

# DEVELOPMENT OF SOFT COMMODITY DERIVATIVE MARKET IN FUNCTION OF THE RISK MANAGEMENT IN CEE

VLADO KOVACEVIC<sup>1</sup>, JONEL SUBIC<sup>2</sup>, IRENA JANKOVIC<sup>3</sup>

**The summary:** *This aim of this paper is to analyse possibilities and potential effects of soft commodity derivative market on the development of risk management practice within the CEE. Agricultural producers and other participants in the soft commodity market in CEE are lacking local commodity market. As a consequence, they are relying on hedging strategies on remote derivative markets that results in basis risk. The local soft commodity derivative market with delivery in CEE ports could significantly improve the risk management practice. One of the most important barriers in developing commodity derivatives market is market liquidity. Joint commodity market between different commodity exchanges in the CEE could lead to increase of necessary liquidity. Attempts to develop commodity derivative markets in individual countries within the region were proven to be inefficient lacking the volume of trade. Methodology used in this paper is based on relevant literature review, consultation with experts in commodity trade and market participants and descriptive statistics applied in order to determine grain price volatility. Results of the research indicate that grain price volatility is high causing the need for application of hedging strategies at the commodity exchanges markets. Second, new EU common regulative is providing improved framework for joint commodity exchange clearing by single clearinghouse. Established market with delivery on Black Sea ports is of special importance for regional stakeholders.*

**Keywords:** *derivative commodity exchanges, hedging strategies, commodity market, futures contract, basis risk*

**Classification JEL:** *Q02, Q14, G23*

## INTRODUCTION

Derivative instruments represent financial innovations originally started in 70s of XX century and since then we are witnessing constant increase in trading volume. As the name of the derivative suggests, these securities are based on certain underlying assets, i.e. are created relying on characteristics of some other type of assets. As an underlying asset in derivative contracts the following real and financial asset classes may occur: commodities, foreign exchange, interest rates, other securities, weather indicators, market indices, etc. Change in the price of the underlying assets will affect the price of derivative securities. Derivative securities are divided into financial and commodity ones. Financial derivatives are created on: currencies, interest rates, other securities, market indices, etc, while commodity derivatives are created on precious metals, agricultural commodities, etc. (Kovačević et al., 2018).

Derivative securities are financial innovations that have emerged in recent decades primarily as a result of the increased agricultural commodity price volatility. Grain price volatility in the world and in Central and Eastern Europe creates necessity for the introduction of price risk management tools. One of the basic vehicles for the implementation of hedging strategies is derivative commodity exchange. Despite to the expressed need of agricultural producers in Central and Eastern Europe, this kind of market is not established in this region. Paper is analysing potential, optimal model and advantages of regional wheat and corn futures market for delivery on Black Sea ports.

Based on the organisation structure there are two commodity derivative markets – OTC and Commodity exchange.

OTC market is regulated to a lesser extent. Name of the OTC market derives from the abbreviation of words Over-The-Counter. This market is regulated to some extent by the rules of

---

<sup>1</sup> Vlado Kovacevic, PhD, Scientific Associate, Institute for Agricultural Economics Belgrade, email: kovacevic\_vlado@yahoo.com,

<sup>2</sup> Jonel Subic, PhD, Principal Research Fellow, Institute for Agricultural Economics Belgrade, email: jonel\_s@iep.bg.ac.rs,

<sup>3</sup> Irena Jankovic, PhD, Associate Professor, University of Belgrade - Faculty of Economics, email: irena.jankovic@ekof.bg.ac.rs

International Swaps and Derivative association (ISDA). The OTC market provides greater flexibility but also a higher counterparty risk.

Commodity exchange is organised derivative market with clearinghouse and trading in highly standardized derivative contracts.

All derivatives securities are in EU classified as financial instruments and regulated by common EU regulation mandatory to all member states. Main EU regulation concerning derivative markets are EMIR and MIFID II regulations.

The derivative markets have been affected by the 2008 financial crisis. Following the G-20 guidance, both US and EU policymakers issued specific harmonised legal framework with Dood Frank act and other world wide legal frameworks (Grossule, 2019).

It is characteristic of the commodity derivative market that trading of goods takes place in some period in the future, while physical delivery of goods usually does not happen, but derivative contracts are settled in cash between buyer and seller depending on the level of market price of underlying goods.

Futures contracts are highly standardised related to the purchase/sale of certain types of goods.

Given that futures contract delivery/settlement takes place in the future, there is a need to provide guarantees to trading participants that in the event of unfavourable price movements and potential losses on futures position will not give up the execution of the contract obligations. Therefore, for the functioning of futures market clearinghouse has essential role. Clearinghouse is managing monetary guarantees – margins deposited by the both the buyer and the seller. In order for the cash deposit to always be above the potential loss resulting from daily movement of the futures settlement price, the daily marking to market is provided based on which the cash is transferred from the accounts of the losing party to the counterparty in the contract. If funds on the margin account fall below the maintenance margin the trader must pay additional money to the level of initial margin (Karali et al., 2020).

The main function of commodity derivative market is in providing price risk management tools - hedging strategies (Belozertsov et al., 2011).

Hedging strategies are most often based on the trade in the futures contracts. Only 2% of agricultural commodity futures contracts are closed by the delivery of the goods. Most of the future contracts are closed by the financial settlements, resulting in two cash flows for hedgers, first actual sale of agricultural commodity at the local market and second profit/loss at the future markets. Essence of the hedging strategies is if the price fell at the delivery time at the spot market where the agricultural commodity is physically sold, the loss from planned hedged price will be compensate by the same amount of the profit at the future contracts, and vice versa if the spot price is above the hedged future price additional gain will be subtracted by the loss at the future market. End result will be that hedger will secure futures price, regardless of the price direction up to the future maturity date (Zakić, Kovačević, 2012).

Gains and losses on futures and spot position usually do not perfectly cancel out. Future basis represents the difference between the price on the spot market and the futures price in each particular moment until the maturity of the contract. Since these two prices are not perfectly positively correlated over time the basis risk emerges. It reflects the uncertainty of the movement of basis over time until the maturity of the contract.

Additional risk emerges from the fact that absence of local derivative market leads to CEE producers implements hedging strategies via more developed commodity exchanges in the world i.e MATIF exchange-Paris, CME-Chicago etc. Besides additional transactional costs that these international transactions may bring to local traders the main risk lies in the imperfect correlation between local and international grain prices but also local grain and foreign futures prices.

Thus, one of the main advantages of the regional derivative market for grain would be the reduction of the basis risk given that the prices at which farmers sell grain are highly positively correlated in the region and most of the regional export is contracted at the Black Sea ports.

Farmers in Central and Eastern Europe are without regional soft commodity derivative market. Individual efforts to establish soft commodity derivative exchanges within the Central and Eastern countries failed due to insufficient volume of trade. Due to the absence of the regional derivative soft commodity exchange, regional farmers are mostly using CME for hedging strategies. Grain price between BLACK See region and CME futures are not highly correlated having effect on potential deviation of planned hedging strategies results (Heigermoser et al., 2019).

As the sufficient trade volume is main precondition for sustainable and successful derivative commodity exchange, production of corn and wheat in the region is analysed. Second precondition is price volatility and this factor is analysed for potential participants in the Regional derivative commodity exchange – Romania, Hungary, Bulgaria and Serbia. Third precondition for development of the regional commodity derivative exchange is price correlation among participating countries (Kovačević et al., 2017).

## MATERIALS AND METHODS

Scientific methodology used for this Paper is desk research, literature review, consultations with potential participants in the Regional grain derivative market, consultations with the experts in the field of the marketing of agricultural products and risk management in the agricultural sector.

Data on production and prices are obtained from FAOSTAT database.

Applied statistical techniques include descriptive statistical analysis.

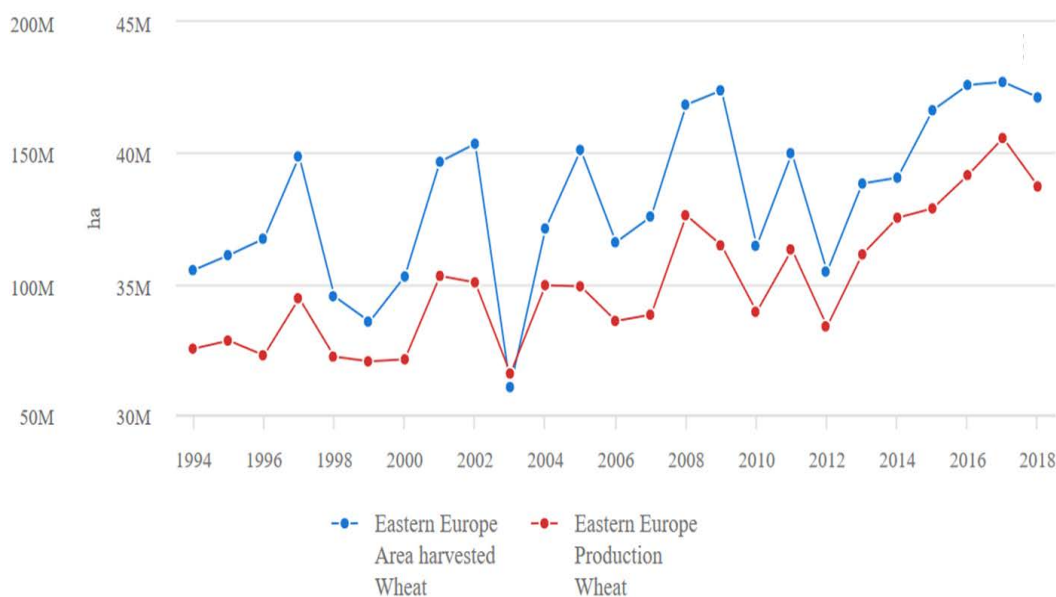
## RESULTS AND DISCUSSION

Research hypothesis are threefold.

First assumption is that there is sufficient grain quantity on the market for establishment of the sustainable derivative market. Second hypothesis is that grain price volatility is high affecting the high need for hedging strategies and trade at the derivative commodity exchange. Third assumption is that grain price correlation is high within the CEE region, causing that producers have common interest in joint regional derivative exchange and low basis risk environment.

The wheat production volume is high with constant increasement (Figure 1)

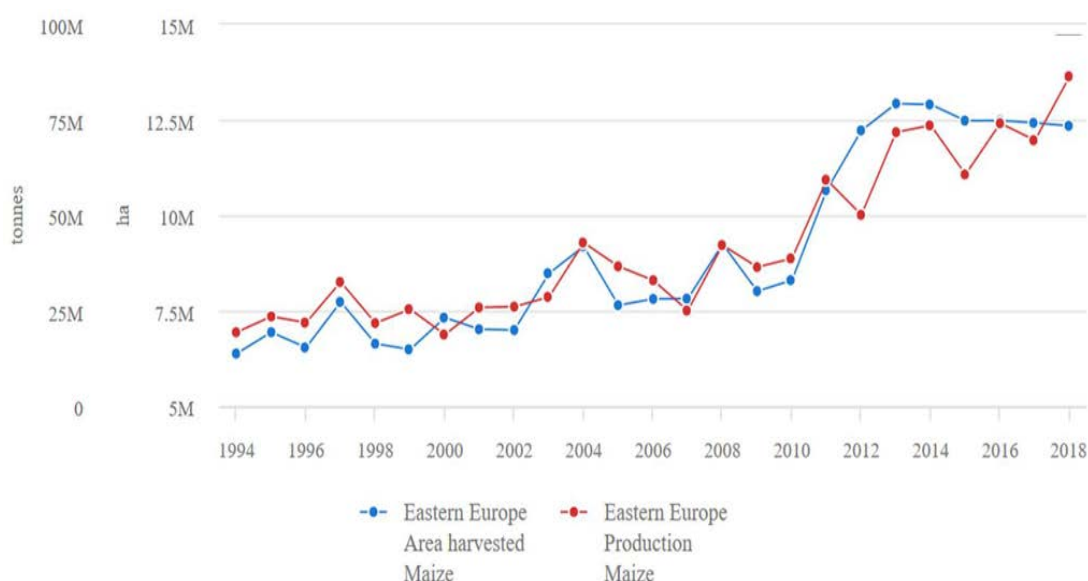
**Figure 1. Production of Wheat in the Eastern Europe, 1994-2018**



Source: FAOSTAT database

The corn production volume is high in CEE region with constant increasement (Figure 2)

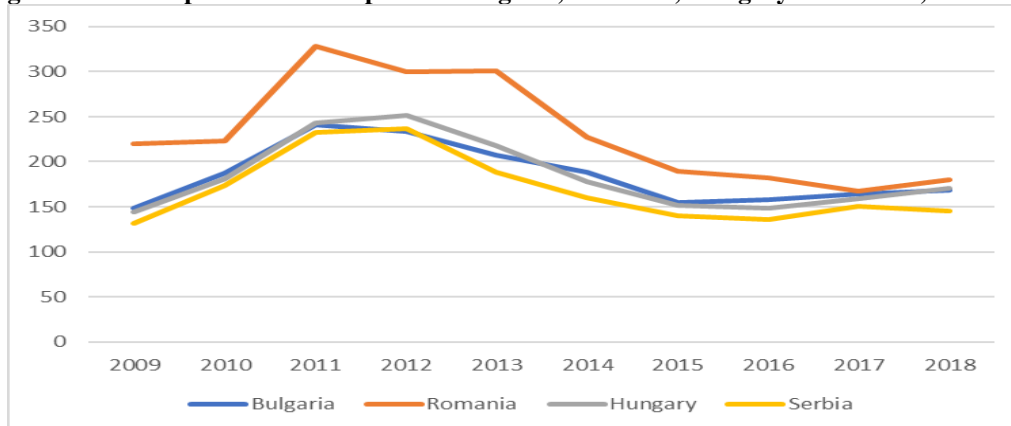
**Figure 2. Production of Corn in the Eastern Europe, 1994-2018**



Source: FAOSTAT database

As the grain price volatility is main driving force for development of soft commodity derivative exchanges, price volatility is analysed for Romania, Bulgaria, Hungary and Serbia (Figure 3 and Figure 4).

**Figure 3. Annual producers corn price in Bulgaria, Romania, Hungary and Serbia, 2009-2018**



Source: FAOSTAT database

In Table 1 descriptive statistics are provided for corn prices for four countries involved in the survey.

**Table 1. Corn price descriptive statistics - Bulgaria, Romania, Hungary and Serbia, 2009-2018**

	Bulgaria	Romania	Hungary	Serbia
Mean	185.21	231.83	184.67	169.38
Var	1074.181	3316.029	1560.867	1480.793
Stdev	32.7747	57.58497	39.50781	38.48107
Coefficient of variation	17.70%	24.84%	21.39%	22.72%

Source: Authors calculation based on FAOSTAT data

In Table 2. is presented correlation matrix for four countries involved in the survey.

**Table 2. Corn price correlation matrix - Bulgaria, Romania, Hungary and Serbia, 2009-2018**

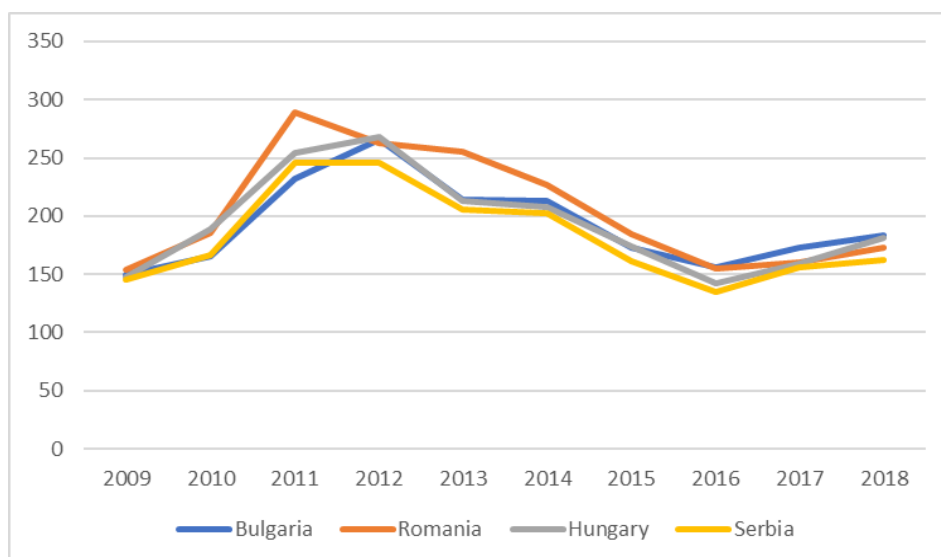
	Bulgaria	Romania	Hungary	Serbia
Bulgaria	1			
Romania	0.906552	1		
Hungary	0.984292	0.91024	1	
Serbia	0.981907	0.891854	0.982832	1

Source: Authors calculation based on FAOSTAT data

According to Table 2. price correlation is positive and very high, which is expected as corn is traded significantly in the region, and main export is organised through Black Sea ports in Romania.

Same analyses are performed for wheat with similar results as for corn. From Figure 4 can be concluded that wheat price is highly volatile in CEE.

**Figure 4. Annual wheat prices in Bulgaria, Romania, Hungary and Serbia, 2009-2018**



Source: FAOSTAT database

In Table 3. descriptive statistics is provided on corn prices for four countries involved in the survey.

**Table 3. Wheat price descriptive statistic - Bulgaria, Romania, Hungary and Serbia, 2009-2018**

	Bulgaria	Romania	Hungary	Serbia
Mean	192.47	204.6	193.71	182.61
Var	1399.951	2468.829	1826.708	1598.632
Stdev	37.41592	49.68731	42.74	39.9829
Coefficient of variation	19.44%	24.29%	22.06%	21.90%

Source: Authors calculation based on FAOSTAT data

Correlation of wheat prices is very high confirming that common CEE wheat derivative market may provide excellent opportunity for application of the hedging strategies for all stakeholders in the region. As in the corn case, this correlation is expected due to high volume of trade in the region and common exports ports at the Black Sea.

**Table 4. Corn price correlation matrix - Bulgaria, Romania, Hungary and Serbia, 2009-2018**

	Bulgaria	Romania	Hungary	Serbia
Bulgaria	1			
Romania	0.90599	1		
Hungary	0.95836	0.944699	1	
Serbia	0.961093	0.972549	0.985241	1

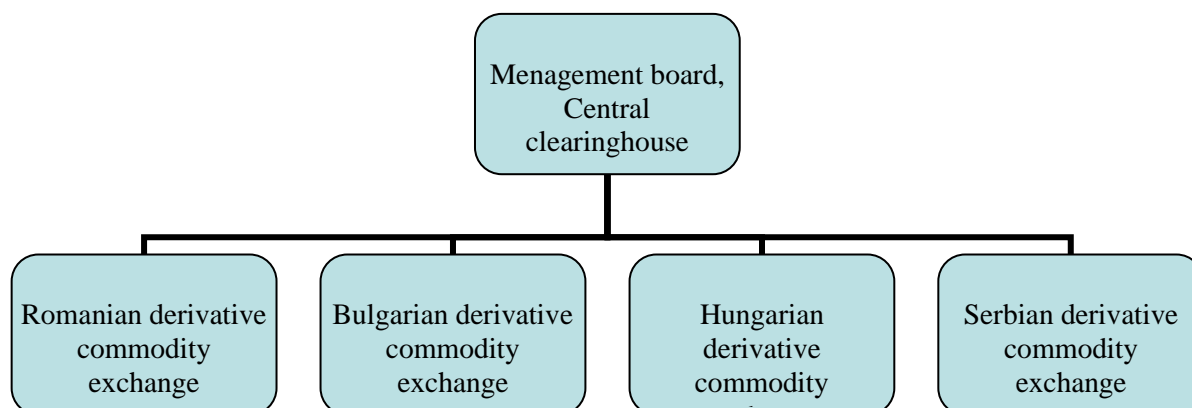
Source: Authors calculation based on FAOSTAT data

The analyses are showing high production level and great need for the grain futures market in CEE. Port of delivery should be Constanta port in Romania as the significant quantity of grain are contracted for delivery at this port.

Most important issue in function of joint commodity exchange is clearing function. The recent EU regulation is providing possibility for clearinghouse established in one EU member state to operate in whole EU. Most suitable solution would be to have one clearinghouse for all exchanges.

At the Scheme 1. is presented organisational model for joint soft commodity derivative exchange.

**Scheme 1. Organization of the CEE Regional derivative soft commodity exchange**



Source: Authors

## Conclusions

Volume of wheat and corn production in CEE is high with constant increase. According to the production volume it can be concluded that CEE has sufficient quantity of grain for establishment of derivative commodity market.

Second important precondition for development of sustainable commodity derivative market with high trading volume is existence of grain price volatility, which is confirmed in conducted analyses.

Third, there is very high correlation between the corn and wheat prices within the countries included in the survey. High price correlation is one of the milestones for joint derivative commodity exchange leading to low basis risk in the implemented hedging strategies.

Despite to evident need and potential for establishment of commodity derivative exchange for grain delivery at the Black Sea ports, all so far efforts from individual CEE countries to establish derivative commodity exchange failed. The reason is in insufficient trade volume. All derivative exchanges (financial and commodity) are requiring high volume of trade.

Initiative and motive for this survey was in the possibility to increase derivative exchange trading volume through establishment of joint CEE regional commodity derivative exchange with one clearinghouse operating on all markets.

In favour of joint regional ECC goes new a single common EU regulation, which significantly facilitates the establishment of a regional market for EU member states by providing on provision for operation of the clearinghouses.

It can be concluded that join Regional CEE soft derivative exchange will have all preconditions for sustainable and efficient operations, providing the agricultural sector stakeholders with important price risk management instruments.

## BIBLIOGRAPHY

1. Belozertsov, A. et al. (2011): *Commodity exchange in Europe and Central Asia a means of management of price risk*, working paper, No. 5, FAO/World Bank, Rome.
2. Dodd-Frank Wall Street Reform and Consumer Protection Act (Pub. L. 111-203, H.R. 4173).
3. Edoardo Grossule (2019): 'Regulatory Strategies towards the Commodity Market Financialization Risk: Position Limits' Regime, Transparency and Enforcement Tools', (2019), 30, *European Business Law Review*, Issue 2, pp. 319-333, available at: <https://kluwerlawonline.com/JournalArticle/European+Business+Law+Review/30.2/EULR2019015>
4. European Market Infrastructure Regulation (EMIR), Regulation (EU) No 648/2012
5. FAOSTAT database, available at: <http://www.fao.org/faostat/en/#data/PP>
6. Heigermoser, M., L.Götz and T. J. Jaghdani. (2019): "Driving Black Sea Grain Prices: Evidence on CBoT Futures and Exchange Rates" Proceedings of the NCCC-134 Conference on Applied Commodity Price Analysis, Forecasting, and Market Risk Management. Minneapolis, MN. Available at: <http://www.farmlandoc.illinois.edu/nccc134>.
7. International Swaps and Derivative association, available at: <https://www.isda.org/>
8. Karali, B., Irwin, S.H. and Isengildina-Massa, O. (2020), Supply Fundamentals and Grain Futures Price Movements. *Amer. J. Agr. Econ.*, 102: 548-568. doi:10.1002/ajae.12012;
9. Kovačević Vlado (2013): Introduction of the grain futures market in the Black Sea region, *Ekonomika poljoprivrede*, vol. 60, no. 4, pp. 695-712, ISSN 0352-3462
10. Kovačević Vlado, Boris Kuzman, Jelena Damjanović (2017): Possibilities for Joint Commodity Futures Market in Eastern Europe, *The Petroleum-Gas University of Ploiesti Bulletin*, Vol.VI(LXIX) No. 4/2017, p. 37-41, Ploiesti Romania, available at: [http://upg-bulletin-se.ro/old\\_site/archive/2017-4/4.Kovacevic\\_Kuzman\\_Damnjanovic.pdf](http://upg-bulletin-se.ro/old_site/archive/2017-4/4.Kovacevic_Kuzman_Damnjanovic.pdf)
11. Kovačević Vlado, Janković Irena, Zakić Vladimir (2018): Značaj i perspektive razvoja kliringa u Srbiji, *Anali Ekonomskog fakulteta u Subotici*, Vol. 54, No 40/2018, str. 121-133. UDC 658:631(497.113) 502.131.1(497.113) doi:10.5937/AnEkSub1840121K, available at: <http://scindeks.ceon.rs/article.aspx?query=ISSID%26and%2614230&page=8&sort=8&stype=0&backurl=%2fissue.aspx%3fissue%3d14230>;
12. Kovačević, V. (2014): Development of commodity exchanges in the function of the management of business risk of agricultural enterprises in Serbia, Doctoral thesis Faculty of Agriculture – Belgrade;
13. MFIR Regulation (EU) No 600/2014;
14. MIFID II Directive (Directive 2014/65/EU);
15. Zakić, V., Kovačević, V. (2012): Importance of commodity derivatives for Serbian agricultural enterprises risk management, Proceedings, Međunarodni naučni skup - Održiva poljoprivreda i ruralni razvoj u funkciji ostvarivanja strateških ciljeva Republike Srbije u okviru dunavskog regiona - očuvanje ruralnih vrednosti, IEP, Belgrade, pp. 907-924;