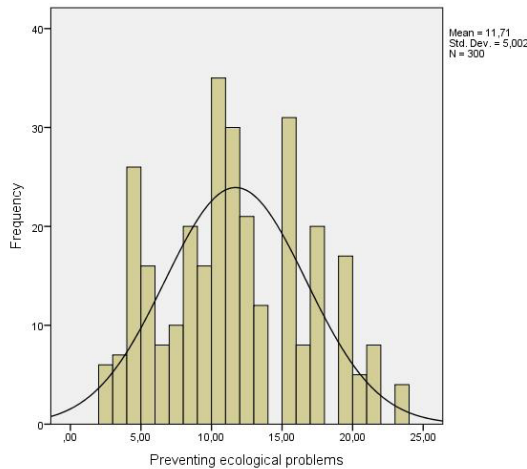
Table 1. The distribution cost of packaged goods from Subotica to retail-store objects

Indicators	Period			Total
	Month 1	Month 2	Month 3	
Distance crossed (km)	12.926	11.295	13.208	37.429
Fuel consumption (litre)	3.231	2.823	3.302	9.356
Value of fuel consumption (RSD)	242.378	211.790	247.653	701.821
Total time spend on touring (hour)	314	266	417	997
Value of total time spend on touring (RSD)	47.048	39.890	62.570	149.508
Number of tours	98	77	102	277
Toll value (RSD)	0	0	0	0
Number of pallets transported (piece)	1.179	976	1358	3.513
Total weight transported (kg)	602.600	429.225	711.116	1.742.941
Vehicle maintenance costs (RSD)	203.858	164.970	224.806	593.634
Lease costs (RSD)	480.938	454.214	565.784	1.500.936
Total sum (RSD)	974.222	870.864	1.100.813	2.945.899

Source: Petrović, 2012

All illustrations whether diagrams, photographs or charts are referred to as Figures. The name and number of figures should be centered on the line above a figure.

Figure 1. Agriculture, value added (% of GDP)



Source: Authors' calculations

Technical preparation, prepress and printing:

DIS PUBLIC D.O.O., Braće Jerković 111-25, Belgrade, phone/fax: 011/39-79-789

Number of copies:

300 copies



The Balkan Scientific Association of Agrarian Economists, Belgrade, Serbia, Institute of Agricultural Economics, Belgrade, Serbia and Academy of Economic Studies, Bucharest, Romania is pleased to announce that journal **ECONOMICS OF AGRICULTURE** has been accepted for indexing in the *Emerging Sources Citation Index (ESCI)*, a new edition of Web of Science.

Content in ESCI is under consideration by Clarivate Analytics, the owner of Web of Science, for additional indexing on the platform, including for the Science Citation Index Expanded, the Social Sciences Citation Index, and the Arts & Humanities Citation Index.

The quality and depth of content Web of Science offers to researchers, authors, publishers, and institutions sets it apart from other research databases. The inclusion of **ECONOMICS OF AGRICULTURE** in the Emerging Sources Citation Index demonstrates our dedication to providing the most relevant and influential **economics of agriculture** content to our community.

You may find necessary information on the following link:

<http://mjl.clarivate.com/cgi-bin/jrnlst/jlresults.cgi?PC=MASTER&ISSN=0352-3462>

Published quarterly

Journal is registered in major scientific databases:

- Web of Science (Clarivate Analytics) – Emerging Sources Citation Index (ESCI)
- EBSCO
- DOAJ
- ERIH PLUS
- AgEcon Search
- Social Science Research Network (SSRN)
- ProQuest
- Library of Congress E-Resources Online Catalog
- Ingenta Connect
- Ulrich's Periodicals Directory
- CABI
- J-Gate
- The World Wide Web Virtual Library for European Integration
- SCIndeks
- The digital repository of the National Library of Serbia
- doiSerbia
- EconLit
- WorldCat

EconLit Journal is indexed in major scientific databases:

- Index Copernicus Journals Master List (ICV2013: 5,22).

CIP - Каталогизација у публикацији
Народна библиотека Србије, Београд

33:63(497.11)

ЕКОНОМИКА пољопривреде = Economics of
Agriculture / editor-in-chief Drago

Свијановић. - Год. 26, бр. 5 (1979)- . -

Београд : Научно друштво аграрних економиста

Балкана : Институт за економику пољопривреде

; Букурешт : Академија економских наука,

1979- (Belgrade : Dis Public). - 24 cm

Тромесечно. - Је наставак: Економика
производње хране = ISSN 0352-3454. - Друго

издање на другом медијуму: Економика

пољопривреде (Online) = ISSN 2334-8453

ISSN 0352-3462 = Економика пољопривреде

(1979)

COBISS.SR-ID 27671

The Ministry of Education, Science and Technological Development of the Republic
of Serbia provides financial support for publishing of the quarterly journal
ECONOMICS OF AGRICULTURE

